

THE EFFECT OF VIRTUE AND ACCEPTANCE ON REHABILITATION OUTCOMES IN  
INDIVIDUALS WITH CHRONIC LOW BACK PAIN

A DISSERTATION  
SUBMITTED TO THE GRADUATE SCHOOL  
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PHILLIP S. KECK

DISSERTATION ADVISOR: DR. SHARON BOWMAN

BALL STATE UNIVERSITY

MUNCIE, INDIANA

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## TABLE OF CONTENTS

ABSTRACT .....	vi
INTRODUCTION .....	1
WHO-ICF Model of Disability .....	2
Personal Factors: Virtue in Rehabilitation .....	6
Personal Factors: Chronic Pain Acceptance in Rehabilitation .....	9
The Current Study .....	11
METHOD .....	12
Participants .....	12
Instrumentation .....	13
Procedure .....	20
Data Analyses .....	21
RESULTS .....	22
Hierarchical Regression .....	26
Zero-Order Correlations .....	30
DISCUSSION .....	33
Clinical and Research Implications .....	38
Strengths and Limitations .....	41
Conclusions .....	43
REFERENCES .....	44
APPENDICES .....	52
A. Extended Literature Review .....	52
B. Demographic Questionnaire .....	92

C. Informed Consent Document .....96

D. IRB Approval Letter .....98

## Abstract

**DISSERTATION:** The Effect of Virtue and Acceptance on Rehabilitation Outcomes in Individuals with Chronic Low Back Pain

**STUDENT:** Phillip S. Keck

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While chronic pain acceptance literature is increasing, no prior study explored how virtue and acceptance work together to promote positive adjustment to chronic low back pain.

Conceptually framed in the World Health Organization-International Classification of Functioning (WHO-ICF) model of disability, 293 individuals with CLBP completed measures of virtue, chronic pain acceptance, depression, anxiety, life satisfaction, and general functioning.

An exploratory hierarchical regression analysis was conducted to determine the role of virtue and acceptance (i.e., activities engagement and pain willingness) in predicting depression, anxiety, and life satisfaction in individuals with chronic low back pain (CLBP). Results showed evidence of an ICF-based understanding of positive pain adjustment whereby virtue and chronic pain acceptance contributed significantly to the experience of depression, anxiety, and life satisfaction in individuals with chronic low back pain. Implications for clinical practice and research are discussed.

Keywords: chronic low back pain, virtue, acceptance, World Health Organization, disability, rehabilitation, mental health, mTurk

## **The Effect of Virtue and Acceptance on Rehabilitation Outcomes in Individuals with Chronic Low Back Pain**

Over 116 million adults in United States suffer from chronic pain with an annual estimated \$635 billion spent on health care and lost productivity (Institute of Medicine of the National Academies [IMNA], 2011). Typically, chronic pain is defined as continuous pain persisting for six months beyond any physical damage causing pain, while remaining unresponsive to available medical treatments (Jensen, Moore, Bockow, Ehde, & Engel, 2011; Lee, Chronister, & Bishop, 2008). While many people with chronic pain encounter minimal difficulty, if any, to their psychological functioning and social interactions, others are confronted by significant challenges given the chronic nature of the condition (Turk & Okifuji, 2002). As such, typical psychosocial problems associated with chronic pain include unemployment, underemployment, and psychological distress (Cutler, Fishbain, Steele-Rosomoff, & Rosomoff, 2003; Jensen et al., 2011; Lee et al., 2008). In addition, the relationship between chronic pain and higher levels of depression and anxiety is well documented (e.g., Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Geertzen, Van Wilgen, Schrier, & Dijkstra, 2006).

Specifically, chronic low back pain (CLBP) affects 15% to 45% of adults annually and at least 70% of adults will experience some form of lower back pain in their lifetime (Hoffman, Papas, Chatkoff, & Kerns, 2007). In addition, Hoffman and researchers (2007) reported that CLBP accounts for 75-90% of the societal costs of back pain. In a study examining functional capacity (e.g., stooping, climbing, crouching, lifting) and employment outcomes in 188 individuals with chronic low back pain, Cutler and colleagues (2003) found lower pain level and compensation status were significant predictors of long-term employment. In a similar effort, Burton, Polatin, and Gatchel (1997) found that age, ethnicity, anxiety, and negative perceptions

of disability predicted lower return-to-work rates, concluding that psychosocial aspects should be factored into the rehabilitation process for the best outcomes. Moreover, in the past 25 years, health care providers began integrating psychosocial approaches into their treatment for pain because the anatomical pathology may be unknown or unresponsive to physical therapy or pharmacotherapy (Geertzen et al., 2006). In response to the growing holistic conceptualization of medical illness, the World Health Organization (WHO) developed the World Health Organization – International Classification of Functioning (WHO-ICF Model; WHO, 2001). For researchers and clinicians alike, the WHO-ICF Model is a definitive framework to approach empirical study and treatment of any disability, including chronic low back pain, citing the biopsychosocial underpinning in conceptualizing how physical health issues affect the whole person.

### **The WHO-ICF Model of Disability**

Models of disability have evolved over time in terms of the how society views the individual with a disability. The ICF Model conceptual framework joins ideas from medical and social models while integrating aspects of individual personhood and context to conceptualize the disability experience (WHO, 2001). The WHO defines several pertinent terms to outline the ICF Model. In the following section, those terms are discussed in the context of the current study constructs and main study analyses (hierarchical regression). The ICF Model is portrayed in *Figure 1* below.

**Functioning and Disability.** The core structure of the ICF consists of the Health Condition and two main parts: (1) Functioning and Disability, consisting of Body Function and Structures, Activity, and Participation; and (2) Contextual Factors, including Personal Factors and Environmental Factors. Within Functioning and Disability, the Body component consists of



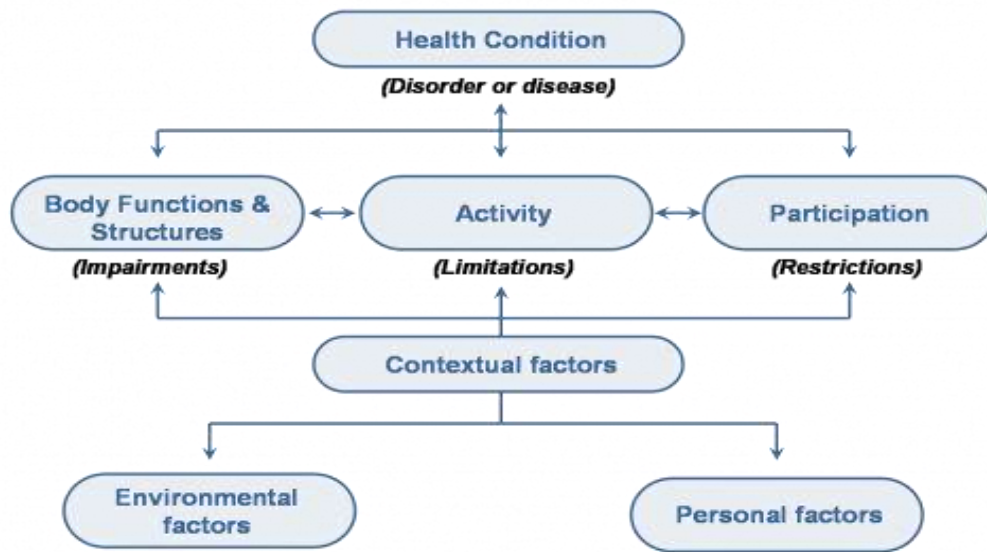


Figure 1. The WHO-ICF Model of Disability. This figure was originally published by WHO (2001).

the two classifications of Body Structure and Body Function, which are qualified by anatomical Impairment to either of the two. For example, if an individual has chronic low back pain thought to be caused by a bulging disc, the Structure affected may be the lumbar spinal vertebrae and the impaired Function would be the ability to absorb pressure and keep the bones from rubbing against each other. In this way, Body Structure and Function are qualified by changes in physiological systems or anatomical structure. In the current study, these components are predictor variables in the regression analyses. In the current study, the Body Structure of interest was the lower back and the Body Function was considered as those pain demographic factors contributing to the level of chronic pain experienced in the lower back. In the hierarchical regression analyses, the predictor variables representing the pain demographic factors were a pain intensity metric termed characteristic pain, number of pain medication, age of onset of pain, number of treatments for pain, and difficult days (the number of days pain limits the individual).

In the Activity and Participation component of Functioning and Disability, domains of functioning are conceptualized from an individual (Activity) and societal (Participation) perspective and components of functioning are described as either non-problematic or disabling (i.e., activity limitation, or participation restriction; Peterson, 2005; WHO, 2001). Typically, Activities are defined as the execution of a task or action by an individual and are thought of as activities of daily living (ADLs) such as cleaning one's body, getting dressed, eating, functional mobility, daily personal hygiene, and toileting (Peterson). For Participation, this may include involvement in life situations of greater society, such as gainful employment, however operationalizing Participation in research and practice has been the subject of debate in the rehabilitation literature (Heinemann, 2005). Further discussion of how Participation is defined may be found in the extended literature review (see Appendix A).

For Activity and Participation, the WHO uses the terms Capacity and Performance to measure Activity and Participation, such that Capacity refers to the individual's ability or potential to complete an action or task in a standard environment while Performance is the actual behavior an individual performs in his or her current environment (WHO, 2001). For example, the person with a bulging disc in her lower back may have the Capacity to perform most of her ADLs at home; however, she may have limited functional mobility (Activity) to Perform her job as a grocery store stocking clerk (Participation). In the current study, Activity and Participation were combined to create one predictor variable in the hierarchical regression and were defined by a specific instrument developed by the WHO to measure Activity and Participation, the WHO Disability Assessment Schedule-2.0 (WHODAS 2.0; Üstün et al., 2010). This measure will be discussed further in the Method section of this document.

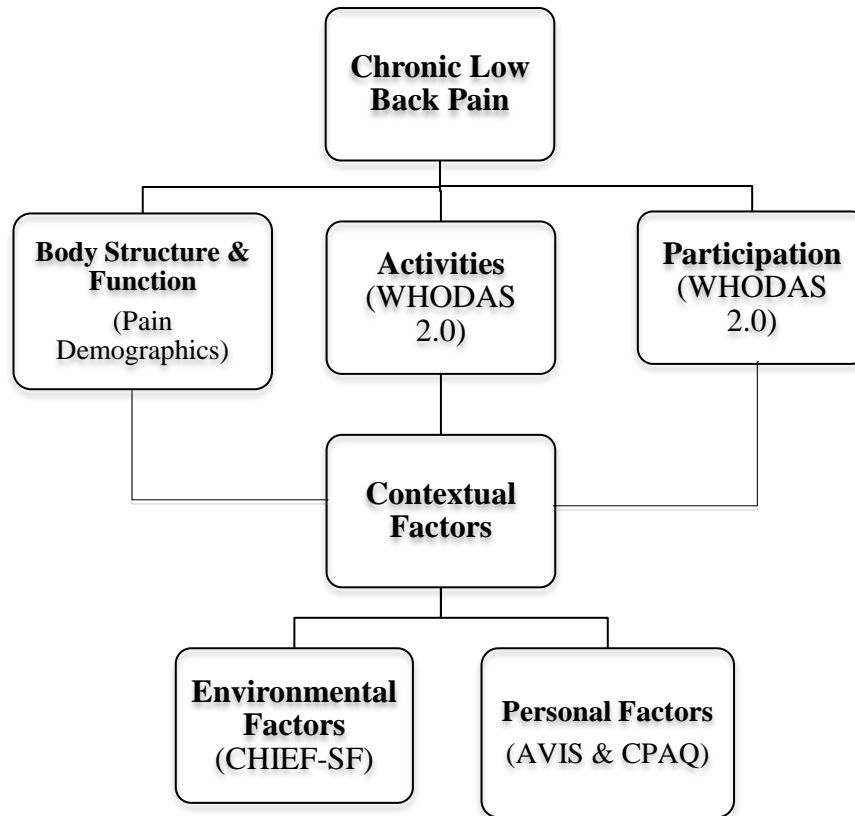
**Contextual Factors.** The next main part of the model is termed Contextual Factors, which includes Environmental Factors and Personal Factors. Environmental Factors are the physical, social, and attitudinal world of the individual that either help or hinder functioning, while Personal Factors describe those unique elements of personhood existing between individuals (Peterson, 2005). In the current study, Environmental Factors made up another predictor variable and were measured using an instrument developed specifically for the construct, the Craig Hospital Inventory of Environmental Factors-Short Form (CHIEF-SF; Whiteneck et al., 2004). Regarding Personal Factors, these predictor variables represent the primary constructs of interest in relation to chronic pain rehabilitation in the current analyses. Specifically, Personal Factors were defined as the positive psychology concept of virtue (Peterson & Seligman, 2004) and chronic pain acceptance (McCracken, 1998; McCracken & Eccleston, 2003). Within the regression analyses, virtue was measured using the Adapted Virtue

Inventory of Strengths (AVIS; Kim, Keck, Gonzalez, & Reid, in preparation). Chronic pain acceptance was operationalized by the two subscales of the Chronic Pain Acceptance Questionnaire (CPAQ; McCracken, Vowles, & Eccleston, 2004), the Pain Willingness and Activities Engagement scales. Together, the scales made up three predictor variables in the regression model; these constructs made up the primary factors of interest in relation to study hypotheses (discussed below), virtue and chronic pain acceptance are explored in depth in the following section. Also, a graphic representation of a proposed ICF-based Understanding of Positive Pain Adjustment is depicted below, summarizing how study instruments are related to the ICF Model in the current study.

### **Personal Factors: Virtue in Rehabilitation**

Peterson and Seligman (2004) developed a classification of virtue and character strength, making the systematic study of virtue possible. To date, a significant body of research links virtue and quality of life (QOL) (c.f., Park, Peterson, & Seligman, 2004; Peterson, Ruch, Beermann, Park, & Seligman, 2004; Seligman, Steen, Park, & Peterson, 2005); however, few of these studies explore chronic illness and disability. Traditionally, rehabilitation research has focused on the psychosocial deficits of physical disability; however, the amount of empirical evidence related to positive emotion, personal strengths, and positive intervention is increasing (Dunn, Uswatte, & Elliott, 2009; Ehde, 2010; Peterson, Park, & Seligman, 2006; Peterson, Park, Pole, D'Andrea, & Seligman, 2008; Rath & Elliott, 2012). In addition, recent investigations of the psychosocial experience of chronic pain have explored resilience and posttraumatic growth (c.f., Ong, Zautra, & Reid, 2010; Sturgeon & Zautra, 2010; Yeung, Arewasikporn, & Zautra, 2012).

Rehabilitation outcome researchers in QOL are also focusing on the positive psychology literature (e.g., Ehde) and these various efforts point toward the development of a positive



*Figure 2.* Proposed ICF-based understanding of positive pain adjustment. This figure specifies the understanding based on how study instruments relate to the ICF Model.

rehabilitation psychology (Dunn & Dougherty, 2005; Rath & Elliott, 2012). Dating back to the emphasis on strengths in rehabilitation proposed by Beatrice Wright (1960; 1983), the roots of positive psychology are strong in the research and practice of rehabilitation psychology today. Linking the virtue classification to rehabilitation, Peterson and colleagues (2006) found that virtue and character strength were related to recovery from illnesses (e.g., cancer, chronic pain, arthritis, obesity, substance abuse, depression, anxiety, diabetes, and autoimmune diseases). In their study, a sample of 2,087 adults who were 36 years old on average, 88% Caucasian, 87% women, and 85% US citizens, completed the Values-In-Action-Inventory of Strengths (VIA-IS; Park et al., 2004) and the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), as well as demographic measures about mental and physical illness and recovery. Participants who had recovered from a psychological disorder scored higher on virtues of Wisdom and Transcendence, with corresponding character strengths of *appreciation of beauty and excellence, creativity, curiosity, gratitude, and love of learning*, than did participants never diagnosed with a psychological disorder. Individuals reporting a physical illness such as arthritis, cancer, and chronic pain showed virtues of Transcendence, Humanity, and Courage, with corresponding character strengths of *humor, bravery, and kindness* to mediate recovery. Individuals with a psychological illness (e.g., anxiety, depression, substance abuse) exhibited possible mediating strengths for recovery including *appreciation of beauty* and *love of learning*. Based on these results, the researchers suggested that individuals who recovered from and made positive adaptations to chronic illness showed a collection of virtues leading to higher life satisfaction than those who had adjusted poorly to their chronic illness and that they may have developed and implemented their virtue and strengths as a result of their experience of illness.

