

HOW ARE WE DOING? THE PSYCHOSOCIAL HISTORY- TAKING PRACTICES
OF PHYSICAL THERAPISTS WHEN EVALUATING

ADULTS WITH CHRONIC PAIN

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

SCHOOL OF PHYSICAL THERAPY

COLLEGE OF HEALTH SCIENCES

BY

ELKE C. SCHAUMBERG PT, MS, DPT, PHD

DENTON, TEXAS

MAY 2020

Copyright © 2020 by Elke C. Schaumberg

DEDICATION

To those who have encouraged and supported me throughout this long process,

I am forever grateful for your understanding and willingness to listen.

Charlie, CJ, and Gigi, you cheered me on each and every day.

Without the three of you, this would not have been possible.

ACKNOWLEDGEMENTS

I am filled with heartfelt gratitude for the unending encouragement and support that I have received from so many throughout this long journey. Earning a PhD has been a lifelong goal that would not have been possible without the love and patience of my family and friends, the tireless support of my dissertation committee, and the selfless assistance provided to me by so many professional colleagues. While it is difficult to fully express the depth of my gratitude, I will try.

Without the support of my dissertation committee and faculty at Texas Woman's University, I would not have been able to complete this project. To my chairperson, Dr. Wayne Brewer, I am thankful for your ability to put this process into perspective and to provide reassurance when it was needed. The countless hours you spent on the phone answering what had to seem like endless questions, your quick turnaround of all submissions, and the perspective you offered as a clinician and researcher were invaluable. To Dr. Kelli Brizzolara, thank you for the fresh perspective you offered early in the survey and study development phases and the thoughtful feedback and suggestions that you provided along the way. To Dr. Peggy Gleeson, your always thorough review of my work and the tough questions that you asked helped to shape this project. To Dr. Jennifer Ellison, thank you for your time and the thoughtful feedback you provided. To Dr. Katy Mitchell, thank you for your support throughout the program, and the confidence you instilled within me early on when I was not sure I had what was needed to make it through the program.

To Dr. Rebecca Greenwood, thank you for the tough questions you asked in the prospectus development phase, your tireless support throughout the program, and most

importantly your friendship. To Dr. Anne Hill Boddy and Dr. Megan Flores, I am grateful for your encouragement and mentorship as I moved through the coursework and dissertation phase of the program. Thank you to physical therapists who took time out of their busy clinical schedules to provide feedback and participate in the studies. Linda Sherman and Matt Smith, I am so appreciative of the time you took to help make this project possible. The passion and commitment each of you have for the profession of physical therapy is truly inspirational.

To my family and friends, who made so many sacrifices to help me realize the goal of earning a PhD, I am forever grateful. To Jen Nelson-Faulconer, the long phone conversations, your never-ending support, and our lifelong friendship bolstered me through those moments when I was not sure I would finish this dissertation. To Lisa Adorno-Dimaria, the hours we spent walking and talking were a reprieve from the rigors of the program. I cannot believe that you both were willing to listen to me go on and on and on (and on) about my research. The thoughtful suggestions you both provided helped shape this project. To Sue Fanning, Carol Aguirre, and Carolyn Dalgliesh who helped ground me, thank you. To Kathryn Lockwood, your willingness to read pages and pages of material at a moment's notice was greatly appreciated. To my Mom, who set an example when she finished her degree later in life and taught me that it is never too late to pursue a dream, I am grateful. To my Dad, who instilled within me the value of an education and taught me how to work towards a goal, thank you. To my sister, thank you for making me laugh and keeping me from taking myself too seriously. Last but certainly not least, to my husband and children, there are no words to express the love and gratitude that I have for each of you. To my children, CJ and Gigi, I know it was not easy to have a distracted mom who was glued to her laptop. I am so proud of both of you and the young adults that you have both become in the four years it has taken me to realize this goal. And to Charlie, for your truly tireless support, thank you. I am so blessed to have a husband who never questions my aspirations but instead finds a

way to help me realize my dreams. And for all the small gestures along the way, I am so grateful to have walked through this experience with you. Without your support, this would not have been possible.

ABSTRACT

ELKE C. SCHAUMBERG

INVESTIGATING THE PSYCHOSOCIAL HISTORY-TAKING PRACTICES OF PHYSICAL THERAPISTS WHEN EVALUATING ADULTS WITH CHRONIC PAIN

MAY 2020

The BPS model, one of four constructs that informs physical therapy practice. In order to effectively manage all aspects of the pain experience, a thorough assessment of psychosocial factors during the history-taking portion of the initial evaluation is required. Little is known about the psychosocial history-taking practices of PTs when evaluating adults with CP in the United States. The aims of the three dissertation studies were: 1) to investigate the reliability and validity of a survey designed to measure psychosocial history-taking practices; 2) to explore the relationship between PTs' demographic characteristics (years of clinical practice, evaluation time allowed, gender, American Board of Physical Therapy Specialty certification (ABPTS), and work setting), and their psychosocial scores on the survey; 3) to explore the decision-making processes that PTs use when they decide whether and to what depth psychological cognitive factors should be explored at the first visit; and to understand the factors and cues that influence the process. A survey developed by the author was emailed to 30,000 PTs licensed in eight states whose licensing boards provided email addresses; to be eligible, PTs had to be licensed in the United States and treating, at least occasionally, adults with CP. Strong test-retest reliability was demonstrated in each of the psychological and social subdomains and the overall psychosocial score using the Pearson's correlation coefficient and the Bland-Altman plot. Item analysis

revealed strong internal consistency of all factors within the psychological subdomains/domain. Criterion validity, using the Pain Attitude and Belief Scale- Physical Therapist, was not demonstrated. In Study Two, evaluation time allowed and years of clinical experience were found to be significant predictors of the psychosocial score. When respondents were grouped by years of clinical experience, the largest significant between group differences in the mean psychosocial score existed between the less than 5 years group and the groups with 5 or more years of experience. No significant interaction was found between work setting and the psychological factors; however, the main effects of work setting, and psychological factor were both significant. Study Three revealed that PT-related factors and external cues and factors influenced PTs' decision-making at the first visit. PTs used fast and slow thinking strategies; however, there was insufficient evidence to identify specific reasoning methods used.

TABLE OF CONTENTS

DEDICATION	ii
ACKNOWLEDGEMENTS.....	iii
ABSTRACT	vi
TABLE OF CONTENTS.....	viii
LIST OF TABLES	xiii
LIST OF FIGURES	xv
Chapters	
I. INTRODUCTION.....	1
Background	1
Purpose	4
Studies One and Two.....	4
Study One:Specific Aims and Hypotheses	4
Study Two: Specific Aims and Hypotheses.....	5
Subjects Studies One and Study Two	6
Instrumentation Studies One and Study Two	6
Procedures Studies One and Study Two.....	7
Data Analysis Study One	7
Data Analysis Study Two	8
Study Three	8
Specific Aim	8
Subjects.....	9
Instrumentation.....	9
Procedure.....	9
Analysis	10
II. LITERATURE REVIEW	12

Chronic Pain	12
Chronic Pain Defined	12
Prevalence of Chronic Pain	16
Cost of Chronic Pain	18
Multidimensional Nature of Chronic Pain and the Biopsychosocial Model	18
Psychosocial Chronic Pain Models	20
Proposed Biopsychosocial Diagnostic Frameworks	24
Psychological and Social Domains	26
Psychological-Cognitive Subdomain	27
Understanding of pain	28
Self-efficacy	31
Pain Catastrophizing.....	33
Expectations	34
Pain acceptance	36
Motivation	37
Psychological-Emotional Subdomain	38
Depression.....	39
Anxiety and Fear	40
Anger.....	42
Psychological-Behavioral Subdomain.....	43
Sleep	45
Substance Abuse.....	46
Social Domain	47
Current State of Assessment of Psychosocial Factors by Physical Therapists	50
Factors that Influence Psychosocial History-Taking Practices of Physical Therapists	60
Pain Attitudes and Beliefs Scale-Physical Therapists	62
Demographic Characteristics and Treatment Orientation	66
Work setting.....	66
Age and years of experience.....	67
Gender	67

