

IMPROVING CHRONIC PAIN PATIENT PROFILING: AN ACCEPTANCE-BASED
APPROACH USING AN ONLINE SAMPLE

by

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Improving Chronic Pain Patient Profiling: An Acceptance-Based Approach Using an Online Sample

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ABSTRACT

Over 116 million Americans experience chronic pain (CP) incurring an annual cost of \$635 billion in healthcare and lost work. Acceptance-based therapies have gained increasing recognition for improving functional outcomes. In our online CP patient support group sample, we predicted 1) CP patients would cluster into low, medium and high groups of CP Acceptance and 2) self-reported scores of Positive Affect (PA), Negative Affect (NA) and Perceived Disability (PD) would differ overall by cluster, with the most positive outcomes found in the high cluster and the least found in the low. The total sample ($N = 300$; Mean age = 44.7 years, $SD = 11.2$) was primarily female (85.6%), Caucasian (82%), married/partnered (53.1%), and well educated ($M = 14.8$ years, $SD = 2.4$). Years with chronic pain was 14.4 ($SD = 11.6$) and average pain intensity was 7.4/10. Participants completed demographic, medical history, the Chronic Pain Acceptance Questionnaire (CPAQ), Positive and Negative Affect Scales (PANAS), and the Pain Disability Index (PDI). A k-means cluster analysis was conducted using Activity Engagement (AE) and Pain Willingness (PW) totals from the Chronic Pain Acceptance Questionnaire (CPAQ). As predicted, cluster analysis with a maximum of 10 iterations specified three clusters: Low AE/Low PW (Low-Low; $n = 81$); High AE/High PW (High-High; $n = 50$); and Medium AE/Medium PW (Med-Med; $n = 71$). A MANCOVA was then conducted to examine differences in PA, NA and PD within each cluster group, covarying for age, number of surgeries, years of education, and current pain level.

Significant MANCOVA results were obtained according to Wilks' λ , (.55), $F(6, 266) = 15.39$, $p < .01$. Follow-up ANCOVAs revealed mean differences in the predicted directions: the High-High group showed the most PA ($M = 32.03$ ($SD = 6.49$)); and the least NA ($M = 17.57$ ($SD = 5.81$)) and PD ($M = 32.28$ ($SD = 15.64$)). Conversely, the Low-Low group displayed the least PA ($M = 20.28$ ($SD = 7.86$)); and the most NA ($M = 28.05$ ($SD = 9.33$)) and PD ($M = 49.57$ ($SD = 9.46$)). Findings support utility of online tailored interventions targeting CP Acceptance subgroups to improve functional status.

The form and content of this abstract are approved. I recommend its publication.

Approved: Abbie O. Beacham, Ph.D.

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CHAPTER I

INTRODUCTION

Chronic pain (CP) is a debilitating and prevalent health concern that is a tremendous financial and emotional burden for over 116 million Americans and their families (Institute of Medicine of the American Academies, 2011). CP is defined by three months or more of “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (International Association for the Study of Pain, 2011). Disability compensation, healthcare costs and lost work productivity are significant problems in CP populations.

The prevalence of CP in most industrialized countries is 10–13% of the population (Croft, 1993; Harstall & Ospina, 2003; Wolfe, 1995). The expense of CP to the consumer and healthcare system is considerable with an approximate cost of \$635 billion in litigation, compensation, healthcare, and lost productivity (IOM, 2011). Loss of daily activity and work productivity due to pain are significant: a 2001 study indicated that 13% of nearly 30,000 randomly sampled working Americans missed productive work time due to pain conditions in a proscribed two-week period (Stewart, Ricci, Chee, Morganstein, & Lipton, 2003).

The dynamics among the initial cause of pain, the onset of CP, and resulting functional disability are complex. Malingering and workers compensation studies specific to chronic pain have shown mixed results; however, Waddell et al. (1993) suggest that fear avoidance of work tasks and activities that may cause pain are more predictive of disability and work loss than physiological factors. In general, evidence suggests that chronic pain patients receiving disability compensation have higher levels

of pain and depression, and exhibit decreased productivity and poorer prognosis overall (Gatchel & Gardea, 1999).

Currently, comprehensive pain programs have not proven to be cost-effective or therapeutically effective (Gatchel & Okifuji, 2006). New CP treatments are needed to foster more positive medical and functional outcomes and lower cost burden on both patients and consumers.

CHAPTER II

REVIEW OF THE LITERATURE

Medical Manifestations and Functional Disability in Chronic Pain

It was once believed that the cause and experience of pain were almost exclusively based in physiology. However, empirical findings have now shifted this thinking in the field to expand this etiology to a combination of physiological, psychological, social, cultural and behavioral factors (Turk & Okifuji, 2002). The experience and report of pain is a subjective and private one comprised of one's perception of not only the pain severity, but also the perception of his/her suffering related to the pain (Gatchel, 2004). Higher pain ratings and perceptions of suffering have been found to impact medical and functional outcomes in numerous studies (Arnstein, Caudill, Mandle, Norris, & Beasley, 1999; Stroud, Thorn, Jensen, & Boothby, 2000; Turner, Holtzman, & Mancl, 2007; Turner, Jensen, & Romano, 2000).

Cross-sectional studies suggest that pain ratings and perceptions of suffering also impact perceived disability, or one's perception of his or her ability to perform tasks, in those with either acute or chronic pain (Feuerstein & Theborge, 1991; Koho, Aho, Watson, & Hurri, 2001; Roth & Geisser, 2002; Swinkels-Meewisse, Roelofs, Oostendorp, Verbeek, & Vlaeyen, 2006; Turner, Jensen, & Romano, 2000). Across multiple studies, pain intensity ratings are found to correlate significantly with Perceived Disability, but not objectively-rated disability (Alschuler, Theisen-Goodvich, Haig, & Geisser, 2008; Geisser, Haig, & Theisen, 2000; Millard, Wells, & Theborge, 1991). Cross-sectional studies examining the effects of pain-related beliefs on Perceived Disability suggest that fear of pain is a stronger predictor of higher Perceived Disability rather than actual

functional ability (Crombez, Vlaeyen, Heuts, & Lysens, 1999; Waddell, Newton, Henderson, Somerville, & Main, 1993). More recently, studies suggest that fear avoidance, lower self-efficacy and depression significantly contribute to both higher perceived and actual disability (Alschuler et al., 2008; Denison, Asenlof, & Lindberg, 2004; Geisser et al., 2000; Geisser, Robinson, Miller, and Bade, 2003). These studies suggest that Perceived Disability is a significant factor in one's personal expression of pain, regardless of the primary cause or nociceptive origin, duration, and severity of pain.

Demographic Factors Prevalent in Chronic Pain

A review of 15 prevalence studies of non-malignant (non-cancer) pain suggests that female gender, lower socioeconomic status (SES) and middle age were more common in both primary care and in the general population (Verhaak, Kerssens, Dekker, Sorbi, & Bensing, 1998). Peak prevalence was found to range between ages 45 and 65 and CP prevalence increasingly rose by age. In a 2000 epidemiological study of over 17,000 surveyed, CP patients were more often women (20% vs. 17.1% in men), older (55 to 69 years of age), and of lower SES and education level as well (Blyth et al., 2000).

Large epidemiological studies suggest the most common pain regions within CP populations include osteoarthritis/arthritis, rheumatoid arthritis, back pain, headache, limb pain, and gastrointestinal pain (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Elliott, Smith, Penny, Smith, & Chambers, 1999; Ohayon & Schatzberg, 2003). Pain intensity ratings in the general population generally fall above 5 on a 10-point Likert scale (10 = worst pain) and the most frequently reported pain durations include: two to five years (22%); five to 10 years (20%); and 20 years or more (21%) (Breivik et al., 2006).

Psychological Manifestations of Chronic Pain

The influence of social, psychological and behavioral factors which exacerbate or minimize one's pain experience, has received considerable attention in the literature. Turk and Nash (1996) report that pain is rated more strongly when people are feeling depressed and hopeless. Other findings indicate that depression is 3 to 4 times more prevalent in lower back pain patients than in the general population (Sullivan, Reesor, Mikail, & Fisher, 1992). Several other studies have suggested that those with chronic lower back pain have higher rates of depression and diagnosed personality disorders and are more likely to abuse drugs and alcohol in comparison to those with acute pain (Brewer & Karoly, 1992; Kinney, Gatchel, Polatin, Fogarty, & Mayer, 1993; Sullivan, et al., 1992).

Positive and negative affectivity and pain. Both positive and negative affect have also been examined and are found to alternately improve and exacerbate CP symptoms (Affleck, Tennen, Urrow, & Higgins, 1992; Litt, Shaffer, & Napolitano, 2004; Smith & Zautra, 2002; Zautra, Smith, Affleck & Tennen, 2001). Watson and colleagues' Positive and Negative Affect Scales (PANAS) (1988) have been utilized to measure positive and negative affect in many studies, including those examining chronic pain. Watson et al.'s underlying theory suggests that positive and negative affect are orthogonal, and are measured as such: both affect types lie on two different spectra, varying from high to low levels on each scale (Watson, Clark & Tellegen, 1988). Negative affect (NA) includes "a variety of aversive mood states including anger, contempt, disgust, guilt, fear, and nervousness" whereas positive affect (PA) has been defined as "the extent to which a person feels enthusiastic, active and alert" (Watson,

Clark & Tellegen, 1988 p. 1063.) High PA as characterized by “high energy, full concentration, and pleasurable engagement” and low PA is defined as “sadness and lethargy” (Watson, Clark & Tellegen, 1988, p. 1063). Several correlational studies suggest that both high NA and low PA are found to best characterize depressive symptomatology, as they correlate significantly with Beck Depression Inventory self-ratings (Jolly, Dyck, Kramer, & Wherry, 1994; Watson, Clark & Carey, 1988; Watson, Clark & Tellegen, 1988). Although the PANAS is not employed as a diagnostic measure, those who score both high on the NA scale and low on the PA scale are likely to exhibit symptoms of, if not diagnoses of depression.

Few studies exist examining affective symptomatology and CP; however, several studies suggest higher ratings of NA are found in CP samples and that both NA and PA significantly contribute to pain levels and mood in those with CP. Specifically, current findings suggest that PA may significantly dampen the effect of NA and lower pain intensity ratings, as these results were consistently found over a several week to six-month time span (Strand et al., 2006; Litt, Shafer and Napolitano, 2004; Zautra et al., 2005).

High NA appears to be a significant mood indicator among those with CP. Smith and Zautra (2002) compared personality factors, disease activity and NA among those with osteoarthritis and rheumatoid arthritis ($n = 175$) and normal healthy controls ($n = 80$) over a 12-week period. Findings suggest the arthritis groups had significantly higher NA compared to healthy controls. High NA in both disease groups was correlated with higher interpersonal stress, interpersonal sensitivity, and measured neuroticism using the NEO-Personality Inventory (Costa & McCrae, 1992). Furthermore, those with higher

neuroticism and interpersonal stress in the arthritis groups showed significant increases in self-reported disease activity, as indicated by higher pain levels, joint tenderness, overall arthritis symptoms, and activity limitations (Smith & Zautra, 2002).

Zautra et al.'s 2005 study highlights the effects of PA and NA on stress and pain over a 10-12 week period in 124 women with osteoarthritis or fibromyalgia. Weekly measures included: the PANAS, an average level of pain self-report, a questionnaire rating perceived interpersonal stress across multiple domains, and an eight-item neuroticism measure derived from the Big Five Inventory (John, Donahue, & Kentle, 1991). The Big Five Inventory is a 44-item questionnaire, similar to Costa and McCrae's (1992) 240-item NEO Personality Inventory, Revised (NEO-PI-R), such that both measure personality traits among five categories: extroverted, agreeable, conscientious, emotionally stable, and openness to new experiences (Gosling, Rentfrow, & Swann, 2003). As hypothesized, multilevel modeling results revealed that higher levels of weekly stress and pain were associated with weekly increases in NA. Weekly increases in NA also correlated with higher levels of pain in future weeks. Interestingly, weekly PA was associated with decreased NA, stress and pain, and increased PA appeared to contribute to significantly lower pain over subsequent weeks. One limitation of this study is that participants were only asked to retrospectively recall their average pain level over the past week: currently experienced NA or PA could significantly bias this rating. Regardless, results highlight the complex dynamics among PA, NA, stress and pain levels in CP patients.

Litt, Shafer and Napolitano (2004) examined momentary PA, NA, pain levels, and coping styles and their results give further credence to Zautra et al.'s (2005) findings.

Multiple daily self-ratings were taken over a six-month period, thus improving the internal validity of Zautra et al.'s design. Participants ($N = 30$) with temporomandibular dysfunction pain (TMD) were asked to give ratings on a hand-held computer four to seven times per day for six months. Multiple measures assessed PA and NA (i.e. mood states such as depressive and anxious mood), self-efficacy, pain ratings, physical and emotional sensitivity, and appraisal and coping styles. High NA (particularly anger, anxiety, boredom and sadness) was found to be the most significant predictor of higher current and subsequent pain levels, followed by depressive mood. Conversely, coping self-efficacy and PA (happy and peppy) were correlated with lower momentary pain ratings. Similar to Zautra et al.'s 2005 findings, Litt et al.'s results indicate that current high NA correlated with higher pain ratings at the very next time point and current high PA was related to lower pain at the next time point. From these two studies, it appears that higher PA leads to current and subsequent lower pain ratings.

Findings from Strand et al.'s 2006 study further suggest these relationships exist in CP patients and imply that PA directly moderates the effect of NA on pain. Strand and colleagues replicated Zautra et al.'s 2005 study design and included a sample of 43 rheumatoid arthritis patients living in Norway. Results again suggest higher NA correlated with more weekly pain and stress, but not PA; and those with higher NA experienced higher interpersonal stress and depression, but not PA. Also, those with higher levels of depression had significantly higher NA. When participants experienced increased pain, NA was more prevalent; however, weekly PA moderated the effect of NA on pain. Authors also compared weekly versus overall PA and found that weekly or

“state” levels only significantly contributed whereas “trait” PA, or overall PA, did not (Strand et al., 2006).

High NA and low PA are also found to be correlated with increased functional disability in those with rheumatoid arthritis (Zautra et al., 1995). In this study examining three independent samples ($n = 179$; 177 and 134), participants with more functional disability had both higher NA and conversely, lower PA. Confirmatory factor and mediation analyses revealed the same significant relationships among the three groups: coping mediates the relationship between affect (both negative and positive) and disease (pain and activity limitation). Most notably, findings indicated that those with higher PA used more adaptive and less maladaptive coping (catastrophizing), while those with more NA used more maladaptive coping and had more pain and activity limitations. Furthermore, high NA again correlated with higher pain levels, as well as more maladaptive coping styles (Zautra et al., 1995).

Mood disorders, functional disability and pain. Many additional studies also suggest psychological factors contribute to functional disability and may predispose individuals to the laying of the foundation for long-term chronic pain. In a 2001 World Health Organization study of nearly 5,500 CP primary care patients, 555 were found to have a persistent pain disorder and a preexisting depressive and anxiety disorder significantly predicted chronic pain onset (Gureje, Simon, & Von Korff, 2001). Additionally, depression and anxiety contribute to increased functional disability and self-reported higher levels of pain at 6 and 12 months post-injury in those with lower extremity trauma ($N = 601$) (Wegener et al., 2011).

Psychosocial Treatment Approaches

Due to these complex contributing factors, it is the dominant belief that CP is a biopsychosocial condition that responds most favorably to behavioral and multidimensional treatment approaches.

Operant model of pain. Fordyce's Operant Model of Pain was a prevailing theory of chronic pain maintenance in the 1970's, following Melzack and Wall's 1965 Gate Control Theory (Melzack & Wall, 1965). This behavioral approach involves the concept of pain behaviors or "things that people say or do when they are suffering or in pain, such as avoiding activities or exercise for fear of reinjury" (Gatchel, Peng, Peters, Fuchs, & Turk, 2007, p. 582). Turk and Rudy (1986) explain that Fordyce's model is primarily based on these pain behaviors or "behavioral manifestations" (p. 761). These are communications from CP patients to providers, family members and others, which are influenced by consequences, and are therefore "subject to reinforcement" in this model (Turk & Rudy, 1986, p. 761). Behavioral treatment, therefore, specifically targets pain *behaviors* and works to change the antecedents and the consequences to the behavior to modify or shape these behaviors.

Fordyce asserts there are three components necessary to change behavior through operant conditioning: 1) identify the behavior to be changed; 2) decide on which types of reinforcers would be most effective; and 3) establish enough control over one's environment in order to influence behavior via consequences and schedules of reinforcement (Fordyce, 1968, p. 181). Although there have been many treatment advances in CP since this time, these operant conditioning principles continue to be regarded as effective in the treatment of CP.

Cognitive and cognitive-behavioral therapy. Cognitive and cognitive-behavioral

therapy (CBT) approaches to CP management began to gain considerable attention in the 1990's and have become the primary non-medical intervention for CP. Negative cognitions specific to pain are correlated with higher pain, disability and general distress and increased healthcare and pain medication use: therefore, they are considered key intervention targets (Gil, Abrams, Phillips, & Keefe, 1989; Jensen, Turner, Romano, & Karoly, 1991; Stroud, Thorn, Jensen, & Boothby, 2000). The largest area in cognitive-based approaches focuses primarily on changing maladaptive pain beliefs or negative cognitions by using either cognitive restructuring, active or problem-solving coping, or emotion-focused coping strategies (Geisser, Robinson, Riley, 1999; Thorn, Cross & Walker, 2007). Problem-solving coping is defined as changing one's physical environment to remove or alter the adverse effects of the stressor whereas emotion-focused coping is characterized by changing the way one "attends to or interpret[s]" the stressor (Lazarus, 1993, p. 8). Cross-sectional CP studies suggest active or problem-solving coping is more effective than emotion-focused coping strategies in maintaining positive mood, activity level and generally positive pain adjustment (Geisser, Robinson, & Riley, 1999; Snow-Turek, Norris, & Tan, 1996).

CP researchers have focused specifically on catastrophizing, and those who "expect the worst from their pain problem, ruminate about pain sensations, and feel helpless about controlling their pain" are said to catastrophize as a result of their pain experience (Thorn, Boothby, & Sullivan, 2002, p. 128). Catastrophizing has also been correlated with increased disability, pain intensity, and depression in those with CP (Sullivan et al., 2001). Multiple intervention studies that focus on decreasing catastrophizing and negative cognitions utilize both cognitive restructuring and

behavioral techniques. Multiple cognitive behavioral intervention studies that target catastrophizing and negative cognitions suggest improvements in these areas as well as decreases in pain intensity, psychosocial symptoms, and physical disability (Jensen, Turner, & Romano, 1994; Keefe, et al., 1991; Parker et al., 1989; Sullivan et al., 2001; Thorn, Boothby, & Sullivan, 2002; Turner & Clancy, 1986). More recently, researchers suggest that catastrophizing is really a more complex combination of emotion and cognitive appraisal than once thought and although this remains an important treatment target, this concept requires further investigation (Jones, Rollman, White, Hill, & Brooke, 2003).

The efficacy of cognitive behavioral therapy is undisputed for many psychological disorders and there have been over 325 intervention studies published on CBT since 2006. CBT for chronic pain is based on Melzack and Wall's Gate Control Theory and on the belief that behavioral improvements can be made by modifying dysfunctional thinking and beliefs (Dozois & Dobson, 2001; Melzack & Wall, 1965). Although the exact mechanisms of CBT are unknown, the structure of CBT interventions for chronic pain is designed to educate and train patients to identify and reconceptualize both maladaptive cognitions and behaviors that serve to maintain their pain experience. Teaching the patient how to conceptualize both his or her pain and their situation in addition to educating them how to more effectively manage their problems helps to improve their perception and provides hope. Encouraging the patient to take an active role in their pain management; teaching them how to self-monitor thoughts, feelings, and behaviors; and providing training on how to give self-praise for achievements boosts self-confidence and fosters a sense of control over the pain experience. Lastly, creative

problem-solving strategies are introduced to anticipate obstacles and to maintain treatment gains (Turk & Melzack, 2001).

Meta-analyses of CBT for chronic pain demonstrate its efficacy to reduce distress and pain experience in general; increase positive/active coping; and improve daily functioning and overall quality of life (Morley, et al., 1999; Hoffman et al., 2007). Hoffman et al.'s 2007 review of psychological interventions for chronic low back pain found consistent significant support for CBT for chronic pain among 22 research studies. Again, randomized controlled trials of CBT and other interventions were found to show significant improvements over attention-control and wait-list groups, with CBT touted as the most effective. Significant and moderate to large effects were found on pain intensity, health-related quality of life, and depression for CBT. In addition, multidisciplinary programs, including those with CBT, were suggested to be superior to other active treatments in producing improved work-related outcomes at both short and long-term follow-up (Hoffman et al., 2007).

Although empirical evidence is robust for CBT for CP, systemic weaknesses in research design and generalizability to all CP patients question the true efficacy of these treatments for all individuals. More importantly, the exact mechanism of CBT for CP is still unknown and the majority of effect sizes are moderate, thus suggesting that more research is needed to further sift out the 'core ingredients' mediating and sustaining the more positive outcomes.

As mentioned previously, the empirical efficacy of CBT is undisputed for many psychological disorders. Meta-analyses conducted for a range of conditions demonstrate that the largest mean effect sizes are found for unipolar depression, generalized anxiety

disorder, panic disorder with or without agoraphobia, social phobia, posttraumatic stress disorder, and childhood depressive and anxiety disorders (comparison-weighted grand mean effect size = .95, ($SD = .08$)) (Butler, Chapman, Forman, & Beck, 2006). Chronic pain, as well as marital distress, anger, and childhood somatic disorders, were found to have only moderate effect sizes ($ES = .62$ ($SD = .11$)), with CP outcomes showing a range of modest effect sizes of $-.14$ to $.40$ when compared to active treatment controls (Butler et al., 2006; Morley et al., 1999). Additionally, evidence of long-term effects is limited for CBT for CP, thus suggesting that more research is needed (Morley et al., 1999).

Morley et al.'s 1999 review similarly notes weaknesses in the current research, drawing attention to the underpowered analyses and a wide range in the quality of treatment and attention-control group protocols across these 25 randomized controlled studies (RCT's). The majority of these RCT's depend primarily on self-report questionnaires and lack multimethod assessment approaches (Morley et al., 1999). These studies also omit intervention provider training details and competency measures: in those that did discuss trainer competency, only 60% were found to be qualified, and treatment fidelity was not accounted for or discussed (Morley et al., 1999). Internal validity is also questioned due to lack of consideration of patient expectations of the treatment (Morley et al., 1999). The variable of patient expectation has been found to be a significant predictor of improved outcomes for several CBT for CP interventions and is generally not accounted for in most of these studies: for example, study participants who believed their treatment to be effective were five times more likely to improve regardless of which treatment arm they were assigned (Kole-Snijders, Vlaeyen, Goossens,

Rutten-van Mölken, Heuts, van Breukelen, & von Eek, 1999; Kalauokalani, Cherkin, Sherman, Koepsell, & Deyo, 2001).

CBT for CP studies additionally demonstrate that a large proportion of individuals suffering from CP do not benefit from this treatment, nor any other therapies irrespective of modality type. Attrition rates average five to 26% for these CBT intervention studies, with higher dropouts in depressed individuals, a common comorbidity in CP samples. An additional confounding factor is comparison across studies with samples that differ in pain location (e.g. lower back vs. temporomandibular pain) and etiology (Turk & Rudy, 1990). It has been suggested that better categorization of participants by pain location may improve definitive findings respective to pain type and location, thus improving treatment efficacy (Turk, 2005). Continued efforts to improve CP outcomes are focused primarily in varying CBT protocols; however, leaders in this field suspect that there is “ample room for improvement in the efficacy of CBT in CP” (Vlaeyen & Morley, 2005, p. 4).