In applying positive psychology to rehabilitation psychology, Dunn and Brody (2008)

theorize three behaviors that may lead to a flourishing life for individuals following an acquired physical disability: building meaningful relations with others, cultivating positive traits, and making efforts toward autonomy and management of one's own life. These behaviors are consistent with the tenets of positive psychotherapy (Seligman, Rashid, & Parks, 2006). In building connections with others, behaviors may include socializing with and helping others while practicing the development of positive social comparisons. Individuals may also cultivate positive traits through finding meaning, developing and acknowledging resilience, expressing gratitude and humor, and savoring their experiences. Finally, the authors define autonomous behavior as how individuals might use their energy, be comfortable with decision-making, and engage in life's activities (Dunn & Brody, 2008). While these circumstances and traits are not necessary for individuals with physical disabilities to thrive, they may substantially contribute to what Wright (1983) described as a positive psychosocial response to disability by orienting toward the coping end of the "coping vs. succumbing" spectrum. In relation to chronic pain acceptance, the underlying mechanism of engagement in the behaviors described may be positive psychological elements, such as practicing virtue and character strength. Therefore, individuals who accept and integrate chronic pain into their lives using these positive elements may be better equipped to engage in these behaviors and realize improvements in quality of life and better rehabilitation outcomes.

### **Personal Factors: Chronic Pain Acceptance in Rehabilitation**

McCracken (1998) defined acceptance as "Acknowledging that one has pain, giving up unproductive attempts to control pain, acting as if pain does not necessarily imply disability, and being able to commit one's efforts toward living a satisfying life despite pain" (p. 22). According to Gatchel and colleagues (2007), emotional and cognitive factors affecting treatment outcomes

in individuals with chronic pain include anxiety, anger, depression, general pain appraisal and beliefs, catastrophizing and fear-avoidance beliefs, perceived control and self-efficacy, and vulnerability and resilience. As a result, psychological treatment addressing pain-related cognition and ensuing behaviors including cognitive-behavioral therapy (CBT) and acceptance-based approaches have gained wide empirical and clinical support (McCracken, Vowles, & Eccleston, 2005; Morley, Eccleston, & Williams, 1999). Specifically, negative pain-related cognitive appraisals such as perceiving pain as harmful, threatening, or an obstacle to everyday functioning were found to be strong predictors of interpersonal distress, greater sense of disability, functional limitation, depressive complaints, and overall importance of pain in everyday limitation (Janowski, Steuden, & Kurylowicz, 2010). In addition, perceiving pain and illness as a challenge to be overcome leads to higher quality of life (QOL) and better acceptance (McCracken et al., 2005; Rath & Elliott, 2012).

In the same vein, perceptions of disability have also recently become a focus in outcome studies exploring acceptance of chronic pain (McCracken, 1998; McCracken & Eccleston, 2003; McCracken & Eccleston, 2006). Related to findings on negative perceptions of pain, Dozois, Dobson, Wong, Hughes, and Long (1995) found perception of disability, along with physical status and treatment variables, a significant predictor of return-to-work in a sample of 117 individuals with CLBP. In addition, psychological factors predicted employment outcomes in their sample. Perception of chronic pain disability may hold implications for rehabilitation outcomes, including employment and QOL. Specifically, greater acceptance of the pain predicted lower pain intensity, less pain-related anxiety and avoidance, lower depression, less physical and psychosocial disability, active engagement in activities, and less catastrophic thinking about pain (McCracken, 1998; Vowles, McCracken & Eccleston, 2008). Finally, Jensen



and colleagues (2011) performed a literature review of psychosocial aspects of chronic pain in individuals with physical disabilities, finding the most common aspects predicting poor psychosocial adjustment to pain included catastrophizing cognitions, along with a tendency to physically guard their body, low perceived social support, and high pain-related beliefs. Essentially, individuals who could not accept and adaptively cope with pain experienced increased rumination and catastrophizing of pain-related beliefs.

### **The Current Study**

The ICF Model affords a conceptual framework for systematic and holistic empirical study of how impairing medical conditions may limit daily activities and restrict participation in society while considering personal and contextual factors across physical, emotional, and environmental experiences. In the current study, individuals' experiences of chronic low back pain were examined through the ICF Model terms and definitions. Using hierarchical regression analyses, the significance of each predictor variable operationalized above was determined in relation to three criterion variables, depression, anxiety, and life satisfaction. The positive psychological effects of chronic pain acceptance seem evident, and further systematic exploration of these processes seems warranted. Specifically, this study aims to formulate and evaluate an ICF-based understanding of rehabilitation outcomes for people with chronic low back pain (PWCLBP) and examine how ICF factors are associated with depression, anxiety, and life satisfaction for PWCLBP. Further, this study generates new knowledge about the contribution of personal factors to depression, anxiety, and life satisfaction of PWCLBP, leading to better understanding of dynamics between CLBP and rehabilitation outcomes.

#### Research Questions:

1. Do the ICF constructs conceptualized in the current study (i.e., demographics,

pain demographics, activities and participation, environmental, and personal factors) predict anxiety, depression, and life satisfaction of individuals with CLBP?

2. Do virtue and/or acceptance of CLBP predict depression, anxiety, or life satisfaction?
3. How is virtue related to acceptance of chronic low back pain?
4. How do acceptance and virtue relate to pain demographics?

Hypotheses:

1. Five ICF-based variables (demographics, pain demographics, activities and participation, environmental, and personal factors) will account for a significant amount of variance in depression, anxiety, and life satisfaction.
2. Virtue and acceptance of chronic pain will predict anxiety, depression, and life satisfaction.
3. Virtue will be positively correlated with acceptance of chronic low back pain.
4. Virtue and acceptance will differ in how they correlate with pain demographics.

## **Method**

### **Participants**

Inclusion criteria for participants in this study were (a) age between 18-65 years of age, (b) a medical diagnosis of chronic low back pain given by their doctor, (c) self-reported English reading level better than or equal to 6<sup>th</sup> grade, and (d) living in the community (i.e., outpatient care). In total, 310 participants initially entered the online survey, of whom 293 participants (163 male, 130 female) completed all study instruments, which was adequate to conduct study analyses. The other 17 participants opened the online survey, but either chose not to begin

responding to the survey or did not respond to a significant amount of survey questions. Table 1 outlines frequency statistics for key demographic variables. The average participant was a married Caucasian male with a Bachelor's degree.

### **Instrumentation**

**Demographic information.** Information in the demographic portion of the questionnaire totaled 26 items including age, sex, race/ethnicity, nationality, education, marital status, and veteran status. Pain-related demographic information included age of onset of chronic pain, length of time with chronic pain, pain intensity (current, average, low, and high pain levels over past week; 0-10), and medical diagnoses and treatments, if applicable. Current, average, and high pain intensity measures were used to compute the characteristic pain metric. Employment and educational information included employment status, employment prior to and following chronic pain onset, time missed from work and/or school. Substance use history (alcohol, tobacco, and illicit drugs) and socioeconomic indicators (social security/medical claims) completed the demographic section.

**Personal Factors: Virtue.** In order to measure participants' virtue, the Adapted Virtue Inventory of Strengths (AVIS; Kim et al., in preparation) was used for this study. It is a semantic differential scale, with 46 pairs of polar opposites with each item representing a virtuous trait at one extreme and a corresponding antonym at the other extreme (e.g., Hateful : Loving; Lazy : Hardworking; Modest : Arrogant). The AVIS has been developed as a measure of the strengths that make up the virtue classification as conceptualized by Peterson and Seligman (2004). To minimize response bias, polarities are reversed on select items and then reversed on scoring. Scaled differential scores ranging 1-7 are recorded, with higher scores on each item indicative of higher perceived strengths in that area. While conceptually based on the Classification of Virtue

Table 1.  
*Frequency Statistics for Key Demographics*

Variable	<i>N</i>	<i>n</i>	%
	293		
Gender (Male)		163	52.6
Race (Caucasian)		199	64.2
Race (Asian)		70	22.6
Education (Bachelor's)		133	42.9
Education (High School Diploma)		57	18.4
Marital Status (Married/Co-habiting)		166	53.5
Marital Status (Single)		108	34.8
Employment		234	79.9

and Character Strengths (Peterson & Seligman, 2004), the AVIS is a new instrument with a unique five-factor structure normed and developed specifically with disability populations. The scale development findings are discussed briefly in the following paragraphs.

Exploratory factor analysis (EFA) was employed to derive factors and provide psychometric information to validate the construct validity of the AVIS (Kim et al., in preparation). Principle axis factoring with a promax rotation was employed. A five-factor solution was ultimately selected, with eigenvalues for those five factors of 13.10, 4.47, 3.13, 2.92, and 2.04, respectively. A five-factor solution, which accounted for 41.37 percent of the total variance in a sample of 256 university students with disabilities, was found parsimonious with a good simple structure and interpretability. The first factor is labeled *Synergetic Transcendence* based on the importance in strengths of a balanced and holistic inner-personal and social life for individuals experiencing chronic illness and disability (CID). In adapting to CID, whether acquired or congenital, the strengths of synergetic transcendence help individuals maintain strength within themselves (such as hope, religiosity, zest, and appreciation of beauty and excellence) and their social support (such as gratitude, capacity to love and be loved, forgiveness, and kindness) across time and context. The second factor is labeled *Wisdom as Openness*. In essence, this factor encompasses the ability to exercise open-mindedness to themselves, their social support, their condition, the context in which they are placed, and the intersecting implications of these aspects. In addition, an open mind may indicate greater acceptance of and positive response to CID (McCrae & Costa, 1986; Tedeschi & Calhoun, 1996, 2004). *Integrity* refers to the self-control inherent in one who is consistently prudent, modest, honest, or loyal in developing intra- and interpersonal relationships. The fourth factor, *Courageousness*, refers to bravery, an important aspect for any individual coping with a chronic

condition. Finally, *Pursuit of Excellence* is a collection of strengths addressing industriousness and drive toward betterment of self by using curiosity, learning, persistence, self-discipline, and appreciation of excellence.

Concurrent validity was tested by correlating subscale scores of the AVIS with other measures including the Satisfaction with Life Scale (Diener et al., 1985), Connor-Davidson Resilience Scale (Connor & Davidson, 2003), and subscales of the Sense of Well-Being Inventory-Revised (Catalano, Kim, Ditchman, Shin, & Chan, 2010). Statistically significant correlations were identified between the AVIS factors and resilience. Further, relatively higher correlations were identified between two AVIS factors (synergetic transcendence and pursuit of excellence) and three factors of life satisfaction (physical, psychological, and family and social well-being). Reported  $\alpha$  coefficients were .844, .784, .784, .772 and .783, respectively, indicating moderately high internal consistency of the items constituting the factors (Kim et al., in preparation). In the current sample, total scale internal consistency for the AVIS was acceptable ( $\alpha = .65$ ) however due to poor reliability in three of five subscales, the one-factor virtue scale of 46 items was utilized to test hypotheses.

**Personal Factors: Chronic pain acceptance.** The Chronic Pain Acceptance Questionnaire (CPAQ; McCracken, Vowles, & Eccleston, 2004) is a 20-item inventory designed to measure pain acceptance. It is based on a general measure of acceptance and emotional avoidance called the Acceptance and Action Questionnaire (AAQ; Hayes, Strosahl, Wilson, Bissett, & Pistorello, 1996) adapted specifically for individuals with chronic pain. All items of the CPAQ are rated on a 0 (never true) to 6 (always true) scale. The original items were rationally derived to tap aspects of the construct of acceptance and consist of two subscales: *activity engagement* (AG: pursuit of life activities regardless of pain) and *pain willingness* (PW:

recognition that avoidance and control are often unworkable methods of adapting to chronic pain). Sample items for the AG subscale include, “My life is going well, even though I have chronic pain” and “I am getting on with the business of living no matter what my level of pain is.” Sample items for the PW subscale 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.” Empirical methods, including item total and inter-item correlations, and reliability statistics, were used to reduce the original item pool to a set of 20 items (nine that were reverse-scored) that were summed to calculate a total score. This version achieved a reliability coefficient of  $\alpha = 0.85$  (Geiser, 1992). Data from two separate studies show that the total score from the CPAQ is negatively correlated with standardized measures of emotional distress (Beck Depression Inventory; Sickness Impact Profile) and daily function supporting its divergent validity as a measure of acceptance (Geiser, 1992; McCracken, 1998). Reliability for the full scale and subscales in this sample was strong ( $\alpha = .83$ ;  $\alpha = .89$ , AG;  $\alpha = .76$ , PW)

**Activities and participation in society.** The World Health Organization Disability Assessment Schedule (WHODAS 2.0; Üstün et al., 2010) is a 36-item measure based on the ICF model of disability and measures functioning in six major life domains: (1) cognition (understanding and communication; e.g., “Concentrating on doing something for ten minutes?”); (2) mobility (ability to move and get around; e.g., “Standing for long periods such as 30 minutes?”); (3) self-care (ability to attend to personal hygiene, dressing and eating, and to live alone; e.g., “Washing your whole body?”); (4) getting along (ability to interact with other people; e.g., “Dealing with people you do not know?”); (5) life activities (ability to carry out responsibilities at home, work and school; e.g., “Taking care of your household responsibilities?”); (6) participation in society (ability to engage in community, civil and

recreational activities; e.g., “How much of a problem did you have in joining in community activities (for example, festivities, religious or other activities) in the same way as anyone else can?”). According to the instrument developers, “all domains were developed from a comprehensive set of ICF items and made to correspond directly with ICF's ‘activity and participation’ dimension, which is applicable to any health condition” (p. 820, Üstün et al., 2010). In the current study, Cronbach’s  $\alpha$  coefficients ranged between  $\alpha = .83 - .91$  for the six subscales, and  $\alpha = .97$  for all 36 items. Individual item scores range from 1 – 5 (none, mild, moderate, severe, and extreme), indicating how the participant’s disability, in this case chronic low back pain, affects their functioning in a given domain.

**Environmental factors.** The Craig Hospital Inventory of Environmental Factors–Short Form (CHIEF-SF; Whiteneck et al., 2004) is a 12-item measure based on the ICF model of disability assessing the frequency, magnitude and overall impact of physical, social/attitudinal, and policy barriers perceived by people with disabilities. For each type of perceived barrier, participants are asked to respond to the frequency they experience them (daily, weekly, monthly, less than monthly, or never) and how much of a problem it imposes (big or little). Scoring is calculated through the product of the frequency (never-0; daily-4) and the magnitude (1-little; 2-big) for an individual item score range from 0-8. Then, all 12 items are summed for the total scale score (0-96). Sample items include, “In the past 12 months, how often has the availability of transportation been a problem for you?” and “In the past 12 months, how often have other people’s attitudes toward you been a problem at school or work?” Items assessing impact on work or school are only included for those who are working or in school. Originally a 25-item measure, the 12-item short form measure was used for this study, utilizing those items with the



best conceptual clarity and discriminant validity, according to the instrument developers (Whiteneck et al., 2004). In the current study, Cronbach's  $\alpha = .85$  for all 12 items.