Pain Science Education	67
Clinical Reasoning and Decision-Making During the Evaluation	68
Clinical reasoning and decision-making	69
Reasoning differences between novice and experienced PTs	74
Clinical reasoning in manual therapists (outpatient orthopedic PTs).....	76
Factors Influencing Clinical Reasoning	78
Conclusion.....	81
III. THE RELIABILITY AND VALIDITY OF THE PSYCHOSOCIAL HISTORY- TAKING SURVEY	83
Background	83
Methods	86
Subjects.....	86
Procedure.....	86
Data Analysis.....	92
Results	93
Test-Retest Reliability	93
Internal Consistency Reliability	102
Validation.....	102
Discussion	105
Limitations.....	108
Strengths	110
Conclusion.....	111
IV. SELF-REPORTS BY PHYSICAL THERAPISTS OF THEIR PSYCHOSOCIAL HISTORY-TAKING PRACTICES WHEN EVALUATING ADULTS WITH CHRONIC PAIN	112
Background	112
Methods	115
Subjects.....	115
Instrumentation.....	115
Procedures	117
Data Analysis.....	119

Results	120
Characteristics of Respondents.....	120
Predictors of Psychosocial History-Taking Practices.....	122
Clinical Experience and Psychosocial History-Taking Practices.....	125
Work Setting and Psychological Factors	129
Discussion	135
Limitations.....	141
Strengths	143
Conclusion.....	144
V. THE DECISION-MAKING PROCESS PHYSICAL THERAPISTS USED WHEN DECIDING HOW TO EXPLORE PAIN PERCEPTIONS DURING THE INITIAL EVALUATION	146
Background	146
Methods.....	148
Theoretical Approach	148
Subjects.....	149
Instrumentation.....	151
Procedure.....	151
Analysis	152
Results	154
Language	154
Factors and/or Cues that Influence the Decision-Making Process...	158
PT related factors	158
Evaluation practices	158
Values, judgements and beliefs	167
External influences/cues	172
Patient cues.....	172
Healthcare system	177
Reasoning Strategies and the Influence Factors have on the Process	178

Discussion	191
Factors that Influenced Decision-Making	192
Decision-Making Processes and the Influence of Factors.....	196
Strengths and Limitations.....	201
Conclusion.....	202
Relevance	203
VI. CONCLUSION	204
Statement of Problem	204
Relevant and Significant Findings	205
Clinical Relevance.....	208
Future Implications	210
REFERENCES	211
APPENDICES	
A. Subject Recruitment Studies One and Two	227
B. Section One of the Survey: Pain Attitudes and Belief Scale—PT.....	229
C. Section Two of the Survey	231
D. Section Three of the Survey- Demographic Questions	236
E. Interview Questions Semi-Structured Interview	246
F. List of Pain Cognitions Used in Interviews.....	249

LIST OF TABLES

Table	Page
1. Elements of Psychosocial Subdomains	88
2. Expert Reviewer Demographic Composition	89
3. Final Expert Review Results.	90
4. Demographic Composition of Respondents Included in Test-Retest Analysis	94
5. Mean and Correlation Coefficient Test-Retest	96
6. Demographic of Participants Internal Consistency and Validity Testing	101
7. Mean Values PABS-PT, Psychosocial Survey Score	104
8. Correlation Coefficients PABS-PT, Composite Survey Scores	104
9. Mean PABS-PT Grouped by Mean Psychological/Psychosocial Score	105
10. Elements of Psychosocial Subdomains	118
11. Demographic Descriptive Statistics of Survey Respondents	121
12. Mean Percentage Score of Respondents by Subdomain	122
13. Mean Psychosocial Score-Overall and by Predictors	123
14. Mean PABS-PT by Gender and ABPTS Certification with Independent T-Test Results	123
15. Linear Regression Results by Predictor Variable	124
16. Multiple Regression Results	125
17. Mean Psychosocial Score when Grouped by Years of Experience	126
18. Post Hoc Comparison of Mean Psychosocial Scores.	127
19. Mean PABS-PT Scores by Years of Clinical Experience.	127
20. Psychological Subdomain Means by Work Setting.	131
21. Marginal Means by Psychological Subdomain	131

22. Marginal Means by Work Setting	133
23. Mean PABS-PT Factor Scores by Work Setting	134
24. Demographics Participants Qualitative.	150

LIST OF FIGURES

Figure	Page
1. Bland Altman Plots by Psychological Subdomain.	97
2. Bland Altman Plot Social Domain	98
3. Bland Altman Plots Composite Psychological and Psychosocial Test-Retest	99
4. Bland Altman Plots PABS-PT Factors 1 and 2	100
5. Mean Psychosocial Score by Years of Clinical Experience	128
6. Mean PABS-PT Scores by Years of Clinical Experience	129
7. Respondents' Psychosocial Score by Psychological Subdomain and Work Setting	132
8. Mean PABS-PT Factor Scores by Work Setting	135
9. Word Cloud PTs' Patient Stories.	155
10. Word Cloud PTs' Early Observations	156
11. Decision-Making Process and Influential Factors	179

CHAPTER I

INTRODUCTION

Background

The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage (IASP, 2018). As of May 2019, the World Health Organization (WHO) defines chronic pain (CP) as pain that has been present for three or more months (WHO, 2019). Approximately 11.2% of adults in the United States report having moderate to severe chronic pain and the estimated societal cost of pain is \$630 billion per year (Nahin, 2015). In a report released by the Institute of Medicine (2011) titled, *Relieving Pain in America*, a call was put forth for a cultural transformation of the healthcare system — a transformation to improve the recognition, assessment, and treatment of pain. The task force concluded that healthcare workers across all disciplines are often “ill-prepared to diagnose, appropriately assess, and treat patients with chronic pain” (Institute of Medicine, 2011, p. 8). Given the increased recognition of the positive role physical therapists (PTs) can have in lessening the personal and societal costs associated with pain, and the evidence suggesting that healthcare providers are ill-prepared to manage the complexity of the pain experience, it is essential that the physical therapy profession continue to investigate the level of preparedness of practicing clinicians to effectively assess and manage CP (Institute of Medicine, 2011; Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016).

The biopsychosocial model (BPS) was developed in response to the recognized shortcomings of the biomedical model (Engel, 1977). The BPS model is a holistic, integrative, systems approach-based model that accounts for the biological, psychological, and sociocultural aspects of the pain experience (Engel, 1977; Louw, Zimney, O’Hotto, & Hilton, 2016; Wijma et al., 2016). It is an inclusive model that requires a provider to take a comprehensive and individualized approach towards the evaluation and treatment of a person suffering from pain. In the BPS model, the psychological domain is divided into cognitive, emotional, and behavioral subdomains (Oostendorp et al., 2015; Wijma et al., 2016). The cognitive subdomain includes the positive and negative thoughts patients have about their pain experience. The emotional subdomains are the feelings of anxiety, depression, and anger that could perpetuate and/or complicate the pain experience. The behavioral subdomain refers to behaviors and adaptations patients make in response to their pain. Finally, the social domain encompasses the environmental factors and social groups with which the individual interacts. In a patient with CP, the interplay among these domains and subdomains results in a unique pain experience that requires a provider to use an integrative, systems-based approach to effectively evaluate the contributions of each domain in the person’s pain experience (Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016; Russek & McManus, 2015).