Third wave behavioral treatment approaches: Acceptance and Commitment Therapy. A recent perspective in behaviorally-based interventions has received increasing attention in the literature since 1994 (Hayes, 1994): Acceptance and Commitment Therapy (ACT). This “third wave” behavioral therapy stems from Relational Frame Theory (RFT) (Hayes, Barnes-Holmes, & Roche, 2001). RFT is an extension of behavioral theory involving both language and cognition. This theory essentially states that individuals develop operantly conditioned responses to stimuli that are not directly conditioned to those responses, but are somehow similar and are therefore generalized. This process, in behavioral learning theory has been described as

“abstraction”; however, Hayes et al. expand on this theory by stating that this process may be “arbitrarily appli[ed]” based on the individual and “contextually dependent” in which they are exposed to the stimulus (McIlvane, 2003, p. 29-30).

For example, those with CP may develop generalized conditioned responses to particular stimuli, thus altering their behavior, limiting their experiences, and invariably, leading to lower levels of function. A common cycle found in CP is avoiding tasks that may invoke more pain; however, as the negative experience of pain continues, the range of activity becomes more and more limited for fear of exacerbating their pain condition. To illustrate, a person may avoid lifting heavy books after re-injuring their back at the library but he or she may also avoid lifting any books or even more simply, avoid the library, due to the similarities to the conditioned stimuli. Additionally, social factors such as enabling or alternately, criticizing behaviors from family or friends further shapes behavior such that one’s world becomes more and more restricted. Negative interpretation of the pain experience and themselves often leads to justification for disengaging from adaptive and daily life activity in an effort to “control or avoid painful experiences” and thus “mov[es] them away from healthy life functioning” (McCracken & Eccleston, 2005, p. 164.)

Acceptance of chronic pain has been defined as “living with pain without reaction, disapproval or attempts to avoid it” (McCracken & Eccleston, 2003, p. 198.) Specifically, CP Acceptance requires a “disengagement from struggling with pain, a realistic approach to pain and pain-related circumstances, and an engagement in positive everyday activities” (McCracken & Eccleston, 2003, p. 198.) This approach differs from more traditional CBT approaches because “there is little emphasis...on changing the *content* of thoughts;

rather, the emphasis is on changing *awareness of* and *relationship to* thoughts” (Segal, 2001).

The definition of Acceptance is two-fold: Pain Willingness and Activity Engagement. The Chronic Pain Acceptance Questionnaire, originally developed by Geiser (1992), has been found to yield this two-factor structure: Pain Willingness (PW) and Activity Engagement (AE). Of the PW items, several include “I would gladly sacrifice important things in my life to control this pain better” and “I need to concentrate on getting rid of my pain” (McCracken, Vowles, & Eccleston, 2004, p. 165). PW has been defined as essentially one’s degree of willingness to experience pain as well as related thoughts and feelings (McCracken & Eccleston, 2005). The AE items include “Despite the pain, I am now sticking to a certain course in my life” and “It’s not necessary for me to control my pain in order to handle my life well” (McCracken, Vowles, & Eccleston, 2004, p. 165). AE is one’s degree of willingness to engage in life’s activities, despite the existence of pain (McCracken, Vowles, & Eccleston, 2004).

Both cross-sectional and prospective studies examining Acceptance and ACT show significant positive chronic pain outcomes. Higher levels of AE and PW in CP samples are associated with significantly lower levels of pain-related anxiety, depression-related interference with functioning, and physical and psychosocial disability. Higher AE and PW were also positively correlated with work status (McCracken & Eccleston, 2003). PW also negatively predicted number of pain medications whereas AE was positively correlated with uptime and work status (McCracken & Eccleston, 2005).

Intervention studies comparing ACT and treatment-as-usual groups with CP outpatients also suggest promising findings, with treatment efficacy sustained over three-

month follow-up. Significant improvements were seen in physical and psychosocial disability outcomes, depression, pain intensity, pain-related anxiety and number of medical visits, school and work absences (McCracken, MacKichan, & Eccleston, 2007; McCracken, et al., 2005; Vowles & McCracken, 2008; Dahl, Wilson, & Nilsson, 2004). Taken together, these findings suggest that Acceptance-based approaches may offer considerable clinical utility in treatment of CP.

Behavioral, cognitive, cognitive behavioral and acceptance-based treatment approaches have contributed substantially to our understanding of the maintenance of CP and provide moderately effective treatment options. However, studies continue to suggest there is heterogeneity within CP samples such that different treatments work more effectively for different individuals (Turk, 2005). Researchers have suggested that patients may find more effective therapeutic responses if treatment is tailored to particular characteristics they may hold (Costa & Pinto-Gouveia, 2010; Vowles, McCracken, McLeod, & Eccleston, 2008). Profiling CP patients by specific characteristics, namely those that are influential in promoting more positive outcomes, may improve the efficacy and effectiveness of behavioral, cognitive, cognitive behavioral and acceptance-based treatment approaches.

Profiling Chronic Pain Patients to Improve Treatment Efficacy

Characterizing CP patients based on single physiological or psychological factors have been the primary means of grouping patients to create more effective CP treatments; however, it may be useful to group patients based on dimensions of patient characteristics (Turk, 2005). Due to the complexity of CP experience and varied treatment response, a more multidimensional approach has been suggested (Dworkin & LeResche, 1992; Turk

& Rudy, 1988). To date, only one grouping method based on cognitive, affective and behavioral variables has been examined. The most widely known application is the West Haven Yale Multidimensional Pain Inventory (MPI; Kerns, Turk, & Rudy, 1985). This measure has known statistical and clinical utility (Hunsley & Mash, 2008). The MPI measures severity and impact of pain on work, social and other life activities in this population across twelve domains of functioning (Wehmer, 1990) and subjective feelings of self-control, problem-solving abilities and patients' perceptions of themselves (Kerns, Turk, & Rudy, 1985). Currently, it is the most commonly used method of profiling chronic pain patients by their varying beliefs and behaviors.

The MPI includes several subscales and cluster analysis further differentiates patients (Turk & Rudy, 1988). Among the multidimensional scales are “1) pain severity and suffering; 2) perceptions of how pain interferes with their lives, including interference with family and marital/couple functioning, work and social and recreational activities; 3) dissatisfaction with present levels of functioning in family relationships, marital/couple relationship, work and social life; 4) appraisals of support received from significant others; 5) perceived life control, incorporating perceived ability to solve problems and feelings of personal mastery and competence; 6) affective distress including depressed mood, irritability, and tension; and 7) activity levels” (Turk & Melzack, 2001).

Cluster analysis produces more concise conceptualizations of patients and groups them into three distinct profiles: “Dysfunctional”, “Adaptive Copers” and “Interpersonally Distressed” (Turk & Rudy, 1988). Patients displaying the profile of the Dysfunctional group are characterized by high pain severity, marked interference with

everyday life due to pain, high affective distress, low perception of life control, and a low activity level. Patients in the Adaptive Coper group report lower pain severity, lower interference, lower levels of affective distress, higher degree of life control and a higher activity level. Patients in the Interpersonally Distressed group display lower reported levels of social support, lower scores on solicitous and distracting responses from significant others, and higher scores on punishing responses (Rudy, Turk, Zaki, & Curtin, 1989).

Empirical support has emerged to suggest that these profiles may predict outcomes for chronic pain patients. Differences between the Dysfunctional and Adaptive Coper groups in particular have been found to show discrepancies in the utilization of pain medication, work status, time spent in bed, and scores indicating pain behaviors such as affective distress and seeking help, with Adaptive Copers using fewer pain medications and negative coping behaviors and demonstrating more active involvement in work and life activities (Turk & Melzack, 2001). Also, some profiles are more likely to benefit from treatment and predict treatment completion (Rudy, Turk, Kubinski, & Zaki, 1995). Following a six week intervention including biofeedback and cognitive behavioral therapy for CP, Dysfunctional groups significantly improved and had larger reductions in pain intensity, perceived interference of pain symptoms in their lives, depression, and negative cognitions in comparison to Adaptive Copers and Interpersonally Distressed Groups at six-month follow-up (Rudy et al., 1995).

Three additional groups of patient “profiles” have been identified; however, research findings suggest that these groups have not been found to be prevalent and in general, have not shown high clinical utility for this population (Ravani, 2005). Despite

the theoretical advantages to grouping CP patients based on psychosocial and behavioral characteristics, the empirical support and clinical application of profiles for use in clinical conceptualization and treatment have been sparse.

However, given the existing positive results and the complexity of CP conditions, finding new ways to characterize patients for purposes of tailoring effective treatment interventions is a worthwhile pursuit. As stated previously, leading researchers in the CP field have suggested that there is “ample room for improvement in the efficacy of CBT in chronic pain”; therefore, opening the door for additional approaches and interventions (Vlaeyen & Morley, 2005, p. 4). New methods of profiling CP patients based on key defining characteristics may inform the development of more specific, effective and tailored interventions for CP.

Profiling Chronic Pain Patients: Acceptance-Based Approaches

Recent studies have examined ways of grouping CP patients using the Acceptance construct and specific clusters and characteristics that differ within samples. Vowles, McCracken, McLeod, & Eccleston’s 2008 study examined cluster analysis results within a sample of CP outpatients seen at a specialty treatment clinic ($N = 641$) and found three distinct clusters: 1) both low AE and PW, 2) both high AE and PW, and 3) high AE and low PW. Subsequent comparisons demonstrated that the high AE and PW group reported significantly lower “pain, depression, pain-related anxiety, physical and psychosocial disability, medical visits, medications, daily rest...and daily activity” than the low AE and PW group (Vowles, McCracken, McLeod, & Eccleston, 2008, p. 288). The third group (high AE and low PW) was reported to significantly differ from both other groups on depression, pain-related anxiety, daily rest, and psychosocial disability. This third

group also differed significantly from either the Low or High group in the five remaining dependent variables: pain, physical disability, medical visits, daily activity, and classes of medicine (Vowles, et al., 2008).

A 2010 study conducted by Costa and Pinto-Gouveia further suggests the validity and reliability of these three clusters. The study findings show that three similar clusters emerged in a mixed CP outpatient primary care and tertiary care sample ($N = 103$): 1) both low AE and PW, 2) both high AE and PW, and a slightly varied third group, 3) medium AE and low PW. The authors labeled this third group “High AE and Low PW”; however, they also state that AE scores fell closer to the mean and therefore “Medium AE” is a more accurate title. Post-hoc analyses demonstrated that among the subgroups, those in the High cluster showed lower levels of anxiety, depression, stress and self-compassion in comparison to the Low Acceptance group. In addition, this medium Acceptance group showed significantly higher levels of depression, stress, self-judgment, and over-identification (versus mindfulness) in comparison to the high Acceptance group. It is interesting to note that this medium group (with relatively similar mean scores on Pain Willingness but scores that are closer to the mean for Activity Engagement when compared to the low AE of the Low Acceptance group) also showed significantly lower levels of depression and stress, in comparison to the low Acceptance group.

Both author groups suggest this medium group displays “good enough” functioning but self-report poorer emotional and social well-being and perhaps have more attachment to finding pain relief (low PW) than the High Acceptance group. Therefore, Costa and Pinto-Gouveia (2010) add that AE may be a “buffer” characteristic that contributes to fewer adverse affects of stress, such as not amplifying negative emotions

and sensations that contribute to depression. Likewise, PW may be an important characteristic to supplement AE such that individuals are not simply ‘grinning and bearing’ pain through increased AE but are truly willing to accept their pain as well (Costa & Pinto-Gouveia, 2010; Vowles et al., 2008). Regardless, future studies would benefit from further investigating this medium group to better understand the associations among AE, PW and important psychosocial characteristics.

Subsequent studies examining 300 study participants in online CP support groups similarly suggest the emergence of these Acceptance groups. One study examining CP Acceptance found similar CP Acceptance subgroups using a different methodology: tertile cutoffs based on levels of CP Acceptance. More specifically, subgroups were formed by creating tertiles of simply high, medium and low scores on both of the CPAQ subscales (AE and PW). The resulting two sets of three subgroups were: High AE, Medium AE, Low AE, High PW, Medium PW, and Low PW. Despite this difference in grouping method from Vowles et al., 2008’s clusters ((1) both low AE and PW, 2) both high AE and PW, and 3) high AE and low PW), results were remarkably similar. Payne-Murphy et al.’s results suggest that both the High AE and PW tertile groups reflected scores that were very similar to that of the MPI “Adaptive Coper” profile. Conversely, both the Low AE and PW tertile groups reflected scores that were very similar to that of the MPI “Dysfunctional” profile (Payne-Murphy, Lillis, Brown, Herbst & Beacham, 2010; Payne-Murphy, Beacham, & Brown, 2011). These results demonstrate a consistent pattern that can be seen in Figures 1 and 2.

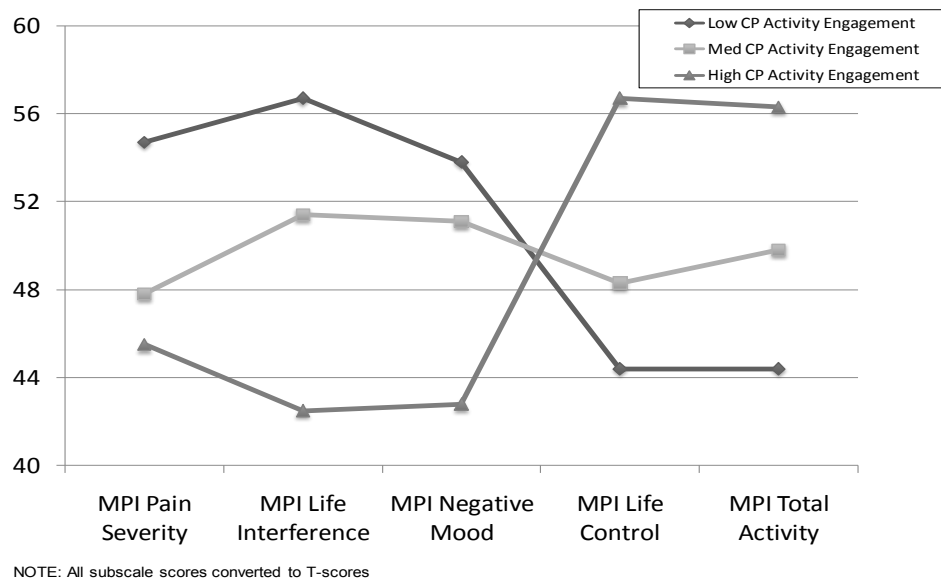


Figure 1. CP Activity Engagement High, Medium and Low score groups and MPI Subscale score plots

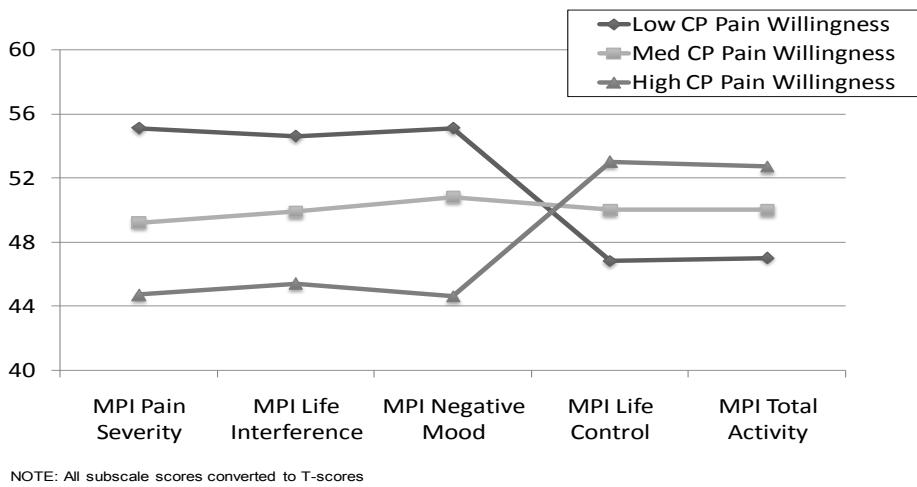


Figure 2. CP Willingness High, Medium and Low score groups and MPI Subscale score plots

Another study conducted with preliminary data analyses in the same online CP sample ($N = 255$), demonstrated that High, Medium and Low Acceptance subgroups differed on ratings of perceived disability of functioning. Both High AE and High PW subgroups scored significantly lower on the following Pain Disability Index (Pollard, 1984) scales in comparison to the Low AE and Low PW subgroups: family/home responsibilities, recreation, social activities, occupation, sexual behavior, self care, and life support (Kinman, Beacham, Payne-Murphy, Lillis, & Brown, 2010). Findings from these studies provide further support for Acceptance as a key factor in CP patients' functional and affective outcomes.

Improving Access to and Dissemination for Chronic Pain Populations: Online Interventions

Healthcare consumers, particularly those with CP and chronic illnesses, are looking to online resources with increasing frequency for social support, psychoeducation, and treatment options. The most recent Harris Poll (2011) found that 74% of American adults, or 173 million people, look to the Internet for health care information; 60% have searched within the past month; and 39% search “often” for this information (Taylor, 2011). The numbers of individuals who have ever searched for health information has risen 47% in the past 13 years and continues to climb (Taylor, 2011). With the popularity of such sites as WebMD (<http://www.webmd.com/>) and the Mayo Clinic website (<http://www.mayoclinic.com/>), more patients are seeking drug interaction, symptom, and diagnoses information, as well as peer support group forums and patient-doctor communication sites and email portals (Nguyen, Carrieri-Kohlman, Rankin, Slaughter, & Stulbarg, 2003). In a study of over 4700 consumers, almost 50% reported that online

health information improved their understanding of their condition and corresponding treatments, and 30% stated this information “improved [their] ability to manage their health care needs without visiting a doctor or healthcare provider” (Baker, Wagner, Singer, & Bundorf, 2003, p. 2404). Some assert that online support groups also have an advantage over in-person resources such that they reach those with restricted mobility, geographic limitations, and/or who desire anonymity (Nguyen et al., 2003).

Due to this increasing popularity and the ease with which researchers can contact online participants, Internet-administered psychosocial interventions for both psychological and health conditions are becoming more common as well. Approximately 10 randomized control trials of Internet self-management interventions for adults (18 years and older) with chronic pain, including headache, have been published since 2000 and one systematic review and meta-analysis. All randomized control studies required participants to login and submit responses at least once weekly via home-based computers. Over half of these studies ($n = 6$) followed CBT-based protocols and almost all studies included some form of relaxation training, stress management, problem solving, and/or psychoeducation on chronic pain and/or exercise with an emphasis on improved pain self-management. The length of intervention for the majority of the studies was six weeks with one to three month follow-up; however, four studies extended follow-up to six or 12 months. Intervention designs and findings from these studies are reviewed below.

Lorig et al.’s group has contributed significantly to this literature with three randomized control studies examining CBT-based Internet interventions for CP and disease. The first, published in 2002, examined a six-week closed medical provider-

moderated email discussion group that included a copy of a CP treatment book and a videotape modeling how to maintain an active life with pain for participants ($n = 202$ vs. $n = 252$ waiting list control) with chronic low back pain. Despite only a mean of eight emails submitted per participant, one-year follow-up findings suggest significant improvements in pain intensity, disability, role functioning, and “health distress” (time spent worrying about one’s health) as measured by the Roland-Morris Scale, Illness Intrusiveness Scale and two other self-developed scales. Significant decreases in physician visits for the treatment group were also reported: 1.5 visits less in the past six months vs. .65 visits for the control group (Lorig, et al., 2002).

Lorig et al. expanded their intervention approach to more comprehensive CBT-based protocols in 2006 and 2008 to examine changes in health behaviors and outcomes in those with rheumatoid arthritis, osteoarthritis, fibromyalgia, type 2 diabetes or heart or lung disease. The authors’ 2006 study examined the effects of a six-week intervention in 457 treatment participants (compared to 501 usual care control patients) with arthritis, type 2 diabetes, or heart or lung disease. Key web-based intervention features included: interactive didactics and psychoeducation on participant-specific chronic diseases, medication and exercises; cognitive symptom management such as negative emotions, self-talk and relaxation; physician-patient communication; healthy eating; action planning; solving problem training; a discussion board; and a hardcopy book similar in content. Moderators led participants ($n = 25$ per group) each day to support utilization and offer encouragement and could be contacted by email for questions. Pertinent findings at one year post-intervention suggest intervention participants logged in an average of 26.5 times over the course of the study and significant changes were found in

1) pain, fatigue, health distress, shortness of breath; 2) stretching and strength exercise; and most notably, 3) self-efficacy (Lorig, Ritter, Laurent, & Plant, 2006).

Similar findings were reported in Lorig, Ritter, Laurent, and Plant's 2008 study investigating a six-week online CBT-based protocol in patients with rheumatoid arthritis, osteoarthritis, and fibromyalgia ($n = 433$ versus $n = 422$ usual care control), thus garnering further support for online CBT interventions for chronic pain. Online intervention features were almost identical to the 2006 study, but 2008 participants received tailored exercise activities based on self-report questionnaire responses. Study findings showed participants averaged higher weekly log-ins (31.6) than 2006 respondents and significant improvements using an intent-to-treat analysis were also found at one year follow-up in 1) self-reported pain, health distress, activity limitation, and global health; and 2) self-efficacy. Notably, no significant changes in healthcare utilization were found and fibromyalgia patients showed fewer improvements over time compared to those with rheumatoid arthritis and osteoarthritis (Lorig, Ritter, Laurent, & Plant, 2008). It is also worthwhile to note significant attrition rates were found in all three of Lorig et al.'s studies: the 2008 study reports a 40% dropout rate (204 out of 855); 22% in the first six months and 7% in the second six months of the 2002 study (159 of 580); and 19% (178 of 958) in the 2006 study (Macea, Gajos, Calil, & Fregni, 2010).

The remaining CBT-based online treatments for CP are similar in design and also report favorable and equivocal findings; however, treatment length and type and duration of research staff interaction varied. Burhman, Falthenhag, Ström, and Andersson (2004) examined the effect of an online six-week CBT therapy in a randomized sample ($n = 22$ treatment; $n = 29$ control) of adults with chronic back pain. Web-based intervention

features mirrored previous studies (applied relaxation, tailored exercise instruction, cognitive reconstruction, problem solving, adaptive coping, daily diary submissions, and psychoeducation on CP and exercise) but followed a CP-specific CBT model published by Vlaeyen and Linton (2000). In addition to email contact by a CBT-trained therapist, participants also received one structured telephone call from their therapist weekly to promote motivation. Telephone contact may have improved attrition rates in comparison to other non-telephone support studies: only five participants (9%) were lost to follow-up. Clinically significant improvements at three month follow-up include: 1) control of pain, ability to decrease pain, catastrophizing, and praying and hoping as self-reported in the Coping Strategies Questionnaire (CSQ); 2) increased life control and a decrease in punishing responses as measured by the MPI; 3) improved beliefs and attitudes towards one's pain and ability to function per the Pain and Impairment Relationship Scale (PAIRS) and 4) fewer depressive symptoms per the Hospital Anxiety and Depression Scale (HADS) (Burhman, Falthenhag, Ström, & Andersson, 2004).