**Depression.** The Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999) is a nine-item measure for depressive symptoms based on DSM-IV criteria. Participants rated nine depressive symptoms (e.g., Little interest or pleasure in doing things" and "Feeling down, depressed, or hopeless.") over the last two weeks on a four-point scale (0 - *not at all* to 3 - *nearly every day*). A total score is summed (0-27) to produce a symptom-severity score, where higher values reflected greater endorsement of depressive symptomatology (Kroenke, Spitzer, & Williams, 2001). According to Löwe and colleagues (2004), total scores exceeding 11 indicate Major Depressive Disorder in the general medical population. In the same study, PHQ-9 scores demonstrated excellent internal consistency ( $\alpha = .88$ ;  $n = 501$ ; mean age = 41.7 (13.8) years). In the current sample, mean scores did not indicate clinical depression ( $M = 7.51$ ;  $SD = 6.49$ ). Reliability in this sample was strong ( $\alpha = .92$ )

**Anxiety.** The Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) is a brief 7-item self-report measure for anxiety rooted in DSM-IV criteria for generalized anxiety disorder. On a 4-point Likert scale (0-*not at all* – 4-*nearly every day*), participants rate anxiety symptoms (e.g., "Feeling nervous, anxious, or on edge;" and "Not being able to sleep or control worry"). The item scores are then summed. Scores may range from 0-28; scores greater than 8 indicate a probable anxiety disorder (Spitzer et al., 2006). In the current sample, the mean scores did not exceed cutoff for an anxiety disorder ( $M = 6.05$ ,  $SD = 5.37$ ) and reliability was excellent ( $\alpha = .93$ )

**Life satisfaction.** The Satisfaction With Life Scale (SWLS; Diener et al., 1985) is a five-item survey measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree)

assessing subjective satisfaction of life. The seven-point Likert scale scores may range from 5-35, with higher scores indicating higher satisfaction with life. Respondents scoring 5-9 are characterized as extremely dissatisfied with life, while those scoring 31-35 are characterized as extremely satisfied with life. Those scoring 21-25 are slightly satisfied, while those scoring 15-19 are slightly dissatisfied; 20 remains a neutral midpoint. Pavot and Diener (2008) summarize findings that conclude alpha coefficients to fall between  $\alpha = .79 - .89$ , showing good internal consistency. Test-retest reliability coefficients were summarized to fall between  $\alpha = .54 - .84$ . Reliability in this sample was strong ( $\alpha = .92$ ).

Regarding order of administration, participants began by providing demographic information and then completed questionnaires assessing virtue, chronic pain acceptance, depression, anxiety, activity and participation, environmental factors, and life satisfaction, in that order. All participants received the same order of questionnaires.

### **Procedure**

Participants were recruited through Amazon Mechanical Turk (mTurk), an online survey community whereby individuals complete Human Intelligence Tasks (HITs), such as data entry or survey research. According to Paolacci and Chandler (2014), the mTurk workforce is composed of more than 500,000 individuals from 190 countries; however, less than a quarter of workers reside outside of the United States and India. Generally, workers are diverse but not necessarily representative samples, as workers tend to be younger (about 30 years old), overeducated, underemployed, less religious, and more liberal than the general population. Conducting behavioral science research using mTurk is considered novel; in a study comparing participants completing a behavioral task through mTurk, social media, and face-to-face convenience sampling methods, the demographics of the three samples differed (Casler, Bickel,

& Hackett, 2013). As such, mTurk participants were significantly more socio-economically and ethnically diverse than the other two groups, yet the test results across the three samples were indistinguishable. The authors concluded that for some behavioral tests, online recruitment and testing through mTurk is a valid and comparable approach, if not better in some cases, than in-person data collection.

The survey was constructed using Qualtrics; to participate, individuals accessed the study link through mTurk. Participants who met the inclusion criteria (i.e., endorsed chronic low back pain for greater than six months, were age 18-65 years old, reported English reading level better than or equal to 6th grade, and lived in the community) completed all study instruments. In compensation, each participant received \$2 for completing the survey, which consisted of 126 total items and required an average completion time of 33 minutes.

### **Data Analyses**

This study was a cross-sectional descriptive correlational design and preliminary data analyses were twofold; (1) computing descriptive statistics and zero-order correlations for demographic, predictor, and criterion variables; and (2) addressing statistical assumptions of hierarchical regression analyses, including normality, multicollinearity, outliers, and sample size. To address the main study aim (the first two research questions) of evaluating an ICF-based conceptual model for predicting well-being outcomes of people with chronic low back pain, beta weights and significance for individual variables, as well as the proportion of variance accounted for in criterion variables by each set of predictor variables, were examined. For the third and fourth research questions, correlational analyses were explored. In each hierarchical regression model, the ICF Model informed how to enter predictor variables into each of the five steps. As such, Step 1 consisted of seven demographic variables, Step 2 included five pain demographics,

Step 3 was Activities and Participation, Step 4 consisted of Environmental Factors, and Step 5 completed the model with Personal Factors.

## Results

Frequencies or means and standard deviations for predictor and criterion variables are reported in Tables 1 (p. 16) and 2 (p. 28), respectively. Across the sample, most participants were married, Caucasian, males with a Bachelor's degree. Self-reported ages ranged from 21 to 65 years old ( $M = 36.92$ ) and mean age at onset of chronic low back pain was 30.64. Overall, the sample reported "moderate" characteristic pain ( $M = 53.21$ ,  $SD = 17.18$ ) and described more than a third of 30 days as difficult days ( $M = 11.59$ ,  $SD = 8.9$ ). Participants tried at least two types of treatment for pain ( $M = 2.07$ ,  $SD = 1.16$ ) and had been prescribed at least one pain medication ( $M = 1.62$ ,  $SD = 1.51$ ) during their treatment. Concerning mental well-being, participants reported "mild" depression ( $M = 7.51$ ,  $SD = 6.49$ ) and anxiety ( $M = 6.04$ ,  $SD = 5.35$ ), while reporting average satisfaction with life ( $M = 21.26$ ,  $SD = 7.78$ ). Participants' activities and participation in society as measured by the WHODAS 2.0 ( $M = 32.72$ ,  $SD = 26.88$ ) was moderate (Üstün et al., 2010) and environmental barriers were not a major overall concern for participants ( $M = 10.27$ ,  $SD = 11.69$ ). Overall, the current sample of individuals with chronic low back pain was a young, high functioning, and reasonably well-adjusted group of participants compared to a clinical population, such as those individuals engaged in an intensive outpatient or inpatient chronic pain management program.

According to kurtosis value and a-priori G\*Power 3 analysis, normality and sample size adequacy were established as kurtosis value did not exceed 1.96 and the necessary sample size for hierarchical regression with 17 predictors ( $N = 293$ ) was met. With regard to outliers, Mahalanobis distances based on the chi-square critical value ( $\chi^2 = 33.41$ , 17 predictors) indicated

Table 2.  
*Descriptive Statistics for Key Study Variables*

Variable	<i>N</i>	Mean	SD
	293		
Age - Pain Onset		30.64	10.30
Characteristic Pain (0-100)		53.21	17.18
Treatments		2.07	1.16
Pain Medications		1.62	1.51
Difficult Days (out of last 30 days)		11.59	8.9
Disability (WHODAS 2.0, 0-144)		32.72	26.88
Environmental Factors (CHIEF-SF)		10.27	11.69
Virtue (AVIS)		177.58	15.92
Activities Engagement (CPAQ-AE)		52.73	10.55
Pain Willingness (CPAQ-PW)		29.69	8.22
Depression (PHQ-9)		7.51	6.49
Anxiety (GAD-7)		6.04	5.35
Life Satisfaction (SWLS, 0-35)		21.26	7.78

four outliers, which was acceptable for the study sample size. In order to determine significant differences across levels of the categorical demographic predictors and address multicollinearity, independent samples t-tests were performed, identifying seven predictor variables across four categorical variables. Upon examining variance inflation factors (VIF) during regression analyses, no multicollinearity persisted ( $VIF < 10$ ). Prior to primary analyses, the significant categorical demographic variables (sex, race, marital status, education) were dummy-coded for integration as predictors in hierarchical regression (Cohen, Cohen, West, & Aiken, 2013). Specifically, the largest variable groups served as the reference groups for each dummy coded variable, totaling the seven variables. Further, analyses addressing assumptions of performing hierarchical regression identified which seven demographic variables to include in the main analysis. Serving as reference variables in the dummy coding, the demographic variables in the main hierarchical regression analyses included the following seven variables: male (sex), Caucasian (race), Indian (race), married (marital status), single (marital status), bachelor's degree (education), and high school diploma (education).

Three hierarchical linear regressions were used to test the prediction of the three criterion variables (PHQ-9: depressive symptoms; GAD-7: anxiety symptoms; and SWLS: life satisfaction) (e.g., Figure 2, p. 7). Hierarchical regression analysis showed specifically which predictor variables contributed to criterion variables and how they interacted with each other. Conceptually, the regression model steps were entered based on the ICF Model in the following order: general demographics (Step 1, seven predictors), Body Structure and Function (Step 2, five predictors), Activities and Participation (Step 3, one predictor), Environmental Factors (Step 4, one predictor), and Personal Factors (Step 5, three predictors). In each of the three regression models, 17 predictors were entered to identify how they contributed to the variance in each

criterion variable. In the following paragraph, each predictor is identified based on how it was quantified in this study.

Seven general demographic variables across the four categories were entered into Step 1 of the regression models. Although other demographic information was collected, only these seven demographic variables were retained for the hierarchical regression analyses, due to multicollinearity assumption violations. Those seven variables included gender (one variable, male or female), race (two variables, Caucasian and Asian), education (two variables, Bachelor's and High School Diploma), and marital status (two variables, Married/Co-habiting and Single). Five pain demographic variables represented Body Structure and Function predictors (age of onset for pain, number of pain treatments tried, number of medications prescribed since pain onset, number of difficult days, and characteristic pain) in Step 2. Of note, difficult days were defined by how many days participants experienced the difficulties described in the WHODAS 2.0 over the past 30 days (Üstün et al., 2010). In computing the characteristic pain variable, participants rated their current, average, and worst pain over the past week on an 11-point scale (0 – *no pain at all* to 10 – *worst pain imaginable*). Then, the three pain ratings were averaged and multiplied by 10, ranging 0 – 100, in order to “more fully capture a reliable hierarchy of pain intensity than using a single rating of average, current, or worst pain alone” (p. 3, Kratz, Hirsh, Ehde, & Jensen, 2013). In Step 3, Activities and Participation (WHODAS 2.0) were entered and Environmental Factors (CHIEF-SF) were entered in Step 4. The virtue and acceptance variables (AVIS: virtue; CPAQ subscale: activity engagement; and CPAQ subscale: pain willingness) represented Personal Factors in Step 5 of the hierarchical regression equation. As described previously, total scale internal consistency for the AVIS was acceptable ( $\alpha = .65$ ); however, due to poor reliability in three of five subscales, the one-factor virtue scale of 46 items was utilized to

test hypotheses. Specifically, reliability coefficients for the Integrity ( $\alpha = .75$ ) and Courageousness ( $\alpha = .65$ ) subscales were adequate; however, coefficients for the Synergetic Transcendence ( $\alpha = .41$ ), Wisdom as Openness ( $\alpha = .39$ ), and Pursuit of Excellence ( $\alpha = .52$ ) subscales were poor. Implications are discussed further in the Limitations section.

### **Hierarchical Regression**

**Depression.** The depression regression model accounted for 60% of the total variance in depression for study participants, a large effect size according to Cohen (1988). All predictor sets significantly contributed to the variance except Environmental Factors (see Table 3). Based on beta weights, in addition to sex, four predictors were found to be significant contributors to the variance in depression, including difficult days, activities and participation, virtue, and activities engagement aspect of pain acceptance. Virtue and pain acceptance contributed to 4.4% of the variance in depression, a significant contribution in this regression model.

Predictor sets were entered into the regression model in a stepwise manner based on the ICF Model. In Step 1 of the depression regression model (demographics), sex significantly predicted higher levels of depression for females. In Step 2 (Body Structure & Function), more difficult days significantly predicted higher depression. Interestingly, the composite pain intensity measure (characteristic pain) was not a significant predictor for any criterion variable. In Step 3 (Activities and Participation), decreased daily activities and participation in society due to disability significantly predicted greater depression. Accounting for 27% of the variance, Activities and Participation contributed more variance than any other aspect of the depression model. In Step 4 (Environmental Factors), greater perception of attitudinal and physical barriers in society had no significant prediction of depression. In Step 5 (Personal Factors), greater perceived levels of virtue and lower activities engagement significantly predicted higher levels of



depression. As such, virtue and acceptance accounted for 4% of the variance in depression. Of note, as participants perceived higher levels of virtue in themselves, they endorsed higher depression symptoms.

**Anxiety.** The anxiety regression model accounted for 54% of the total variance in anxiety for study participants, a large effect size according to Cohen (1988). All predictor sets significantly contributed to the variance except Step 4, Environmental Factors (see Table 4). In addition to sex and race, the same four predictors that were found to be significant contributors to the variance in depression also predicted anxiety significantly, including difficult days, activities and participation, virtue, and activities engagement aspect of pain acceptance. Virtue and pain acceptance contributed to 4% of the variance in anxiety, a significant contribution in this regression model.

In Step 1 (demographics), sex (female) and Caucasian race significantly predicted higher anxiety. In Step 2 (Body Structure & Function), more difficult days significantly predicted higher anxiety. Considering the full anxiety regression model, predictor variables in Step 2 contributed to 22% of the variance; more than any other step in the model. In Step 3 (Activities and Participation), decreased daily activities and participation in society due to disability significantly predicted greater anxiety. In Step 4 (Environmental Factors), greater perception of attitudinal and physical barriers in society had no significant prediction of anxiety. In Step 5 (Personal Factors), greater perceived levels of virtue and lower activities engagement significantly predicted higher levels of anxiety. Similar to the depression model, virtue and acceptance accounted for 4% of the variance. Notably, as individuals perceived higher levels of virtue in themselves, they endorsed more anxiety symptoms.

**Life satisfaction.** The life satisfaction regression model accounted for 39% of the total

Table 3.

*Hierarchical Regression Model – Depression*

	R Square	R Square Change	Adjusted R Square	B	SE	$\beta$	<i>p</i> value
<b>Step 1</b>	.072	.072**	.049				
Male				-1.117	.521	-.086	.033
Caucasian				.093	.775	.007	.905
Asian				.732	.918	.047	.426
Single				.292	.891	.021	.744
Married				-1.232	.837	-.095	.142
High School Diploma				-.419	.728	-.025	.566
Bachelors				-.599	.573	-.046	.296
<b>Step 2</b>	.291	.219**	.261				
Age of Onset				-.026	.025	-.041	.303
Treatments				-.159	.252	-.028	.529
Pain Medication				.259	.213	.060	.225
Difficult Days				.100	.035	.137	.005
Characteristic Pain				-.003	.017	-.007	.879
<b>Step 3</b>	.556	.265**	.536				
Activities & Participation				.123	.014	.509	.000
<b>Step 4</b>	.556	.000	.534				
Environmental Factors				.020	.026	.035	.452
<b>Step 5</b>	.600	.044**	.576				
Virtue				.081	.018	.199	.000
Activities Engagement				-.098	.025	-.159	.000
Pain Willingness				.013	.035	.016	.712

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

Table 4.