Wijma et al. (2016) stated that an evaluation grounded in a BPS framework is foundational to the management of the multidimensional nature of chronic pain. Such an evaluation is the cornerstone of pain neuroscience programs and other cognitive-behavioral, evidence-based therapies, which target faulty pain belief systems, and when combined with traditional therapy approaches, results in decreased disability and improved quality of life for patients with CP (Conrad, Wegener, Geiser, & Kleiman, 2013; Crofford, 2015; George & Beneciuk, 2015; Keefe, Main, & George, 2018). Researchers have determined that factors such as

depression, anxiety, difficulty concentrating, and fear avoidance are the result of the continued activation of a vast neurological pain network and are present to varying degrees in all individuals suffering from chronic pain (Melzack, 2001; Moseley, 2007). Furthermore, there is a recognition that negative emotions, negative thoughts about pain, behavioral neglect of an injured area, and an unsupportive social network can intensify and perpetuate an individual's pain experience (George, 2017; Louw, Zimney, Puente, & Diener, 2016). For this reason, it is critical that PTs utilize a model that requires the assessment of these factors when evaluating adults with CP.

The research suggests that in practice, PTs have not fully embraced the BPS model when evaluating patients in pain, but instead continue to utilize a methodology grounded in the biomedical tradition (Ladeira, 2018; Oostendorp et al., 2015; Roussel et al., 2016). The themes that emerged from qualitative studies, many of which were conducted in Europe and Australia, suggest that PTs consider psychosocial factors to be outside of their scope of practice. These PTs report that they lack the knowledge and training to assess and manage these issues; there is insufficient time to adequately address psychological and social factors; they do not feel patients want PTs interacting with them in this manner; they lack the appropriate communication skills; and they employ a “gut feeling” strategy when deciding whether the matter should be addressed (Cowell et al., 2018; Opsommer & Schoeb, 2014; Singla, Jones, Edwards, & Kumar, 2015; Synnott et al., 2015; van Wilgen, Beetsma, Neels, Roussel, & Nijs, 2014). Emilson et al. (2016), reported that even when psychosocial factors were identified, therapists did not incorporate these findings into their treatment plan and goals. To date, few studies investigating the psychosocial history-taking practices of PTs in the United States have been published.

Specifically, the importance of identifying negative pain perceptions is critical to implementing evidence-based treatments (Russek & McManus, 2015; van Wilgen et al., 2014). A study conducted in Belgium investigated the pain perception history-taking practices of PTs. The

researchers concluded that questions asked by therapists were predominately biomedically oriented and that therapists did not sufficiently cover the cognitive psychological domain (Roussel et al., 2016). Given the finding that faulty pain thoughts are predictive of higher pain levels and greater disability, it is important that PTs assess patients' pain perceptions (Roussel et al., 2016; Setchell et al., 2017; van Wilgen et al., 2014). There is a paucity of published research assessing the pain perception history-taking practices of PTs in the United States. Additionally, Ladeira (2018) recommended that future studies examine the cognitive reasons for inappropriate clinical decision-making when evaluating patients' pain perceptions.

Purpose

The overarching purpose of this three-study research project was to investigate the current psychosocial history-taking practices of PTs who manage adults with chronic pain. The goal was accomplished in three distinct studies: Study 1, a psychometric study that assessed the reliability and validity of the survey that assessed the psychosocial history-taking practices of PTs who treat adults with chronic pain; Study 2, a descriptive survey-based study that analyzed the history-taking practices of PTs who treat adults with chronic pain; and Study 3, a qualitative multiple case study informed by the social constructionism theory that explored the decision-making processes of PTs as they decide what types of questions to ask patients about pain perceptions.

Studies One and Two

Study One: Specific Aims and Hypotheses

The design of the first study, Investigating the reliability and validity of "Physical therapists' psychosocial history-taking practices when evaluating adults with chronic pain" survey, was a psychometric correlational study to evaluate: the test-retest reliability; internal

consistency; and face, content, and criterion validity for the use of the survey in the population of PTs who treat adults with chronic pain.

The aim of the first study was to determine if the survey was a valid and reliable measurement of the psychosocial history-taking practices of PTs who practice in settings in which adults with chronic pain are evaluated. The hypotheses were: 1) respondents would demonstrate consistent and stable responses with repeated testing; 2) participants would respond in a consistent manner to the items within each psychological subdomain and social domain; 3) the survey, as determined by clinical and pain research experts, would represent a comprehensive list of the types of questions PTs could ask about psychosocial factors; and 4) there would be a positive correlation between the overall psychosocial score and the Factor 1 score of the Pain Attitudes and Beliefs Scale-Physiotherapists (PABS-PT-concurrent criterion validity).

Study Two: Specific Aims and Hypotheses

The design of the second study, *Self-reports by PTs of their psychosocial history-taking practices when evaluating adults with chronic pain*, was a descriptive and exploratory survey-based study. An online survey assessing the psychosocial history taking practices was administered over an 8-week period. The data was analyzed utilizing descriptive and inferential statistics to determine whether there were significant differences in psychosocial history-taking practices among PTs when grouping subjects in the manner described below.

The aims of the second study were to describe and analyze the self-reported psychosocial history-taking practices of PTs. The hypotheses were that: 1) gender, allowed evaluation time, advanced specialization, and years of clinical experience would significantly predict the frequency PTs ask questions about psychosocial factors; 2) there would be a significant difference among groups in the composite psychosocial survey score when respondents were grouped by years of clinical experience; and 3) there would be a significant difference in the

respective composite scores for the cognitive, emotional, and behavioral psychological factors when PTs were grouped by work setting.

Subjects for Studies One and Two

PTs who evaluate adults with chronic pain were eligible for inclusion in Studies One and Two. Adults with CP were individuals 18-years or older who have had pain for three or more months. The survey was distributed to PTs practicing in the United States using email addresses obtained from state licensing boards and state American Physical Therapy Association (APTA) chapters and the social media platforms of state APTA chapters (see Appendix A). Snowball sampling was used.

All participants who complete the survey were asked to provide an email address if they were interested in participating in the evaluation of the test-retest reliability of the survey. Only the respondents who provided their email addresses after completing the survey the first time were sent a second survey. The second survey was sent out 1 week after completing the first survey.

Using an *a priori* G*Power two-tailed analysis at an alpha level of 0.05, power of 0.95, and a correlation of 0.5, it was determined that a minimum of 46 subjects would be needed for the first study. An *a priori* G*Power analysis for the proposed 3x3 mixed ANOVA (power of .80, an adjusted alpha level of .005, and an effect size of 0.19) was conducted. It was determined that a minimum of 126 participants are needed for the second study.

Instrumentation for Studies One and Two

An online survey created in PsychData® was used to measure the psychosocial history-taking practices of PTs. Section One of the survey included the PABS-PT (see Appendix B). This survey was a 19-question, Likert scale (6-point) instrument developed to measure the strength of the biomedical and biopsychosocial treatment orientation in PTs when managing individuals with

low back pain (Eland, Kvåle, Ostelo, Raymond, & Strand, 2017). The survey has been utilized in studies investigating the treatment orientation of providers in populations with chronic pain.

Section Two (see Appendix C) of the survey was comprised of 31, 6-point Likert scale questions designed to assess the frequency PTs asked questions that assessed the psychological and social factors of adults with CP. Section Three of the survey was comprised of demographic questions about the PT's educational and work history (see Appendix D).

Procedures for Studies One and Study Two

The PsychData® survey assessing psychosocial history-taking practices of PTs was activated. As described above, subjects were invited to participate in the survey. The researcher forwarded a second survey via email to the respondents who volunteered to participate in the test-retest reliability arm of Study One, 1 week after they completed the first survey. In an effort to improve the overall survey response rate, one email was sent per week. The researcher requested that the social media posts be shared twice over a 2-week period; however, the researcher had little control over the frequency of posts. The survey was active for a total time of 3 months.

Data Analysis for Study One

Face and content validity were assessed by eight PTs. Four PTs had expertise in the pain sciences. To assess test-retest reliability of the social domain and three psychological subdomains, Pearson's correlation coefficients were calculated for the survey administered at times one and two. Bland-Altman plots were constructed to visualize the relationship between times one and two. Internal consistency and validity were assessed using the data collected from all survey respondents. Internal consistency of the factors in each respective psychological subdomain and social domain was evaluated using Cronbach's alpha. Evidence of concurrent criterion validity was evaluated by correlating the PABS-PT Biopsychosocial Factor One score to the composite psychological and social domain scores of the survey using the Pearson's

correlation coefficient. The alpha level for the analysis of data in Study One was set at 0.05.