Expanding on Burhman et al.'s design, Guttberg (2006) examined a 20-week web-based CBT-based therapy in which chronic pain and "burnout" (on sick leave for six months or more) participants ($n = 30$ versus $n = 30$ wait list controls) watched 19 videos and read handouts; responded to related questions; and participated in weekly online Socratic discussion moderated by a CBT-trained therapist and a staff member who had a good quality of life despite a fibromyalgia diagnosis. The videos focused on teaching "cognitive self-treatment of chronic pain and burnout" and included such topics as "Down in the Dumps or Depressed," "Obstacles to Change," and "Setting Limits" (p. 222-223). This treatment approach also differed from others of this type such that

participants first met study staff in-person for one-half day prior to intervention-related online exchanges. Follow-up findings at 23 weeks post-baseline showed significant favorable changes in 1) depression as measured by the HADS; 2) vitality, social functioning, role-physical, and bodily pain according to the Medical Outcomes 36-item Short-Form Health Survey (SF-36) (Sullivan et al., 1995); and 3) 13 of 23 participants who were not on disability pensions increased their work capacity. Only the significantly improved work capacity of 12 of 23 non-disability-receiving participants was maintained, however, at one-year follow-up (Guttberg, 2007). Lastly, only 13% ($n = 5$) were lost to attrition over the course of the study (Guttberg, 2007).

Non-CBT web-based randomized control trial interventions for CP have shown promising, yet less conclusive findings. Berman, Iris, Bode, and Drengenberg's 2009 online mind-body intervention compared changes in pain intensity, self-efficacy, depression, anxiety, and responses to pain in treatment ($n = 41$) and control ($n = 37$) participants aged 55 and older with CP. Over a six-week period, participants were required to log in at least once each week to the study site to access 1) the initial module, which educated users on problem-solving around change according to Prochaska, Norcross and DiClemente's Six-Stage Model Program (1994), and 2) six remaining self-care tutorials that could be completed in any order: relaxation, breathing, positive thinking, writing about positive experiences, writing about negative experiences, and creative visual expression. Participants also received additional information on CP and how to communicate with others about pain, and daily email support and encouragement from study staff. Although attrition was lower than other studies described herein (12%), only improvement in participants' awareness of their responses to their pain was found

significant, and pain intensity between login and logoff were notable but non-significant (Berman, Iris, Bode, & Drengenberg, 2009).

Lastly, results from a five-month online pilot intervention examining CP self-management for chronic low back pain ($n = 20$; $n = 15$ control) suggests improved pain intensity and physical activity, and decreased medical visits and opioid use at post-treatment. Participants received access to an online portal containing psychoeducation on chronic low back pain; videos and descriptions of specific exercises; videos and other materials written by health professionals; a forum and chat room; and a “Tell a Story” page in which to discuss personal histories with other patients. The authors state participants also completed the treatment with improved procedural and declarative knowledge of course material. More generally, reported findings lacked significance levels, attrition, pain intensity ratings and other important measures which unfortunately do not lend to the validity and reliability of results (Schulz, Rubinell, & Hartung, 2007).

Web-based treatment approaches differ for headache treatment: a combination of relaxation and autogenic training (“passive concentration of bodily perceptions (e.g., heaviness and warmth of arms...) that are facilitated by self-suggestions”) has shown efficacy in two randomized control trials for adults with headache (Stetter & Kupper, 2002, p. 45). Ström, Pettersson and Andersson’s team (2000) was one of the first groups to conduct a randomized control trial of an Internet-based self-help treatment for a CP condition (headache). Over a six-week period, adult participants (post-treatment $n = 20$) with recurrent non-cluster headaches received an Internet-delivered relaxation program based on Öst’s (1987) applied relaxation and autogenic training (DeGood, 1996). Participants had minimal contact with experimenters; received training weekly; and

submitted weekly self-report measures online regarding problem solving and relaxation training practice. Headache diaries, including pain ratings, were submitted daily. Findings suggest exactly half of those in the treatment group (10 of 20) showed significant improvement over waiting-group controls ($n = 25$) in the areas of headache frequency and pain intensity; however, no differences were found in depression symptoms from pre to post-treatment. Attrition was a significant challenge with 56% leaving the study (Ström, Pettersson, & Andersson, 2000).

Devineni and Blanchard (2005) then streamlined Ström et al.'s design into a four-week online intervention but expanded treatment to include cognitive stress coping therapy for those with tension-type headache ($n = 12$; $n = 20$ symptom-monitoring control), whereas those with migraine and mixed headache ($n = 27$; $n = 35$ symptom-monitoring control) received autogenic training. Both treatment groups also received progressive muscle relaxation training using downloadable audio with guided instruction; practiced a limited biofeedback exercise; completed baseline and two week post-treatment self-report measures; and maintained a daily headache diary for eight weeks. Participants had minimal email contact from study staff. Results were generally positive with 38.5% of the treatment group having a 50% reduction in disability scores due to headache (and without increased medication use); however, 11.6% of this group also experienced worse headache symptoms at post-treatment. Attrition was high as well, with 38.5% lost to follow-up from baseline to post-treatment, a span of eight weeks (Devineni & Blanchard, 2005).

Given these studies' findings, randomized control trials for Internet interventions for chronic pain and chronic disease offer a promising and more cost-effective alternative

to in-person therapies. Significant weaknesses in these studies include high attrition, with an estimated average rate of 26.6%; and exclusion of adults with chronic pain who do not have home-based computers or who cannot afford Internet services (Macea, et al., 2010). Macea et al.'s (2010) meta-analysis and systematic review reports a .285 pooled effect size using nine of the described studies herein and two additional online therapies for adolescents: therefore, these therapies had an approximately small to medium effect (.29) when intervention groups were compared to controls.

More specifically, these therapies improved health outcomes (lower pain intensity) in several studies as well as contributed to significant behavioral changes such as reduced medical utilization and medication use; improved functional outcomes including less work disability, and increased self-efficacy to pursue life activities despite the presence of pain and symptoms, in general. Additionally, only two studies reported approximate intervention cost (\$115 (Lorig, et al., 2002) and \$243 per patient (Lorig, et al., 2008)) but both are less costly than in-person care (Macea, et al., 2010). Despite current weaknesses, the efficacy and effectiveness of these online therapies and the increased frequency of Internet education resources make online health care consumers an important target population for clinical research and, ultimately, behavioral and psychosocial intervention.

Purpose of the Present Study

The purpose of the present study is to replicate Vowles et al.'s (2008) group cluster methodology using an internet-based support group sample of self-identified chronic pain patients. Replicating this methodology in this online sample may further our understanding of the role of Acceptance in those with CP and may provide credence to a

more parsimonious (as compared to MPI profiles) approach of grouping CP patients based on these characteristics. Furthermore, simplified methods may lead to the development of tailored interventions based on these groupings to maximize positive outcomes in chronic pain patients. Findings from this study and subsequent development of tailored approaches to intervention with CP subgroups may likewise inform new modalities of intervention delivery (i.e., electronic, telehealth, internet based).

Study Hypotheses

Hypothesis 1: It is hypothesized that there will be no differences in the cluster groups identified in this online CP support group sample compared to the cluster groups identified in Vowles et al.'s (2008) clinical sample using the same methodology outlined in that study. Specifically, the following group clusters are predicted:

- 1) Low Activity Engagement – Low Pain Willingness
- 2) High Activity Engagement – High Pain Willingness
- 3) High Activity Engagement – Low Pain Willingness

Hypothesis 2: It is hypothesized that, in the online support group sample, self-reported scores of Positive Affect, Negative Affect and Perceived Disability will differ overall by group, when controlling for demographic and pain characteristics as indicated.

Specifically, cluster group 1 will be expected to show lower levels of Negative Affect and Perceived Disability and higher levels of Positive Affect. Conversely, cluster group 3 will be expected to show higher levels of Negative Affect and Perceived Disability and lower levels of Positive Affect. Group 2 will show moderate levels of Positive Affect, Negative Affect and Perceived Disability. Groups will be identified via cluster analysis as described in hypothesis one.

CHAPTER III

METHOD

The proposed study is an analysis of archival data from a previous data collection conducted at Spalding University in Louisville, Kentucky and a subsequent variation of that study conducted at the University of Colorado Denver in Denver, Colorado. The study procedure and data collection was reviewed and approved by the both the Spalding University Research Ethics Boards and University of Colorado Denver Colorado Multiple Institutional Review Board for their respective data collection waves.

Participants

Self-identified chronic pain patients were recruited via online chronic pain support groups. These groups were inclusive of individuals with non-malignant (i.e., not related to cancer) chronic pain (pain lasting ≥ 3 months), were 18 years of age or older, and were able to read English. The following groups were excluded from the studies: a) 12 step; b) biofeedback; c) intervention-based; d) prayer/religious; e) medication focused (e.g., Opioid, Oxy-Contin); f) malignant pain (cancer); and g) litigious groups.

Three waves of data collection were conducted between September and November 2008, from March to July 2009 and from July 2010 to March 2011. Data from two sample groups of participants were collected: targeted adult members that sought support only (versus intervention-seeking) and general public group participants that did not subscribe to group membership. For specific details of collection procedure and wave variations, refer to Materials and Procedure. The total sample ($N = 300$; Mean age = 44.7 years, $SD = 11.2$) was primarily female (85.6%), Caucasian (82%), married/partnered (53.1%), and well educated ($M = 14.8$ years, $SD = 2.4$), with an

average income between \$30k and \$40k. Most common pain locations were lower limbs and back ($n = 132$ and 134 , respectively). Mean years with chronic pain was 14.4 ($SD = 11.6$) and average pain intensity was $7.4/10$.

Materials and Procedure

Chronic pain group selection for the first two initial data waves was derived from the “Yahoo! Groups” search engine by searching under “chronic pain support group.” Due to the identical procedure and materials followed in these first two data waves that were completed by the same research group, these two waves are henceforth referred to as “Wave 1” in this document. Appropriate group facilitators/moderators were then contacted individually to propose research involvement. Following approval from group moderators to approach members, an announcement was posted to invite participation in a brief online study on the group website (Appendix A). Responding members were then directed to a link that produced instructions for survey completion, informed consent, a page requesting demographic information to become eligible for the gift card incentive, and the multi-page survey (Appendix C). Moderators were then contacted two weeks and one month following to repost the study recruitment announcement.

The second data collection wave was recruited via Facebook, a popular social networking site, on chronic pain-related group web pages and included posting invitations to participate in an online research survey. Searches for “chronic pain” produced 147 groups, of which several closed groups required permission from study staff to post study survey invitations. Once permission from these groups was granted, three waves of posting to both open and closed groups began over the course of five weeks (Appendix B). Responding group members were directed to the Survey Monkey

survey site, which was nearly identical in structure and material in both the new wave one and wave two of data collection. This entailed an introductory page, informed consent, demographic-related questions, the multi-page self-report questionnaires, a page seeking demographic information to enroll them in the gift card incentive lottery, and a concluding page. For both waves of data collection, participants were encouraged to contact study staff by electronic mail if they had any questions or concerns.

There was only one difference between the two collection waves that is pertinent to the present study: Wave 1 was given the option to select “pain location: other” for the question, “Please indicate the location of your pain: (Check all that apply),” whereas wave 2 was not. Other changes made from wave 1 to wave 2 that do not apply to the present study include the following. Wave 1 participants completed the Mindfulness Attention Awareness Scale (MAAS) (Brown & Ryan, 2003), whereas wave 2 received the Cognitive and Affective Mindfulness Scale- Revised (CAMS-R) (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Wave 1 was also given the Short Health Anxiety Inventory (S-HAI; Salkovskis, Rimes, Warwick, & Clark, 2002), a measure of hypochondriasis and health anxiety, whereas wave 2 was not. Wave 2 received the McGill Pain Questionnaire (MPQ; Melzack, 1975); the Godin Leisure-Time Exercise Questionnaire (Godin & Shepard, 1985); and was asked to specify the types of medications taken for pain symptoms: all of these items were not present in wave 1 data collection.

Measures

See Appendix C through F to view the following measures.

Demographics and Medical History. Participants responded to questions regarding demographics and history of chronic pain such as the initial causes of pain, location of pain, medication use, numbers of surgeries, and all types of treatments utilized. Other health and lifestyle-related questions included substance use and pain-related legal involvement. See Appendix C.

Chronic Pain Acceptance. The Chronic Pain Acceptance Questionnaire (CPAQ) is a brief, self-report measure of acceptance of chronic pain that was originally derived from the Acceptance and Action Scale (AAQ) (Geiser, 1992). Two subscales further differentiate outcomes: Activity Engagement and Pain Willingness. Items include: “Despite the pain, I am now sticking to a certain course in my life” and “I would gladly sacrifice important things in my life to control this pain better” (McCracken & Eccleston, 2005, p. 165). The 20 items are rated on a 7-point Likert-type scale from 0 (“*never true*”) to 6 (“*always true*”). This assessment has been found to be internally consistent ($\alpha = .78-.82$) and has moderate to high correlations with measures of avoidance, patient functioning and emotional distress (McCracken & Eccleston, 2005). See Appendix D.

Pain Disability Index. The Pain Disability Index (PDI) (Pollard, 1984) assesses the degree to which individuals believe their pain interferes with various activities in their daily lives. Specific areas include: occupation, family/home responsibilities, sexual behavior, self-care, recreation, and social and life support activities. The PDI is a brief, 7-item, self-report measure and items are rated on a 0-10 scale ranging from “no disability” to “total disability.” Internal consistency is reportedly high (Cronbach alpha = .86); concurrent validity is strong (Tait, Chibnall, & Krause, 1990), and generally, psychometric properties have been reported as adequate and support its utility (Turk &

Melzack, 2001). See Appendix E.

Positive and Negative Affect Scales. The Positive and Negative Affect Scales (PANAS) is a brief 20-item self-report measure of Positive and Negative Affect (Watson, Clark, & Tellegen, 1988). Each item is a mood state adjective (i.e. “distressed”) and is rated on a scale of 1 (“very slightly or not all”) to 5 (“extremely”). The negative items are summed to provide a NA score for negative affect, and the positive items are summed to provide a PA score for positive affect. Reliability has been reported to be good, ranging from .84 to .87 Cronbach alphas for the NA scale and .86 to .90 for the PA scale (Watson, Clark, & Tellegen, 1988). See Appendix F.

Data Analysis

All analyses were conducted using PASW (Predictive Analytics Software; formerly SPSS or Statistical Package for the Social Sciences) version 17 for Mac. Analyses of demographic and pain characteristics of both sample waves were conducted by wave and cluster group using descriptive, frequency, correlational and chi-square analyses and are presented in the tables below.

Hypothesis one was analyzed using hierarchical cluster (Ward’s method) procedures using both CPAQ Activities Engagement (AE) and Pain Willingness (PW) variables to determine number of cluster groups. A hierarchical approach was chosen to closely follow Vowles et al.’s methodology but the type of hierarchical approach was not specified: therefore, Ward’s method was chosen based on the following steps. Hierarchical analyses were initially conducted using all method types for clustering: between groups, within groups, centroid clustering, median linkage, nearest neighbor, and farthest neighbor. Comparisons of all method types revealed a range of two to four

groups emerging. The identification of three groups was selected based on viewing dendograms and fusion plots specifically for the two methods that most clearly demarcated clusters, Ward's method and nearest neighbor. Ward's method was chosen due to its most clearly marked cluster groups based on its dendogram and fusion plot. Ward's method was then conducted on two randomly selected subsamples from the cohort to establish internal validity and cross-validation of the emerging number of three clusters (Gore, 2000; Blashfield, 1977). The k-means method was utilized to determine cluster group identification and was chosen based on precedent set by previous studies examining CPAQ clusters (Costa & Pinto-Gouveia, 2010; Vowles et al., 2008).

Hypothesis two was tested by conducting a one-way multivariate analysis of covariance (MANCOVA) to assess whether there were significant differences among the three cluster groups of combined AE and PW on a linear combination of Perceived Disability, Positive Affect, and Negative Affect. The three cluster groups, 1) Low AE and Low PW (Low-Low); 2) High AE and High PW (or High-High); and 3) Medium AE and Medium PW (Medium-Medium); served as the categorical independent variable. Total scores for the Pain Disability Scale (PDI), or Perceived Disability; and Positive and Negative Affect, respectively, from the Positive and Negative Affect Scale (PANAS), were employed as the three continuous dependent variables. Age, years of education, number of surgeries, and current level of pain were chosen as covariates based on prior research that indicate these variables correlate highly with degree of perceived disability and negative and positive affect. Univariate analyses (Analysis of Covariance; ANCOVA) were subsequently conducted to ascertain specifically where differences among dependent variables were observed between the three cluster groups.

Assumptions for multivariate analysis of covariance that are robust to violation include independence, multivariate normality, and homogeneity of variance and covariance. However, it is noteworthy that cluster sample sizes used to conduct the MANCOVA were not of equal size. The resulting sample sizes likely contributed to significant Box's M values, thus indicating covariance matrices of the dependent variables are not homogeneous across all three cluster groups. Similarly, Levene's Test of Equality of Error Variances suggests heterogeneity among the error variance of the dependent variables across the cluster groups. These limitations are discussed herein.

CHAPTER IV

RESULTS

Characteristics of the Participant Sample Compared to Population Means

Descriptive statistics comparing population means from non-cancer chronic pain patient samples from clinical sites are reviewed here to more carefully examine the differences between them and our online sample. Specifically, demographic and pain characteristic means from two samples of CP patients recruited from subspecialty pain clinics in the U.K. and two samples of CP patients from the U.S. (one primary care and the other mixed outpatient and subspecialty) are compared to the current online study sample in Table 1.

Table 1

Demographic and Pain Characteristics of Clinic Samples vs. Current Online Sample

Characteristic	McCracken ^a Mean (SD)	Vowles ^a Mean (SD)	Chelminsky ^b Mean (SD)	Puder ^c Mean (SD)
Age (Years)	42.3 (12.4)**	47.3 (11.4)**	51 (9.6)**	52.74 (14.4)**
Education (Years)	13.1 (3.5)**	12.5 (3.0)**	-----	14.07 (2.6)**
Years in Pain	9.24 (8.2)**	8.0** (mdn)	-----	10.06 (11.0)**
Pain Rating (11 point)	-----	7.0 (1.8)	6.8	-----

* $p < .05$ ** $p < .01$

^a U.K. Pain Subspecialty

^b U.S. Primary Care

^c U.S. Mixed outpatient sample: Pain clinic; CP support groups; media ads

Significant differences are found between these clinical samples and the current online sample in both demographic and pain characteristics, with the exception of pain ratings found on an 11-point Likert type scale. The two U.K. pain subspecialty clinical

samples described in McCracken, Vowles, and Zhao-O'Brien (2010) and Vowles and McCracken (2008) were non-cancer CP outpatients that were seen at a multidisciplinary pain treatment center in Southwest England ($N = 205$; $N = 187$, respectively).

Chelminsky et al.'s 2005 CP outpatients ($N = 85$) were referred by their primary care physicians at an academic primary care site at the University of North Carolina and

Puder's 1988 sample included a mix of CP outpatients seen at University of Washington pain clinics and patients recruited from local CP support groups, senior citizen groups, and media advertisements in the Seattle, Washington area ($N = 69$).

As reported in Table 1, all clinical CP samples were primarily middle-aged and mean age in years in the clinic samples ranged from 42.3 to 52.74. In comparison, our online sample had a mean age of 44.73 ($SD = 11.24$) and significantly differed from each clinical CP sample as indicated by independent t tests (all p 's $< .01$). Our online sample had a mean 14.81 years of education ($SD = 2.42$) and also significantly differed from clinical means that presented with a range from 12.5 to 14.07 years as indicated by independent t tests (all p 's $< .01$). Although Chelminsky et al. (2005) did not report mean years of education, authors report 34% had some college; 28% graduated from high school; and 38% did not have a high school diploma in this primary care CP sample. Duration of CP in years also differed from our online sample such that online participants had 14.41 years ($SD = 11.58$) and clinical samples reported mean ranges of 8 (median) to 10.06 years. Online CP participants self-reported a mean current pain severity rating of 7.04 ($SD = 1.99$) on an 11-point Likert type scale, with 10 representing most severe pain. The two clinical studies that reported current pain severity on similar 11-point Likert type scales also indicated similar pain ratings (7.0 ($SD = 1.8$) in Vowles and McCracken,

2008; 6.8 in Chelminsky, et al., 2005) and were found to be non-significant when compared to the online sample as reported by independent t-tests (both p 's > .05).

Other important differences between sample types (online vs. clinical) that are not reported in Table 1 are described herein. Our online sample was represented primarily by women ($n = 250$; 83.3%). This was found to be the case in three out of four clinical samples as well; however, the percentage of women was lower in all of these clinical studies (65.7%, McCracken, Vowles, & Zhao-O-Brien, 2010; 64.2%, Vowles & McCracken, 2008; 40%, Chelminsky, et al., 2005; and 71%, Puder, 1988). Similar ethnicity ratios were represented across all studies, with Caucasians overrepresented: 82.7% of our online sample ($n = 248$); 98% (McCracken, Vowles, & Zhao-O-Brien, 2010); 98.4% (Vowles & McCracken, 2008); and 78% (Chelminsky, et al., 2005) in the clinical studies. Our sample included 4.8% African Americans, 2.7% Hispanics, 1.3% Asian or Pacific Islanders, and 8.7% other. Most studies did not fully describe ethnicity representation and Puder (1988) did not address this demographic variable at all: therefore, minority percentages were not available.

Marriage/partner status did not differ greatly across these five studies. The majority of all participants across all studies were married: 49% in our online sample; 58.3% in McCracken, Vowles, and Zhao-O-Brien (2010); 68.4% in Vowles and McCracken (2008); 49% in Chelminsky, et al. (2005); and 75.4% in Puder (1988). Other marriage/partner categories contrasted slightly with our online sample, which included 15.7% single; 12.0% living with partner; 9.0% divorced; 4.0% separated; and 2.7% widowed. McCracken, Vowles, and Zhao-O-Brien (2010) reported 31.2% single, 10.1% divorced, and .5% widowed. Vowles and McCracken (2008) reported 13.4% single,

15.5% divorced, and 2.7% widowed. Both U.S. study authors combined these categories to report 7% in stable relationships and 44% unmarried (Chelminsky et al., 2005); whereas 24.6% were widowed, single or divorced in Puder's 2008 study.

Notably, employment status differed across samples: 49.7% were unemployed in our online group compared to 69.7% (McCracken, Vowles, & Zhao-O'Brien, 2010); 76.3% (Vowles & McCracken, 2008); and 58% (unemployed, retired, student or homemaker) in Puder, 1988. Chelminsky, et al. (2005) did not report employment status. Twenty-five percent of our online sample reported full (17.7%) or part-time (7.3%) employment; however, only 15.2% of one of the U.K. pain subspecialty samples were found to be working either full or part-time (McCracken, Vowles, & Zhao-O'Brien, 2010). In contrast, Puder's 1988 mixed CP sample indicated 42% were employed full or part-time.

Both online and clinical samples had non-cancer CP for at least three months in duration, with the exception of Puder's (1988) six-month criteria, and all five samples represented similarly diverse variations of pain type and location. Due to differences in reporting methods across studies, only general variations can be ascertained. Our sample included the following types of pain and location in order of most prevalent: Lower Limbs (47.2%); Lower Back (44.7%); Cervical Spine (39.7%); Upper Extremities (37.3%); Full Body (32%); Head/Face (29.7%); Thoracic Spine (27.0%); Pain Location: Other (21.0%); and Pelvic/Genital (16.0%). McCracken, Vowles, and Zhao-O'Brien (2010) reported pain diagnoses of CP syndrome or non-specific musculoskeletal pain (50.4%); fibromyalgia (14.5%); post surgical (10.0%); complex regional pain syndromes (CRPS; 6.5%); or other (e.g. arthritis, peripheral neuropathy, (19.0%)).