*Hierarchical Regression Model - Anxiety*

	R Square	R Square Change	Adjusted R Square	B	Std. Error	$\beta$	<i>p</i> value
<b>Step 1</b>	.081	.081**	.059				
Male				-1.779	.460	-.166	.000
Caucasian				1.907	.685	.170	.006
Asian				1.190	.811	.092	.144
Single				.159	.788	.014	.840
Married				-1.179	.739	-.110	.112
High School Diploma				-.426	.644	-.031	.508
Bachelors				-.503	.506	-.047	.321
<b>Step 2</b>	.299	.218**	.269				
Age of Onset				-.038	.022	-.072	.091
Treatments				-.017	.223	-.004	.939
Pain Medication				.062	.188	.017	.744
Difficult Days				.091	.031	.151	.003
Characteristic Pain				.011	.015	.036	.449
<b>Step 3</b>	.498	.200**	.475				
Activities & Participation				.084	.013	.420	.000
<b>Step 4</b>	.499	.001	.475				
Environmental Factors				.018	.023	.039	.437
<b>Step 5</b>	.539	.040**	.512				
Virtue				.043	.016	.127	.009
Activities Engagement				-.089	.022	-.176	.000
Pain Willingness				-.054	.031	-.082	.081

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

variance in life satisfaction for study participants, a moderate effect size according to Cohen (1988). All predictor sets contributed significantly to the variance (see Table 5). Specifically, five predictors contributed significantly to the variance, including age of pain onset, number of treatments tried, difficult days, perceived environmental barriers, and activities engagement. Virtue and pain acceptance contributed to 10.1% of the variance in life satisfaction, a significant contribution in this regression model.

No factors in Step 1 (general demographics) significantly predicted life satisfaction. In Step 2 (Body Structure & Function), more difficult days significantly predicted lower life satisfaction. In addition, younger age of pain onset and more treatment history predicted higher life satisfaction. Considering the full life satisfaction regression model, predictor variables in Step 2 contributed to 14% of the variance, accounting for more than any other step in the model. In Step 4 (Environmental Factors), greater perception of attitudinal and physical barriers in society predicted lower life satisfaction. In Step 5 (Personal Factors), greater activities engagement significantly predicted higher life satisfaction. Virtue and acceptance accounted for 10% of the variance in life satisfaction.

### **Correlational Analysis**

Based on correlational analyses (see Table 6), virtue scores were unrelated to activities engagement and significantly negatively related to pain willingness ( $r = -.22, p < .01$ ). In response to *RQ4*, age of onset and number of treatments tried for CLBP had no significant relationship with virtue or acceptance variables. Characteristic pain was negatively correlated with both measures of chronic pain acceptance, activities engagement ( $r = -.23, p < .01$ ) and pain willingness ( $r = -.23, p < .01$ ). Pain medications correlated negatively to virtue ( $r = -.14, p < .05$ )

Table 5.  
*Hierarchical Regression Model - Life Satisfaction*

	R Square	R Square Change	Adjusted R Square	B	Std. Error	$\beta$	<i>p</i> value
<b>Step 1</b>	.081	.081**	.059				
Male				.361	.769	.023	.639
Caucasian				-1.773	1.145	-.109	.123
Asian				1.671	1.355	.089	.218
Single				-2.038	1.315	-.125	.122
Married				.729	1.235	.047	.555
High School Diploma				.863	1.075	.043	.423
Bachelors				.706	.845	.045	.404
<b>Step 2</b>	.216	.135**	.184				
Age of Onset				-.118	.037	-.156	.002
Treatments				.789	.372	.118	.035
Pain Medication				-.506	.314	-.098	.108
Difficult Days				-.188	.051	-.215	.000
Characteristic Pain				.022	.025	.049	.369
<b>Step 3</b>	.229	.013*	.194				
Activities & Participation				.025	.021	.087	.231
<b>Step 4</b>	.292	.063**	.257				
Environmental Factors				-.202	.038	-.304	.000
<b>Step 5</b>	.393	.101**	.356				
Virtue				-.029	.027	-.059	.292
Activities Engagement				.254	.037	.345	.000
Pain Willingness				-.014	.051	-.015	.785

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

and activities engagement ( $r = -.12, p < .05$ ). Difficult days correlated negatively to virtue ( $r = -.21, p < .01$ ) and activities engagement ( $r = -.11, p < .05$ ).

Other findings beyond those related to specific research questions of this study emerged. Interestingly, virtue scores were strongly positively related to activities and participation ( $r = .41, p < .01$ ), depression ( $r = .39, p < .01$ ), and anxiety ( $r = .28, p < .01$ ). Characteristic pain is a metric representing a more comprehensive measure of pain intensity by averaging current, worst, and average pain levels over the past week on the typical 11-point scale (0-10) (Kratz et al., 2013). Then, the resulting score is multiplied by 10 to obtain a scoring range from 0-100. For example, if current pain is 6, worst pain was 8, and average pain was 5, the resulting characteristic pain score would be 63. The following formula shows the example equation in mathematical terms:  $6 + 8 + 5 = 19 / 3 = 6.33 * 10 = 63.33$ . Mean characteristic pain scores for the sample were moderate ( $M = 53.21; SD = 17.18$ ). For all three models, characteristic pain was not significantly predictive of the criterion; however, characteristic pain was inversely correlated at a modest level to both facets of pain acceptance (activities engagement,  $r = -.23$ ; pain willingness,  $r = -.24$ ). Characteristic pain was significantly positively correlated with pain medication ( $r = .16, p < .01$ ), difficult days ( $r = .32, p < .01$ ), activities and participation ( $r = .34, p < .01$ ), environmental factors ( $r = .14, p < .05$ ), and depressive ( $r = .25, p < .01$ ) and anxiety ( $r = .28, p < .01$ ) symptoms. Pain medications and number of treatments were strongly correlated ( $r = .49, p < .01$ ). Activities and participation were strongly related to experience of environmental factors ( $r = .47, p < .01$ ), depression ( $r = .71, p < .01$ ), and anxiety ( $r = .64, p < .01$ ) symptoms while negatively related to activities engagement ( $r = -.30, p < .01$ ), pain willingness ( $r = -.40, p < .01$ ), and life satisfaction ( $r = -.21, p < .01$ ). Experience of environmental factors as barriers was negatively related to activities engagement ( $r = -.16, p < .01$ ), pain willingness ( $r = -.33, p <$

.01), and life satisfaction ( $r = -.32, p < .01$ ) while strongly related to anxiety ( $r = .36, p < .01$ ) and depressive ( $r = .37, p < .01$ ) symptoms. Virtue scores had a strong positive relationship with activities and participation ( $r = .41, p < .01$ ), depression ( $r = .39, p < .01$ ), and anxiety ( $r = .28, p < .01$ ). Finally, life satisfaction was most strongly related to activities engagement ( $r = .40, p < .01$ ) and negatively related to activities and participation ( $r = -.21, p < .01$ ), environmental factors ( $r = -.32, p < .01$ ), difficult days ( $r = -.37, p < .01$ ), and pain medications ( $r = -.17, p < .01$ ), depression ( $r = -.31, p < .01$ ), and anxiety ( $r = -.35, p < .01$ ).

Virtue and pain acceptance variables—activity engagement and pain willingness—as a set were significant predictors of each outcome variable. Nevertheless, in all equations, virtue and acceptance accounted for a small amount of variance in the criterion variables compared with other factors in the regression model. In particular, activity engagement appears to be an important predictor of adjustment to chronic pain, as it demonstrated relatively robust and significant prediction of lower depression and anxiety and higher life satisfaction. Interestingly, pain willingness, or the weight of one's willingness to experience a higher than typical level of pain in exchange for the opportunity to participate in a pleasurable event, was not a factor in the regression models and lacked predictive ability for any criterion variable.

### **Discussion**

As understanding of the psychosocial experience of chronic pain increases, identifying a systematic conceptualization of how an individual with chronic pain responds positively may provide both clinical and research implications. Bridging the gap between positive rehabilitation psychology and chronic pain rehabilitation outcomes, the current study examined the relationships among virtue, pain acceptance, and mental health and well-being outcomes (i.e., depression, anxiety, life satisfaction) in individuals with chronic low back pain. While the

constructs are often linked in general populations, research on positive traits and acceptance in individuals with chronic pain are limited in depth and breadth. To date, this gap in the positive psychology and pain literature remains and it may be important to address the needs of individuals with chronic pain by examining how individuals cultivate the positive pain appraisals that lead to effective treatment and positive outcomes. Specifically, this study aimed to formulate and evaluate an ICF-based understanding of rehabilitation outcomes for people with chronic low back pain (PWCLBP) and examine how ICF factors are associated with depression, anxiety, and life satisfaction for PWCLBP.

Consistent with recent literature in pain acceptance, study findings suggest higher levels of engaging in life activities contributes to lower symptoms of depression and anxiety while increasing life satisfaction in patients with chronic pain (McCracken, 2010). Nevertheless, according to McCracken, pain acceptance is only attained through the interaction of these two aspects together, with pain willingness describing the mechanism to achieve greater engagement in life activities. In the current study, this notion is not supported; instead, participants engaged in life activities without consideration of their willingness to disengage from pain reduction goals. In a study identifying patient clusters based on chronic pain acceptance (CPAQ) scores, researchers found that the most common subgroup of pain patients scored low on pain willingness and high on activity engagement, and reported experiencing less difficulty than those patients scoring low on both subscales, but more difficulty than patients scoring higher on both (Vowles, McCracken, McLeod, & Eccleston, 2008). As a result, it is evidenced that pain willingness is not a necessary ingredient of pain acceptance, although both the willingness to “get on with the business of living” despite pain and greater engagement in activities may lead to better overall adjustment.



Table 6.

*Zero-Order Correlations of Participant Demographic and Key Study Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age - Pain Onset	--												
2. Characteristic Pain (0-100)	.09	--											
3. Treatments	.09	.09	--										
4. Pain Medications	.03	.16**	.49**	--									
5. Difficult Days	.02	.32**	.11	.31**	--								
6. Disability (WHODAS 2.0, 0-144)	.03	.34**	.04	.04	.43**	--							
7. Environmental Factors (CHIEF-SF)	-.05	.14*	.06	.00	.31**	.47**	--						
8. Virtue (AVIS)	-.01	.01	-.05	-.14*	.06	.41**	.08	--					
9. Activities Engagement (CPAQ-AE)	.07	-.23**	.02	-.12*	-.21**	-.30**	-.16**	-.01	--				
10. Pain Willingness (CPAQ-PW)	-.02	-.24**	-.05	.02	-.11*	-.40**	-.33**	-.22**	.12*	--			
11. Depression (PHQ-9)	-.04	.25**	.02	.09	.43**	.71**	.37**	.39**	-.34**	-.28**	--		
12. Anxiety (GAD-7)	-.07	.28**	.02	.12*	.44**	.64**	.36**	.28**	-.36**	-.31**	.78**	--	
13. Life Satisfaction (SWLS, 0-35)	-.08	-.11	.07	-.17**	-.37**	-.21**	-.32**	-.02	.40**	.07	-.31**	-.35**	--

\* p &lt; .05. \*\* p &lt; .01

With regard to virtue, higher perceived virtue emerged as a significant factor in predicting higher depression and anxiety in individuals coping with chronic illness (e.g., arthritis, cancer, chronic pain). According to Peterson and colleagues (2006), individuals coping with chronic illness used virtuous traits to transcend their condition, leading to higher life satisfaction and lower depression and anxiety. In the current sample of young and high-functioning individuals with chronic low back pain, this positive relationship between virtue and depression/anxiety symptoms may suggest that experiencing greater emotional pain in conjunction with persistent and unwavering physical pain may lead individuals to be more likely to search internally within themselves to identify broad, buffering positive traits to balance their pain. As no prior study has examined virtue and chronic pain acceptance in relation to mental health in individuals with CLBP, results are considered exploratory and informative of how virtue and pain acceptance work together to contribute to both positive (life satisfaction) and negative (depression and anxiety) indicators of adjustment to chronic pain. Specifically, results showed that only greater pain acceptance (activity engagement) contributed to the positive indicator and both higher virtue and lower activity engagement together contributed to negative indicators of adjustment to pain.

Of note, characteristic pain was not a significant predictor within the pain demographics predictor set for any of the models. Therefore, pain intensity does not seem to inform how this group approaches their life with pain, which may explain why pain willingness is also not a factor. Furthermore, the relative high functioning of the current sample may affect how these individuals identify with their experience of pain and explain the diminished role of pain intensity.

**Amazon Mechanical Turk Sampling.** It is important to address the nature of mTurk as

work for people with disabilities. Rehabilitation scholars assert that the primary outcome of rehabilitation is *participation*, meaning engagement in the social and familial opportunities afforded by the community and in many cases, employment (Heinemann, 2005). In the current sample, 80% of respondents endorsed gainful employment with an average of 40 hours of work per week and 53% of respondents denied missing any work time related to their CLBP.

Typically, CLBP significantly affects work status, with as many as 70% of workers either unable to work at all or experiencing restrictions related to CLBP (Kuijer et al., 2006). As iterated previously, the current sample is a young and functional group with CLBP, which may be attributable to sampling characteristics through mTurk. According to Mason and Suri (2012), the typical mTurk “worker” is a 32-year-old female making \$30K per year in income. Further, researchers reported that 30% of mTurk workers identified as unemployed or employed part-time while between 12-27% of workers stated that they use mTurk as a their main source of income. Interestingly, mTurk refers to the individuals completing Human Intelligence Tasks (HITs), or the surveys such as the one completed for this study, as “workers,” potentially contributing to an identity around gainful employment.

For individuals with CLBP, mTurk may be a creative platform to perform work duties at their own pace, from their own home, in order to supplement their income in times of unemployment or other work difficulties. Considering that those individuals with CLBP who report engaging in work-related activities also tend to have higher self-reported physical and mental health, greater physical fitness, more self-reported ADLs, higher education, and less depressive symptoms than those who do not engage in work (Kuijer et al., 2006), mTurk workers with CLBP may not only be supplementing their bank account, but also their emotional well-being and overall functioning by identifying as a “worker.”

While no other chronic pain studies have used mTurk for sampling, there may be further sampling characteristics affecting study outcomes that cannot be determined. Future studies should consider employing more validity checks when using mTurk, such as embedded questions in the survey intended to capture effort. In the current study, only those validity checks available in the survey administration were used, which included requiring respondents to have completed at least 5000 prior HITs (surveys), with no negative feedback, before completing this study. This validity check is designed to minimize the number of individuals who may blindly complete the HIT simply to receive the incentive.