Data Analysis for Study Two

Descriptive statistical analysis was conducted to establish the demographic profile of respondents and to describe their psychosocial history-taking practices. To test the first hypothesis, a multiple regression analysis was conducted with an alpha level set at 0.05. To test the second hypothesis, four groups were created based on years of clinical experience: less than 5 years, 5-10 years, 11-15 years, and 16+ years. An independent one-way ANOVA was conducted with an alpha set at 0.05 to analyze the significance of the between group difference in the composite psychosocial survey scores. Post-hoc comparisons were conducted with an adjusted alpha level of 0.0125. To test the third hypothesis, three groups were created based on work setting: 1) outpatient rehabilitation- to include orthopedic, neurological, women's health, and vestibular clinical settings; 2) inpatient rehabilitation-to include neurological rehabilitation and long-term care; and 3) acute care. A 3x3 mixed ANOVA was conducted, with an alpha level of 0.05 for main effects of work setting and psychological subdomain. An adjusted alpha level of 0.008 was set for post-hoc comparisons.

Study Three

In Study Three, *Decision-making process physical therapists used when deciding how to explore pain perceptions during the initial evaluation*, the internal and external cues that PTs incorporated into their decision-making process, and the influence these cues had on their history-taking practices were examined. A qualitative multiple case study design that was exploratory in nature and informed by social constructionism theory was used.

Specific Aims

The aims of the third study were to explore: 1) the decision-making processes PTs utilized when deciding how to assess the pain perceptions of an adult with chronic pain; 2) the

internal and external cues to which therapists attended when evaluating patients' pain perceptions; and 3) how the internal and external cues then influenced the history-taking practices of the PTs. The study was qualitative in nature and the analysis was inductive; therefore, there was no hypothesis.

Subjects

Purposeful sampling was used to recruit approximately 10 PTs from outpatient orthopedic practices. Efforts were made to recruit an equal number of male and female therapists with varied years of clinical experience. A minimum of three years of outpatient orthopedic clinical experience was required to increase the likelihood that the therapists have developed methods of clinical reasoning and memory patient databases from which to make inferences. No more than two therapists were interviewed at one site. The observed evaluation was of an adult who had had pain for three or more months. The patients were required to be English speaking and their reason for seeking therapy could not be due to recent surgical procedures or significant traumas that the patient had had in the last three months.

Instrumentation

The PABS-PT and the demographic questions posed in Section Three of the survey were used to describe the PT's educational and work experience profile. A Sony ICD-PX470 recorder with a 32 GB microSDHC memory card was used as the primary recording device. A computer was used and graduate students were hired to transcribe the interviews.

Procedure

The therapist was told the purpose of the study was to understand the evaluation practices of PTs when evaluating adults with chronic pain. The researcher obtained written informed consent from the PTs. The therapist was asked to complete the PABS-PT and Section Three of the survey (see Appendix B and D). When scheduling a new patient, the front desk staff inquired

about the duration and nature of the patient's condition to ensure adults with chronic pain were identified. Patients who had been referred to physical therapy to rehabilitate following a significant trauma that occurred within the last three months and patients whom the therapist had evaluated previously were not be eligible for observation. Prior to the initial evaluation, the PT obtained verbal consent from the patient, after which the researcher obtained informed consent in writing from the patient. The researcher observed the therapist conduct the evaluation of the individual with chronic pain; written notes were taken during the observation by the principal investigator (PI). Following the evaluation, a 30 to 45-minute semi-structured interview of the PT was conducted by the PI in a private setting within the clinic (see Appendix E). The interview was audio recorded. The identity of the therapist was protected—the therapist's name was not used during the interview and the interview transcript was de-identified. For the purposes of the dissertation study, no more than 10 PTs were interviewed.

Analysis

An inductive cross-case pattern thematic analysis was conducted until theme saturation was reached or 10 subjects had been interviewed. Analysis was conducted after every five interviews to determine if data saturation had occurred. Thematic analysis was informed by the research question and the theoretical constructs of social constructionism and the biopsychosocial framework. Trustworthiness of the data was established using the following methods: 1) the researcher maintained a reflective journal to improve the credibility of the findings; 2) triangulation of data was done through the use of observation notes and the interview transcriptions to improve credibility; 3) the demographic profile of interviewed PTs was described to improve the transferability of the findings; 4) a clear explanation was provided of the analysis process, including data reduction decisions and the process that led to establishment of

themes; 5) feedback was solicited from participants on the themes that emerged and peer review will be utilized during the coding process to ensure confirmability of the results.

CHAPTER II

LITERATURE REVIEW

Chronic Pain

Chronic Pain Defined

The IASP defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (IASP, 2018). It is a protective, evolutionary, warning signal that motivates an individual to take action (Institute of Medicine, 2011). A person's experience of pain is the result of a complex, unique interplay of an individual's health status, genetics, neurobiological pain factors, life experiences, emotional disposition, and social and cultural influences (Institute of Medicine, 2011). The interaction of each of the factors results in an experience of pain that is inherently individualized. This poses a challenge to pain experts when defining and classifying CP. The debate on basic classifications, such as the distinction between acute versus CP, continues among pain experts; however, efforts are underway to adopt an internationally accepted CP definition and classification system.

The consensus is that the definition of CP must include a recognition of the multidimensional nature of the pain experience, as well as a temporal component that demarcates acute from persistent, longstanding pain (Clauw, Essex, Pitman, & Jones, 2019; Institute of Medicine, 2011; Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016; Nijs, Roussel, Van Wilgen, Koke, & Smeets, 2013). Pain experts argue that a purely temporal definition of persistent pain insufficiently accounts for 1) the neurobiological processes that produce pain in the acute versus CP state, and 2) the psychological and social factors that perpetuate the pain experience. The following definition put forth by the American Pain Society incorporates the above stated elements and is representative of the definition put forth by other pain experts:

Chronic pain is a pain that extends beyond the normal period of healing, with levels of identified pathology that often are low and insufficient to explain the presence and/or extent of the pain. It is a persistent pain that disrupts sleep and normal living, ceases to serve a protective function, and instead degrades health and functional capability (The Joint Commission on Accreditation of Healthcare Organizations & The National Pharmaceutical Council, 2001, p. 11)

However, the ambiguity of “normal period of healing” posed a challenge for epidemiological researchers and healthcare providers who were required to classify persons with longstanding pain. The issue is further complicated by the discrepancy in the literature on the time period after which a pain condition would be considered chronic. Prior to 2010, the National Health Interview Survey (NHIS) quantified CP, as pain that lasted more than 12 months. The 2011 National Institute of Health’s report, *Relieving Pain in America*, defined CP as “pain that lasts more than several months” (Institute of Medicine, 2011, p. 33). The 2016 *National Pain Strategy* considered pain chronic when present at least half the days for six months or more (Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016). Nahin (2015) suggested that pain present every day for three or more months is chronic.

In addition to inconsistencies in the temporal definition of pain, the pain community has pushed for a classification that aligns with the emerging perspective that CP be considered a disease in its own right, and not just a symptom of medical conditions. The rationale behind this shift is multifaceted. Epidemiologists struggle to identify the prevalence of CP, as pain is often embedded within the International Classification of Disease (ICD) codes of specific conditions (Gaskin & Richard, 2012; Institute of Medicine, 2011; Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016; Melzack, 2005; Nahin, 2015,

2016). Additionally, the identified biochemical and morphological changes within the central nervous system, and the well-documented negative impact longstanding pain has on a person's quality of life, function, and disability status, have pain experts arguing that the impact of CP is similar to conditions that are recognized as diseases (Institute of Medicine, 2011; Raffaeli & Arnaudo, 2017; Tracey & Bushnell, 2009). Tracey and Bushnell (2009) made the case that the CP should be considered a disease state because of the multitude of neuroimaging studies that demonstrate functional and structural changes to the neurological system in those afflicted with CP, factors consistent with conditions that are classified as disease. In the 2011 National Institute of Health's report, the following comment was made: "Chronic pain has a distinct pathology, causing changes throughout the nervous system that often worsen over time. It has significant psychological and cognitive correlates and can constitute a serious, separate disease entity" (Institute of Medicine, 2011, p. 3). Raffaeli and Aranaudo (2017) also argued that CP should be considered a disease state. Given the significant worldwide burden of pain, the evidence supporting pathological neurological changes that occur due to prolonged pain, and the need for research and funding directed at all aspects of the CP experience, they argued that a need exists for a paradigm shift that acknowledges that CP is more than just a symptom.