Vowles and McCracken (2008) reported 51.2% of their pain subspecialty sample did not have established diagnoses (45.9% low back; 18.4% shoulder/arms; 16.8% full body; 11.8% legs/pelvic region; 2.7% neck; 2.2% mid-back; and 2.2% other (head, abdominal, others)). Fibromyalgia (35.7%) and smaller percentages of CRPS, arthritis, and other comprised the rest of this sample. Chelminsky et al.'s 2005 primary care cohort included 49% spine (35% lumbar; 8% cervical; 6% thoracic); fibromyalgia (15%); polyarthritis (9%); 16% other specific locations (knee, abdomen, elbow and hip) and diffuse neuropathic pain (5%). Lastly, 70% of Puder's 1988 mixed CP sample had various musculoskeletal diagnoses including rheumatoid arthritis, osteoarthritis, sciatica, temporomandibular joint syndrome, or fibromyalgia; followed by idiopathic (17%); neurological (10%); and vascular (3%) pain disorders.

Demographic Characteristics of the Participant Sample

Descriptive statistics for both data waves (September 2008 to July 2009 and July 2010 to March 2011) are shown in Table 2. Three time periods (between September and November 2008, from March to July 2009, and from July 2010 to March 2011) are described in the Methods section; however, as previously described, the classification of two data waves is used as it better defines these samples. Specifically, the 2008 and 2009 waves were collected using online support-only groups (versus intervention-seeking) from "Yahoo! Groups" whereas the 2010-2011 wave includes online general public group participants via Facebook.

Both data collection waves (wave 1, $n = 148$; wave 2, $n = 152$) were predominately female (85.1% and 86.1% respectively), Caucasian (89.9%; 75.7%) and were well-educated (wave 1, mean years = 15.08 ($SD = 2.24$); wave 2, mean years =

14.52 ($SD = 2.58$). No significant differences were found between the waves in terms of gender, income, and years of education. Although participants in both waves were primarily middle-aged (mean years = 47.14 and 42.25, respectively), an independent t-test revealed there was a significant effect for age, $t(290) = 3.81, p < .01$. There were also no significant differences found for income, with the majority of participants from both waves earning between \$5k and \$14,999 (wave 1 = 19.6%; wave 2 = 22.6%) and \$30k and \$49,000 (wave 1 = 19.6%; wave 2 = 22.6%), with even distribution across other annual salary ranges.

Results from a chi-square test of independence also showed significant differences between the two waves for ethnicity ($\chi^2(6, N = 300) = 43.33, p < .01$) with more African American (4.1% vs .7%) and Hispanic participants (2% vs .7%) in wave 1. A chi-square test of independence was also performed to examine the differences in type of employment. Overall, the majority of participants in this sample were unemployed (wave 1 = 56.8%; wave 2 = 50%); however, a significant difference was found between the two waves, ($\chi^2(3, n = 278) = 9.96, p < .05$). Wave 1 had more homemakers (23.6%) than wave 2 (14.6%) whereas wave 2 was found to have significantly more participants who were employed full-time (25.4%) compared to wave 1 (13.5%).

Table 3 displays descriptive statistics for each of the cluster groups, low AE and low PW (or Low-Low), high AE and high PW (High-High), and medium AE and medium PW (Med-Med) that were identified by k-means cluster analysis. Most participants fell into the Low-Low group ($n = 81$), followed by the Med-Med ($n = 71$), and the High-High groups ($n = 50$). No significant differences were found among these three cluster groups in terms of demographic variables with the exception of type of

Table 2

Demographic Characteristics of Sample by Data Collection Wave

Characteristic	Wave 1 (<i>n</i> = 148) <i>n</i> (%)	Wave 2 (<i>n</i> = 152) <i>n</i> (%)	χ^2	<i>p</i>
Gender			.06	.81
Male	22 (14.9)	20 (13.9)		
Female	126 (85.1)	124 (86.1)		
Income			16.77	.40
Below \$5000	7 (6.9)	8 (6.5)		
\$5000 - \$14,999	20 (19.6)	28 (22.6)		
\$15,000 - \$29,999	18 (17.7)	26 (21)		
\$30,000 - \$49,999	20 (19.6)	28 (22.6)		
\$50,000 - \$69,999	11 (10.8)	14 (11.2)		
\$70,000 - \$89,999	13 (12.7)	9 (7.3)		
\$90,000 - \$109,999	9 (8.9)	5 (4)		
Over \$110,000	4 (3.8)	6 (4.8)		
Employment			9.96	.02*
Full time	20 (13.5)	33 (25.4)		
Part time	9 (6.1)	13 (10)		
Homemaker	35 (23.6)	19 (14.6)		
Unemployed	84 (56.8)	65 (50)		
Ethnicity			43.33	<.01**
Caucasian	133 (89.9)	115 (75.7)		
African American	6 (4.1)	1 (.7)		
Hispanic	3 (2)	1 (.7)		
Asian/Pacific Islander	0 (0)	2 (1.3)		
Other	6 (4.1)	7 (4.6)		
	Mean (SD)	Mean (SD)	<i>t</i>	<i>p</i>
Age (years)	47.14 ± 10.61 Range: 18-71	42.25 ± 11.36 Range: 19-70	3.81	<.01**
Education (years)	15.08 ± 2.24 Range: 10-22	14.52 ± 2.58 Range: 6-24	1.86	.06

* $p < .05$ ** $p < .01$

employment. A chi-square test of independence reveals a significant difference in employment type among these groups (χ^2 (6, $n = 202$) = 15.48, $p < .05$). Participants within the High-High group were most likely to be employed (32%) or a homemaker

Table 3

Demographic Characteristics of Sample by Cluster Group

Characteristic	Cluster 1 Low-Low (<i>n</i> = 81) <i>n</i> (%)	Cluster 2 High-High (<i>n</i> = 50) <i>n</i> (%)	Cluster 3 Med-Med (<i>n</i> = 71) <i>n</i> (%)	χ^2	<i>p</i>
Gender				1.04	.6
Male	13 (16)	5 (10)	11 (15.5)		
Female	68 (84)	45 (90)	60 (84.5)		
Income				39.01	.18
Below \$5000	4 (6)	3 (7.5)	3 (5)		
\$5000 - \$14,999	20 (29.8)	6 (15)	8 (13.3)		
\$15,000 - \$29,999	12 (18)	8 (20)	9 (15)		
\$30,000 - \$49,999	14 (20.9)	9 (22.5)	16 (26.7)		
\$50,000 - \$69,999	18 (2)	2 (5)	10 (16.6)		
\$70,000 - \$89,999	6 (9)	6 (15)	6 (10)		
\$90,000 - \$109,999	1 (1.5)	5 (12.5)	4 (6.6)		
Over \$110,000	2 (3)	1 (2.5)	4 (6.7)		
Employment				15.48	.02*
Full time	10 (12.3)	16 (32)	14 (19.7)		
Part time	2 (2.5)	3 (6)	7 (9.9)		
Homemaker	14 (17.3)	12 (24)	13 (18.3)		
Unemployed	55 (67.9)	19 (38)	37 (52.1)		
Ethnicity				8.54	.74
Caucasian	74 (91.4)	44 (88)	68 (95.8)		
African American	2 (2.5)	1 (2)	1 (1.4)		
Hispanic	2 (2.5)	1 (2)	0 (0)		
Asian/Pacific Island	0 (0)	0 (0)	1 (1.4)		
Other	3 (3.6)	4 (8)	1 (1.4)		
	Mean (SD)	Mean (SD)	Mean (SD)	<i>F</i>	<i>p</i>
Age (years)	44.9 (9.83) Range: 20-70	44.78 (12.66) Range: 20-68	45.37 (12.32) Range: 18-71	.05	.95
Education (years)	14.58 (2.29) Range: 10-22	15.18 (2.51) Range: 10-21	14.84 (2.08) Range: 11-20	.99	.37

* $p < .05$ ** $p < .01$

(38%) and were the least likely to be unemployed (38%) when compared to the two other groups. Conversely, participants in the Low-Low cluster were the most likely to be unemployed (67.9%), and least likely to be a homemaker (17.3%) or employed either part-time (2.5%) or full-time (12.3%). Those in the Med-Med cluster fell within all middle ranges between the High-High and Low-Low group employment classifications.

Although there were no other significant differences among demographic characteristics, variations among the three clusters show notable trends. The majority of participants in the High-High and Med-Med groups self-reported higher earnings than the Low-Low participants and the High-High participants also reported the highest levels of education ($M = 15.18$, ($SD = 2.51$)), and Low-Low the lowest ($M = 14.58$, ($SD = 2.29$)).

Pain Characteristics of the Participant Sample

Descriptive statistics for all pain characteristics for both data collection waves (September 2008 to July 2009 and July 2010 to March 2011) are shown in Table 4. Independent t tests and chi-square tests of independence were again conducted to determine if there were significant differences between the data waves. Bonferroni adjusted criterion alpha levels were applied to pain locations ($p = .005$ (.05/9)) and the remaining pain characteristics ($p = .02$ (.05/3)). Participants were asked to record all areas they experienced pain; therefore, more than one area may have been indicated per individual. Most results from independent t tests comparing the location of the participants' pain and the two waves were found to be significantly different, even when accounting for adjusted criterion levels. These endorsed areas include pain located in the lower back, lower limbs, upper extremities, cervical spine, pelvic/genital, and 'other.' No significant differences were found for head/face, thoracic spine, or fully body pain.

Table 4

Pain Characteristics of Sample by Data Collection Wave

Characteristic	Wave 1 (n = 148) n (%)	Wave 2 (n = 152) n (%)	χ^2	p
Pain Location				
Lower Back	50 (33.8)	84 (55.3)	14	.00*
Lower Limbs	52 (35.1)	90 (59.2)	17.44	.00*
Upper Extremities	38 (25.7)	74 (48.7)	16.97	.00*
Head/Face	40 (27)	49 (32.2)	.98	.33
Cervical Spine	42 (28.4)	77 (50.7)	15.55	.00*
Thoracic Spine	43 (29.1)	38 (25)	.63	.43
Pelvic/Genital	9 (6.1)	39 (25.7)	31.38	.00*
Full Body	49 (33.1)	47 (30.9)	.17	.69
Pain Location: Other	63 (42.6)	0 (0)	81.92	.00*
	Mean (SD)	Mean (SD)	t	p
Years in Pain	6.82 ± 12.77	12.54 ± 10.22	2.73	.00**
	Range: 1-54	Range: 0-45		
Current Pain Level: 0-10-point scale (10 = most)				
	7.13 ± 1.93	6.92 ± 2.06	.81	.42
	Range: 0-10	Range: 0-10		
Number of Surgeries	1.43 ± 2.23	2.56 ± 4.6	-2.28	.02
	Range: 0-13	Range: 0-30		

* $p < .005$ using Bonferroni correction for nine chi-square tests of independence.

** $p < .02$ using Bonferroni correction for three independent t tests.

Wave 1 endorsed having the most ‘other’ locations of pain (42.6%), followed by lower limb (35.1%), lower back (33.8%), full body (33.1%), and thoracic spine pain (29.1%).

Wave 2 was not offered the ‘other’ pain location item: lower limbs (59.2%), lower back (55.3%), cervical spine (50.7%), upper extremities (48.7%), and head/face pain (32.2%) were the most frequently endorsed.

Additionally, an independent t test with a Bonferroni adjusted alpha level of .02 (.05/3) was conducted to examine the differences in participants’ number of years they had experienced pain (Years in Pain.) Results showed a significant difference in these

number of years between the two data waves, $t(185) = 2.73, p < .01$. Wave 1 participants self-reported they experienced significantly more years of pain ($M = 16.82$ ($SD = 12.77$)) than wave 2 ($M = 12.54$ ($SD = 10.22$)). Wave 2 participants reported having had a greater number of surgeries ($M = 2.56$ ($SD = 4.6$)) compared to wave 1 participants ($M = 1.43$ ($SD = 2.23$)); however, with Bonferroni correction alpha levels applied per test (.02), this was not significant, $t(132) = -2.28, p = .02$. The average current pain levels for the entire sample, rated between zero and ten on an 11-point Likert scale, fell between 6.92 ($SD = 2.06$) for wave 2 and 7.13 ($SD = 1.93$) for wave 1. There were no significant differences reported for current pain level between the two groups, $t(232) = .81, p = .42$.

Table 5 displays pain characteristics of the sample by the three cluster groups, Low-Low ($n = 81$), High-High ($n = 50$), and Med-Med ($n = 71$). No significant differences were found among the cluster groups, with the exception of Current Pain Level. A one-way analysis of variance (ANOVA) was conducted to examine differences among groups in Current Pain Level. These results show a significant difference among the clusters, $F(2, 191) = 3.76, p < .05$. The Low-Low group reported the highest pain levels ($M = 7.44$ ($SD = 1.98$)); followed by the Med-Med group ($M = 6.95$ ($SD = 1.9$)); and lastly, the High-High cluster showed the lowest current pain ratings ($M = 6.44$ ($SD = 2.22$)).

Despite the absence of other significant differences among pain characteristics, several trends are again worth noting. The top three endorsed pain locations among all three groups were nearly identical: lower back, lower limbs, and cervical spine. Notable differences among the groups were as follows: overall, Low-Low participants endorsed more pain locations in general than both other cluster groups; High-High members

Table 5

Pain Characteristics of Sample by Cluster Group

Characteristic	Cluster 1	Cluster 2	Cluster 3	χ^2	<i>p</i>
	<u>Low-Low (<i>n</i> = 81)</u>	<u>High-High (<i>n</i> = 50)</u>	<u>Med-Med (<i>n</i> = 71)</u>		
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		
Pain Location					
Lower Back	43 (53.1)	20 (40)	36 (50.7)	2.24	.33
Lower Limbs	45 (55.6)	20 (40)	37 (52.1)	.21	3.11
Upper Extremities	36 (44.4)	13 (26)	30 (42.3)	4.87	.09
Head/Face	26 (32.1)	19 (38)	19 (26.8)	1.72	.42
Cervical Spine	41 (50.6)	21 (42)	27 (38)	2.55	.28
Thoracic Spine	24 (29.6)	18 (36)	23 (32.4)	.58	.75
Pelvic/Genital	17 (21)	4 (8)	11 (15.5)	3.92	.14
Full Body	32 (39.5)	11 (22)	23 (32.4)	4.31	.12
Pain: Other	18 (22.2)	18 (36)	19 (26.8)	2.97	.23
	Mean (SD)	Mean (SD)	Mean (SD)	<i>F</i>	<i>p</i>
Years in Pain	14.39 ± 11.67	16.71 ± 11.16	13.83 ± 11.92	.804	.45
	Range: 0-54	Range: 1-48	Range: 1-41		
Current Pain Level: 10-Point Scale (10 = Most)					
	7.44 ± 1.98	6.44 ± 2.22	6.95 ± 1.9	3.76	.03*
	Range: 0-10	Range: 0-10	Range: 0-10		
# Surgery	1.43 ± 2.23	1.64 ± 4.1	1.95 ± 4.17	.23	.80
	Range: 0-13	Range: 0-25	Range: 0-30		

* $p < .05$ ** $p < .01$

reported the fewest pain locations; High-High experienced less upper extremity pain (26% versus 44.4% and 42.3%); and pelvic/genital pain was the least frequently endorsed among all cluster groups (21%, 8% and 15.5%). High-High members also reported experiencing the longest periods of years in pain ($M = 16.71$ ($SD = 11.16$)) compared to both the Low-Low group ($M = 14.39$ ($SD = 11.67$)) and Med-Med cluster ($M = 13.83$ ($SD = 11.92$)).

Lastly, Table 6 displays comparisons of pain location by gender. Chi-square tests of independence and independent t tests were conducted to determine differences

between genders among types of pain location. Again, Bonferroni adjusted criterion alpha levels were applied to pain locations ($p = .005 (.05/9)$) and the remaining pain characteristics ($p = .02 (.05/3)$). Chi-square test results suggest that when compared to men ($n = 42$), women ($n = 250$) experienced upper extremity pain significantly more, ($\chi^2 (1, n = 292) = 12.02, p < .005$), as well as head/face ($\chi^2 (1, n = 292) = 10.17, p < .005$); and cervical spine pain, ($\chi^2 (1, n = 292) = 11.79, p < .005$). Further examination of Years in Pain, Current Pain Level and Number of Surgeries suggest that there are no significant differences among these variables by gender. In the total sample, women reported higher spine pain, ($\chi^2 (1, n = 292) = 11.79, p < .005$). Further examination of Years in Pain, Current Pain Level and Number of Surgeries suggest that there are no significant differences among these variables by gender. In the total sample, women reported higher pain ratings ($M = 7.1 (SD = 1.96)$) when compared to men ($M = 6.72 (SD = 2.14)$); women reported slightly more Years in Pain ($M = 14.44 (SD = 11.78)$) than men ($M = 14.25 (SD = 10.4)$); and men have had more pain-related surgeries ($M = 2.22 (SD = 3.16)$) than women ($M = 1.84 (SD = 3.5)$).

Hypothesis One

Hypothesis one states that there will be no differences in the cluster groups identified in this online CP support group sample compared to the cluster groups identified by Vowles et al. (2008) using the same methodology outlined in that study. Specifically, the following group clusters were predicted:

- 1) Low Activity Engagement – Low Pain Willingness
- 2) High Activity Engagement – High Pain Willingness
- 3) High Activity Engagement – Low Pain Willingness

Table 6

Pain Characteristics by Gender

Characteristic	Men (<i>n</i> = 42) <i>n</i> (%)	Women (<i>n</i> = 250) <i>n</i> (%)	χ^2	<i>p</i>
Pain Location				
Lower Back	14 (33.3)	120 (48)	3.12	.08
Lower Limbs	16 (38.1)	126 (50.4)	2.18	.14
Upper Extremities	6 (14.3)	106 (42.5)	12.02	.00*
Head/Face	4 (9.5)	85 (34)	10.17	.00*
Cervical Spine	7 (16.7)	112 (44.8)	11.79	.00*
Thoracic Spine	7 (16.7)	74 (29.6)	3	.08
Pelvic/Genital	7 (16.7)	41 (16.4)	.00	.97
Full Body	7 (16.7)	89 (35.6)	5.84	.02
Pain Location: Other	6 (14.3)	57 (22.8)	1.54	.22
	Mean (SD)	Mean (SD)	<i>t</i>	<i>p</i>
Years in Pain	14.25 ± 10.4 Range: 1-38	14.44 ± 11.78 Range: 0-54	.08	.94
Current Pain Level: 0-10-point scale (10 = most)				
	6.72 ± 2.14 Range: 0-10	7.1 ± 1.96 Range: 0-10	1.05	.30
Number of Surgeries	2.22 ± 3.16 Range: 0-13	1.84 ± 3.5 Range: 0-30	-.62	.54

* $p < .005$ using Bonferroni correction for nine chi-square tests of independence.

** $p < .02$ using Bonferroni correction for three independent t tests.

Hierarchical cluster analysis using Ward's method, followed by k-means cluster analysis were conducted using Activity Engagement (AE) and Pain Willingness (PW) totals from the Chronic Pain Acceptance Questionnaire (CPAQ). This method was chosen to replicate Vowles et al.'s 2008 methodology as closely as possible. The AE/PW k-means cluster analysis with a maximum of 10 iterations specified three clusters: Low AE and Low PW "Low-Low" ($n = 81$), High AE and High PW "High-High" ($n = 50$) and Medium AE and Medium PW "Med-Med" ($n = 71$) (see Table 7). These findings indicate that hypothesis one was largely supported: our predicted Low-Low and High-

High groups emerged but the third group varied slightly such that a Medium AE/Medium PW group appeared. AE and PW means for each cluster are consistent with their designated labels and are reported in Table 7. Average scores for the Low-Low group are the lowest of the three clusters: AE ($M = 15.75$ ($SD = 6.26$)) and PW ($M = 15.75$ ($SD = 7.1$)). High-High members self-reported the highest ratings for both AE ($M = 48.4$ ($SD = 16.2$)) and for PW ($M = 30$ ($SD = 7$)). The Med-Med group's scores fell between the two other clusters: AE ($M = 33.68$ ($SD = 5.52$)) and PW ($M = 21.4$ ($SD = 6.7$)).

Table 7

CPAQ Score Means of the Patient Clusters

	Cluster 1 Low-Low ($n = 81$) Mean (SD)	Cluster 2 High-High ($n = 50$) Mean (SD)	Cluster 3 Med-Med ($n = 71$) Mean (SD)
Activity Engagement	15.75 (6.26)	48.4 (6.2)	33.68 (5.52)
Pain Willingness	15.75 (7.1)	30 (7)	21.4 (6.7)

Hypothesis Two

The second hypothesis stated that in this online support group sample, self-reported scores of Positive Affect, Negative Affect and Perceived Disability would differ overall by cluster group, when controlling for demographic and pain characteristics as indicated. Groups were to be identified via cluster analysis as described in the hypothesis one. In the case that identical cluster groups were identified, it was hypothesized that cluster group 1 (Low-Low) was expected to show higher levels of both Negative Affect and Perceived Disability and lower levels of Positive Affect. Conversely, cluster group 2 (High-High) was expected to show lower levels of Negative Affect and Perceived Disability and higher levels of Positive Affect. Group 3 (High AE/Low PW) was

predicted to show moderate levels of Positive Affect, Negative Affect and Perceived Disability. Results from testing hypothesis one suggest that these groups were largely similar; therefore, we proceeded to conduct the following statistical analyses using the current three clusters.

In order to test hypothesis two, a one-way multivariate analysis of covariance (MANCOVA) was conducted to examine differences in Perceived Disability, Negative Affect and Positive Affect within each cluster group (Low-Low, High-High, and Med-Med). The categorical cluster group type (Low-Low, High-High, and Med-Med) served as the independent (i.e., group) variable and Perceived Disability, Negative Affect and Positive Affect comprised the three continuous dependent variables. Age, number of surgeries, years of education, and current level of pain were used as covariates based on conducted correlational analyses that revealed significant relationships between these survey items and the three dependent variables. The a priori criterion significance level was set at .05.

As previously mentioned, homogeneity of variance and covariance were not obtained as indicated by a significant Box's M value ($M = 38.25, p < .01$). This finding may have been partially due to the unequal sample sizes that resulted from conducting the MANCOVA ($n = 30, 52$ and 60). However, assumptions for multivariate analysis of covariance that are robust to violation include homogeneity of variance and covariance as well as independence, and multivariate normality (Tabachnick & Fidell, 2006).

Significant results were obtained from the MANCOVA according to Wilks' λ , (.55), $F(6, 266) = 15.39, p < .01$, thus suggesting the combined DVs were significantly affected by the type of cluster group (Table 8). These findings also showed a moderate

effect size ($\eta_p^2 = .26$) between the three cluster groups (Low-Low High-High, and Med-Med) and the combined DVs (Tabachnick & Fidell, 2006).

Table 8

MANCOVA Results by Perceived Disability, Positive Affect and Negative Affect^a

Variable	Wilks' λ	<i>df</i>	<i>F</i>	η_p^2	<i>p</i>
Cluster Group	.55	6	15.39	.26	.00**

^a Age, number of surgeries, years of education, and current level of pain were used as covariates.

* $p < .05$ ** $p < .01$

Prior to conducting follow-up univariate tests, Levene's Tests of Equality of Error Variances were conducted. These results showed heterogeneity among the error variance of both the Perceived Disability ($F(2, 139) = 7.58, p < .01$) and Negative Affect ($F(2, 139) = 6.99, p < .01$) dependent variables across the three cluster groups. Again, assumptions for multivariate analysis of covariance that are robust to violation include homogeneity of variance and covariance (Tabachnick & Fidell, 2006).