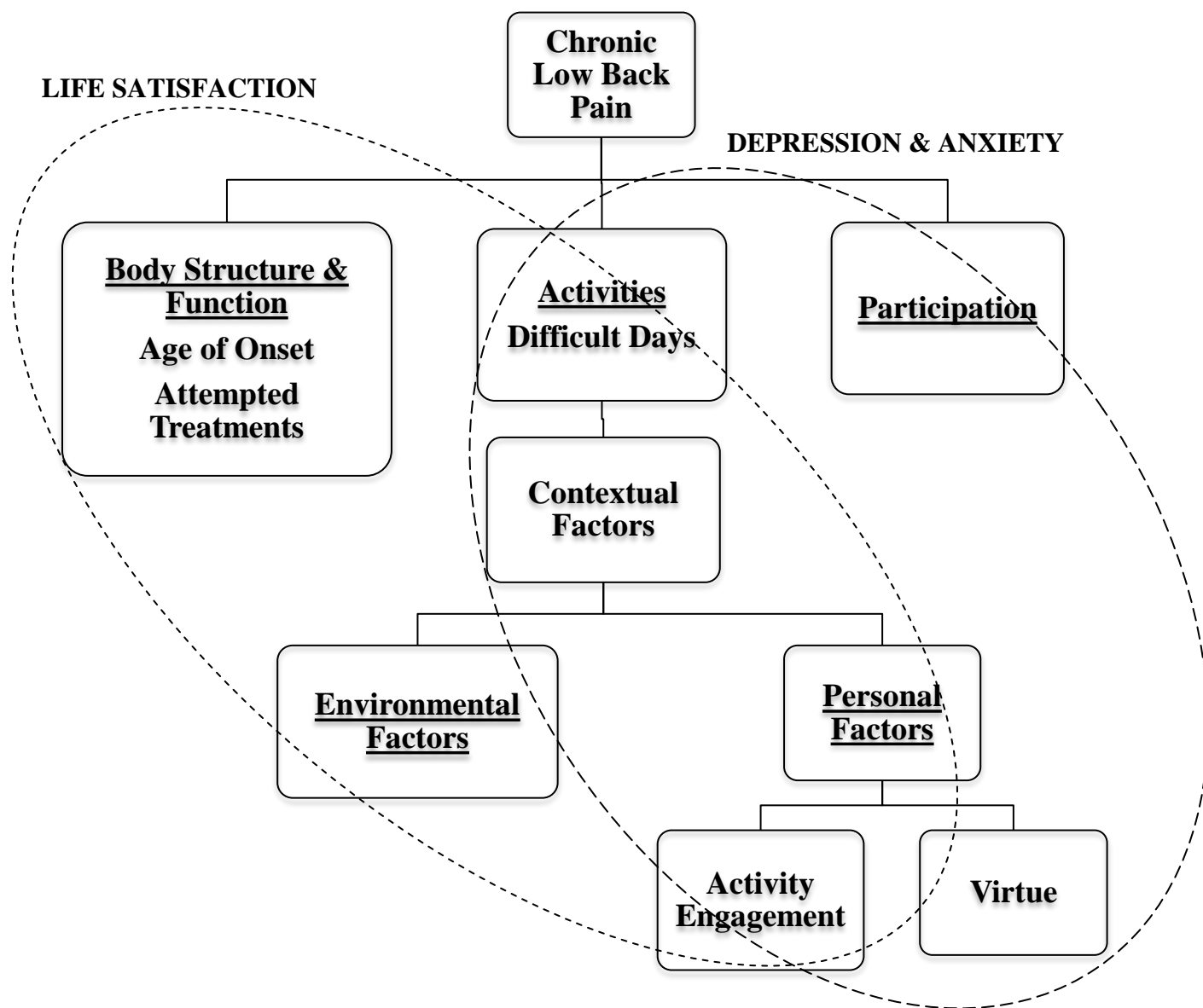
### **Clinical and Research Implications**

The study findings emphasize the potential role of virtue and acceptance in the experience of well-being and positive rehabilitation outcomes such as anxiety, depression, and life satisfaction. It is argued that both individuals with disabilities and people without disabilities experience a thriving life through their strength of character. In applying virtue to the World Health Organization ICF model of disability, findings may contribute to innovative treatment approaches in a model widely accepted by rehabilitation and health professionals across the globe. Results suggest an ICF-based interpretation of positive pain adjustment. A graphic representation is revisited in Figure 3 below, outlining specific factors contributing to mental health rehabilitation outcomes based on findings in the current study. Regarding depression and anxiety, four factors contributed significantly to outcomes, including difficult days, activities and participation, virtue, and activity engagement. For life satisfaction, five factors contributed significantly to outcomes, including age of onset, attempted treatments, difficult days, environmental factors, and activity engagement.

Final regression models accounted for 60%, 54%, and 39% of the variance in depression,

anxiety, and life satisfaction, respectively. According to Cohen (1988), effect sizes for depression and anxiety are large and moderate for life satisfaction. In the conceptual model presented, the Body Structure and Function element of the ICF model is based on pain demographics. Specifically, the predictors contributing most to the variance in the regression models were difficult days, age of onset of pain, and the number of treatments attempted to alleviate pain throughout participants' rehabilitation. In the anxiety and life satisfaction models, this predictor set accounted for the most variance. Difficult days, or the number of days in the last month an individual was hampered in performing activities of daily living and participation in society due to pain, contributed most strongly to the variance within this predictor set for all three models. In treatment, it may be beneficial for clinicians to assess these pain demographics, particularly difficult days, and focus on activity and functioning rather than limitations in relatively high-functioning clients with chronic low back pain.

Based on study findings, virtue and activities engagement may act as protective factors for maladaptive adjustment to chronic low back pain. Results from this study suggest that individuals with chronic low back pain coping with anxiety or depression are searching for strength and positivity along their journey. Knowing this, clinicians may be able to help them capitalize on this motivation as a function of appraising their pain experience through a more positive lens, with the aim of facilitating psychological growth and acceptance of pain and disability, leading to positive rehabilitation outcomes related to activities engagement and participation in society. Conversely, clinical professionals may be able to help those who lack such personality characteristics by encouraging them to interpret the situation through the lens of one's virtue rather than potentially exacerbating their problems through maladaptive responses to disability. Finally, psychosocial factors may account for over half of the variance of physical



*Figure 3.* ICF-based understanding of positive pain adjustment. Factors that most significantly affected depression and anxiety include Difficult Days, Activities and Participation, Activity Engagement, and Virtue. Factors that most significantly affected life satisfaction included Age of Onset, Attempted Treatments, Environmental Factors, Difficult Days and Activity Engagement.

disability in individuals with chronic pain (Burton, Tillotson, Main, & Hollis, 1995) and virtue and acceptance may work together to support a thriving life in individuals with chronic low back pain, leading to decreased depression and anxiety, and increased life satisfaction. Ehde (2010) explored the intersection of positive psychology and rehabilitation psychology research and practice and it is recognized that rehabilitation psychologists harbor a general interest in and have addressed individual strengths over time (Dunn & Dougherty, 2005; Elliott, Kurylo, & Rivera, 2002). Nevertheless, Ehde further points out that the research and practice of rehabilitation psychology typically occurs in hospital settings, where the dominant paradigm of psychological health for individuals with disabilities is the medical model. In contrast, biopsychosocial models such as the ICF model of disability favor positive psychosocial adjustment, challenging tenets of the medical model emphasizing prevalence or absence of psychopathological reactions to disability (Dunn & Dougherty; Elliott et al.). An ICF-based understanding of positive pain adjustment allows for the systematic biopsychosocial study of positive pain appraisals.

### **Strengths and Limitations**

The conceptualization of positive psychological factors in relation to chronic low back pain (CLBP) is an important strength of this study. Further, consideration of acceptance and virtue constructs as Personal Factors within the context of the WHO-ICF model adds significant theoretical implications for future studies. The major study outcomes represent both positive (life satisfaction) and negative (depression, anxiety) indicators of adjustment to CLBP. Another strength is the diverse sample obtained through novel means via Amazon Mechanical Turk, which provided valuable insight into performing behavioral research with a chronic pain population in this platform. At the same time, sampling characteristics limited the

generalizability of the results to clinical CLBP samples; however, the large sample provided a picture of how higher functioning individuals function with CLBP. Future research may integrate this conceptual approach fusing positive psychological constructs with the ICF model across clinical rehabilitation samples such as traumatic brain injury, stroke, neurological disorders, and spinal cord injury.

Two social and cognitive factors affecting both virtue and chronic pain acceptance were not assessed in this study, social desirability and catastrophizing. Because virtue is a positive self-reported construct, participants may feel compelled to present as more socially favorable and thus, more virtuous, than they actually are (Peterson & Seligman, 2004). Further, it is determined that catastrophizing thoughts about chronic pain, such as “my pain is killing me,” contribute to lower levels of pain acceptance and poor outcomes in chronic pain rehabilitation (McCracken, 1998; Vowles et al., 2008). The decision to omit these constructs from assessment in the current study are threefold: 1) they did not necessarily fit with the ICF conceptualization of positive pain adjustment; 2) when conducting research with individuals with chronic illness and disability, respondent fatigue should be considered when determining length of surveys (Kim et al., 2012); and 3) the exploratory nature of studying constructs that have never before been assessed in the same study allowed for flexibility in study design. Methodological limitations related to online convenience sampling and a descriptive correlational design include relying on self-report of medical and psychological processes and only one instrument to measure each construct of interest. Requiring physician confirmation and employing further instruments measuring these constructs to improve construct, convergent, and divergent validity could address these issues. Finally, because of the cross-sectional design of this study, conclusions cannot be drawn between regarding the direction of the association between predictors and criterion variables of CLBP



adjustment.

### **Conclusions**

Despite study limitations, findings herein share important implications for clinical and research endeavors related to chronic low back pain acceptance and virtue in an ICF model framework, and suggest that these constructs contribute to mental health and well-being outcomes in people with chronic low back pain. Important next steps include validating the ICF-based understanding of positive pain adjustment across different types of chronic and secondary pain conditions and further understanding of the relative importance of the interpretation both clinically and empirically. As a result, treatment programs integrating virtue and acceptance concepts for individuals with chronic low back pain may further general understanding and improve outcomes in chronic pain rehabilitation.

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## Appendix A – Extended Literature Review and References

Over 116 million adults in United States suffer from chronic pain (Institute of Medicine of the National Academies [IMNA], 2011). An estimated \$635 billion annually are spent on health care and lost productivity (IMNA, 2011). Given the financial burden and potential social consequences of chronic pain, a comprehensive understanding of pain coping mechanisms and their corresponding outcomes is warranted. Chronic pain is characterized as continuous pain that persists for three months, beyond any physical damage that may have caused pain, and is unresponsive to available medical treatments (Turk & Okifuji, 2002). The unpredictable, uncontrollable, and unrelenting nature of chronic pain places significant psychological stress on pain patients, which in turn can result in deleterious effects on their well-being (Jensen, Moore, Bockow, Ehde, & Engel, 2011; Tunks, Crook, & Weir, 2008; Turk & Okifuji, 2002; Zautra, 2003).

Psychologists have called for a strong and consistent focus on the psychosocial experience of chronic illness (Chwalisz, 2008; Dunn & Dougherty, 2005; Elliott & Johnson, 2008; Wright, 1983). Many psychosocial factors contribute to the experience of long-term physical disability in chronic pain conditions (Boothby, Thorn, Stroud, & Jensen, 1999; Johansson & Lindberg, 2000; Pflingsten, Hildebrandt, Leibing, Franz, & Saur, 1997; Turk & Okifuji, 2002). Traditionally, research has focused on the psychosocial deficits of physical disability; however, empirical evidence is increasing pertaining to the positive psychological principles of positive emotion, personal strengths, and intervention (Dunn, Uswatte, & Elliott, 2009; Ehde, 2010; Peterson, Park, & Seligman, 2006; Peterson, Park, Pole, D'Andrea, & Seligman, 2008; Rath & Elliott, 2012). In addition, literature regarding resilience and posttraumatic growth has permeated recent efforts investigating the psychosocial experience of chronic pain (Ong, Zautra, & Reid, 2010; Sturgeon & Zautra, 2010; Yeung, Arewasikporn, &

Zautra, 2012). Consequently, these efforts show promise in the development of a positive rehabilitation psychology (Dunn & Dougherty, 2005; Rath & Elliott, 2012).

When addressing the needs of individuals with chronic pain, it may be important to explore how individuals cultivate the positive pain appraisals that lead to effective treatment and positive outcomes. Further, utilizing the World Health Organization-International Classification of Functioning (ICF model; WHO, 2001) lens affords a holistic and biopsychosocial approach to examining these factors. In an effort to connect the research in positive rehabilitation psychology with relevant chronic pain rehabilitation outcomes, this review examines the relationship between virtue, pain acceptance, and depression, anxiety, and life satisfaction outcomes in individuals with chronic low back pain. The first section will be an overview of the ICF model of disability. The sections following further discuss each individual element of the model and how they are conceptualized in the current study. Finally, the components of the ICF model will be integrated to examine the relationship of the proposed constructs.

### **The International Classification of Functioning**

Societal views of an individual with a disability have evolved over time. The World Health Organization derived a model of disability that integrates the medical and social perspectives of interpreting disability and disability-related components (WHO, 2001). This conceptual framework joins ideas from the medical and social models while integrating aspects of individual personhood and context to describe the disability experience. In this effort, the WHO model of disability is explored as a conceptual model in rehabilitation and applied to a specific population (chronic pain) for clarity in understanding the functional utility of the model.

According to researchers in rehabilitation psychology and counseling, the International Classification of Functioning (ICF) model of disability is a tool that can be used to conceptualize

not only the individual with a disability but also serves as a framework for research and clinical application (Chan et al, 2009; Peterson, 2005). The WHO defines several pertinent terms to outline their model. First, *health* includes the components of health (seeing, hearing, walking, speaking) and health-related components of well-being (education, employment, social interaction). Next, *functioning* is an inclusive term describing all body functions, activities, and social participation in society. Third, *impairments* are manifestations of dysfunction in the body structures or function. Unlike prior models of disability such as the medical model, functioning is the focus of the ICF model rather than impairments and deficits related to the disability. Fourth, *disability* refers to any impairments, activity limitations, or participation restrictions. Stated another way, disability is the result of a complex and unique interaction between the individual's health condition and personal factors, in conjunction with the external factors representing the circumstances in which the individual lives (WHO, 2001). Finally, elements of the ICF model are referred to as *domains*, which make up the physiological functioning (including psychological), anatomical structures, tasks, actions, and areas of life described by the body, individual, and society (Peterson; WHO).

In all, these operational definitions provide the basis for understanding the ICF model. Of interest, the ICF model does not attempt to classify individuals but, instead, encourages flexibility in the interpretation of the individual with a disability. Further, the ICF model was created not only to describe the impairments and limitations imposed by disability, but also the positive aspects and ability within the body structure, activities, and participation of persons with disabilities. The following section offers a detailed description of the structure and each domain within the ICF model.

**Structure of the ICF.** Two main parts, Functioning and Disability and Contextual Factors, make up the core structure of the ICF. Each of these core structures has two components, Body, and Activities and Participation. Within Functioning and Disability, the Body component consists of two classifications, Body Structure and Body Function. The Activities and Participation component of Functioning and Disability describes functioning from an individual and societal perspective. Components of functioning can be described as either non-problematic or disabling (i.e. impairment, activity limitation, or participation restriction) (Peterson, 2005, WHO, 2001). Body Structure and Function are qualified by changes in physiological systems or anatomical structure and with Activities and Participation, the level of Capacity and Performance help to understand level of active involvement in daily life and social engagement. These qualifiers will be explored in further detail in later sections. The next main part of the model is Contextual Factors, which consists of Environmental Factors and Personal Factors. Environmental Factors are the physical, social, and attitudinal world of the individual that either help or hinder functioning. Personal Factors describe those unique elements of personhood existing between individuals. Due to the complex social circumstances across individuals, no qualifiers currently govern this component (Peterson; WHO).

The ICF model was constructed to be universal across physical and mental impairments and an alphanumeric, book-like system annotates each of the two main parts and four corresponding components within the classification. As such, several chapters within the classification mark each component. Specifically, Body Structure, Body Function, Activities and Participation, and Environmental components boast eight, eight, nine, and five chapters within the classification, respectively. In all, Functioning and Disability Factors and Contextual Factors

create a dynamic understanding of how biological, individual, and societal components converge to describe the disability experience (Peterson, 2005; WHO, 2001).

**Closely examining Activities and Participation components.** Interest in researching the ICF has existed since its inception in 2001. In an effort to condense the ICF literature, Bruyere, Bruyere, Van Looy, and Peterson (2005) conducted a literature review of the ICF model up to that point. Bruyere and colleagues found that, overall, the model held promise across the many sub-disciplines of rehabilitation; but it also had its critics. In 2003, *Disability and Rehabilitation* dedicated a special issue to the ICF to educate its readers on the many aspects of the model and its utility. The special issue included efforts outlining a rationale for use clinical and research settings (Üstün, 2003), implication of social advocacy within the model (Hurst, 2003), a detailed exploration of specific components of participation measurement (Perenboom & Chorus, 2003) and environmental factors (Schneidert et al., 2003), and criticism of the model (Nordenfelt, 2003). Since that time, several specific components of the ICF model continue to garner criticism, including the difference between activities and participation, the difficulty of measuring participation, and the vast reach of environmental factors (c.f., Heinemann, 2010; Whiteneck & Dijkers, 2009).