In June 2018, the World Health Organization (WHO) and the IASP created a new ICD category for CP that was formally adopted and incorporated into the ICD-11 in May of 2019 (Treede et al., 2019; WHO, 2019). A definitive temporal definition of CP has been proposed: pain that lasts or recurs for longer than 3 months (WHO, 2019). Other changes included: 1) the incorporation of a seven category subclassification system that distinguishes primary from secondary pain syndromes, 2) sub classifications that clearly define characteristics of each of the primary and secondary pain syndromes, 3) modifiers to indicate the severity of the pain condition, and 4) the acknowledgment of psychological and social factors that perpetuate the pain

experience by providing extension codes (Treede et al., 2019). The seven subcategories of CP are as follows: 1) chronic primary pain syndromes, 2) chronic cancer-related pain, 3) chronic postsurgical or posttraumatic pain, 4) chronic neuropathic pain, 5) chronic secondary headache or orofacial pain, 6) chronic secondary musculoskeletal pain, and 7) severity and other extension codes. Within each of the subcategories, pain is recognized as a condition, instead of a symptom of an associated disease— a condition requiring treatment. Under the severity category, the provider, using the patient's rating of pain intensity and functional impact, classifies the severity of the individual's pain condition. In the final subcategory, the provider, underscoring the importance of assessing and treating CP utilizing an individualized whole person approach, rates psychological and social factors thought to perpetuate the pain experience.

The WHO and IASP recently revised and adopted the definition and classification of CP used in this study. CP will be considered pain that has been present for a time period of three or more months. The pain region will not be specified, which is consistent with the proposed change as it recognizes CP as a distinct condition. Finally, the updated description recognizes the psychological and social factors associated with long standing pain and requires the provider to assess for the effect these factors have on an individual's condition. PTs positioned as frontline providers and experts in movement-based disorders that are secondary to neuromusculoskeletal conditions, will be asked to comply with these updated changes in pain classification, in order to contribute to the data on the prevalence of CP and efficacy of interventions. To date, there is a paucity of published studies in the United States that have evaluated the psychosocial history-taking practices of PTs. Investigating PTs' assessment of the psychosocial factors is the central purpose of the three studies and is aligned with the modifications made in the classification of CP by the WHO and the IASP.

Prevalence of Chronic Pain

Given pain is often classified as a symptom of a health condition and has not been classified as a condition in its own right, measuring the prevalence and societal impact of pain has been challenging. Researchers have relied predominately on the NHIS, an annual survey on health-related issues that is conducted by the United States Census Bureau for the National Center for Health Statistics (National Center for Health Statistics, 2019). This survey is based on annual personal interviews of approximately 87,500 individuals from 35,000 United States households. It was not until 2010 that the survey included questions aimed at uncovering the frequency of persistent and bothersome pain, understanding the severity of the pain experience, and the functional impact the pain exacted on the individual's life (Institute of Medicine, 2011; National Center for Health Statistics, 2019). Beginning in 2010, respondents were asked whether they had pain in the last three months, no days, some days, most or every days; if the severity of the pain is a little, between a little and a lot, or a lot; and if, when presented with a list of eight activities, they do the activity, don't do the activity, or can't do the activity, because of the pain (Nahin, 2015; Pitcher, Von Korff, Bushnell, & Porter, 2019). Prior to 2010, surveyors asked if the respondent had been diagnosed with arthritis and/or had suffered from neck or back pain within the last 12 months.

The statistics in the National Institute of Health report, *Relieving Pain in America* and the *National Pain Strategy*, cited epidemiological studies that utilized NHIS data (Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016). Kennedy et al. (2014) utilized data from the 2010 NHIS study and reported that 19.0% of adults suffered from CP. Nahin (2015) analyzed data from the 2012 NHIS and concluded that approximately 11.2% of adult participants experienced pain every day within the prior 3-month period. He noted that 55.7% of respondents had some level of pain, 10.3% had a lot of pain, and

6.3% of adults lived with severe pain. The variability in the reported prevalence of CP was due to the diverse study methodologies employed by researchers and the use of interview data from different years.

Studies cited in the 2016 National Pain Strategy that did not use NHIS data reported higher prevalence rates than the previously referenced studies (Johannes, Le, Zhou, Johnston, & Dworkin, 2010; Tsang et al., 2008). Tsang et al. (2008) defined CP as rheumatism, arthritis pain, back or neck pain in the last 12 months, and estimated 43.9% of adults suffered from CP in the United States. Johannes et al. (2010), based on an internet survey, reported that 30.9% of United States adults had CP.

Based on the National Pain Strategy's call to further classify CP as high impact CP or CP without limitations and the variability in the reported frequency of CP, Pitcher et al. (2019) set out to determine the prevalence of CP using data from the 2011 NHIS. High impact CP was defined as pain on most days or every day in the last three months with more than one activity limitation. The distinguishing factor between CP without limitations and high impact CP was that individuals with CP without limitations reported that the pain did not prevent them from participating in activities. When utilizing this definition, 4.8% and 13.6% of adults had high impact CP and CP without limitations, respectively. A total of 18.4% of adults experienced CP.

Researchers anticipate that the addition of CP as a parent code in the ICD-11 will decrease the discrepancy that currently exists in the literature concerning the prevalence of CP (Treede et al., 2019). Due to the database limitations described above, the prevalence of CP is often reported to be between 2% to 43.9%, with a caveat stating the actual frequency of CP remains unknown and that estimates are likely underreporting the presence of CP in the United States (Institute of Medicine, 2011; Interagency Pain Research Coordinating Committee &

Department of Health and Human Services, 2016; Nahin, 2016; Pitcher et al., 2019; Treede et al., 2019).

Cost of Chronic Pain

The consensus among researchers is that the total societal cost of CP is conservatively estimated to be between \$560 to \$635 billion dollars per year (Gaskin & Richard, 2012b; Institute of Medicine, 2011; Pitcher et al., 2019). The frequently cited estimate is thought to be conservative as it is based on 2008 medical expenditure data that was adjusted for inflation in 2010. This figure includes direct medical care costs and the indirect costs associated with lower productivity.

Based on the 2008 Medical Expenditure Panel Survey, Gaskin and Richard (2012) estimated that an individual with moderate CP had health care expenditures \$4,516 higher than someone with no pain, and that an individual with severe pain had healthcare costs \$4,210 higher than someone with moderate pain. The total annual medical costs for moderate to severe pain were estimated to be between \$261 to \$300 billion, respectively. Gaskin and Richards (2012) calculated the indirect costs of CP by comparing the hours worked, days missed and hourly wages of individuals reporting no pain, moderate, and severe pain. Individuals with moderate CP worked on average 291 fewer hours and missed 2.1 more days annually when compared to individuals with no pain. Persons with severe CP worked 717 fewer hours and missed 4.7 more days annually compared to persons with no pain. A reduction in wages secondary to pain ranged from \$191 to \$226 billion per year. The impact on the three measures of productivity resulted in a total indirect cost of \$335 billion for moderate and severe pain.