A series of one-way analysis of covariance analyses (ANCOVAs) were then conducted to examine individual mean differences between each of the DVs and the independent variable (cluster type). The same covariates that were described in the MANCOVA analysis were used here as well. As indicated in Table 9, all ANCOVAs were significant for each of the DVs (all p 's $< .01$) with effect sizes (η_p^2) in the moderate ranges from .22 (Negative Affect and Perceived Disability) to .29 (Positive Affect).

Findings suggest that hypothesis two correctly predicted Perceived Disability, Negative Affect, and Positive Affect differences by cluster groups. Specifically, the

Low-Low cluster displayed both the most Negative Affect ($M = 28.05$ ($SD = 9.33$)) and Perceived Disability ($M = 49.57$ ($SD = 9.46$)) and the least Positive Affect ($M = 20.28$ ($SD = 7.86$)). Conversely, the High-High group ($n = 30$) showed the least Negative Affect ($M = 17.57$ ($SD = 5.81$)); the least Perceived Disability ($M = 32.28$ ($SD = 15.64$)); and the most Positive Affect ($M = 32.03$ ($SD = 6.49$)). Lastly, the Med-Med group revealed predicted averages in the moderate ranges: Negative Affect ($M = 21.98$ ($SD = 6.88$)); Perceived Disability ($M = 38.8$ ($SD = 12.71$)); and Positive Affect ($M = 26.85$ ($SD = 6.54$)).

Table 9

ANCOVA Results, Means and Standard Deviations for Positive Affect, Negative Affect, and Perceived Disability by Cluster Group^a

Characteristic	Cluster 1: Low-Low (<i>n</i> = 60)		Cluster 2: High-High (<i>n</i> = 30)		Cluster 3: Med-Med (<i>n</i> = 52)		<i>df</i>	<i>F</i>	η_p^2	<i>p</i>
	Mean (SD)		Mean (SD)		Mean (SD)					
Positive Affect	20.28 (7.86)		32.03 (6.49)		26.85 (6.54)		2	27.17	.29	<.01**
Negative Affect	28.05 (9.33)		17.57 (5.81)		21.98 (6.88)		2	19.03	.22	<.01**
Perceived Disability	49.57 (9.46)		32.28 (15.64)		38.8 (12.71)		2	19.64	.22	<.01**

^a Age, number of surgeries, years of education, and current level of pain were used as covariates.

* $p < .05$ ** $p < .01$

CHAPTER IV

DISCUSSION

Chronic pain is a debilitating and costly health concern for over 116 million Americans and their families with an approximate cost of \$635 billion in litigation, compensation, healthcare, and lost productivity (IOM, 2011). New CP treatments are needed to foster more positive medical and functional outcomes and lower cost burden for patients. Findings from previous studies suggest that profiling CP patients by levels of Acceptance, a core concept in Acceptance and Commitment Therapy (ACT), may have clinical utility in designing alternative and more effective CP interventions.

The overall purpose of this study was to examine how CP Acceptance (specifically, Activity Engagement and Pain Willingness) may be utilized to group a CP online sample using a cluster analysis design. Given these predicted clusters, we sought to determine what degree of Perceived Disability, Positive Affect and Negative Affect might differentially exist among these cluster groups. Costa and Pinto-Gouveia's (2010) and Vowles et al. (2008) studies found three cluster groups emerged in a clinic sample: a Low-Low AE and PW group; a High-High AE and PW group; and a mixed group. These studies' findings suggest fewer negative traits and behaviors (pain-related anxiety, depressive symptoms, and physical disability) were present in the Low-Low group vs. the High-High group (Costa & Pinto-Gouveia, 2010; Vowles et al., 2008).

Sample characteristics

The current online sample ($N = 300$) was primarily women (83.3%; $n = 250$); Caucasian (82.7%; $n = 248$) middle-aged (44.73 ($SD = 11.24$)); married (49%); and of higher education (14.81 ($SD = 2.42$)). The largest group of participants was unemployed

(49.7%); followed by homemakers (18%); and full-time (17.7%) and part-time (7.3%) workers. Mean years with chronic pain was 14.41 ($SD = 11.58$) and average current pain rating was 7.04 ($SD = 1.99$) on an 11-point Likert scale with 11 as most severe. The most prevalent pain locations were Lower Limbs (47.2%); Lower Back (44.7%); Cervical Spine (39.7%); Upper Extremities (37.3%); Full Body (32%); Head/Face (29.7%); Thoracic Spine (27.0%); Pain Location: Other (21.0%); and Pelvic/Genital (16.0%).

Although variations among demographic and pain characteristics were found when comparisons were made to other non-cancer CP clinical samples in early published work; by gender; by cluster groups; and by both data collection waves, these were not substantial differences.

Because two waves of data collection were conducted at two time periods (September 2008 to July 2009 in wave 1 and July 2010 to March 2011 in wave 2), and were recruited from two different support group Internet sites (“Yahoo! Groups” and Facebook, respectively), comparisons were made to determine whether significant differences existed between them. No significant differences were found between the waves in terms of gender, income, and years of education. The waves did differ significantly in terms of age (wave 1 participants were an average of 4.89 years older); ethnicity (wave 1 included more African American (4.1% vs .7%) and Hispanic participants (2% vs .7%)); and employment (wave 1 had more homemakers (23.6% vs 14.6%) and fewer full-time workers (13.5% vs 25.4%)).

The waves also differed significantly by pain characteristics with variations in pain locations (lower back, lower limbs, upper extremities, cervical spine, pelvic/genital, and ‘other’). No significant differences were found for head/face, thoracic spine, or full

body pain. One possible explanation for these differences may be due to study design changes made between data collection waves 1 and 2. The “pain location: other” item was not offered at wave 2: therefore, wave 1 participants may have felt their pain condition was best described by this “catch-all” category whereas wave 2 was directed to characterize their pain in the more diverse specific pain location items. However, these differences may also be simply due to wide variations in pain location sites as reported by CP populations.

Lastly, years in pain differed between the waves, with wave 1 participants’ self-reporting a mean of nearly half as many years (6.82 ($SD = 12.77$)) as wave 2 participants (12.54 ($SD = 10.22$)). Given these findings, distinguishing characteristics of the earlier “Yahoo! Groups” (wave 1) compared to the wave 2 Facebook cohort include: older, more ethnically diverse, more homemakers and fewer full-time workers, more “other” pain locations, and fewer years with CP.

These differences may reflect variations in the type of online participant that is drawn to frequent either Facebook or Yahoo! Groups. Although no studies of Facebook or Yahoo! Groups online CP support groups exist to date; several studies estimate more women than men utilize Facebook (57% women in 2012, AnsonAlex.com, 2012; and 61% in 2011, Kiser, 2011) and users tend to be younger, in general: 29% range from age 18 to 25; 23% are aged 26 to 34; and 18% are aged 35 to 44 (Community102.com, 2011). More research should be done in this area to illuminate the differences among online support group users.

Comparisons between gender within the total sample, as well as by cluster group, showed fewer significant differences. Only differences in pain location were found

between men and women, with women reporting significantly more upper extremity (42.5% vs 14.3%), head/face (34% vs. 9.5%), and cervical spine pain (44.8% vs 16.7%). It is a possibility that unequal sample sizes (women $n = 250$; men $n = 42$) may have contributed to these significant differences; however, the PASW software is designed to account for this inequality in sample sizes. Lastly, only two differences were found between the three cluster groups (Low-Low, High-High, and Med-Med): employment type, with Low-Low participants reporting the most unemployment (67.9% vs 38% in the High-High and 52.1% in the Med-Med group); and current pain level, with the Low-Low cluster reporting the highest ratings (7.44 ($SD = 1.98$)) compared to the lowest ratings in the High-High group (6.44 ($SD = 2.22$)).

A primary question in conducting research utilizing online chronic pain support group members is whether these findings may generalize to clinical chronic pain populations. In attempts to answer this question, comparisons were made to both clinical samples in the United States and the United Kingdom. Compared to four other CP clinical samples (two U.K. pain subspecialty samples; one U.S. primary care; and one U.S. mixed outpatient, support group and media respondents), single sample t tests revealed significant differences suggesting that our online sample was slightly younger, more educated, and had experienced more years in pain. When other demographic and pain characteristics were qualitatively compared due to studies' differences in reporting, our sample appeared to have more female than male participants (83.3% women); and more were employed full or part-time or were homemakers (43%); however, our sample had fairly comparable diverse representations of CP locations.

Overall, these findings suggest that participants in our online sample are simultaneously different and similar to general population means, as represented by these four clinical samples from the U.S. and U.K. When compared to other online CP samples, however, our cohort's characteristics are more similar. Gender trends in online intervention studies that recruit chronic illness or CP patients exclusively from Web sites report greater numbers of women. For example, 62.5% women were recruited in Burhman et al.'s 2004 study of an Internet therapy with telephone support and 88% women chronic headache patients were enrolled in Devineni and Blanchard's study (2005). Likewise, 71.6% and 71.2% women chronic illness patients were enrolled in usual care and intervention groups, respectively, in Lorig et al.'s 2006 study (total $N = 780$); and 90.5% and 89.8% usual care and treatment group women were enrolled in Lorig et al.'s 2008 study of arthritis and fibromyalgia therapy ($N = 866$). Likewise, these studies reflect comparable age means to our online sample (44.73 ($SD = 11.24$)): 44.6 ($SD = 10.4$); 43.6 ($SD = 12.0$); and 52.2 ($SD = 10.9$) (Buhrman et al., 2004; Devineni & Blanchard, 2005; Lorig et al., 2008, respectively). These findings suggest that online CP patients differ from clinical survey respondents due to sampling bias. As described in other online studies, Internet recruitment readily excludes individuals who lack computer skills, the means to own equipment and afford related service costs, and those who may not have time to engage with CP support groups (Macea et al., 2010).

Hypothesis One

Hypothesis one states that there will be no differences in the cluster groups identified in this online CP support group sample compared to the cluster groups identified by Vowles et al. (2008) using the same methodology outlined in that study.

Specifically, we predicted three clusters would emerge: 1) Low Activity Engagement – Low Pain Willingness; 2) High Activity Engagement – High Pain Willingness; and 3) High Activity Engagement – Low Pain Willingness. This hypothesis was largely supported such that the following three cluster groups emerged in our online sample: 1) Low Activity Engagement – Low Pain Willingness; 2) High Activity Engagement – High Pain Willingness; and 3) Medium Activity Engagement – Medium Pain Willingness. This third group also varied in Costa and Pinto-Gouveia's 2010 replication and expansion of Vowles et al.'s 2008 study such that this third group represented those with High Activity Engagement and Low Pain Willingness.

It is interesting that the characteristics of the middle group vary between the current and previous studies and are, in general, less distinct than the other two clusters. Similarly, the consistency of replicating cluster groups using the MPI measure has also been shown to vary between studies and CP samples. For example, six clusters are known to emerge from the MPI profiling procedure, (Unanalyzable, Anomalous, and Hybrid in addition to Dysfunctional, Adaptive Copers and Interpersonally Distressed). Although results vary across studies, studies have indicated that 3-30% of CP patients fall into these unusable categories (Okifuji, 1999; Ravani, 2005; Zaza, Reyno, & Moulin, 2000). Other studies suggest that characteristics are so similar between the groups (e.g. Interpersonally Distressed and Dysfunctional) that they should be combined (Epker & Gatchel, 2000). Therefore, it appears that although both MPI and Acceptance profiles predict better and worse functioning depending on profile type, Acceptance has thus far shown more reliability in replicating similar cluster groups with no outlier groups. It may be that variability in replicating the exact profiles across samples is a challenge within the

CP population, due to diversity of pain type and location. Future research limited to specific pain location and type may reveal key constructs among these varied CP groups.

Hypothesis Two

Hypothesis two states that self-reported scores of Positive Affect, Negative Affect and Perceived Disability will differ overall by group, when controlling for demographic and pain characteristics as indicated. Specifically, cluster group 1 will be expected to show lower levels of Negative Affect and Perceived Disability and higher levels of Positive Affect. Conversely, cluster group 3 will be expected to show higher levels of Negative Affect and Perceived Disability and lower levels of Positive Affect. Group 2 will show moderate levels of Positive Affect, Negative Affect and Perceived Disability.

Although results of hypothesis one were dependent on hypothesis two and the third cluster group differed from the predicted group (Medium AE – Medium PW was our current finding), results support this hypothesis, such that we predicted moderate levels of Positive Affect, Negative Affect and Perceived Disability. Specifically, Perceived Disability, Positive Affect, and Negative Affect all significantly differed by group in the predicted directions. Overall, the Low-Low group revealed the least favorable of these characteristics among the three variables: the lowest mean Positive Affect ($M = 20.28$ ($SD = 7.86$)); the highest mean Negative Affect ($M = 28.05$ ($SD = 9.33$)); and the highest mean Perceived Disability ($M = 49.57$ ($SD = 9.46$)). Similarly, the High-High cluster showed the most favorable degree of these traits: specifically, this group reflected the highest mean Positive Affect ($M = 32.03$ ($SD = 6.49$)); the lowest mean Negative Affect ($M = 17.57$ ($SD = 5.81$)); and the lowest Perceived Disability ($M = 32.28$ ($SD = 15.64$)). Also, the Med-Med participants had levels between these two

groups: Positive Affect ($M = 26.85$ ($SD = 6.54$)); Negative Affect ($M = 21.98$ ($SD = 6.88$)); and Perceived Disability ($M = 38.8$ ($SD = 12.71$)).

Significantly less physical and psychosocial disability was also found in the High-High group in Vowles et al.'s 2008 study as measured by the Sickness Impact Profile (SIP; Bergner, Bobbitt, Carter, & Gilson, 1981). Similarly, Vowles et al.'s Low-Low group also showed significantly higher ratings in physical and psychosocial disability when compared to the two other cluster groups. Although Positive and Negative Affect were not specifically measured in these two prior studies by Vowles et al. (2008) and Costa and Pinto-Gouveia (2010), depressive symptoms (sadness, guilt, lethargy) are reflected in low Positive Affect and high Negative Affect in the PANAS measure (Watson, 1988). Both Vowles et al. (2008) and Costa and Pinto-Gouveia (2010) found the most depression in the Low-Low group and conversely, the least, in the High-High group as measured by the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Self-Compassion Scale (Neff, 2003), respectively. Given the significant parallels in all three studies, our replicated findings strongly suggest those with higher Pain Willingness and Activities Engagement also experience less pain-related disability, and more positive and fewer negative emotions, which may be manifested in depression.

Limitations

The primary limitations in this study include data collected from a retrospective self-report sample. Retrospective data is subject to inaccuracies in participants' self-reporting; therefore, prospective data collection, in which participants are followed and assessed over time, is preferable (Kazdin, 2003). Providing objective behavioral

measures would also strengthen this study design, as well as collateral assessments such as semistructured questionnaires administered to participants' health providers or significant others. These measures could provide convergent validity and verify participants' subjective ratings. Additionally, online recruitment, despite increased feasibility over in-person data collection, did reveal bias in our sample of CP patients, suggesting these results may not generalize to clinical primary care or subspecialty CP patients in the general population. Notably, however, given the proliferation of online venues for support, information and intervention, online samples may prove to be a "clinical" population upon which specific norms may be based in the future. Lastly, previous studies using cluster analysis have reported difficulty consistently reproducing the same clusters, therefore demonstrating some degree of limitation of this type of methodology (Gore, 2000).

Future Directions

Future research should further illuminate the precise mechanisms that contribute to our study's findings in efforts to design and implement more effective CP interventions. Specifically, our results matched previous studies such that those with low Acceptance experience more negative outcomes (low positive affect and both high negative affect and perceived disability) whereas significantly more positive outcomes are found for those with high Acceptance; however, future studies might explore specific mechanisms regarding how this occurs in CP populations. This research is important for improving Acceptance-based interventions targeting increased Activity Engagement and Pain Willingness.

Given the rapidly increasing numbers of healthcare consumers turning to the Internet for health information, future Acceptance-based studies should also provide assessment and profiling interventions online to CP patients as a viable alternative to in-person treatments (Baker et al., 2003; Nguyen, et al., 2003; Taylor, 2011). As reported previously, current online interventions, primarily based in CBT, have known efficacy in targeting and improving CP symptom management and affective and behavioral outcomes (Macea et al., 2010). Specifically, these therapies improved health outcomes (lower pain intensity) in several studies as well as contributed to significant behavioral changes such as reduced medical utilization and medication use; improved functional outcomes including less work disability, and increased self-efficacy to pursue life activities despite the presence of pain and symptoms, in general (Berman et al., 2009; Burhman et al., 2004; Devineni & Blanchard, 2005; Guttberg, 2007; Guttberg, 2006; Lorig, et al., 2008; Lorig, et al., 2006; Lorig, et al., 2002; Macea et al., 2010; Schulz et al., 2007; Ström, Pettersson, & Andersson, 2000).

Results from previous studies suggest that future studies may benefit from increased staff contact, whether via telephone, email, or in-person, that expresses encouragement and support to maintain adherence in order to lower attrition rates (Buhrman et al., 2004; Guttberg, 2007). Increased privacy and access to services for patients and reduced cost for both the healthcare consumer and provider are also significant advantages of these interventions, given rising healthcare costs (Lorig et al., 2002; Lorig et al., 2008; Macea et al., 2010). Future studies should also include random assignment to the treatment and control group, as well as 12-month follow-up to monitor intervention efficacy longitudinally. Special recruitment efforts and appropriate

incentives should be offered to reach participants who may not be able to afford computer access and services as well as online male CP patients, due to their less active engagement in Internet CP support group studies (Buhrman et al., 2004; Devineni & Blanchard, 2005; Lorig et al., 2006; Lorig et al., 2008).

According to Vlaeyen and Morley, Acceptance-based profiling may help fill the gap in which there is “ample room for improvement”: a change the field has been waiting for (Vlaeyen & Morley, 2005, p. 4). Subsequent development of these online tailored approaches via Acceptance-based profiling have significant implications for not only changing the type of delivery of therapy services, but also for improving patients’ symptoms and affective and behavioral outcomes.

Summary

We conducted a cluster analysis on a sample of online CP support group members based on levels of Acceptance (Activity Engagement and Pain Willingness). Three clusters emerged suggesting our first hypothesis was largely supported: 1) Low Activity Engagement – Low Pain Willingness; 2) High Activity Engagement – High Pain Willingness; and 3) Medium Activity Engagement – Medium Pain Willingness. Results from the MANCOVA then confirmed our second hypothesis: those in the Low-Low group showed the most Negative Affect and Perceived Disability and the least Positive Affect. Conversely, the High-High group showed the least amount of Negative Affect and Perceived Disability and the highest scores on Positive Affect. The middle group revealed moderate scores across these same measures of mood and functional outcome. Implications from these results include 1) Acceptance is a viable construct that predicts mood and functional outcome in an online CP sample; 2) Acceptance-based profiling is a

promising new method of characterizing those with CP; 3) Acceptance-based profiling interventions, whether conducted in vivo or online, provides the field with an alternative treatment that may improve the efficacy and effectiveness of existing CP therapies.

REFERENCES

- Affleck, G., Tennen, H., Urrows, S., & Higgins, P. (1992). Neuroticism and the pain-mood relation in rheumatoid arthritis: Insights from a prospective daily study. *Journal of Consulting and Clinical Psychology, 60*(1), 119-126. doi: 10.1037/0022-006X.60.1.119
- Alexander, A. (February 12, 2012). Facebook user statistics 2012 [infographic]. Retrieved from <http://ansonalex.com/infographics/facebook-user-statistics-2012-infographic/>
- Alschuler, K. N., Mary E. Theisen-Goodvich, M. E., Haig, A. J. & Geisser, M. E. (2008). A comparison of the relationship between depression, perceived disability, and physical performance in persons with chronic pain. *European Journal of Pain, 12*, 757–764.
- Arnstein, P., Caudill, M., Mandle, C. L., Norris, A. & Beasley, R. (1999). Self efficacy as a mediator of the relationship between pain intensity, disability and depression in chronic pain patients, *Pain, 80*, 483-491.
- Baker, L., Wagner, T. H., Singer, S., & Bundorf, M. K. (2003). Use of the internet and e-mail for health care information: Results from a national survey. *JAMA, 289*, 2400-2406.
- Barnes-Holmes, D., Hayes, S. C., & Roche, B. (2001). The (not so) strange death of stimulus equivalence. *Journal of Behavior Analysis, 2*(1), 35-98.
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561–571.
- Bergner, M., Bobbitt, R. A., Carter, W. B., & Gilson, B. S. (1981). The sickness impact

- profile: Development and final revision of a health status measure. *Medical Care*, 29, 787–805.
- Berman, R. L. H., Iris, M. A., Bode, R., & Drengenberg, C. (2009). The effectiveness of an online mind-body intervention for older adults with chronic pain. *The Journal of Pain*, 10(1), 68-77.
- Blashfield, R. K. (1977). On the equivalence of four software programs for performing hierarchical cluster analysis. *Psychometrika*, 42, 429-431.
- Blyth, F. M., March, L. M., Brnabiv, A. J. M., Jorm, L. R., Wiliamson, M., & Cousins, M. J. (2001). Chronic pain in Australia: A prevalence study. *Pain*, 89, 127-134.
- Brattberg, G. (2006). Internet-based rehabilitation for individuals with chronic pain and burnout: A randomized trial. *International Journal of Rehabilitation Research*, 29, 221-227.
- Brattberg, G. (2007). Internet-based rehabilitation for individuals with chronic pain and burnout: A long-term follow-up. *International Journal of Rehabilitation Research*, 30, 231-234.
- Breivik, H., Collett, B., Ventafridda, V., Cohen, R., & Gallacher, D. (2006). Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *European Journal of Pain*, 10, 287-333.
- Brewer, B., & Karoly, P. (1992). Recurrent pain in college students. *Journal of American College Health*, 41(2), 67.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84, 822-848.

- Buhrman, M., Faltenhag, S. Ström, L., & Andersson, G. (2004). Controlled trial of Internet-based treatment with telephone support for chronic back pain. *Pain, 111*, 368-377.
- Butler, A. C., Chapman, J. E., Forman, & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analysis. *Clinical Psychology Review, 26*(1), 17-31.
- Chelminsky, P. R., Ives, T. J., Felix, K. M., Prakken, S. D., Miller, T. M., Perhac, J. S., ...Pignone, M. P. (2005). A primary care, multi-disciplinary disease management program for opioid-treated patients with chronic non-cancer pain and a high burden of psychiatric comorbidity. *BMC Health Services Research, 5*(3), 1-13.
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin, 119*(1), 155-159.
- Community102.com. (June 28, 2011). How Different Age Groups Interact Online! Retrieved from <http://news.community102.com/how-different-age-groups-interact-online>
- Costa, J. & Pinto-Gouveia, J. (2010). Acceptance of pain, self-compassion and psychopathology: Using the chronic pain acceptance questionnaire to identify patients' subgroups. *Clinical Psychology and Psychotherapy*.
- Costa, P. T., & McCrea, R. R. (1992). Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI). Odessa, FL: Psychological Assessment Resources.
- Croft, P., Rigby, A. S., Boswell, R., Schollum, J., & Silman, A. (1993). The prevalence of chronic widespread pain in the general population. *Journal of Rheumatology, 20*, 710-713.