While the WHO (2001) distinctly defines activity and participation, researchers disagree on how to measure these constructs (c.f., Dijkers, 2010; Heinemann, 2010; Whiteneck & Dijkers, 2009). Activity is defined as the execution of a task or action by an individual, while participation is defined as involvement in a life situation (Peterson, 2005; WHO, 2001). Interestingly, the WHO actually subsumes these two constructs into one section of the classification with nine chapters, including Learning and Applying Knowledge, General Tasks and Demands, Communication, Mobility, Self-Care, Domestic Life Areas, Interpersonal

Interaction and Relationships, Major Life Areas, and Community and Civic Engagement.

Further, Nordenfelt (2003) and Imrie (2004) identified two flaws in this conceptual understanding of activity and participation, confusion between the capacity for action and the actual performance of that action and a failure to specify what defines impairment and disability.

As stated previously, capacity and performance govern these constructs. Essentially, capacity refers to the individual's ability to complete an action or task in a standard environment, while performance is what an individual actually executes in his or her current environment (WHO, 2001). In an effort to identify existing measures of participation, Perenboom and Chorus (2003) expanded the concept of participation to include autonomy and the ability to control one's own life, even if one is not actually doing a given task or action themselves. In their study, they found that no existing instrument could fully measure the concept of participation, even when expanded beyond that of the close connection between participation and performance conceived by the WHO.

In the same vein, this is likely why this issue caught the attention of Allen Heinemann at the Center for Rehabilitation Outcomes Research at the Rehabilitation Institute of Chicago. As a rehabilitation outcome researcher, Heinemann (2010) and Dijkers (2010) summarized conceptual issues of participation as a function of which main aspects of participation should be measured and the fact that one construct (participation) should be defined as a function of another (activities). Stated another way, we cannot understand one construct without the existence of the other. Additionally, participation is a major outcome of interest for rehabilitation clinicians and researchers because it can take many forms, most notably employment and quality of life (Bishop, Chapin, & Miller, 2008). Because individuals with disabilities may not be performing at a level suitable to their service providers, family, or themselves, improving rehabilitation

outcomes is of paramount concern to the individual with disability. Further, understanding how an individual integrates into the community following injury or illness can help practitioners create rehabilitation programs that increase not only employment, but depression, anxiety, and life satisfaction as well.

In summary, the ICF model interprets disability as a function of the biological, individual, and societal level through a biopsychosocial lens. As such, the situation rather than the individual is classified in the specific context of their condition. This conceptualization integrates previous understanding of disability and purports to be comprehensive in nature. Nevertheless, conceptual criticism remains and researchers are working to increase understanding of specific theoretical relationships, predominately between activity and participation.

### **Virtue and Character Strength as Personal Factors**

Personal factors may include demographics, disability-related factors, pre-disability behavioral patterns, and personality characteristics. In the current study this element of the model is represented by virtue (Peterson & Seligman, 2004). As a pervasive element of the individual, virtue and character strength has been found to help negotiate the difficulties of chronic illness and disability (Peterson et al., 2006; Peterson et al., 2008). Before addressing the direct relationship between virtue and well-being, a brief review of positive psychology is warranted.

In 1998, the American Psychological Association (APA) president Martin E. P. Seligman reminded psychologists that two of the three main objectives of psychology before World War II had been abandoned. Those three missions were curing mental illness, making the lives of individuals more fulfilling, and fostering the remarkable talent of individuals. He cited the inception of the Veterans Administration (VA) and the National Institute of Mental Health



(NIMH) as outstanding yet distracting entities due to their emphasis on alleviating deficits. He added that mental health professionals were able to receive grant funds to conduct research and provide treatment to individuals suffering psychosocial issues due to mental and physical illness.

Seligman summarized his thesis in the following statement:

“Fifty years of working in a medical model on personal weakness and on the damaged brain has left the mental health professions ill equipped to do effective prevention. We need massive research on human strength and virtue. We need practitioners to recognize that much of the best work they do is amplifying the strengths rather than repairing their patients’ weaknesses. We need psychologists who work with families, schools, religious communities, and corporations to emphasize their primary role of fostering strength”

(Fowler & Seligman, 1999, p. 561)

Seligman picked up and succeeded where Maslow (1954) left off. It was Maslow who first introduced the term “positive psychology,” emphasizing the success of the psychopathology focus and subsequent lack of focus on the strengths and virtues of humankind. Seligman’s call has been answered and positive psychology research has significantly increased over the past twelve years. Those three main pillars of positive psychology researchers are positive emotion, positive traits, and positive institutions (Seligman & Csikszentmihalyi, 2000). Positive emotions are those subjective experiences of well-being at the individual level and may exist as a function of the other two pillars. Positive traits pertain to character strengths and virtues outlined in the classification of virtue and character strength framework (CSV; Peterson & Seligman, 2004). Positive institutions include organizational entities at the macro level, serving a social justice purpose to increase quality of life and well-being. They include schools, businesses, and services that help to teach, train, employ, and serve individuals for the greater good of society.

The classification of virtues and character strengths (Peterson & Seligman, 2004) serves as the backbone of empirical research in the field. Entities like the VIA Institute of Character and *The Journal of Positive Psychology*, conceived in 2006, provides a mainstay for positive psychology researchers. Peterson and Seligman (2004) organized positive traits by a stringent set of criteria, and classified virtues into six broad, intrinsic qualities encompassing the character strengths. The cross-cultural and interdisciplinary review of literature (Dahlsgaard, Peterson, & Seligman, 2005) elucidated twenty-four strengths of character for the six virtues. The strengths for each related virtue were determined through identifying behaviors consistent with virtuous conduct. The CSV consists of six virtues and twenty-four corresponding character strengths, outlined by Peterson and Seligman as follows:

- *Wisdom and knowledge*: creativity, curiosity, judgment and open-mindedness, love of learning, perspective
- *Courage*: bravery, honesty, perseverance, zest
- *Humanity*: kindness, capacity to love and be loved, social intelligence
- *Justice*: fairness, leadership, teamwork
- *Temperance*: forgiveness and mercy, modesty and humility, prudence, self-regulation
- *Transcendence*: appreciation of beauty and excellence, gratitude, hope, humor, religiousness and spirituality

The number of character strengths corresponding with each virtue is not consistent across virtues. In addition, an individual does not necessarily need to possess all character strengths included in a particular virtue to be considered transcendent, courageous, or humane (Seligman, Steen, Park, & Peterson, 2005). For example, one might achieve the virtue of transcendence by

demonstrating religiosity, appreciating the beauty of the world, and/or being gracious through their actions in life.

Research exploring the CSV framework has been impressive in both breadth and depth. Considering life satisfaction and subjective well-being, the CSV harbors practical implication in cross-cultural, rehabilitation, educational, occupational, and military contexts. Studies utilizing the CSV framework have linked it to positive human attributes such as well-being and life satisfaction (Park, Peterson, & Seligman, 2004), developmental implications (Isaacowitz, Vaillant, & Seligman, 2003, academic success (Lounsbury, Fisher, Levy, & Welsh, 2009), and cultural considerations (Biswas-Diener, 2006; Brdar & Kashdan, 2010; Linley et al., 2007; Park, Peterson, & Seligman, 2006; Peterson, Ruch, Beerman, Park, & Seligman, 2007; Ruch et al., 2010; Shimai, Otake, Park, Peterson, & Seligman, 2006).

Cross-cultural studies of virtue have been successful in finding a common thread of virtue constructs across the globe. Biswas-Diener (2006) examined three vastly different cultures using the CSV framework including the Inughuit tribe of Northern Greenland ( $n = 71$ ), the Maasai tribe of Western Kenya ( $n = 123$ ), and American students at the University of Illinois – Urbana-Champaign ( $n = 519$ ). Each group aside from the Maasai were given written statements and asked to respond on a scale of 1-3 (1, I strongly do not wish to have/my child to have X virtue/character strength; 2, I moderately wish to have/my child to have X virtue/character strength; 3, I strongly wish to have/my child to have X virtue/character strength). The Maasai are an illiterate tribe, communicating only in their native language, Maa, so interviews were administered orally by trained tribal members. The Inughuit were randomly assigned to respond to six of the twenty-four character strengths while the Maasai and university students were randomly assigned two character strengths. Although groups responded to different strengths,

results showed that all three groups emphasized the existence, importance, and desire to possess all twenty-four character strengths between them, supporting the trans-cultural ideology of virtue.

As a broadly validated measure for virtue, the Values in Action Inventory of Strengths (VIA-IS; Peterson, Park, & Seligman, 2005) has been translated into 15 languages, including Japanese. Shimai, Otake, Park, Peterson, and Seligman (2006) wanted to confirm cross-cultural effects of happiness and strength of character in Japan. In their study, an American sample of 1099 young adults (312 males, 787 females; ages 18-24), of whom 88% were college educated, was extracted from the same sample of online participants completing the VIA-IS used by Park et al. (2004). Within this sample, 789 also completed the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999). In addition, a Japanese sample of 245 students aged 18-24, (roughly 60% female) completed the translated Japanese VIA-IS, and the translated Japanese Subjective Happiness Scale. Results were similar to those of Park et al. (2004) in showing zest, curiosity, gratitude, and love to correlate highest with happiness for both samples.

Park and colleagues (2006) examined a large cross-cultural sample ( $N = 117,676$ ) in an effort to show ubiquity of virtue and character strength across lines of ethnicity and environment. A large portion of the sample ( $n = 83,576$ ) were American and the remainder ( $n = 34,100$ ) came from 54 other countries, all of whom had a representation of at least 20 participants. Data were retrieved in the same fashion as previous studies, from an existing online database. Participants completed an online version of the VIA-IS in English, as the survey was yet to be translated to the capacity it is available today. Americans possessed the following top five character strengths in rank order: kindness, fairness, honesty, gratitude, and judgment. Ranks from the bottom up included prudence, modesty, and self-regulation. Interestingly, 53 of the 54 countries (all

continents represented except Antarctica) converged with the US sample for the top and bottom ranked character strengths. These findings explicitly demonstrate the common thread of how individuals all over the world share the virtue of humanity and perceive themselves to be lacking in the virtue of temperance.

Several additional research efforts have demonstrated cross-cultural findings over time regarding well-being, gender, and age in relation to character strength. Linley and colleagues (2007) used an online sample ( $N = 17,056$ ; 6,332 men; 10,724 women; 81.5% aged 25-54) of participants in the United Kingdom, finding women's overall character strength scores to be slightly higher than men's scores. However, when examining both men and women's top five character strengths scores, similarities emerged across genders and four out of five top strengths were the same (open-mindedness/judgment, fairness, curiosity, and love of learning). It was also noted that more similarities than differences existed across gender. Character strength was positively associated with age, meaning as age increased, scores across character strengths also increased. Most notably, older participants' scores in strengths of wisdom (curiosity, love of learning), justice (fairness), and temperance (self-regulation, forgiveness) were significantly higher than younger participants, supporting the tenets of developmental and humanistic psychology that personal growth, self-actualization, and wisdom come with age (Maslow, 1954; Rogers, 1975).

The literature supports the universality of virtue and character strengths across cultures; one may wonder if there is universality for other dimensions of one's identity. For example, is it possible that individuals experiencing chronic pain demonstrate similar virtue profiles? Finally, if unique virtuous profiles emerge for individuals with chronic low back pain, implications for treatment could be large. For example, individual and group psychosocial treatment protocols

may be developed aimed at identifying and utilizing signature strengths and cultivating virtue in relation to their experience of chronic pain in an effort to maximize the mental health rehabilitation outcomes of depression, anxiety, and life satisfaction.

### **The Appraisal Process: Acceptance of Chronic Pain**

Within the disability literature, emphasis has been placed on the individual's perceptions of disability rather than the disability itself, which has considerable influence on one's subsequent adjustment to the disability (Elliott, Kurylo, & Rivera, 2002). Another personal factor potentially contributing to rehabilitation outcomes for individuals with CLBP is the appraisal process whereby the individual finds positive meaning and benefits to their circumstances. Stated another way, individuals who perceive their pain, disability, and functioning in a positive way generally respond more adaptively to challenges they face than others who do not view themselves through a lens of strength and ability. For individuals with chronic pain, this process is acceptance, defined by McCracken (1998) as "acknowledging that one has pain, giving up unproductive attempts to control pain, acting as if pain does not necessarily imply disability, and being able to commit one's efforts toward living a satisfying life despite pain" (p. 22). For example, an individual might perceive the disability as a challenge and not a deficit, effectively accepting their circumstances and focusing on their abilities as a person as opposed to lamenting those activities that are met with extreme difficulty. This disposition is typically referred to in the literature as a positive "response" to disability (Olkin, 1999). The positively responsive individual with chronic pain avoids rumination or assuming a victim role because he/she would miss potential positive meaning construction moments or events. Finally, unrealistic self-statements such as "my pain can be cured" may contribute to maladaptive or negative psychosocial response to pain (Elliott et al., 2002).

Acceptance has emerged in empirical literature and treatment intervention as a viable construct for individuals with chronic pain (Blacker, Herbert, Forman, & Kounios, 2012; McCracken, 1998; McCracken & Eccleston, 2006; McCracken & Eccleston, 2003; McCracken, Vowles, & Eccleston, 2005; Viane et al, 2003; Vowles, McCracken, & Eccleston, 2007). An important distinction must be made between acceptance and avoidance, which has been found to predict depression, disability, and pain interference. (McCracken, Zayfert, & Gross, 1992; Philips, 1987). Interestingly, McCracken, Gross, Aikens, and Carnrike (1996) broadly defined avoidance as any effort to reduce pain, including seeking treatment and cure. Due to the inherently perpetual nature of chronic pain, actual pain reduction may not be possible and patients are often told to ‘learn to live with it’ (McCracken, 1998).

McCracken (1998) sampled a group of 160 (66.3% female, 35.7% male) patients with chronic pain at a university pain management center. The women were 18 – 82 years of age ( $m = 46.9$ ,  $sd = 14.8$ ), who had suffered pain for a median of 36 months (range 3 – 372 months), and mostly suffered from lower back pain (60.0%). All patients completed measures of acceptance, depression, anxiety, and pain disability. Then, the researcher utilized regression analyses to determine the relationship between acceptance and patient adjustment. As a result, greater acceptance of the pain predicted the factors of lower pain intensity ( $r = -0.28$ ), less pain-related anxiety ( $r = -0.66$ ) and avoidance ( $r = -0.55$ ), lower depression ( $r = -0.58$ ), less physical ( $r = -0.46$ ) and psychosocial ( $r = -0.54$ ) disability, and more daily uptime, or active engagement in activities ( $r = 0.46$ ). Further, McCracken (1998) found that acceptance significantly predicted each factor at the 0.007 level and asserted that the minimal association between acceptance and pain intensity suggested that acceptance is more than just low levels of pain. Stated another way, people with lower pain intensity were not necessarily more accepting of their pain, meaning that

pain acceptance may also implicate other personality factors, such as positive traits in relation to pain.

In a similar study, McCracken and Eccleston (2003) studied a group of 230 patients with chronic pain seeking treatment from a university pain management center hoping to distinguish the construct of coping from acceptance. Subjects were mostly Caucasian (80.4%) women (66.5%) experiencing back pain (57.6%) for a median of 32.5 months. Much like the previous study, subjects were given measures for pain intensity, disability, depression, anxiety, and uptime (time spent on their feet, such as performing activities of daily living). The researchers found that greater acceptance of pain was again significantly associated with less experienced pain, disability, depression, and pain-related anxiety while it was positively correlated with uptime. In an effort to distinguish acceptance and coping, patients also completed a questionnaire that conceptualized coping as attention diversion, praying and hoping, reinterpreting pain sensations, coping self-statements, ignoring pain sensations, and increasing behavioral activity. The results indicated attention diversion and praying and hoping were consistently associated with greater pain (diversion,  $r = .34$ ; praying,  $r = .43$ ) and lower healthy functioning (diversion/physical,  $r = .29$ ; praying/physical,  $r = .40$ ). In the regression model, acceptance accounted for 24% of pain adjustment on average while all six coping variables combined accounted for 4.6% of the variance. Further, these results suggest that acceptance and coping are different constructs and that acceptance may be a more beneficial dispositional aspect of personality for successful response to the disability caused by chronic pain than the coping variables they measured.