Multidimensional Nature of Chronic Pain and the Biopsychosocial Model

Historically, the concept of pain was understood through the biomedical model and considered the result of a deviation from normal biological functioning. The biomedical model, a

reductionist model, viewed pain through the lens of disease. It reduced pain to a biological phenomenon independent of the psychological state and environment of the individual experiencing pain (Engel, 1977). Engel (1977) argued that the biomedical model viewed the mind and body as separate entities functioning in isolation, one exerting no influence over the other. The model shaped the long-standing cause and effect approach taken by the scientific and medical community to identify a singular neurophysiological cause of pain. The pain response was thought to be directly proportional to the level of tissue damage. Providers steeped in the biomedical tradition strive to identify a single biological source for pain, reducing the complex experience of pain to a simplistic biological explanation.

The limitation of the biomedical model is that it does not account for the absence of physical “causal” findings often associated with CP. Psychological and social factors that contribute to the development and perpetuation of the pain experience cannot be accounted for using the biological reductionistic framework (Engel, 1977). The singular focus on biological systems is not aligned with the current understanding of the multidimensional nature of the CP experience (Institute of Medicine, 2011; Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016; The Joint Commission on Accreditation of Healthcare Organizations & The National Pharmaceutical Council, 2001). The limitations of the biomedical model prompted Engel (1977) to propose the adoption of the broader more inclusive BPS framework. The systems-based BPS model views disease and pain from the perspective of a whole person situated within the context of his/her larger environment. Biological, psychological, and social factors are on a bidirectional, nonhierarchical continuum, each factor equally influencing the other. From a theoretical perspective, in this systems-based model, the person is comprised of atoms, molecules, organelles, cells, tissues, organ systems, and nervous system and is situated within a social framework that can include a partnership, family, community, culture,

society, and biosphere. At any one time, each system is part of a higher and lower order system (Engel, 1977). Cells contain a system of molecules and are part of a system of tissues—the stability of the tissue is reliant upon the health of the cell, which is dependent upon the sound structure of the molecule. The health of the person is dependent on a system of organs that is influenced by the person’s family, culture, and biosphere. The BPS model is a holistic, integrative model that accounts equally for the biological, psychological, and sociocultural aspects of the pain experience (Engel, 1977; Institute of Medicine, 2011; Wijma et al., 2016). It is an inclusive model that allows a provider to take a comprehensive and individualized approach towards the evaluation and treatment of a person suffering from pain.

Psychosocial Chronic Pain Models

Under the larger heading of the BPS model, several specific explanatory mechanism-based models describing the pathways by which psychological and social factors influence the chronification of pain process have been proposed. The primary aim of the pain models is to depict the process by which psychosocial factors lead to the development of CP. PTs’ conceptualization of the genesis of CP and the disability that often accompanies this pain condition is based on cognitive-behavioral pain models, such as the fear-avoidance model (Linton & Shaw, 2011). In order to understand the conceptual models that have shaped PTs’ evaluation and treatment approaches when managing individuals with CP and to provide context for the development of the survey used in this dissertation study, a brief overview of the history of the origin of the cognitive behavioral approach will be provided. The pain models underscore the importance of addressing psychosocial factors when evaluating CP and highlight the specific factors that a PT should address.

The philosophical foundation of each of the cognitive-behavioral models can be traced back to Dr. Bill Fordyce’s seminal work, *Behavioral Methods for Chronic Pain and Illness*. Prior

to Fordyce's pain behavior model, the role psychological and environmental factors played in the pain experience were poorly understood. Pain that lacked a clear explanation was labeled psychogenic and individuals who were labeled as such were often told that medicine had nothing to offer them, as their pain was "in their heads" (Engel, 1977; Fordyce, 1976). Fordyce's model was predicated on the assertion that the same learning process that governed the acquisition of adaptive behaviors was responsible for the learning of maladaptive pain behaviors in individuals with CP. Additionally, Fordyce was the first to explain how environmental and social factors operated to lessen or intensify the pain experience and how the factors could be manipulated to affect a positive change in an individual's pain experience. Fordyce drew distinction between respondent pain factors and operant-based pain behaviors. Respondent factors are reflexive responses that occur after a stimulus is administered. Operant pain behaviors are learned behaviors that are shaped by social and environmental influences. In his clinical practice, Fordyce noted that in order for individuals with CP to successfully cope with their conditions, a new set of behaviors had to be learned and environmental changes made. By changing an individual's behavior, his/her suffering could be lessened. In his work, Fordyce proposed techniques such as activity pacing that continue to be used today in physical therapy when treating persons with CP.

Fordyce's seminal work served as a catalyst for the development of numerous cognitive-behavioral-based pain models that emphasized the importance of examining emotional states, cognitive factors (thoughts and beliefs), and the behaviors of individuals with CP, as a way of reducing maladaptive pain behaviors and subsequent suffering. Exploring adopted pain behaviors, maladaptive thoughts and beliefs, and dysfunctional emotional responses to pain are central tenets of the major pain models utilized by PTs when managing CP (Linton & Shaw, 2011). Linton and Shaw (2011) described a "modern view" of pain, which is the construct upon which the pain models are built. The model provides a simplistic overview of a complex psychological process

that involves an interplay of emotions, past experiences, expectations, ways of thinking, coping strategies, and pain behaviors. Each factor is represented as a distinct independent factor, when in reality it is the interplay of each of the factors that influences the pain response. The psychosocial factors influence the perception and interpretation of the painful stimulus on a number of levels. The entire psychological process of interpreting and responding to pain is then further shaped by the influence of social and cultural factors.

In Linton and Shaw's modern view of CP models, attention is directed towards a painful stimulus. The stimulus is interpreted, and a coping strategy or pain response is elicited. Emotions, thoughts, beliefs, and perceptions influence the attention, interpretation, and strategy utilized to separate from the painful stimulus. A multidirectional relationship exists among psychological, social, and biological factors. For example, emotional distress, fear, and anxiety shape the thoughts a person holds about the pain and influence the behavioral response to the pain. The thoughts and belief individuals have about their pain lead to emotional distress, fear, and anxiety. The behavioral response is further influenced by the positive or negative outcome of the behavior and by social and cultural factors (Linton & Shaw, 2011). The psychological processing of pain involves cognitive, emotional, and behavioral factors and is directly influenced by social and environmental factors.

In an effort to further highlight the use of this basic framework in pain models that have shaped PTs' understanding of the psychosocial model of pain, a brief overview of the most researched and influential psychosocial CP models is provided. In doing so, the philosophical constructs that shape the thought processes of PTs when managing individuals with CP can be better understood. In addition, this brief description of psychosocial pain models will also help explain the thought process that guided the design of the survey associated with Studies One and Two. However, an extensive discussion of the models is beyond the scope of this review.

The fear-avoidance model, based on the early work of Lethem et al. (1983) and Vlaeyen and Linton (2000), depicts the role fear of pain plays in the development of dysfunctional avoidant or functional confrontational behaviors. It is an operant cognitive-behavioral approach. Originally, the model proposed that individuals with acute low back pain transitioned into a CP state secondary to maladaptive avoidant behaviors that manifested due to the individual's fear of pain. As a result, the individual decreased his/her participation in activities, which led to the development of disuse syndromes, depression, and heightened pain states. The end result is a cycle that perpetuates and intensifies the individual's pain experience and disability level. At the core of the fear-based avoidant behaviors are anxiety, hypervigilance to pain, negative and catastrophic pain beliefs and thoughts, and low expectations. The model underscores the importance of the assessment of a patient's pain beliefs, emotional state, and pain behaviors when evaluating an individual with pain.

The acceptance and commitment model is an emerging paradigm with roots in the cognitive-behavioral theory. In this model, pain and suffering are normalized through the recognition that both are part of the human experience (McCracken & Vowles, 2014). The model requires the person with pain to examine the effectiveness of his/her thoughts, beliefs, pain assessment methods, and problem-solving approaches in managing his/her suffering. The emphasis is on developing flexibility surrounding the interpretation of pain and the impact it has on the ability to live a purposeful and meaningful life. The focus is not on changing the person's thoughts and beliefs, but instead raising the individual's awareness through mindfulness of the negative impact the beliefs have. By becoming aware of the influence arbitrary thoughts and feeling have on pain and remaining focused on the goals that bring meaning to life, the individual's view of life is broadened (Vowels & Thompson, 2011).