- Crombez, G., Vlaeyen, J. W. S., Heuts, P. H. T. G., & Lysens, R. (1999). Pain-related fear is more disabling than pain itself: evidence on the role of pain-related fear in chronic back pain disability. *Pain, 80*, 329–39.
- Cuijpers, P., van Straten, A., & Andersson, G. (2008). Internet-administered cognitive behavior therapy for health problems: A systematic review. *Journal of Behavioral Medicine, 31*, 169-177.
- Dahl, J., Wilson, K., & Nilsson, A. (2004). Acceptance and commitment therapy and the treatment of persons at risk for long-term disability resulting from stress and pain symptoms: A preliminary randomized trial. *Behavior Therapy, 35*(4), 785-801.
- DeGood, D. E. (1996). Headaches. In E. Mohr Catalano & K. N. Hardin (Eds.), *The chronic pain control workbook* (pp. 195-203). Oakland, CA: New Harbinger.
- Denison, E., Asenlof, P., & Lindberg, P. (2004). Self-efficacy, fear avoidance, and pain intensity as predictors of disability in subacute and chronic musculoskeletal pain patients in primary health care. *Pain, 111*, 245–252.
- Dozois, D., & Dobson, K. (2001). Information processing and cognitive organization in unipolar depression: Specificity and comorbidity issues. *Journal of Abnormal Psychology, 110*(2), 236-245.
- Dworkin, S. F., & LeResche, L. (1992). Research diagnostic criteria for temporomandibular disorders: Review, criteria, examinations and specifications critique. *Journal of Craniomandibular Disorders: Facial and Oral Pain, 6*, 301–334.
- Elliott, A. M., Smith, B. H., Penny, K. I., Smith, W. C., Chambers, W. A. (1999). The epidemiology of chronic pain in the community. *The Lancet, 354*, 1248.

- Epker, J., & Gatchel, R. J. (2000). Coping profile differences in the biopsychosocial functioning of patients with temporomandibular disorder. *Psychosomatic Medicine*, 62, 69-75.
- Feldman, G. C., Hayes, A. M., Kumar, S. M., Greeson, J. G., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, 29, 177-190.
- Feuerstein, M. & Theborge, R. W. (1991). Perceptions of disability and occupational stress as discriminators of work disability in patients with chronic pain. *Journal of Occupational Rehabilitation*, 1(3), 185-195.
- Fordyce, W. E., Fowler, R. S., Lehmann, J. F., & DeLateur, B. J. (1968). Some implications of learning in problems of chronic pain. *Journal of Chronic Disease*, 21, 179-190.
- Gatchel, R. (2004). Comorbidity of chronic pain and mental health disorders: The biopsychosocial perspective. *American Psychologist*, 59(8), 795-805.
- Gatchel, R., & Gardea, M. (1999). Psychosocial issues: Their importance in predicting disability, response to treatment, and search for compensation. *Neurologic Clinics*, 17(1), 149-166.
- Gatchel, R., & Okifuji, A. (2006). Evidence-based scientific data documenting the treatment and cost-effectiveness of comprehensive pain programs for chronic nonmalignant pain. *Journal of Pain*, 7(11), 779-793.
- Gatchel, R., Peng, Y. B., Peters, M. L. P., Fuchs, P. N., & Turk, D. (2007). The biopsychosocial approach to chronic pain: Scientific advances and future directions.

Psychological Bulletin, 133(4), 581-624.

Geiser, D. (1992). A comparison of acceptance-focused and control-focused interventions in a chronic pain treatment center. *Unpublished doctoral dissertation. University of Nevada, Reno.*

Geisser, M. E., Haig, A. J., & Theisen, M. E. (2000). Activity avoidance and function in persons with chronic back pain. *Journal of Occupational Rehabilitation*, 10, 215–27.

Geisser, M. E., Robinson, M. E., Miller, Q. L., & Bade, S. M. (2003). Psychosocial factors and functional capacity evaluation among persons with chronic pain. *Journal of Occupational Rehabilitation*, 13, 259–76.

Geisser, M. E., Robinson, M. E., & Riley, J. L. (1999). Pain beliefs, coping, and adjustment to chronic pain: Let's focus more on the negative. *Pain Forum*, 8, 161-168.

Gil, K. M., Abrams, M. R., Phillips, G., & Keefe, F. J. (1989). Sickle cell disease pain: The relation of coping strategies to adjustment. *Journal of Consulting and Clinical Psychology*, 57, 725-731.

Godin, G. R. & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sports Sciences*, 10, 141–146.

Gore, Jr., P. A. (2000). Cluster Analysis. In H. E. A. Tinsley & S. D. Brown (Eds.), *Multivariate statistics and mathematical modeling. Handbook of applied multivariate statistics and mathematical modeling* (pp. 296-321). San Diego, CA: Academic Press.

Gosling, S. D., Rentfrow, P. J., & Swann Jr., W. B. (2003). A very brief measure of the

- Big-Five personality domains. *Journal of Research in Personality*, 37, 504-528.
- Gureje, O., Simon, G., & Von Korff, M. (2001). A cross-national study of the course of persistent pain in primary care. *Pain*, 92(1-2), 195-200.
- Harstall, C. & Ospina, M. (2003, June). How Prevalent is Chronic Pain? *Pain Clinical Updates*, XI(2) International Association for the Study of Pain, 1-4.
- Hayes, S. C. (1994). Content, context, and the types of psychological acceptance. In S. C. Hayes, N. S. Jacobson, V. M. Follette, & M. J. Dougher (Eds.), *Acceptance and change: Content and context in psychotherapy* (pp. 13-32). Reno, NV: Context Press.
- Hoffman, B., Papas, R., Chatkoff, D., & Kerns, R. (2007). Meta-analysis of psychological interventions for chronic low back pain. *Health Psychology*, 26(1), 1-9.
- Hunsley, J., & Mash, E. J. (2008). *A Guide to Assessments that Work*. Oxford: Oxford University Press, Inc.
- Institute of Medicine of the American Academies (June, 2011). *Relieving pain in America: A Blueprint for transforming prevention, care, education, and research*. (Issue Brief). Washington, D.C.: Institute of Medicine of the American Academies.
- International Association for the Study of Pain. (2011). *International Association for the Study of Pain Taxonomy*. Retrieved from <http://www.iasppain.org/Content/NavigatioMenu/GeneralResourceLinks/PainDefintions/default.htm>
- Jensen, M. R., Turner, J. A., & Romano, J. M. (1994). Correlates of improvement in multidisciplinary treatment of chronic pain. *Journal of Consulting and Clinical Psychology*, 62, 172-179.

- Jensen, M., Turner, J., Romano, J., & Karoly, P. (1991). Coping with chronic pain: A critical review of the literature. *Pain*, 47(3), 249-283.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). The “Big Five” Inventory: Versions 4a and 54. University of California, Berkeley, Institute of Personality and Social Research, Berkeley.
- Jolly, J. B., Dyck, M. J., Kramer, T. A., & Wherry, J. N. (1994). Integration of positive and negative affectivity and cognitive content-specificity: Improved discrimination of anxious and depressive symptoms. *Journal of Abnormal Psychology*, 103(3), 544-552. doi: [10.1037/0021-843X.103.3.544](https://doi.org/10.1037/0021-843X.103.3.544)
- Jones, D. A., Rollman, G. B., White, K. P., Hill, M. L., & Brooke, R. I. (2003). The relationship between cognitive appraisal, affect, and catastrophizing in patients with chronic pain. *The Journal of Pain*, 4(5), 267-277.
- Kalauokalani, D., Cherkin, D., Sherman, K., Koepsell, T., & Deyo, R. (2001). Lessons from a trial of acupuncture and massage for low back pain: patient expectations and treatment effects. *Spine*, 26(13), 1418.
- Kazdin, A. E. (2003). *Research Design in Clinical Psychology*. Boston: Allyn and Bacon.
- Keefe, F. J., Caldwell, D. S., Williams, D. A., Gil, K.A., Mitchel, D., Robertson, C....Helms, M. (1991). Pain coping skills training in the management of osteoarthritis knee pain: A comparative study. *Behavioral Therapy*, 21, 49-62.
- Kerns, R., Turk, D., & Rudy, T. (1985). The west haven-yale multidimensional pain inventory (WHYMPI). *Pain*, 23(4), 345-356.
- Kinman, C.R., Beacham, A.O., Payne-Murphy, J., Lillis, T., & Brown, D.L. (2010). *Should we tailor chronic pain intervention foci and components according to*

baseline levels of acceptance and experiential avoidance? Poster presentation at the Association for Behavioral and Cognitive Therapies Convention, San Francisco, CA.

Kinney, R., Gatchel, R., Polatin, P., Fogarty, W., & Mayer, T. (1993). Prevalence of psychopathology in acute and chronic low back pain patients. *Journal of Occupational Rehabilitation*, 3(2), 95-103.

Kiser, P. (April 13, 2011). Who uses Facebook, Twitter, LinkedIn, and MySpace? 4thQ & 1stQ stats and analysis. Retrieved from <http://socialmediatoday.com/paulkiser/285851/who-uses-facebook-twitter-linkedin-myspace-4thq-1stq-stats-and-analysis>

Koho, P. Sarita, A., Watson, P. & Hurri, H. (2001). Assessment of chronic pain behaviour: Reliability of the method and its relationship with perceived disability, physical impairment and function. *Journal of Rehabilitation Medicine*, 33, 128-132.

Kole-Snijders, A., Vlaeyen, J., Goossens, M., Rutten-van Mölken, M., Heuts, P., van Breukelen, G., et al. (1999). Chronic low-back pain: What does cognitive coping skills training add to operant behavioral treatment? Results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 67(6), 931-944.

Lazarus, R. S. (1993). From psychological stress to the emotinos: A history of changing outlooks. *Annual Reviews in Psychology*, 44, 1-21.

Litt, M. D., Shafer, D. & Napolitano, C. (2004). Momentary mood and coping processes in TMD pain. *Health Psychology*, 23(4), 354-362.

Lorig, K. R., Laurent, D. D., Deyo, R. A., Marnell, M. E., Minor, M. A., & Ritter, P. L. (2002). Can a back pain e-mail discussion group improve health status and lower

- health care costs? A randomized study. *Archives of Internal Medicine*, 162, 792-796.
- Lorig, K. R., Ritter, P. L., Laurent, D. D., Plant, K. (2006). Internet-based chronic disease self-management. *Medical Care*, 44(11) 964-971.
- Lorig, K. R., Ritter, P. L., Laurent, D. D., Plant, K. (2008). The internet-based arthritis self-management program: A one-year randomized trial for patients with arthritis or fibromyalgia. *Arthritis & Rheumatism*, 59(7), 1009-1017.
- Macea, D. D., Gajos, K., Calil, Y. A., & Fregni, F. (2010). The efficacy of web-based cognitive behavioral interventions for chronic pain: A systematic review and meta-analysis. *The Journal of Pain*, 11(10), 917-929.
- McCracken, L., & Eccleston, C. (2003). Coping or acceptance: What to do about chronic pain? *Pain*, 105(1-2), 197-204.
- McCracken, L., & Eccleston, C. (2005). A prospective study of acceptance of pain and patient functioning with chronic pain. *Pain*, 118(1-2), 164-169.
- McCracken, L., MacKichan, F., & Eccleston, C. (2007). Contextual cognitive-behavioral therapy for severely disabled chronic pain sufferers: Effectiveness and clinically significant change. *European Journal of Pain*, 11(3), 314-322.
- McCracken, L. M., Vowles, K. E., & Eccleston, C. (2005). Acceptance-based treatment for persons with complex, long standing chronic pain: a preliminary analysis of treatment outcome in comparison to a waiting phase. *Behaviour Research and Therapy*, 43(10), 1335-1346.
- McCracken, L. M., Vowles, K. E., & Eccleston, C. (2004). Acceptance of chronic pain: Component analysis and a revised assessment method. *Pain*, 107, 159-166.

- McCracken, L. M., Vowles, K. E., & Zhao-O'Brien, J. (2010). Further development of an instrument to assess psychological flexibility in people with chronic pain. *Journal of Behavioral Medicine*, 33, 346-354.
- McIlvane, W. J. (2003). A stimulus in need of a response: A review of relational frame theory: A post-Skinnerian account of human language and cognition, *The Analysis of Verbal Behavior*, 19, 29-37.
- Melzack R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. *Pain*, 1, 277-299.
- Melzack, R. & Wall, P. D. (1965). *Pain mechanisms: A new theory. Science*, 150(699), 971-979.
- Millard, R. W., Wells, N., & Theborge, R. W. (1991). A comparison of models describing reports of disability associated with chronic pain. *Clinical Journal of Pain*, 7, 283-91.
- Morley, S., Eccleston, C., & Williams, A. (1999). Systematic review and meta-analysis of randomized controlled trials of cognitive behaviour therapy and behaviour therapy for chronic pain in adults, excluding headache. *Pain*, 80(1-2), 1-13.
- National Institutes of Health. (1998). *New Directions in Pain Research*. Retrieved from: <http://grants.nih.gov/grants/guide/pa-files/PA-98-102.html>
- Neff, K. (2003). The development and validation of a scale to measure. Self Compassion Scale. *Self and Identity*, 2, 223-250.
- Nguyen, H. Q., Carrieri-Kohlman, V., Rankin, S. H., Slaughter, R. & Stulbarg, M. S.

- (2004). Internet-based patient education and support interventions: A review of evaluation studies and directions for future research. *Computers in Biology and Medicine*, 34, 95-112.
- Ohayon, M. M., & Schatzberg, A. F. (2003). Using chronic pain to predict depressive morbidity in the general population. *Archives of General Psychiatry*, 60, 39-47.
- Öst, L. G. (1987). Applied relaxation: Description of a coping technique and review of controlled studies. *Behaviour Research and Therapy*, 25, 379-409.
- Parker, J. C., Smarr, K. L., Buescher, K. L., Phillips, L. R., Frank, R. G., Beck, N. C...Walker, S. E. (1989). Pain control and rational thinking: Implications for rheumatoid arthritis. *Arthritis & Rheumatology*, 32, 984-90.
- Payne-Murphy, J., Beacham, A. O., & Brown, D. T. (2011). *Clinical Utility of Differentiating Among High, Medium and Low Chronic Pain Acceptance Subgroups*. Poster presentation at the Society for Behavioral Medicine, Washington, D.C.
- Payne-Murphy, J., Lillis, T., Brown, D. T., Herbst, A., & Beacham, A. O. (2010). *Revisiting Chronic Pain "Adaptive Coper" and "Dysfunctional" Clinical Profiles: Can Acceptance and Experiential Avoidance Better Inform Effective Interventions?* Poster presentation at Association for Behavioral and Cognitive Therapies Convention, San Francisco, CA.
- Pollard, C. (1984). Preliminary validity study of the pain disability index. *Perceptual and Motor Skills*, 59, 974.
- Prochaska, J., Norcross, J., DiClemente, C. (1994). *Changing for Good: A Revolutionary Six-Stage Program for Overcoming Bad Habits and Moving Your Life Positively*

Forward. New York: Avon Books, Inc.

Puder, R. S. (1988). Age analysis of cognitive-behavioral group therapy for chronic pain outpatients. *Psychology and Aging*, 3(2), 204-207.

Ravani, P. J. (2005). *Multidimensional Pain Inventory: Revised profile classification based on clinical observations in a pain setting* (Master's thesis). Retrieved from Southwestern Medical Center database.

Roth, R. S. & Geisser, M. E. (2002). Educational achievement and chronic pain disability: Mediating role of pain-related cognitions. *The Clinical Journal of Pain*, 18, 286–296.

Rudy, T., Turk, D., Kubinski, J., & Zaki, H. (1995). Differential treatment responses of TMD patients as a function of psychological characteristics. *Pain*, 61(1), 103-112.

Rudy, T., Turk, D., Zaki, H., & Curtin, H. (1989). An empirical taxometric alternative to traditional classification of temporomandibular disorders. *Pain*, 36(3), 311-320.

Salkovskis, P. M., Rimes, K. A., Warwick, H. M., & Clark, D. M. (2002). The health anxiety inventory: development and validation of scale for measurement of health anxiety and hypochondriasis. *Psychological Medicine*, 32(5), 843-853.

Schulz, P. J., Rubinell, S., & Hartung, U. (2007). An internet-based approach to enhance self-management of chronic low back pain in the Italian-speaking population of Switzerland: Results from a pilot study. *International Journal of Public Health*, 52, 286-294.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. T. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*: Guilford Press, New York.

- Smith, B. W., & Zautra, A. J. (2002). The role of personality in exposure and reactivity to interpersonal stress in relation to arthritis disease activity and negative affect in women. *Health Psychology, 21*(1), 81-88.
- Snow-Turek, A. L., Norris, M., & Tan, G. (1996). Active and passive coping strategies in chronic pain patients. *Pain, 64*, 455-462.
- Stetter, F. & Kupper, S. (2002). Autogenic training: A meta-analysis of clinical outcome studies. *Applied Psychophysiology and Biofeedback, 27*(1), 45-98.
- Stewart, W., Ricci, J., Chee, E., Morganstein, D., & Lipton, R. (2003). Lost productive time and cost due to common pain conditions in the US workforce. *JAMA, 290*(18), 2443.
- Strand, E. B., Zautra, A. J., Thoresen, M., Odegard, S., Uhlig, T. & Finset, A. (2006). Positive affect as a factor of resilience in the pain-negative affect relationship in patients with rheumatoid arthritis. *Journal of Psychosomatic Medicine, 60*, 477-484.
- Stroud, M. W., Thorn, B. E., Jensen, M. P., & Boothby, J. L. (2000). The relation between pain beliefs, negative thoughts, and psychosocial functioning in chronic pain patients. *Pain, 84*, 347-352.
- Ström, L., Pettersson, R., & Andersson, G. (2000). A controlled trial of self-help treatment of recurrent headache conducted via the internet. *Journal of Consulting and Clinical Psychology, 68*(4), 722-727.
- Sullivan, M., Karlsson, J., & Ware, J. E. (1995). The Swedish SF-36 health survey: Evaluation of data quality, scaling assumptions, reliability and construct validity across general populations in Sweden. *Social Science & Medicine, 41*, 1349-1358.

- Sullivan, M., Reesor, K., Mikail, S., & Fisher, R. (1992). The treatment of depression in chronic low back pain: review and recommendations. *Pain, 50*(1), 5-13.
- Sullivan, M. J. L., Thorn, B., Haythornthwaite, J. A., Keefe, F., Martin, M., Bradley, L. A., & Lefebvre, J. C. (2001). Theoretical perspectives on the relation between catastrophizing and pain. *The Clinical Journal of Pain, 17*, 52-64.
- Swinkels-Meewisse, I. E. J., Roelofs, J., Oostendorp, A. B., Andre', L. M., Verbeek, J, Vlaeyen, W. S. (2006). Acute low back pain: pain-related fear and pain catastrophizing influence physical performance and perceived disability. *Pain, 120*, 36-43.
- Tabachnick, B. G. & Fidell, L. S. (2006). *Using Multivariate Statistics* (5th Ed.). Boston: Allyn and Bacon.
- Tait, R. C., Chibnall, J. T. and Krause, S. (1990). The Pain Disability Index: psychometric properties, *Pain, 40*, 171-182.
- Taylor, H. (2011). The Harris Poll: The growing influence and use of health care information obtained online. *The Harris Interactive*. Retrieved from <http://www.harrisinteractive.com/NewsRoom/HarrisPolls/tabid/447/ctl/ReadCustom%20Default/mid/1508/ArticleId/863/Default.aspx>
- Thorn, B. E., Boothby, J. L., & Sullivan, M. J. L. (2002). Targeted treatment of catastrophizing for the management of chronic pain. *Cognitive and Behavioral Practice, 9*, 127-138.
- Turk, D. C. (2005). The potential of treatment matching for subgroups of patients with chronic pain: lumping versus splitting. *Clinical Journal of Pain, 21*, 44-55.
- Turk, D., & Melzack, R. (2001). *Handbook of pain assessment*. The Guilford Press.

- Turk, D., & Nash, J. (1996). Psychological issues in chronic pain. *Pain Management: Theory and Practice. Philadelphia, PA: FA Davis*, 323-335.
- Turk, D. & Okifuji, A. (2002). Psychological factors in chronic pain: Evolution and revolution. *Journal of Consulting and Clinical Psychology*, 70(3), 678 – 690.
- Turk, D., & Rudy, T. (1990). The robustness of an empirically derived taxonomy of chronic pain patients. *Pain*, 43(1), 27-35.
- Turk, D., & Rudy, T. (1988). Toward an empirically derived taxonomy of chronic pain patients: Integration of psychological assessment data. *Journal of Consulting and Clinical Psychology*, 56(2), 233-238.
- Turk, D., & Rudy, T. (1986). Assessment of cognitive factors in chronic pain: A worthwhile enterprise? *Journal of Consulting and Clinical Psychology*, 54(6), 760-768.
- Turner, J. A. & Clancy, S. (1986). Strategies for coping with chronic low back pain: Relationships to pain and disability. *Pain*, 24, 355–64.
- Turner, J. A., Holtzman, S., & Mancl, L. (2007). Mediators, moderators, and predictors of therapeutic change in cognitive–behavioral therapy for chronic pain. *Pain*, 127, 276–286.
- Turner, J. A., Jensen, M. P., & Romano, J. M. (2000). Do beliefs, coping, and catastrophizing independently predict functioning in patients with chronic pain? *Pain*, 85, 115-125.
- Verhaak, P. F., Kerssens, J. J., Dekker, J., Sorbi, M. J., & Bensing, J. M. (1998). Prevalence of chronic benign pain disorder among adults: A review of the literature. *Pain*, 77, 231-239.

- Vlaeyen, J. W., & Linton, S. J. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain*, 85, 317-325.
- Vlaeyen, J., & Morley, S. (2005). Cognitive-behavioral treatments for chronic pain: what works for whom? *The Clinical Journal of Pain*, 21(1), 1.
- Vowles, K., & McCracken, L. (2008). Acceptance and values-based action in chronic pain: A study of treatment effectiveness and process. *Journal of Consulting and Clinical Psychology*, 76(3), 397-407.
- Vowles, K., McCracken, L., McLeod, C., & Eccleston, C. (2008). The Chronic Pain Acceptance Questionnaire: Confirmatory factor analysis and identification of patient subgroups. *Pain*, 140, 284-291.
- Waddell, G., Newton, M., Henderson, I., Somerville, D., & Main, C. (1993). A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*, 52(2), 157-168.
- Watson, D., Clark, L. A., Carey, G. (1998). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology*, 97(3), 346-353. doi: [10.1037/0021-843X.97.3.346](https://doi.org/10.1037/0021-843X.97.3.346)
- Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063-1070.
- Wegener, S. T., Castillo, R. C., Haythornthwaite, J., MacKenzie, E. J., & Bosse, M. J. (2011). Psychological distress mediates the effect of pain on function. *Pain*, 152, 1349-1357.

- Wehmer, M. (1990). The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). *Association of Perioperative Registered Nurses*, 51(4), 1092.
- Wolfe, F., Ross, K., Anderson, J., & Russell, I. (1995). Aspects of fibromyalgia in the general population: sex, pain threshold, and fibromyalgia symptoms. *The Journal of Rheumatology*, 22(1), 151.
- Zautra, A. J., Burleson, M. H., Smith, C. A., Blalock, S. J., Wallston, K. A., DeVellis, R. F., DeVellis, B. M., & Smith, T. W. (1995). Arthritis and perceptions of quality of life: An examination of positive and negative affect in rheumatoid arthritis patients. *Health Psychology*, 14, 399-408.
- Zautra, A., Smith, B., Affleck, G., & Tennen, H. (2001). Examinations of chronic pain and affect relationships: Applications of a dynamic model of affect. *Journal of Consulting and Clinical Psychology*, 69(5), 786-795.
- Zaza, C., Reyno, L., & Moulin, D. E. (2000). The Multidimensional Pain Inventory Profiles in patients with cancer-related pain: An examination of generalizability. *Pain*, 87, 75-82.

APPENDIX A

Hello!

You are being invited to participate in a project designed to increase understanding of chronic pain. Specifically, we are conducting a study on persons with chronic pain who are involved in online support groups. We are inviting participants (age 18 and older) who have been and are currently experiencing a recurrent or “nonremitting” chronic pain condition for at least 3 months to complete an online survey. It is anticipated that this survey will take 45-60 minutes of your time to complete.