In a study examining the broader effect of acceptance on the experience of pain, Vowles, McCracken, and Eccleston (2007) explored the relationship between acceptance and catastrophic



thoughts about pain. Participants included 334 patients (62.2% female; 98.5% Caucasian) receiving treatment for chronic pain in an interdisciplinary clinic in England. Additionally, subjects were 46.2 years old on average, median pain duration was 96 months, and 73.5% were out of work due to pain. Prominent pain locations included lumbar spine (39.9%), full body (16.9%), lower extremities (13.3%), cervical spine (9.8%), upper extremity (9.8%), and thoracic spine (4.4%), with the remainder reporting pain in other regions (5.9%; e.g., pelvis, head). Finally, secondary pain sites existed for the majority of participants (76.1%). Patients completed measures of pain acceptance, pain catastrophizing, depression, anxiety, physical and psychosocial functioning, along with a physical task activity. Results indicated that pain catastrophizing was moderately to strongly correlated with each of the validated measures with correlations ranging from  $r = .27 - .70$ . Further, mediational analyses concluded that catastrophizing accounted for variance in acceptance  $r^2 = .23, p = .001$  while linear regression models uncovered that both acceptance and catastrophizing significantly predicted all criterion variables except pain intensity and the physical task completion. When accounting for catastrophizing, acceptance was also a significant predictor of all measures except pain intensity and one of the physical tasks. Other studies report similar findings for acceptance and chronic pain (Dahl, Wilson, & Nilsson, 2004; Kratz, Davis, & Zautra, 2007; McCracken, Carson, Eccleston, & Keefe, 2004; McCracken, Vowles, & Eccleston, 2005; Wicksell, Melin, & Olsson, 2007).

**Limitations in pain acceptance research.** The empirical findings linking acceptance and chronic pain are largely correlational, including those studies discussed herein. While these studies do not explain causality between the two constructs, experimental research will be discussed outlining the effect of acceptance on mental well-being in the coming sections. In

addition, researchers found that treatment approaches utilizing tenets of acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 1999; 2012) have profound implication for individuals with chronic pain.

Another limitation of the research discussed herein seems to be the homogenous nature of sampling and publication. The participants were largely middle-aged Caucasian females experiencing low back pain studied by the same research team. Seemingly, samples used by McCracken (1998) and McCracken and Eccleston (2003) may actually be the same sample, limiting the generalizing conditions of their work. Although limitations are apparent, these researchers have been pioneers in the study of acceptance of general chronic pain. As a result of their work, further research has emerged examining acceptance in more specific pain conditions such as whiplash (Wicksell, Melin, & Olsson, 2007), fibromyalgia (Bergman, 2005), and work-related musculoskeletal pain (Lee, Wu, Lee, Cheing, & Chan, 2008).

While limitations in the pain acceptance literature exist, acceptance-based treatments for chronic pain are gaining in popularity and continue to be validated and employed in integrated settings such as the Veterans Health Administration. As use of acceptance-based treatment approaches increases, research into the relation between acceptance and virtue may enhance the use of these treatment models. While these constructs may be applied to individuals experiencing pain in a number of ways, the majority of participants in the aforementioned studies reported chronic lower back pain. It seems prudent to narrow the focus to this area of pain.

### **Chronic Illness, Psychological Well-Being, and Life Satisfaction**

The focus on strengths in rehabilitation psychology has existed since Wright's (1983) treatise on psychosocial effects of chronic illness and disability (CID). She stated "assets of the person must receive considerable attention in the rehabilitation effort" (p. xiii). The dichotomous

framework offered by Wright has the individual with CID choosing a path of coping versus succumbing. When choosing to cope with CID, the individual perceives the situation to be a challenge worthy of their efforts toward well-being. Succumbing individuals, on the other hand, maintain a focus of loss and helplessness, perpetuating a bleak outlook without recognition of their inherent strengths as a human. Dunn and Elliot (2008) purported that an orientation toward coping rather than succumbing more often leads to overcoming and thriving as an individual with CID. Further, this orientation toward coping means that neither physical and psychological well-being is compromised by the experience of disability (Chou, Lee, Catalano, Ditchman, & Wilson, 2009; Vash & Crewe, 2004). More recently, researchers found “great potential for improving services and outcomes through the integration of positive psychology practice in rehabilitation,” and continue to examine the clinical application of these constructs (Chou, Chan, Phillips, & Chan, 2013, p. 126). For people with chronic low back pain, the identification, cultivation, and utilization of virtue may lead to better acceptance of their pain and physical and psychological dysfunction. The following studies help to provide clarity about how strengths may relate to the experience of chronic illness and pain.

Chronic low back pain affects 15% to 45% of adults annually and at least 70% of adults at some point in their lifetime (Hoffman, Papas, Chatkoff, & Kerns, 2007). In a study examining functional capacity (stooping, climbing, crouching, lifting) and employment outcomes in 188 individuals with chronic low back pain (CLBP), Cutler and colleagues (2003) found lower pain level and compensation status to be significant predictors of long-term employment. In a similar effort, Burton, Tillotson, Main, and Hollis (1995) found that age, ethnicity, anxiety, and negative perceptions of disability predicted lower return-to-work rates, concluding that psychosocial aspects should be factored into the rehabilitation process for the best outcomes.

In application of positive psychology to rehabilitation psychology, Dunn and Brody (2008) theorized three behaviors that may lead to a flourishing life for individuals following an acquired physical disability. These include building meaningful relations with others, cultivating positive traits, and making efforts toward autonomy and management of one's own life. Building connections with others entails socializing with others, positive social comparisons, and helping others, whereas identifying positive personal qualities includes finding meaning, resilience, expressing gratitude, humor, and savoring. Finally, autonomous behavior encompasses how an individual might exercise and expend energy, be comfortable under her own devices, engage herself in life's activities, afford special rewards that are meaningful to the self, and give back socially through the generation of her own greater ideals. The authors emphasized that these circumstances are not necessary for individuals with physical disabilities to thrive; however, they may substantially contribute to an individual adopting the coping orientation described by Wright (1983).

Linking the virtue framework to rehabilitation, Peterson and colleagues (2006) found that certain strengths were related to recovery from illnesses. A sample of 2,087 adults (36 years old on average; 88% Caucasian; 87% women; 85 % US citizens) completed the VIA-IS (Park et al., 2004) and the SWLS (Diener, Emmons, Larsen, & Griffin, 1985), in addition to demographics about mental and physical illness and whether they had recovered. Illnesses included cancer, chronic pain, arthritis, obesity, substance abuse, depression, anxiety, diabetes, and autoimmune diseases, among others. Participants who had recovered from a psychological disorder scored higher on *appreciation of beauty and excellence, creativity, curiosity, gratitude, and love of learning* than participants who had never been diagnosed with a psychological disorder. For individuals with physical illness (arthritis, cancer, chronic pain, etc.), character strength scores in

*humor, bravery, and kindness* related most robustly with recovery. In those with a psychological illness (anxiety, depression, substance abuse, etc.), scores on *appreciation of beauty* and *love of learning* were most strongly related to recovery. The authors suggested that those individuals who recovered from chronic illness had different character strengths than those who had not recovered from chronic illness (Peterson et al., 2006).

In another study of strength and recovery, Peterson and colleagues (2008) showed that the experience of trauma was associated with an increase in character strengths (posttraumatic growth). They examined 1,739 adults (40 years old on average; 80% Caucasian; 69% women; 72% US citizens) who completed measures of character strength (VIA-IS) and posttraumatic growth (Post-Traumatic Growth Inventory; Tedeschi & Calhoun, 1996), which measures how individuals change their behavior following traumatic experiences. Over one-half of the respondents reported experiencing at least one type of trauma, including life-threatening trauma (32%), sexual assaults (23%), and physical assaults (19%). Positive correlations were found between the character strength and posttraumatic growth scales; the highest correlations were for posttraumatic growth and the character strengths of religiousness ( $r = .35$ ), kindness ( $r = .30$ ), bravery ( $r = .29$ ), hope ( $r = .29$ ), zest ( $r = .28$ ), and appreciation of beauty ( $r = .28$ ).

In their progress report on positive psychology, Seligman and colleagues (2005) identified specific strength-based interventions, effectively creating a novel therapeutic approach later termed positive psychotherapy (Seligman, Rashid, & Parks, 2006). Centering on those three elements proposed to lead to a fulfilling life (pleasance, engagement, and meaning), the authors tested five interventions and a control on a convenience sample of 411 participants (77% Caucasian, 58% female; 64% between 35-54 years old). Participants completed pre- and post-test measures for happiness and depression. Post-test measures were given immediately following

intervention and at one week, one month, three month, and six month follow-up. Two interventions, one tapping into character strength and another utilizing journaling of three positive experiences (*using signature strengths in a new way* and *three good things*) predicted higher levels of happiness and lower levels of depression at six months following the intervention, as indicated by the Steen Happiness Index (SHI; Seligman et al., 2005) and Center for Epidemiological Studies–Depression Scale (CES-D; Radloff, 1977). The SHI was developed for this study and conceptualized happiness as the opposite of the construct of depression as measured by the Beck Depression Inventory (Beck, Ward, & Mendelson, 1961).

Well-being and life satisfaction remain pertinent topics in relation to positive character traits. Park et al. (2004) found character strengths to be strongly related to subjective life satisfaction in a sample of 5,299 individuals with an average age of 35–40 years; 70% were females, and 80% were U.S. citizens. Participants completed online versions of the VIA-IS and the Satisfaction with Life Scale (Diener et al., 1985). The character strengths showing the strongest relationship with life satisfaction were zest, hope, gratitude, curiosity and love. Modesty and other intellectual strengths (creativity, love of learning, appreciation of beauty, and judgment) were only mildly correlated with life satisfaction. Zest can be loosely defined as living life to the fullest and enthusiastically engaging in life's activities, relating to Csikszentmihalyi's (1990) idea of flow and clearly showing the connection to a happy life. Park and colleagues adeptly described how gratitude links us to the past, hope to the future, and how love and curiosity keep us grounded in the present.

Exploring life satisfaction, Peterson et al. (2007) sampled American ( $n = 12,439$ ) and German-speaking Swiss individuals ( $n = 445$ ). Character strength was measured with a translated German version of the VIA-IS, a validated measure of character strength, and life

satisfaction was measured using the Satisfaction with Life Scale (SWLS; Diener et al., 1985). In addition, participants completed the Orientations to Happiness Scale (Peterson et al., 2005), which measures the fulfilled life as a function of subjective pleasure, engagement (flow), and meaning in life (Seligman et al., 2005). The researchers found the character strength most indicative of life satisfaction to be gratitude in the US sample and perseverance for the Swiss. The Swiss sample showed higher levels of life satisfaction overall while the US sample endorsed higher levels of meaning. Ruch et al. (2010) examined a sample of 1,674 German-speaking individuals in an effort to validate the German version of the VIA-IS and previous findings regarding life satisfaction. Results showed strong associations of character strength with well-being and life satisfaction, consistent with previous research (Park et al., 2004). Finally, Brdar and Kashdan used a sample of Croatian students ( $n = 881$ ) to analyze the virtue factor structure; they also found results consistent with the previous studies regarding life satisfaction as measured by the SWLS.

In summation, the findings outline connections between well-being and positive character traits. As stated previously, higher quality of life may lead to more positive mental health rehabilitation outcomes and employment (Lee et al., 2008). If similar relationships are found in individuals with chronic low back pain, it may help to inform and expand upon acceptance-based treatment approaches (i.e., Dahl, Wilson, & Luciano, 2005) in an innovative way.

### **An ICF Model of Positive Pain Adjustment**

Rehabilitation scholars assert that the primary outcome of rehabilitation is *participation*, meaning engagement in the social and familial opportunities afforded by the community and in many cases, employment (Heinemann, 2005). In a qualitative effort exploring persons with disabilities' conception of participation, Hammel and colleagues (2008) uncovered domains such

as choice and control, meaningful engagement, and personal and societal responsibility. Interestingly, rehabilitation outcome researchers have also called for a strong and consistent focus on the psychosocial experience of chronic illness (Chwalisz, 2008; Dunn & Dougherty, 2005; Elliott & Johnson, 2008; Wright, 1983). Many psychosocial factors contribute to the experience of long-term physical disability in chronic pain conditions including depression, anxiety, social support, coping, interference, substance abuse, history of abuse, pain level, compensation status, employment status, and perceptions of disability (Boothby et al., 1999; Burton, Polatin, & Gatchel, 1997; Cutler et al., 2003; Dozois, Dobson, Wong, Hughes, & Long, 1995; Johansson & Lindberg, 2000; Lee et al., 2008; Pfingsten et al., 1997; Turk & Okifuji, 2002). Further, specific pain-related factors are important in determining outcome, such as duration, location, intensity, onset, range of motion, and previous treatment (Geertzen, Van Wilgen, Schrier, & Dijkstra, 2006). The ICF model is proposed as a framework to address these issues with chronic pain populations.

Models of disability have evolved over time in terms of how society views the individual with a disability. One group, the World Health Organization, derived a model of disability that integrates the medical and social perspectives of interpreting disability and disability-related components (WHO, 2001). This conceptual framework joins ideas from the medical and social models while integrating aspects of individual personhood and context to describe the disability experience. The WHO defines several pertinent terms to outline their model. The ICF model is portrayed in *Figure 1*.

In describing the elements of the model, the construct representation in the current study is also included. The core structure of the ICF consists of the Health Condition (in this case, chronic low back pain) and two main parts, (1) Functioning and Disability and (2) Contextual



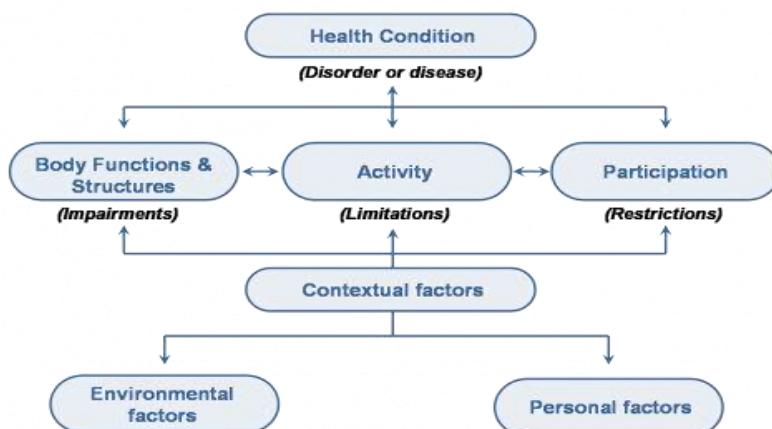


Figure 1: The WHO-ICF model of disability

Factors, each of which has two components. Within Functioning and Disability, the Body component consists of two classifications, Body Structure (lower back) and Body Function. The Activities and Participation component of Functioning and Disability outline domains of functioning from an individual and societal perspective. Components of functioning are described as either non-problematic or disabling (i.e., impairment, activity limitation, or participation restriction) (Peterson, 2005; WHO, 2001). Within both the Body component and the Activities and Participation component of Functioning and Disability, qualifiers govern how to interpret disability. Body Structure and Body Function are qualified or modified by changes in physiological systems or anatomical structure (injury or disease affecting lower back). In the current study, this domain is represented as *pain demographics*, namely age of onset, characteristic pain (composite score of current, average, and highest pain levels), number of treatments undergone, and number of pain medications tried in the past.