Research has demonstrated that people in pain experience more worry about pain than they do other non-pain problems and that the intensity of worry is greater and more difficult to control (Eccleston & Crombez, 2007). The misdirected-worry theory is a cognitive-behavioral based model that views worry as an evolutionary attribute that activates problem-solving to ensure survival (Eccleston & Crombez, 2007; Linton & Shaw, 2011). Central to this model is the view that humans are neurologically wired to attend to pain above all else and that in order to survive, the person's primary focus will be dedicated to devising a strategy to escape the painful stimulus. Within the CP population, this search for a solution often manifests itself as a heightened drive to find a biomedical remedy for their symptoms. Patients continue to implement techniques and strategies that, even though ineffective, satisfy their need to find a solution for the problem. In this model, the person is viewed as an engaged problem-solver who in spite of repeated failure continues to search for a solution. The role of the provider is to broaden the patient's understanding of the problem, raise the patient's awareness of the ineffectiveness of past efforts to find a solution within the biomedical paradigm, and to redirect the patient's drive to solve the problem towards function and quality of life based goals (Linton & Shaw, 2011).

While the exact mechanism by which psychological factors contribute to longstanding pain differ in the aforementioned models, they all underscore the powerful influence cognitive, emotional and behavioral factors have on the pain experience. The research supporting the presence of the psychological factors and the mechanisms described in the CP models in the CP population, which will be presented later, call for PTs to assess for psychosocial factors that increase the risk of the chronification of pain (Clauw et al., 2019; Linton & Shaw, 2011).

Proposed Biopsychosocial Diagnostic Frameworks

The research of Speckens et al. (1995) led to the development of a diagnostic framework to assess for psychosocial stressors that could be used by practitioners less familiar with the

biopsychosocial approach when evaluating individuals with CP (Speckens et al., 1995). The assessment method identified three domains: 1) somatic (neurobiological dimension); 2) psychological; and 3) social. The psychological domain, consistent with the pain models described above, is comprised of cognitive, emotional, and behavioral subdomains. The model, which is referred to as the SCEBS method (Somatic, Cognitive, Emotional, Behavioral, Social method), has been utilized extensively by PTs and physical therapy researchers in Belgium and the Netherlands and is the theoretical basis of the design of the psychosocial history-taking practices survey developed for this dissertation study. Wijma et al. (2016) and Oostendorp et al. (2015) proposed a history-taking framework specifically for PTs evaluating CP that incorporated the assessment of psychosocial factors based on the evaluation protocol of Speckens et al. (1995).

Oostendorp et al. (2015) used the SCEBS method to develop and pilot a set of quality indicators to measure Dutch PTs' integration of the BPS approach into the evaluation of patients with CP. A list of questions PTs might ask a patient about somatic, cognitive, emotional, behavioral, and social stressors were developed. In total, 14 cognitive indicators, six emotion indicators, 11 behavior indicators, and 10 social indicators were generated for the complete list of questions. Under the psychological cognitive heading, questions covered patient expectations, patients' understanding of their pain condition, pain catastrophizing, and pain self-efficacy. The psychological emotional subdomain included questions on depression, anxiety, stress, and perceived emotional balance. The questions in the psychological behavioral subdomain pertained to how the individual dealt with the pain, the activities that the individual no longer participated in, movements and activities that the individual avoids and how they feel when they avoid the activities, and with whom and how often the individual discussed his/her pain with others. Finally, the social domain focused on the reaction of the people in the patient's social circle. The

framework proposed and the nature of the questions generated influenced the formation of the psychosocial survey developed for this dissertation study.

Wijma et al. (2016) proposed that PTs utilize an updated version of Oostendorp's SCEBS method when assessing and treating patients with CP. The researchers emphasized that an evaluation grounded in the BPS model was essential for the delivery of effective physical therapy care that incorporated patient education about the multi-dimensional nature of CP. In order to effectively address psychosocial contributors to a person's pain experience, the evaluating PT must utilize a paradigm that adequately addresses the multidimensional nature of patient's condition. Wijma et al. changed the SCEBS method to include neurobiologically-based, pain-typing questions (nociceptive, neuropathic, central sensitization, or combination) to the somatic domain, and a question that ascertains the motivation level of a patient to make a behavioral change.

Psychological and Social Domains

In this section, each of the psychological subdomains and social domain will be described in greater detail; however, given the extensive body of literature that exists investigating the psychological and social contribution to CP, the discussion will be centered around the aspects of each domain/subdomain that are directly relevant to PTs' history-taking during the initial evaluations of adults with CP. Furthermore, the upcoming examination of factors will pertain to the dissertation survey questions developed to assess the psychosocial history-taking practices of PTs when evaluating adults with CP.

The discussion will utilize the SCEBS framework proposed by Oostendorp et al. (2015) and modified by Wijma et al. (2016), as these frameworks were designed specifically for use by PTs and/or clinicians without extensive educational training in psychological treatment techniques. The somatic domain will not be covered. The focus will be on the cognitive,

emotional, and behavioral subdomains of the psychological domain, and the social domain (CEBS). It is important to note that the CEBS factors represent distinct theoretical and evidence-based constructs; however, in reality the relationship between psychosocial factors is complex and multidirectional. In order to measure the psychosocial history-taking practices of PTs and be consistent with other researchers, each factor will be considered a unique contributor to pain.

Psychological-Cognitive Subdomain

As established, pain is a subjective experience. The neurobiological response to a noxious stimulus is mediated by people's thoughts and beliefs about pain. Pain perceptions shape the interpretation of pain. Traumatic events, childhood experiences, past healthcare providers, and familial and cultural belief systems are a few factors that influence the formation of a belief system that directly affects how an individual perceives pain (Moseley, 2007). Oostendorp et al. (2015) identified the following elements of the cognitive subdomain: 1) patients' expectations, 2) patients' understanding and explanation of their pain condition, 3) patient's perceptions and beliefs on activities that exacerbate and remediate their pain, 4) patient's self-efficacy surrounding their ability to independently manage their symptoms, and 5) an exaggerated concern that their pain is due to a more serious condition that has yet to be diagnosed. Based on the recommendation by Wijma et al. (2016), motivation, a complex and multifaceted cognitive construct, was added to this section.

The influence pain perceptions/cognitions have on a person's pain experience is well established in the literature. Maladaptive beliefs about pain impact clinical outcomes and disability levels to a greater extent than the actual level of tissue damage (Foster et al., 2008; Foster, Thomas, Bishop, Dunn, & Main, 2010; Woby, Roach, Urmston, & Watson, 2007). In a survey-based study of patients with low back pain seeking care from primary care physicians, Foster et al. (2008) reported that patients' illness perceptions (cognitions) were important

determinants of clinical outcomes six months after initial consultation. In a later study, illness perceptions, self-efficacy, expectations, and pain acceptance, were found to be stronger predictors of disability than pain, depression, and fear avoidance behaviors in individuals with chronic low back; the four predictors accounted for 56.6% of the variance in disability (Foster et al., 2010).

Furthermore, addressing faulty pain perceptions/cognitions as part of a rehabilitation program resulted in patients feeling that they had better personal control over their pain condition (Glattacker, Heyduck, & Meffert, 2012). In a similar study conducted on patients with chronic low back pain receiving physical therapy in the United Kingdom, the intervention group that received treatment that addressed cognitive factors had a significantly greater change in patient-relevant physical activity (Siemonsma et al., 2013). The findings of these studies highlight how pain perceptions can be positively influenced when addressed during rehabilitation and the impact intervention directed at challenging maladaptive pain beliefs has on pain-related outcomes. It also underscores the importance of assessing the pain perceptions of people with CP.