In addition, we request that you forward/share the survey link to other individuals with chronic pain who may wish to participate in this study so that they may have the opportunity to assist us in gathering information about chronic pain and online support groups.

Participants who complete the survey may elect to be entered into a drawing to win one of twelve \$50 VISA gift cards. We expect to have approximately 600 people complete the survey. If everyone enters the drawing your odds of winning one of the gift cards would be 1 in 50.

To participate in this study, please click on the following link:

<http://www.questionpro.com/akira/TakeSurvey?id=1179976>

This study has been approved by *Spalding University's Research Ethics Committee* in support of dissertation requirements for the completion of a doctorate of psychology (Psy.D.) degree. If you have any questions regarding this study, please feel free to contact Kristen Crafton, M.A. at chronicpaincyberstudy@hotmail.com or Dr. Steve Katsikas at skatsikas@spalding.edu.

Sincerely,

Kristen Crafton, MA
Steve Katsikas, PhD
School of Professional Psychology
Spalding University

APPENDIX B

HSRC # 10-0538

An Exploratory Correlational Study of Persons with Chronic Pain Involved in Internet-Based Chronic Pain Groups

Abbie Beacham, Ph.D.

Facebook advertisement:

You are invited to take part in a research study: An Exploratory Correlational Study of Persons with Chronic Pain Involved in Internet-Based Chronic Pain Groups (HSRC# 10-0538). This study is being led Abbie Beacham, Ph.D., at the University of Colorado Denver. The study involves answering a series of online questionnaires. Upon completion of the study questionnaires, you will have to opportunity to enter a drawing for a gift card. Please click one of the following links if you are interested in learning more about the research study.

APPENDIX C

Please begin by providing the following general information:

Gender:

- ☐ Male
- ☐ Female

What is your current age?

_____ years

What is your current height?

_____ feet

_____ inches

What is your current weight?

_____ lbs.

What is your current cigarette smoking status?

- ☐ Currently smoke
- ☐ Previously smoked, but quit
- ☐ Never smoked

The following questions are about cigarette smoking. If you are not currently a smoker, please skip ahead to page 3.

How much do you smoke?

Number of cigarettes per day that you smoke: _____

Number of days per week that you smoke: _____

How long have you been a smoker?

_____ years

Please rate your agreement with the following statements:

I intend to QUIT smoking sometime.

☐	☐	☐	☐	☐	☐	☐
Disagree completely	Disagree	Disagree somewhat	Unsure	Agree somewhat	Agree	Agree completely

For me, to QUIT smoking is:

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Worthless			Neutral			Valuable

Most people who are important to me think that I:

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Should not QUIT smoking			Neutral			Should QUIT smoking

Many people like me who smoke, or have smoked cigarettes, have either QUIT smoking or are working on quitting smoking.

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Completely false			Neutral			Completely true

For me, to QUIT smoking cigarettes is:

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Unpleasant			Neutral			Pleasant

For me, to QUIT smoking cigarettes is:

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Bad			Neutral			Good

It's only up to me whether or not I QUIT smoking cigarettes.

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Strongly disagree			Neutral			Strongly agree

For me, to QUIT smoking would be:

☐ -3	☐ -2	☐ -1	☐ 0	☐ 1	☐ 2	☐ 3
Impossible			Neutral			Possible

Total years of education (EXAMPLE: high school + 1 year of college = 13 years of education):

_____ years

Are you currently employed?

- ☐ Full-time
- ☐ Part-time
- ☐ Homemaker
- ☐ Unemployed – if so, how long? _____

Occupation (if employed):

Household annual income (per year; check one):

- | | |
|--|--|
| ☐ Below \$5,000 | ☐ \$70,000 - \$79,999 |
| ☐ \$5,000 - \$9,999 | ☐ \$80,000 - \$89,999 |
| ☐ \$10,000 - \$14,999 | ☐ \$90,000 - \$99,999 |
| ☐ \$15,000 - \$19,999 | ☐ \$100,000 - \$109,999 |
| ☐ \$20,000 - \$29,999 | ☐ \$110,000 - \$119,999 |
| ☐ \$30,000 - \$39,999 | ☐ \$120,000 - \$129,999 |
| ☐ \$40,000 - \$49,999 | ☐ \$130,000 - \$139,999 |
| ☐ \$50,000 - \$59,999 | ☐ \$140,000 - \$149,999 |
| ☐ \$60,000 - \$69,999 | ☐ Over \$150,000 |

Please indicate your primary race:

- ☐ American Indian/Alaska Native
- ☐ Asian
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Black or African American
- ☐ White (not of Hispanic origin)
- ☐ Other – please specify: _____

If applicable, please indicate your secondary race:

- ☐ Not applicable
- ☐ American Indian/Alaska Native
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Black or African American
- ☐ White (not of Hispanic origin)
- ☐ Other – please specify: _____

Marital/Partner status:

- ☐ Single
- ☐ Married
- ☐ Living with partner
- ☐ Divorced
- ☐ Widowed
- ☐ Separated

Do you have children (under 18 living) at home?

- ☐ Yes
- ☐ No

If yes, how many?

Insurance type:

- ☐ No insurance
- ☐ Medicaid/Passport
- ☐ Medicare
- ☐ 3rd Party payer
- ☐ Private carrier

Do you receive Social Security or Worker's Compensation benefits?

- ☐ Yes
- ☐ No

Have you had or are you involved in legal action regarding your pain?

- ☐ Yes
- ☐ No

How long have you had your pain problem? (Answer in years and months.)

Please indicate the location of your pain: (Check all that apply.)

- ☐ Head/face
- ☐ Upper extremities (arms, wrists, hands, fingers, etc.)

- ☐ Thoracic spine
- ☐ Cervical spine (upper back, neck)
- ☐ Lower back
- ☐ Pelvic/genital
- ☐ Lower limbs (legs, knees, feet, toes, etc.)
- ☐ Full body
- ☐ Other – please specify: _____

Circumstance under which your pain began:

- | | |
|--|--|
| ☐ Accident at work | ☐ Following surgery |
| ☐ Accident at home | ☐ Following childbirth |
| ☐ Motor vehicle accident | ☐ At work (no accident) |
| ☐ Other accident | ☐ At home (no accident) |
| ☐ Following illness | ☐ No known cause |
| ☐ Other – please specify: _____ | |

Please check the healthcare givers you have seen since your pain condition began: (Check all that apply.)

- | | |
|--|---|
| ☐ Acupuncturist | ☐ Neurosurgeon |
| ☐ Anesthesiologist | ☐ Ophthalmologist (eyes) |
| ☐ Cardiologist | ☐ Orthopedist (bones and joints) |
| ☐ Chiropractor | ☐ Pediatrician |
| ☐ Clergyman | ☐ Plastic Surgeon |
| ☐ Dentist | ☐ Psychiatrist |
| ☐ Dermatologist (skin) | ☐ Psychologist |
| ☐ Faith healer | ☐ Radiologist |
| ☐ Ear, Nose & Throat (ENT) | ☐ Surgeon (general) |
| ☐ General/Family Practice | ☐ Urologist |
| ☐ Hypnotist | ☐ Endocrinologist |
| ☐ Internal Medicine (Internist) | ☐ Physical Therapist |
| ☐ Neurologist | ☐ Osteopath |
| ☐ Other – please specify: _____ | |

Please check the treatments that you have received for your pain (other than medications): (Check all that apply.)

- ☐ Surgery – how many? _____
- ☐ Exercise
- ☐ Physical therapy
- ☐ Acupuncture

- ☐ Occupational therapy
- ☐ Massage
- ☐ Other – please specify: _____

Please list all the ***prescription*** medications/drugs you have taken in the last 6 months:

Please list all the ***over-the-counter*** medications/drugs you have taken in the last 6 months:

Please list all the ***natural/herbal*** medications/drugs you have taken in the last 6 months:

Do you think you have used too much of any drug (listed above) in the past year because of your pain?

- ☐ Yes
- ☐ No
- ☐ Uncertain

Do you feel you need to take more of the pain medication than your doctor has prescribed?

- ☐ Yes
- ☐ No
- ☐ Uncertain

Are you concerned that you use too much pain medication?

- ☐ Yes
- ☐ No
- ☐ Uncertain

Overall, how much pain relief have pain treatments or medications provided?
(Please mark the one percentage that most shows how much relief you have received.)

- ☐ Yes
☐ No

For the following, please mark the answer that best matches your level of pain:
 (0 = no pain at all; 10 = worst pain imaginable.)

Average level of pain over the *past week*?

0	1	2	3	4	5	6	7	8	9	10
No pain at all										Worst pain imaginable

Highest or *peak* pain over the *past week*?

0	1	2	3	4	5	6	7	8	9	10
No pain at all										Worst pain imaginable

Lowest level of pain over the *past week*?

0	1	2	3	4	5	6	7	8	9	10
No pain at all										Worst pain imaginable

Level of pain *right now*?

0	1	2	3	4	5	6	7	8	9	10
No pain at all										Worst pain imaginable

Have you ever been told you have a problem with alcohol?

- ☐ Yes
☐ No

Have you ever been told you have a problem with drugs?

- ☐ Yes
☐ No

If pain management sessions were available, would you be interested in participating in them?

- ☐ Yes
☐ No

If you attended these sessions, where would you *most* like to attend them?

- ☐ At my doctor's office
☐ At a psychology clinic
☐ On the Internet
☐ Other – please specify: _____

Please feel free to take a break for a few minutes before continuing.

1. In the past month, how many times did you visit a primary/family healthcare provider? Do not include visits while in the hospital, a hospital emergency room, or visits to specialty pain management provider. Fill in with "0" or another number.	_____ times
2. In the past month, how many times did you visit a specialty pain management physician? Do not include visits while in the hospital, a hospital emergency room, or visits to a primary/family provider. Fill in with "0" or another number.	_____ times
3. In the past month, how many times did you go to a hospital emergency room? Fill in with "0" or another number.	_____ times
4. In the past month, how many different times did you stay in a hospital overnight or longer? Fill in with "0" or another number.	_____ times
5. In the past month, how may total nights did you spend in the hospital? Fill in with "0" or another number.	_____ times
6. In the past month, how many times have you been to a pharmacist to have prescription medications filled?	_____ times
7. In the past month, how many different pharmacists did you visit to have prescription medications filled?	_____ times

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

	0 never true	1 very seldom true	2 seldom true	3 sometimes true	4 frequently true	5 almost always true	6 always true
_____ 1.							
							I am able to take action on a problem even if I am uncertain what is the right thing to do.
_____ 2.							
							A person who is really "together" should not struggle with things the way I do.
_____ 3.							
							When I feel depressed or anxious, I am unable to take care of my responsibilities.
_____ 4.							
							I try to suppress thoughts and feelings that I don't like by just not thinking about them.
_____ 5.							
							There are not many activities that I stop doing when I am feeling depressed or anxious.
_____ 6.							
							It's OK to feel depressed or anxious.
_____ 7.							
							It is unnecessary for me to learn to control my feelings in order to handle my life well.
_____ 8.							
							I rarely worry about getting my anxieties, worries, and feelings under control.
_____ 9.							
							In order for me to do something important, I have to have all my doubts worked out.
_____ 10.							
							I'm not afraid of my feelings.
_____ 11.							
							When I compare myself to other people, it seems that most of them are handling their lives better than I do.
_____ 12.							
							I try hard to avoid feeling depressed or anxious.
_____ 13.							
							Anxiety is bad.
_____ 14.							
							Despite doubts, I feel as though I can set a course in my life and then stick to it.

_____ 15. If I could magically remove all the painful experiences I've had in my life, I would do so.

_____ 16. I am in control of my life.

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

	0	1	2	3	4	5	6
	never true	very rarely true	seldom true	sometimes true	often true	almost always true	always true
_____ 1.							
_____ 2.							
_____ 3.							
_____ 4.							
_____ 5.							
_____ 6.							
_____ 7.							
_____ 8.							
_____ 9.							
_____ 10.							
_____ 11.							
_____ 12.							

- _____ 13. Keeping my pain level under control takes first priority whenever I'm doing something
- _____ 14. Before I can make any serious plans, I have to get some control over my pain
- _____ 15. When my pain increases, I can still take care of my responsibilities
- _____ 16. I will have better control over my life if I can control my negative thoughts about pain
- _____ 17. I avoid putting myself in situations where my pain might increase
- _____ 18. My worries and fears about what pain will do to me are true
- _____ 19. It's a 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

Below are areas of life that some people value. I am interested in your quality of life in each of these areas. One aspect of quality of life involves the importance you place on each area of living. Not everyone will value these areas, nor will people value these areas in the same way. Rate each area according to *your own personal sense of importance*.

Please rate the importance of each area by circling a number **0** through **10**.

Please select "**N/A**" if a category does not apply to you.

Importance = How important is this area to you?

Satisfaction = Overall, how satisfied are you with the quality and depth of your experience in this aspect of your life?

Actions (last week) = How often have you done something to move you forward in this area during the last week?

N/A = Not
applicable

0 = Not at all

5 = Moderately

10 = Very
important

Family (other than marriage or parenting):

Importance:

N/A 0 1 2 3 4 5 6 7 8 9 10

Satisfaction:

N/A 0 1 2 3 4 5 6 7 8 9 10

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Intimate Relationships (e.g. marriage, couples):**Importance:**

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Parenting:**Importance:**

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Friends/Social Life:**Importance:**

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Work/Career:**Importance:**

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Education/Training:

Importance:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Recreation/Fun:

Importance:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Spirituality:

Importance:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Citizenship/Community Life:

Importance:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Health/Physical Self-Care:

Importance:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Satisfaction:

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

Actions (last week):

N/A	0	1	2	3	4	5	6	7	8	9	10
-----	---	---	---	---	---	---	---	---	---	---	----

For each of the 7 categories of life activities listed, please circle the number on the scale, which describes the level of disability you *typically* experience. A score of “0” means no disability at all, and a score of “10” signifies that *all* of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

1. **Family/Home Responsibilities:** This category refers to activities related to the home or family. It includes chores or duties performed around the house (e.g. yard work) and errands or favors for other family members (e.g. driving the children to school).

1	2	3	4	5	6	7	8	9	10
No									Total
Disability									Disability

2. **Recreation:** This category includes hobbies, sports, and other similar leisure time activities.

1	2	3	4	5	6	7	8	9	10
No									Total
Disability									Disability

3. **Social Activity:** This category refers to activities, which involve participation with friends and acquaintances other than family members. It includes parties, theater, concerts, dining out, and other social activities.

1	2	3	4	5	6	7	8	9	10
No									Total
Disability									Disability

4. **Occupation:** This category refers to activities that are part of or directly related to one’s job. This includes nonpaying jobs as well, such as housewife or volunteer work.

1	2	3	4	5	6	7	8	9	10
No									Total
Disability									Disability

5. **Sexual behavior:** This category refers to the frequency and quality of one’s sex life.

1	2	3	4	5	6	7	8	9	10
No									Total
Disability									Disability

- ☐ Military combat
 ☐ Natural or man-made disaster
☐ Violent attack (robbery, mugging, physical, sexual assault)
 ☐ Severe auto accident
☐ Being kidnapped
 ☐ Being diagnosed with w life-threatening illness
☐ Taken hostage
 ☐ Sudden injury/serious accident
☐ Terrorist attack
 ☐ Observed someone hurt or killed
☐ Torture
 ☐ Learned about a family member or close friend that was hurt or killed
☐ Incarceration (POW, Concentration camp)
 ☐ Learned that your child has a life-threatening illness
☐ Check here if none of these events have happened to you.

Below is a list of problems and complaints that people sometimes have in response to stressful experiences. Please read each one carefully, put an X in the box to indicate how much you have been bothered by that problem in the past month.

	Not at all	A little Bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing <i>memories, thoughts, or images</i> of a stressful experience?	☐	☐	☐	☐	☐
2. Repeated, disturbing <i>dreams</i> of a stressful experience?	☐	☐	☐	☐	☐
3. Suddenly <i>acting or feeling</i> as if a stressful experience <i>were happening again</i> (as if you were reliving it)?	☐	☐	☐	☐	☐
4. Feeling <i>very upset</i> when <i>something reminded you</i> of a stressful experience?	☐	☐	☐	☐	☐
5. Having <i>physical reactions</i> (e.g., heart pounding, trouble breathing, sweating) when <i>something reminded you</i> of a stressful experience?	☐	☐	☐	☐	☐
6. Avoiding <i>thinking about</i> or <i>talking about</i> a stressful or avoiding <i>having feelings</i> related to it?	☐	☐	☐	☐	☐
7. Avoiding <i>activities</i> of <i>situations</i> because <i>they reminded you</i> of stressful experience?	☐	☐	☐	☐	☐
8. Trouble <i>remembering important parts</i> of a stressful experience?	☐	☐	☐	☐	☐
9. Loss of interest in activities that you used to enjoy?	☐	☐	☐	☐	☐

10. Feeling distant or cutoff from other people?	☐	☐	☐	☐	☐
11. Feeling emotionally numb or being unable to have loving feelings for those close to you?	☐	☐	☐	☐	☐
12. Feeling as if your future will somehow be cut short?	☐	☐	☐	☐	☐
13. Trouble falling or staying asleep?	☐	☐	☐	☐	☐
14. Feeling irritable or having angry outbursts?	☐	☐	☐	☐	☐
15. Having difficulty concentrating?	☐	☐	☐	☐	☐
16. Being “super-alert” or watchful or on guard?	☐	☐	☐	☐	☐
17. Feeling jumpy or easily startled?	☐	☐	☐	☐	☐

Hang in there! You are halfway through!

You may want to stand up and take a break for a few minutes.

Please circle the number that best corresponds to how much you agree with each item. If any of the items concern something that is not part of your experience (for example, “It scares me when I feel shaky” for someone who never trembled or felt shaky) answer on the basis of what you expect you think you might feel if you had such an experience. Otherwise, answer all items on the basis of your own experience. Be careful to circle only one number for each item and please answer all items.

	Very little	A little	Some	Much	Very much
1. It is important for me not to appear nervous.	1	2	3	4	5
2. When I cannot keep my mind on a task, I worry that I might be going crazy.	1	2	3	4	5
3. It scares me when my heart beats rapidly.	1	2	3	4	5
4. When my stomach is upset, I worry that I might be seriously ill.	1	2	3	4	5
5. It scares me when I am unable to keep my mind on a task.	1	2	3	4	5
6. When I tremble in the presence of others, I fear what people might think of me.	1	2	3	4	5
7. When my chest gets tight, I get scared that I won't be able to breathe properly.	1	2	3	4	5
8. When I feel pain in my chest, I worry that I'm going to have a heart attack.	1	2	3	4	5
9. I worry that other people will notice	1	2	3	4	5

my anxiety.					
10. When I feel “spacey” or spaced out I worry that I may be mentally ill.	1	2	3	4	5
11. It scares me when I blush in front of people.	1	2	3	4	5
12. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.	1	2	3	4	5
13. When I begin to sweat in a social situation, I fear people will think negatively of me.	1	2	3	4	5
14. When my thoughts seem to speed up, I worry that I might be going crazy.	1	2	3	4	5
15. When my throat feels tight, I worry that I could choke to death.	1	2	3	4	5
16. When I have trouble thinking clearly, I worry that there is something wrong with me.	1	2	3	4	5
17. I think it would be horrible to faint in public.	1	2	3	4	5
18. When my mind goes blank, I worry that there is something terribly wrong with me.	1	2	3	4	5

The following relate to your usual sleep habits during the past month *only*. Your answers should indicate the most accurate reply for the *majority* of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?

USUAL BED TIME _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

NUMBER OF MINUTES _____

3. During the past month, when have you usually gotten up in the morning?

USUAL GETTING UP TIME _____

4. During the past month, how many hours of *actual sleep* did you get at night? (This may be different than the number of hours you spend in bed.)

HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, choose the **one** best response. Please answer **all** questions.

5. During the past month, how often have you had trouble sleeping because you...

a. Cannot get to sleep within 30 minutes

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

b. Wake up in the middle of the night or early in the morning

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

c. Have to get up to use the bathroom

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

d. Cannot breathe comfortably

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

e. Cough or snore loudly

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

f. Feel too cold

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

g. Feel too hot

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

h. Had bad dreams

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

i. Have pain

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

j. Other reason(s), please describe:

How often during the past month have you had trouble falling asleep because of this?

- | | | | |
|--|--|---|---|
| ☐ Not during the past month | ☐ Less than once a week | ☐ Once or twice a week | ☐ Three or more times a week |
|--|--|---|---|

6. During the past month, how would you rate your sleep quality overall?

- ☐ Very good
- ☐ Fairly good
- ☐ Fairly bad
- ☐ Very bad

7. During the past month, how often have you taken medicine (prescribed or “over the counter”) to help you sleep?

- ☐ Not during the past month
- ☐ Less than once a week
- ☐ Once or twice a week
- ☐ Three or more times a week

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

- ☐ Not during the past month
- ☐ Less than once a week
- ☐ Once or twice a week
- ☐ Three or more times a week

9. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?

- ☐ No problem at all
- ☐ Only a very slight problem
- ☐ Somewhat of a problem
- ☐ A very big problem

10. Do you have a bed partner or roommate?

- ☐ No bed partner or roommate
- ☐ Partner/roommate in other room
- ☐ Partner in same room, but not same bed
- ☐ Partner in same bed

Please rate the truth of each statement as it applies to you, using the following scale:

1	2	3	4	5
Not at all characteristic of me				Entirely characteristic of me

_____ 1. Unforeseen events upset me greatly.

- _____ 2. It frustrates me not having all the information I need.
- _____ 3. One should always look ahead so as to avoid surprises.
- _____ 4. A small, unforeseen event can spoil everything, even with the best of planning.
- _____ 5. I always want to know what the future has in store for me.
- _____ 6. I can't stand being taken by surprise.
- _____ 7. I should be able to organize everything in advance.
- _____ 8. Uncertainty keeps me from living a full life.
- _____ 9. When it's time to act, uncertainty paralyzes me.
- _____ 10. When I am uncertain, I can't function very well.
- _____ 11. The smallest doubt can stop me from acting.
- _____ 12. I must get away from all uncertain situations.

For each of the following, choose only the best word that describes your feelings and sensations **at this moment** (right now). Please answer all questions.