In Activities and Participation, the level of Capacity and Performance describe the level of active involvement in daily life and social engagement. As such, activity is defined as the execution of a task or action by an individual, while participation is defined as involvement in life situations of the greater society. As qualifiers, capacity refers to the individual's ability to complete an action or task in a standard environment while performance is what an individual actually executes in their current environment (WHO, 2001). In the current study, activities and participation are predictor measures and activities and participation will be defined by a specific measure designed by WHO to represent these constructs, the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0). Psychometrics and further information on this measure will be addressed in subsequent sections.

The next main part of the model is termed Contextual Factors. These consist of Environmental Factors and Personal Factors. In the current study, these are the primary factors of interest in relation to chronic pain rehabilitation outcomes. Environmental Factors are the physical, social, and attitudinal world of the individual that either help or hinder functioning. Currently, these factors are operationalized by an instrument constructed by the WHO to measure perceived environmental barriers, the Craig Hospital Inventory of Environmental Factors – Short Form (CHIEF-SF: Whiteneck, Harrison-Felix, Mellick, Brooks, Charlifue, & Gerhart, 2004). Specific statistical implications are discussed in the methods section. Next, Personal Factors describe the unique elements of personhood that exist between individuals; for the current study they are represented by virtue (Peterson & Seligman, 2004) and chronic pain acceptance (McCracken, 1998, McCracken & Eccleston, 2003). Virtue is operationalized by the Adapted Virtue Inventory of Strengths (AVIS: Kim, Keck, Gonzalez, & Reid, in preparation) while acceptance is measured by the Chronic Pain Acceptance Questionnaire (CPAQ: McCracken, Vowles, & Eccleston, 2004). McCracken (1998) defined acceptance as “Acknowledging that one has pain, giving up unproductive attempts to control pain, acting as if pain does not necessarily imply disability, and being able to commit one’s efforts toward living a satisfying life despite pain” (p. 22). Due to the complex social circumstances across individuals, no qualifiers currently govern this component (Peterson, 2005; WHO, 2001).

### **Rationale and Implications of an ICF Model of Positive Pain Adjustment**

The literature discussed herein emphasizes the potential role of positive traits and acceptance in the experience of well-being and positive rehabilitation outcomes such as anxiety, depression, and life satisfaction. It is argued that a route of administration by which both individuals with disabilities and people without disabilities experience a thriving life is through

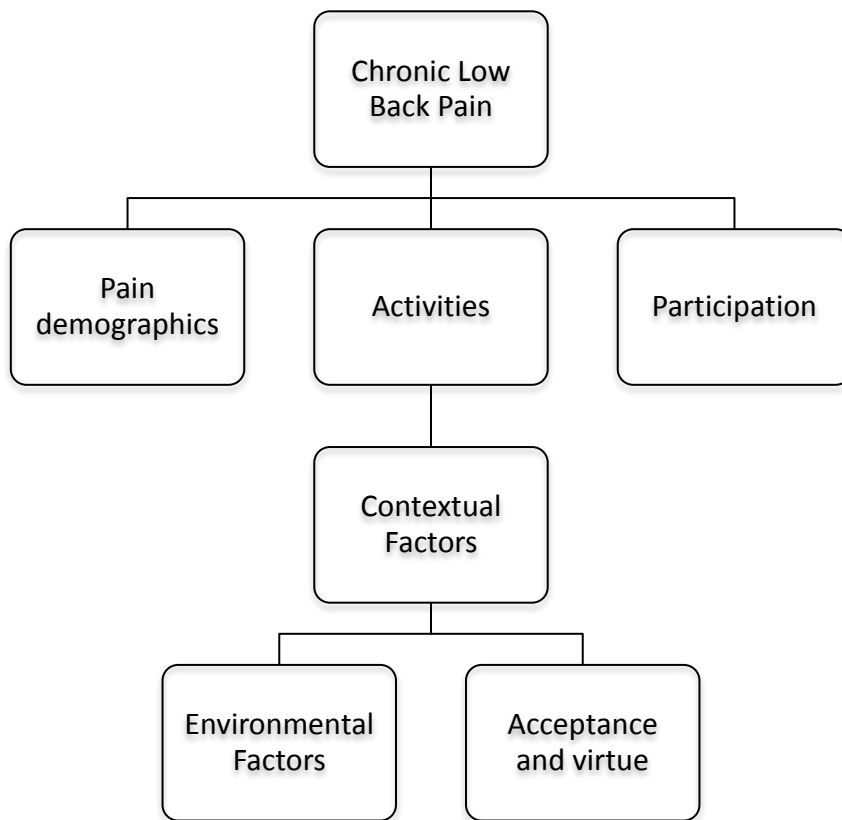
their strength of character. In applying virtue to the World Health Organization ICF model of disability, findings may contribute to a treatment model in a context widely accepted by rehabilitation and health professionals across the globe.

In her chapter in the *Handbook of Rehabilitation Psychology*, Ehde (2010) explores the intersection of positive psychology and rehabilitation psychology through resilience, posttraumatic growth, and positive emotions. There is no mention of character strength and virtue or positive traits, however, although it is recognized that rehabilitation psychologists harbor a general interest in and have addressed individual strengths over time (Dunn & Dougherty, 2005; Elliott, et al., 2002). Ehde (2010) further points out that because the practice of rehabilitation psychology typically occurs in hospital settings, the dominant paradigm of psychological health for individuals with disabilities are approached from a medical model perspective. In contrast, biopsychosocial models such as the ICF model of disability favor positive psychosocial adjustment, challenging tenets of the medical model emphasizing prevalence or absence of psychopathological reactions to disability (Dunn & Dougherty, 2005; Elliott, et al., 2002).

Character strength and virtue may act as protective factors to maladaptive adjustment to CID. For example, if a rehabilitation client identifies zest as a signature strength, the therapist may work with the client to identify and conceptualize how he/she uses zest in his/her life to achieve higher life satisfaction, increased social engagement, and employment. Another example might explore how the client uses humor and creativity to facilitate asking others for help when needed (e.g., veterans with chronic pain who are not accustomed to asking for help). Accordingly, professionals can help individuals who possess an adaptive personality (complete with an arsenal of character strengths) to capitalize on these individual difference factors when

appraising their pain experience, with the aim of facilitating psychological growth and acceptance of pain and disability, leading to positive rehabilitation outcomes related to activities and participation. Conversely, professionals may be able to help those who lack such personality characteristics by encouraging them to interpret the situation through the lens of their strengths rather than potentially exacerbating their problems through maladaptive responses to disability. Finally, psychosocial factors may account for over half of the variance of physical disability in individuals with chronic pain (Burton, Tillotson, Main, & Hollis, 1995). Clarifying these factors is a primary purpose of the current research and it is hypothesized that virtue and acceptance may work together to support a thriving life in individuals with chronic pain, leading to decreased depression and anxiety, and increased life satisfaction.

In the current study, an ICF-based understanding of positive pain adjustment is proposed and illustrated below in Figure 2. Essentially, it is proposed that acceptance of chronic low back pain and virtue will predict depression, anxiety, and life satisfaction in individuals with chronic low back pain. As the literature in this specific area is sparse, the current study is the first to integrate these factors of chronic pain to understand and conceptualize the experience of pain in such terms. As a result, this study will utilize exploratory hierarchical regression and correlational analysis, conceptually rooted in the ICF model of disability. Implications for a positive understanding of chronic pain through acceptance could be significant for treatment targeting acceptance through virtue, as both constructs have separately been found to positively influence mental health rehabilitation outcomes such as depression, anxiety, and life satisfaction.



*Figure 2. ICF-based Understanding of Positive Pain Adjustment*

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**Appendix B – Demographic Questionnaire**

1. Do you have chronic low back pain (CLBP)? (CLBP is defined as persistent low back pain for greater than six months)
  - Yes
  - No
  
2. Age: \_\_\_\_\_
  
3. Sex:
  - Male
  - Female
  - Transgender
  
4. Race/Ethnicity:
  - White (non-Hispanic)
  - Black (non-Hispanic)
  - Hispanic or Latino
  - Asian
  - American Indian or Alaska Native
  - Native Hawaiian or Other Pacific Islander
  - Other \_\_\_\_\_
  
5. Nationality:
  - United States
  - Other \_\_\_\_\_
  
6. Marital Status
  - Single
  - Partnered
  - Married/Co-habiting
  - Separated
  - Divorced
  - Widowed

7. Highest education received:

- Some High School
- High School Diploma
- GED
- Associates degree
- Bachelors degree
- Masters degree
- Doctoral degree
- Other (please describe) \_\_\_\_\_

8. Are you a veteran? Y N

9. How long have you experienced chronic low back pain? Please respond in years and months.  
\_\_\_\_\_

10. How old were you when your pain began? \_\_\_\_\_

11. Are you currently employed? Y N

- a. If yes, occupation: \_\_\_\_\_
- b. If yes, hours/week: \_\_\_\_\_
- c. If yes, how long employed (years and months) \_\_\_\_\_
  - i. If no, how long since you last worked? \_\_\_\_\_

12. Do you have any claims pending (Social Security, workers comp, etc.)? Y N

13. Do you have any medical lawsuits pending? Y N

14. Were you employed prior to your experience of chronic low back pain?

Y N

- a. If yes, how many years were you employed at this position prior to your experience of chronic low back pain? \_\_\_\_\_

15. Did you miss work due to your chronic low back pain? Y N

a. If yes, how much work time did you miss?

- i. Less than 1 week
- ii. 1 week – 1 month
- iii. 1-3 months
- iv. 3-6 months
- v. Greater than 6 months

16. After missing work time, did you return to work? Y N

17. Did you return to the same position you held prior to missing work time? Y N

18. How many hours per week do you spend in school working toward a degree (including hours in class and studying)? \_\_\_\_\_

19. What is/are your medical diagnoses, if applicable? (Check the box for all that apply to your CHRONIC LOW BACK PAIN only)

- Fibromyalgia
- Arthritis
- Degenerative Disc Disease
- Occupational injury
- Tissue injury
- Disc herniation or bulge
- Failed back surgery
- Neuralgia
- Multiple Sclerosis
- Neuropathy
- Pinched nerve
- Sacroiliitis
- Complex Regional Pain Syndrome
- Sciatica
- Traumatic spinal injury
- Vertebral compression fracture
- Other \_\_\_\_\_

20. Please describe any treatment you have experienced for your CHRONIC LOW BACK PAIN  
(select all that apply):

- Pain medication (opioids, NSAIDS, etc)
- Behavioral health strategies (psychotherapy, counseling, etc)
- Physical therapy
- Back or neck surgery
- Injection therapies (epidural, trigger point, etc)
- Chiropractic
- Acupuncture
- Other (please describe)\_\_\_\_\_

21. What types of pain medication have you been prescribed in the past? (select all that apply)

- Opioids (Lortab, Percocet, Opana, MS Contin, etc)
- NSAIDs (Ibuprofen, Naproxen, etc)
- Acetaminophen
- Muscle relaxants (Flexeril, Valium, etc)
- Anti-depressants (Cymbalta, Elavil, Doxepin, Effexor, etc)
- Anti-seizure medications (Neurontin, Lyrica, Topamax, etc)
- Other (please describe) \_\_\_\_\_

22. What is your overall low back pain rating *right now* (0-10)? \_\_\_\_\_

23. Over the last week, what was your low back pain rating (0-10)?

- a. Average \_\_\_\_\_
- b. Lowest \_\_\_\_\_
- c. Highest \_\_\_\_\_

24. Do you use any alcohol, tobacco, or illegal substances?    Y        N

- a. If yes, drinks/week \_\_\_\_\_
- b. If yes, tobacco type and how much \_\_\_\_\_
- c. If yes, what substances and how much \_\_\_\_\_

## **Appendix C – Informed Consent**

### **TITLE OF THE STUDY**

Experiences of Individuals with Chronic Low Back Pain

### **PRINCIPLE INVESTIGATOR**

Phillip S Keck, MA

Department of Counseling Psychology and Guidance Services

Phone: 765-285-8040

Email: [pskeck@bsu.edu](mailto:pskeck@bsu.edu)

### **FACULTY ADVISOR**

Sharon Bowman, Ph.D, HSPP

Department of Counseling Psychology and Guidance Services

Phone: 765-285-8040

Email: [sbowman@bsu.edu](mailto:sbowman@bsu.edu)

### **DESCRIPTION OF THE RESEARCH**

You are invited to participate in a research project to investigate some factors that may influence psychosocial treatment for individuals with chronic low back pain.

This study will include individuals with chronic low back pain who meet the following criteria: (a) participants must be 18-65 years old, (b) have chronic low back pain (greater than or equal to 1 year prior to data collection ), and (c) reported English reading level better than or equal to 6th grade. If you meet these criteria, we are interested in the information and perspectives that you might be able to provide through your responses to the questions in this study.

### **WHAT WILL MY PARTICIPATION INVOLVE?**

Your participation in this study is completely **VOLUNTARY**. Your responses will be anonymous and your name will be removed from association with your responses. The study will include a survey that takes 30-45 minutes to complete, depending on individual differences.

If you are interested in participating and would like to speak with the primary researcher, please feel free to call the indicated number (765-285-8040) and speak to Phillip Keck.

### **ARE THERE ANY RISKS TO ME?**

Foreseeable risks to participating in this study are minimal. The study survey includes questions about your current mental health. Should you experience any emotional distress as a result of completing this study, please contact a local licensed mental health provider.

### **ARE THERE ANY BENEFITS TO ME?**

There are no foreseeable benefits to participating in this study.

### **COMPENSATION**

Upon completion, you will receive \$2 via Amazon Mechanical Turk. The researcher will compensate the participant within 72 hours of completion.

### **HOW WILL MY CONFIDENTIALITY BE PROTECTED?**

This study is **ANONYMOUS**. Participant responses will not be linked to any identifiable information. Only group and aggregate data will be published or presented. Once collected, all data will be stored in a secure digital file and data will be kept up to three years following completion of the study. Only the primary researcher will have access to the data and any electronic spreadsheet files with data will be encrypted.

**WHOM SHOULD I CONTACT IF I HAVE QUESTIONS**

You may ask questions about the research at any time by contacting Phillip Keck or Dr. Sharon Bowman at the phone number or email address given above.

For questions about your rights as a research subject, please contact Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5106; [irb@bsu.edu](mailto:irb@bsu.edu).

## Appendix D – IRB Approval Letter



Office of Research Integrity  
 Institutional Review Board (IRB)  
 2000 University Avenue  
 Muncie, IN 47306-0155  
 Phone: 765-285-5070

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DATE: February 3, 2015

TO: Phillip Keck, MA

FROM: Ball State University IRB

RE: IRB protocol # 608866-3

TITLE: Experiences of Individuals with Chronic Low Back Pain

SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVED

DECISION DATE: February 3, 2015

REVIEW TYPE: **EXEMPT**

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The Institutional Review Board reviewed your protocol on February 3, 2015 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

### Exempt Categories:

	<b>Category 1:</b> Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
	<b>Category 2:</b> Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior
	<b>Category 3:</b> Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (i) the human subjects are elected or appointed officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
	<b>Category 4:</b> Research involving the collection of study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.



	<b>Category 5:</b> Research and demonstration projects which are conducted by or subject to the approval of Department or agency heads, and which are designed to study, evaluate or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in methods or levels of payment for benefits or services under these programs.
	<b>Category 6:</b> Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed which contains a food ingredient at or below the level and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

**Editorial Notes:**

## 1. Modification Approved

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact (ORI Staff) if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

**Reminder:** Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

Bryan Byers, PhD/Chair  
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/Director  
Office of Research Integrity