1. Choose **one** of the following:

- ☐ Flickering
- ☐ quivering
- ☐ pulsing
- ☐ throbbing
- ☐ beating
- ☐ pounding

2. Choose **one** of the following:

- ☐ Jumping
- ☐ flashing
- ☐ shooting

3. Choose **one** of the following:

- ☐ Pricking
- ☐ boring
- ☐ drilling
- ☐ stabbing
- ☐ lancing

4. Choose **one** of the following:

- ☐ Sharp

- ☐ cutting
- ☐ lacerating

5. Choose **one** of the following:

- ☐ Pinching
- ☐ pressing
- ☐ gnawing
- ☐ cramping
- ☐ crushing

6. Choose **one** of the following:

- ☐ Tugging
- ☐ pulling
- ☐ wrenching

7. Choose **one** of the following:

- ☐ Hot
- ☐ burning
- ☐ scalding
- ☐ searing

8. Choose **one** of the following:

- ☐ Tingling
- ☐ itchy
- ☐ smarting
- ☐ stinging

9. Choose **one** of the following:

- ☐ Dull
- ☐ sore
- ☐ hurting
- ☐ aching
- ☐ heavy

10. Choose **one** of the following:

- ☐ Tender
- ☐ taut
- ☐ rasping
- ☐ splitting

11. Choose **one** of the following:

- ☐ tiring
- ☐ exhausting

12. Choose **one** of the following:

- ☐ sickening
- ☐ suffocating

13. Choose **one** of the following:

- ☐ fearful
- ☐ frightful
- ☐ terrifying

14. Choose **one** of the following:

- ☐ punishing
- ☐ grueling
- ☐ cruel
- ☐ vicious
- ☐ killing

15. Choose **one** of the following:

- ☐ wretched
- ☐ blinding

16. Choose **one** of the following:

- ☐ annoying
- ☐ troublesome
- ☐ miserable
- ☐ intense
- ☐ unbearable

17. Choose **one** of the following:

- ☐ spreading
- ☐ radiating
- ☐ penetrating
- ☐ piercing

18. Choose **one** of the following:

- ☐ tight
- ☐ numb
- ☐ drawing
- ☐ squeezing
- ☐ tearing

19. Choose **one** of the following:

- ☐ cool

- ☐ cold
- ☐ freezing

20. Choose **one** of the following:

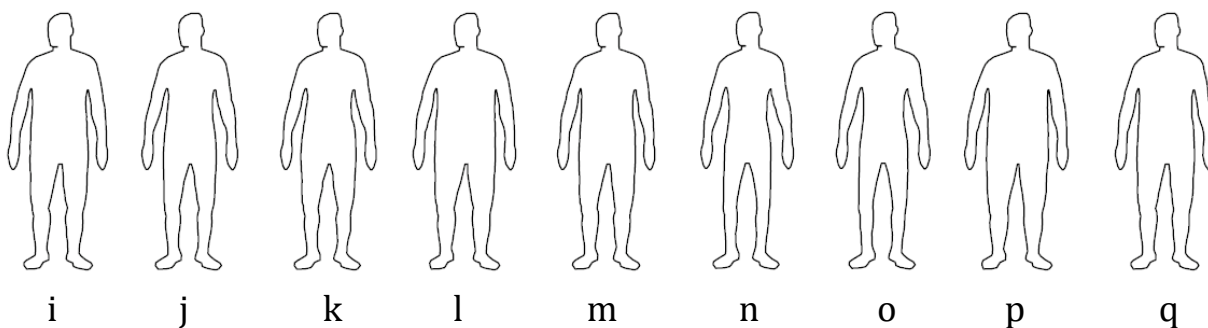
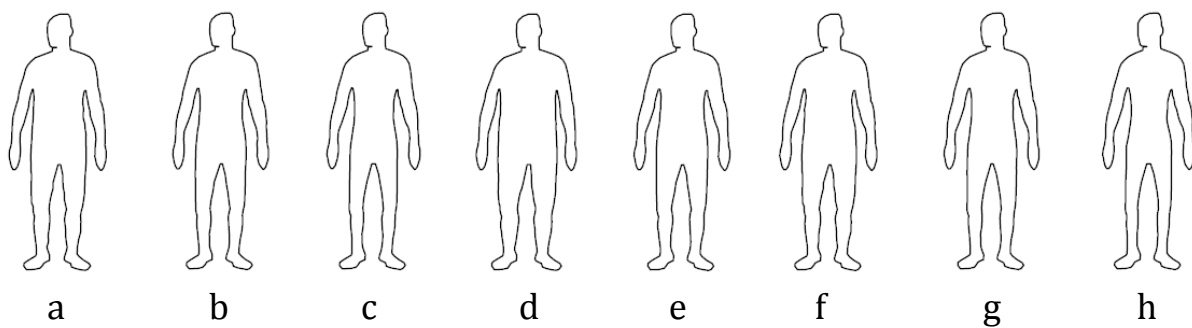
- ☐ nagging
- ☐ nauseating
- ☐ agonizing
- ☐ dreadful
- ☐ torturing

People have a variety of ways of relating to their thoughts and feelings. For each of the items below, rate how much each of these ways applies to you.

	Rarely/ not at all	Sometimes	Often	Almost always
1. It is easy for me to concentrate on what I am doing.	☐	☐	☐	☐
2. I am preoccupied by the future.	☐	☐	☐	☐
3. I can tolerate emotional pain.	☐	☐	☐	☐
4. I can accept things that I cannot change.	☐	☐	☐	☐
5. I can usually describe how I feel at that moment in considerable detail.	☐	☐	☐	☐
6. I am easily distracted.	☐	☐	☐	☐
7. I am preoccupied by the past.	☐	☐	☐	☐
8. It's easy for me to keep track of my thoughts and feelings.	☐	☐	☐	☐
9. I try to notice my thoughts without judging them.	☐	☐	☐	☐
10. I am able to accept the thoughts and feelings I have.	☐	☐	☐	☐
11. I am able to focus on the present moment.	☐	☐	☐	☐
12. I am able to pay close attention to one thing for a long period of time.	☐	☐	☐	☐

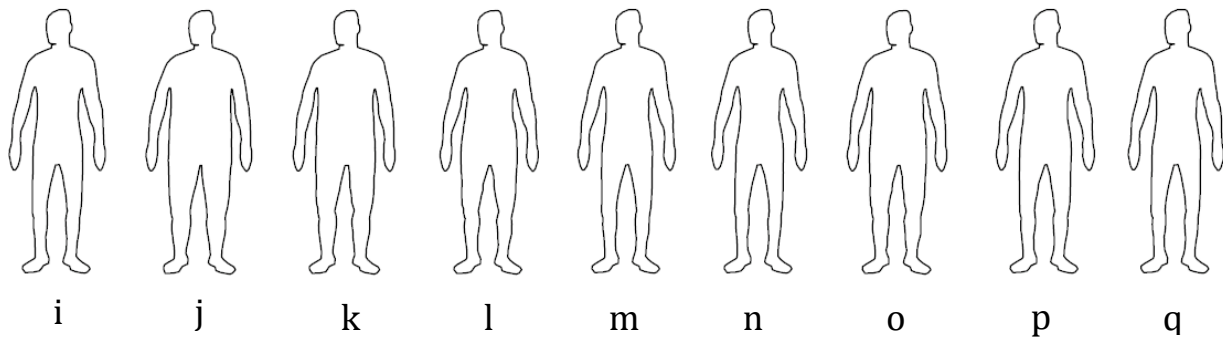
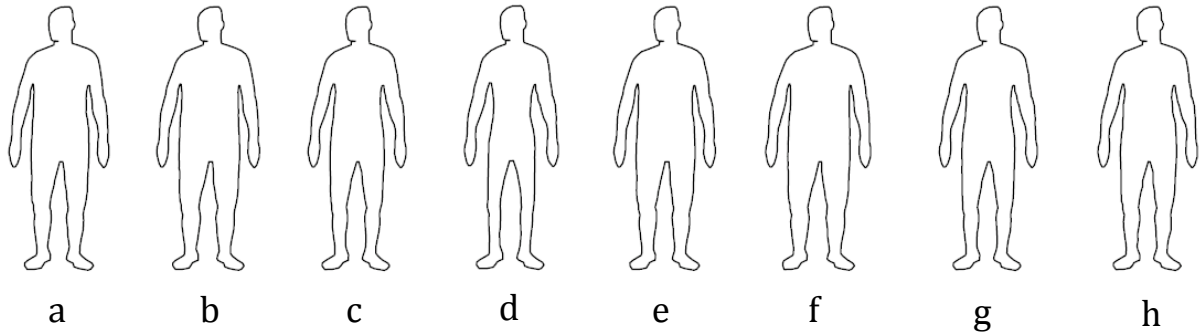
These next two pages are for males only. If you are female, please skip ahead two pages and answer the questions for females. Thank you.

Below are images of male bodies. They are all slightly different, even though some of them might look the same. Please select the image that most closely resembles your body and circle the letter under it.



Male

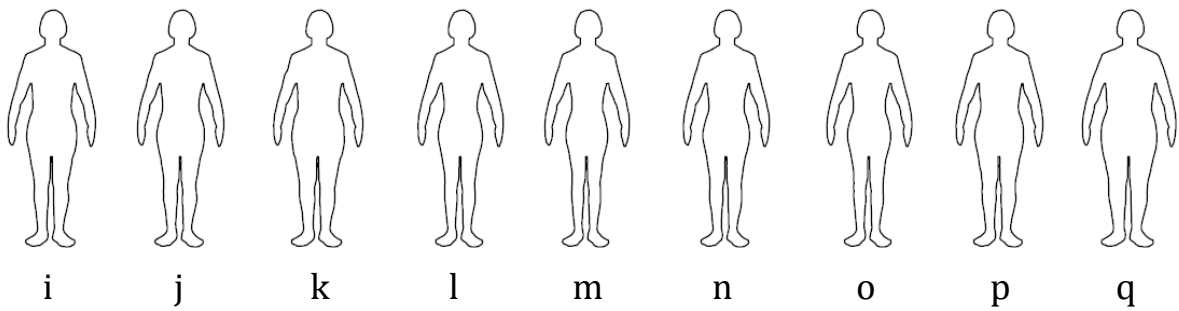
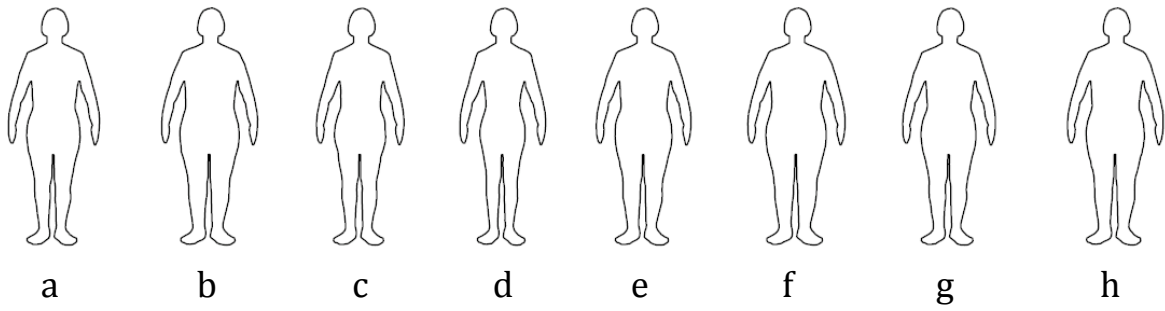
Now select the image that most closely resembles the way you would like your body to look ideally and circle the letter under it.



Male

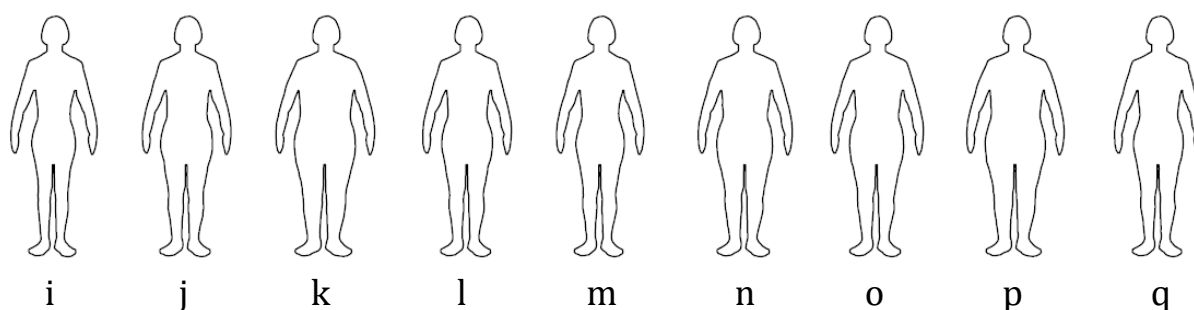
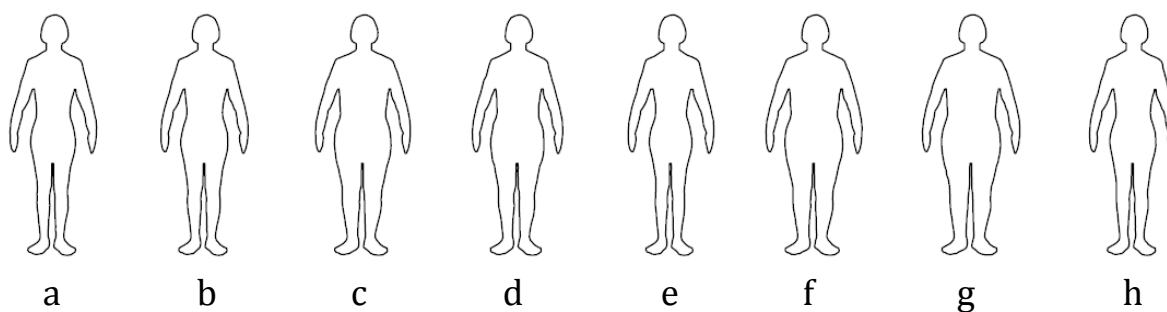
These next two pages are for females only. If you are male, please skip ahead two pages. Thank you.

Below are images of female bodies. They are all slightly different, even though some of them might look the same. Please select the image that most closely resembles your body and circle the letter under it.



Female

Now select the image that most closely resembles the way you would like your body to look ideally and circle the letter under it.



Female

You are almost done!

Please feel free to get up and take a break for a few minutes.

Please report the frequency and average duration of any exercise ***over the past week*** in the spaces below.

As an example, if you exercised four times last week at a moderate intensity, you would write “4” in the frequency space next to moderate exercise. We would like you to also give an average of the time you spent exercising. In our example, if two of those “4” exercise sessions were 30 minutes and the other two were 20 minutes, you would put 25 minutes in the duration space following moderate exercise.

When answering these questions, please remember to:

- Only count the exercise that was done in your free time (i.e., not occupational or housework).
- Note that the difference between the three categories is the ***intensity*** of the exercise.
- If you did not participate in a type of exercise, put “0” in the frequency space.

STRENUOUS EXERCISE (Heart beats rapidly, sweating)

Examples: running, jogging, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes.

Frequency: _____ times

Duration: _____ minutes

MODERATE EXERCISE (Not exhausting, light perspiration)

Examples: fast walking, tennis, easy bicycling, easy swimming, popular and folk dance.

Frequency: _____ times

Duration: _____ times

MILD EXERCISE (Minimal effort, no perspiration)

Examples: easy walking, yoga, bowling, shuffleboard, horseshoes, golf.

Frequency: _____ times

Duration: _____ minutes

An important part of our evaluation includes examination of pain from **YOUR** perspective. You know your pain better than anyone, so the information you give is very helpful in planning a treatment program for you.

Please read each question carefully and then do your best to answer each one. **Do not skip any questions.** After you have completed the questionnaire, check your responses to make sure that you have answered each question. Please use the last page to add any additional information or comments that you think would be of help to us in better understanding your pain problem.

A. Some of the questions in this questionnaire refer to your “significant other.” A significant other is a person with whom you feel closest. This includes anyone that you relate to on a regular or infrequent basis. It is very important that you identify someone as your “significant other.” Please indicate below who your significant other is (check one):

☐ Spouse

☐ Partner/Companion

☐ Housemate/
Roommate

☐ Friend

☐ Neighbor

☐ Parent/Child/Other
relative

☐ Other (please describe):

B. Do you currently live with this person? ☐ Yes ☐ No

When you answer questions in the following pages about “your significant other”, always respond in reference to the specific person you just indicated.

Please continue on the next page.

SECTION 1

This part asks questions to help us learn more about your pain and how it affects your life. Under each question is a scale to mark your answer. Read each question carefully and then **circle a number** on the scale under that question to indicate how that specific question applies to you. An example may help you to better understand how you should answer these questions.

EXAMPLE

How nervous are you when you ride in a car when the traffic is heavy?

0	1	2	3	4	5	6
Not at all nervous						Extremely nervous

If you are not at all nervous when riding in a car in heavy traffic, you would want to **circle** the number 0. If you are very nervous when riding in a car in heavy traffic, you would then **circle** the number 6. Lower numbers would be used for less nervousness, and higher numbers for more nervousness.

PLEASE ANSWER THE FOLLOWING QUESTIONS

1. Rate the level of your pain at the **present moment**.

0	1	2	3	4	5	6
No pain						Very intense pain

2. In general, how much does your pain interfere with your day-to-day activities?

0	1	2	3	4	5	6
No						Extreme

interference

interference

3. Since the time your pain began, how much has your pain changed your ability to work? (_____ Check here if you are not working for reasons other than your pain).

0	1	2	3	4	5	6
No change						Extreme change

4. How much has your pain changed the amount of satisfaction or enjoyment you get from taking part in social and recreational activities?

0	1	2	3	4	5	6
No change						Extreme change

5. How supportive or helpful is your significant other (this refers to the person you indicated above) to you in relation to your pain?

0	1	2	3	4	5	6
Not at all supportive						Extremely supportive

6. Rate your overall mood during the past week.

0	1	2	3	4	5	6
Extremely low						Extremely high

7. On the average, how severe has your pain been during the last week?

0	1	2	3	4	5	6
Not at all severe						Extremely severe

8. How much has your pain changed your ability to take part in recreational and other social activities?

0	1	2	3	4	5	6
No change						Extreme change

9. How much do you limit your activities in order to keep your pain from getting worse?

0	1	2	3	4	5	6
---	---	---	---	---	---	---

Not at all

Very
much

10. How much has your pain changed the amount of satisfaction or enjoyment you get from family related activities?

0	1	2	3	4	5	6
No change						Extreme change

11. How worried is your spouse (significant other) about you because of your pain?

0	1	2	3	4	5	6
Not at all worried						Extremely worried

12. During the past week how much control do you feel you have had over your life?

0	1	2	3	4	5	6
No control						Extreme control

13. How much suffering do you experience because of your pain?

0	1	2	3	4	5	6
No suffering						Extreme suffering

14. How much has your pain changed the amount of satisfaction or enjoyment you get from work? (____ Check here if you are not presently working.)

0	1	2	3	4	5	6
No change						Extreme change

15. How attentive is your spouse (significant other) to you because of your pain?

0	1	2	3	4	5	6
Not at all attentive						Extremely attentive

16. During the past week, how well do you feel you've been able to deal with your problems?

0	1	2	3	4	5	6
Not at all						Extremely well

17. How much has your pain changed your ability to do household chores?

0	1	2	3	4	5	6
No change						Extreme change

18. During the past week, how successful were you in coping with stressful situations in your life?

0	1	2	3	4	5	6
Not at all successful						Extremely successful

19. How much has your pain interfered with your ability to plan activities?

0	1	2	3	4	5	6
No interference						Extreme interference

20. During the past week how irritable have you been?

0	1	2	3	4	5	6
Not at all irritable						Extremely irritable

21. During the past week how tense or anxious have you been?

0	1	2	3	4	5	6
Not at all tense or anxious						Extremely tense & anxious

SECTION 2

In this section, we are interested in knowing how your spouse (or significant other) responds to you when he or she knows you are in pain. On the scale listed below each question, **check one of the responses** to indicate how often your spouse (or significant other) responds to you in that particular way when you are in pain.

PLEASE ANSWER ALL OF THE 12 QUESTIONS

1. Asks me what he or she can do to help.

_____Never _____Seldom _____Sometimes _____Often

2. Gets irritated with me.
 Never Seldom Sometimes Often
3. Takes over my jobs or duties.
 Never Seldom Sometimes Often
4. Talks to me about something else to take my mind off the pain.
 Never Seldom Sometimes Often
5. Gets frustrated with me.
 Never Seldom Sometimes Often
6. Tries to get me to rest.
 Never Seldom Sometimes Often
7. Tries to involve me in some activity.
 Never Seldom Sometimes Often
8. Gets angry with me.
 Never Seldom Sometimes Often
9. Gets me pain medication.
 Never Seldom Sometimes Often
10. Encourages me to work on a hobby.
 Never Seldom Sometimes Often
11. Gets me something to eat or drink.
 Never Seldom Sometimes Often
12. Turns on the T.V. to take my mind off my pain.
 Never Seldom Sometimes Often

SECTION 3

Listed below are 15 daily activities. Please indicate how often you do each of these **checking one of the responses** on the scale listed below each activity. Please complete all 15 questions.

1. Wash dishes.
 Never Seldom Sometimes Often
2. Go out to eat.
 Never Seldom Sometimes Often

3. Go grocery shopping.
 Never Seldom Sometimes Often
4. Go to a movie.
 Never Seldom Sometimes Often
5. Visit friends.
 Never Seldom Sometimes Often
6. Help with the house cleaning.
 Never Seldom Sometimes Often
7. Take a ride in a car or bus.
 Never Seldom Sometimes Often
8. Visit relatives. (Check here if you do not have relatives within 100 miles.)
 Never Seldom Sometimes Often
9. Prepare a meal.
 Never Seldom Sometimes Often
10. Wash the car.
 Never Seldom Sometimes Often
11. Take a trip.
 Never Seldom Sometimes Often
12. Go to a park or beach.
 Never Seldom Sometimes Often
13. Do the laundry.
 Never Seldom Sometimes Often
14. Work on a needed household repair.
 Never Seldom Sometimes Often
15. Engage in sexual activities.
 Never Seldom Sometimes Often

Congratulations! You have completed the survey! As a thank you for your time and participation, we would like to offer you the opportunity to be entered into a drawing for 1 of 12 \$50.00 Visa gift cards.

Please note that the information you provide us will not be used for any other purpose than to send you the gift card, should you be selected in the drawing. ***If you do not wish to provide us with this information, that is perfectly okay.***

Name:

Street address:

Street address:

City, State, and Zip Code:

Phone number (with area code):

Email address:

APPENDIX D

Chronic Pain Acceptance Questionnaire (CPAQ)

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

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

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

APPENDIX E

Pain Disability Index (PDI)

The rating scales below are designed to measure the degree to which several aspects of **your** life are presently disrupted by chronic pain. In other words, we would like to know how much your pain is preventing you from doing what you would normally do, or from doing it as well as you normally would. Respond to each category by indicating the overall impact of pain in your life, not just when the pain is at its worst. For each of the 7 categories of life activity listed, please circle the number on the scale which describes the level of disability you typically experience. A score of 0 means no disability at all, and a score of 10 signifies that all of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

(1) **Family/Home Responsibilities:** This category refers to activities related to the home or family. It includes chores or duties performed around the house (e.g. yard work) and errands or favors for other family members (e.g. driving the children to school).

0	1	2	3	4	5	6	7	8	9	10
No Disability					Total Disability					

(2) **Recreation:** This category includes hobbies, sports, and other similar leisure time activities.

0	1	2	3	4	5	6	7	8	9	10
No Disability					Total Disability					

(3) **Social Activity:** This category refers to activities, which involve participation with friends and acquaintances other than family members. It includes parties, theater, concerts, dining out, and other social functions.

0	1	2	3	4	5	6	7	8	9	10
No Disability					Total Disability					

(4) **Occupation:** This category refers to activities that are a part of or directly related to one's job. This includes non-paying jobs as well, such as that of a housewife or volunteer worker.

0	1	2	3	4	5	6	7	8	9	10
No Disability					Total Disability					

(5) **Sexual Behavior:** This category refers to the frequency and quality of one's sex life.

0	1	2	3	4	5	6	7	8	9	10
No Disability					Total Disability					

(6) **Self-Care:** This category includes activities which involve personal maintenance and independent daily living (e.g. taking a shower, driving, getting dressed, etc.).

0	1	2	3	4	5	6	7	8	9	10
No Disability									Total Disability	

(7) **Life-Support Activity:** This category refers to basic life-supporting behaviors such as eating, sleeping, and breathing.

0	1	2	3	4	5	6	7	8	9	10
No Disability									Total Disability	

APPENDIX F

Positive and Negative Affect Scale (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way during the past week.

Use the following scale to record your answers.

(1) = Very slightly or not at all (2) = A little (3) = Moderately (4) = Quite a bit (5) = Extremely

	Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely
1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5