Further justification for the assessment of pain cognition is provided in the sections that follow. Given that the three studies in this dissertation project address pain perception, the discussion of this subdomain will be more extensive than the discussion of the emotional and behavioral subdomains and social domain.

Understanding of pain. Moseley (2007) reported that the evidence supported the concept that the experience of pain was mediated less by tissue damage and more by the belief that tissue damage was imminent. Moseley reported that perceived threat of tissue damage resulted in higher levels of pain. The perception that pain served as an alarm, intended to warn people of looming danger, propagated the notion that anything that caused pain should be avoided. The medical community's longstanding use of a nociceptive pain response model based in the biomedical paradigm perpetuated an inaccurate understanding among healthcare providers

and patients about the underlying cause of pain. The emphasis on identifying the damaged, pain provoking structure through the use of diagnostic testing and the use of interventions aimed at reducing tissue damage resulted in a misunderstanding of pain that has permeated not only the medical community, but also society at large within westernized countries. The end result is a widely held belief that pain is always a sign of tissue damage that can be made worse by participating in activities that elicit the pain response (Moseley, 2007).

It is this misunderstanding of pain that has been demonstrated to result in elevated pain levels, diminished function and greater levels of disability, and an intensification of psychosocial factors (Fletcher, Bradnam, & Barr, 2016; Jensen, Turner, & Romano, 2007). A poor understanding of pain also resulted in higher levels of fear avoidance and pain related disability scores in a study conducted by Fletcher et al. (2016), who examined 29 adults with CP who were receiving care at a multidisciplinary pain rehabilitation program. Subjects completed the Neurophysiology of Pain Questionnaire (a questionnaire designed to understand pain knowledge), the Tampa scale of Kinesiophobia, and the Pain Disability Index. The Neurophysiology of Pain Questionnaire was negatively correlated with the Tampa scale of Kinesiophobia, suggesting that a poor understanding of the cause of pain is associated with a heightened fear of activity and movement. There was a negative relationship between the Neurophysiology of Pain Questionnaire and Pain Disability Index score and between the Pain Disability Index and educational level. These findings suggest that a poor understanding of the mechanisms within the neurological system that produce pain is associated with fear avoidant behavior, and higher levels of disability secondary to pain. The results of this study highlight the debilitating impact misperceptions and a lack of understanding about the pain experience have on adults with CP's willingness to move and participate in activities.

Jensen et al. (2007) examined the association between changes in pain beliefs and changes in pain and physical disability 1 year after treatment at a multi-disciplinary pain center. Additionally, the researchers investigated which pain beliefs were most strongly connected to changes in physical disability. Of the pain beliefs identified in the 141 participants, the strongest predictors of disability scores at the 12-month follow-up were “Changes in Medical Focus” and “Change in Permanence and Mystery Beliefs,” with standardized betas of 0.18 and 0.17, $p < 0.05$ respectively. A shift away from a biomedically based definition of pain, a belief that pain is not a constant unchanging state, and an understanding of the pain experience (pain is not due to a mysterious, poorly understood phenomenon) were the strongest predictors of long-term changes in the disability score 12 months after treatment. When considering cognitions as a whole (including catastrophizing, and pain coping strategies), changes in cognitions and coping explained 47% of the variance in the disability change score between posttreatment and the 12-month follow-up, $F = 12.85$, $p < 0.001$. Jensen et al. (2007) concluded that pain beliefs play a role in patients’ adjustment to pain and disability level overtime, following treatment.

Educating patients with CP about the neurophysiology of pain is the basis of patient pain education programs, including pain neuroscience education (PNE). Reconceptualizing the experience of CP is the central tenet of pain neuroscience patient education programs. The biomedical model’s emphasis on a linear relationship between tissue damage and pain is deemphasized. The explanation of pain that views it as a warning signal of imminent tissue damage is replaced with an explanation that emphasizes that pain, when it becomes chronic, is a sign of the sensitization of the nervous system. The pain signal is no longer proportional to the level of tissue damage and is often experienced in the absence of any nociceptive indicators of pain. This conceptual framework not only changes patients’ understanding of their pain, but it

also changes their relationship with pain-provoking activities (Louw, Zimney, O'Hotto, et al., 2016; Moseley, 2007).

Multiple studies have demonstrated the efficacy of educational programs that target misconceptions about pain when these programs are combined with traditional physical therapy interventions (Louw, Zimney, Puentedura, et al., 2016; Malfliet et al., 2018). In a systematic review on the efficacy of PNE on musculoskeletal pain, Louw et al. (2016b) reported that the use of PNE in conjunction with physical therapy intervention reduced pain, lowered disability, improved patients' understanding of pain, reduced the prevalence of other psychosocial stressors, and minimized healthcare utilization. These findings underscore the importance of a PT's assessment of an individual's understanding of pain.

Self-efficacy. Bandura (1994) defined self-efficacy as a person's belief in his/her ability to perform in a manner that allows him/her to have control over his/her life. Self-efficacy has been found to influence people's feelings about themselves, their level of motivation to make a change, and their ability to cope with difficult situations. Individuals with high self-efficacy are more likely to have a positive, optimistic view of themselves and their situation; display high levels of motivation to engage in activities that will change their current state of being; to view difficult situations as challenges to be confronted instead of avoided; to persevere in the face of failure; and to be less susceptible to high counter-productive levels of stress and depression. This is in contrast to persons with low self-efficacy, who view difficult situations as insurmountable obstacles best to be avoided; who dwell on their personal short-comings and are easily deterred in the face of failure; and who are prone to stress and depression (Bandura, 1994).

Pain self-efficacy is the confidence to engage in life and work, despite the pain. It is a reflection of the belief an individual holds regarding his/her ability to manage pain and it can determine the individual's behavior when confronted with situations that elicit pain (Jackson,

Wang, Wang, & Fan, 2014). High pain self-efficacy has been strongly associated with and is predictive of lower impairment levels and pain intensity reports (Baets, Matheve, Meeus, Struyf, & Timmermans, 2019; Chester, Jerosch-Herold, Lewis, & Shepstone, 2018; Jackson et al., 2014). In a systematic review of 23 studies with 3,769 participants with chronic shoulder pain, Baets et al. (2019) determined that of the psychosocial factors, self-efficacy was the only variable that consistently predicted pain and disability levels in participants engaged in physical therapy. Furthermore, in a multiple cohort longitudinal study conducted in the United Kingdom of 1,080 patients referred to physical therapy for shoulder pain, researchers reported that low self-efficacy was a significant predictor of higher disability ratings on the Shoulder Pain and Disability and the Quick Disability of the Shoulder and Hand Indexes at 6-weeks and 6-months, $\beta = -0.36$, 95% CI -0.50 to -0.22, $p < 0.001$.

In a meta-analysis performed by Jackson et al., (2014), 86 studies were investigated to determine the effect self-efficacy had on functional impairments, emotional distress, and reported pain severity in individuals with non-cancer related CP. It was determined that the effect size for the association between self-efficacy and the abovementioned outcomes was moderate and highly significant: self-efficacy and impairments, $r = -0.49$, $p < 0.001$; self-efficacy and affective distress, $r = -0.43$, $p < 0.001$; and self-efficacy and pain severity, $r = -0.39$, $p < 0.001$. Interestingly, low baseline self-efficacy scores predicted future exacerbations and those exacerbations had poor outcomes. For this reason, researchers suggested that self-efficacy should be viewed as a risk/protective factor for maximization of functional outcomes in the CP population.

Pain self-efficacy is responsive to intervention in a physical therapy setting. In a case series investigating the effect of a cognitive behavioral physical therapy approach on pain self-efficacy in symptomatic lumbar spondylolisthesis, researchers reported improvement in the self-

efficacy levels of each of the participants (Ferrari, 2016). The mean Pain Self-Efficacy Questionnaire score of participants (scored from 0 to 60, with a higher score representing higher self-efficacy) significantly increased by 20.1 points, increasing from 21.6 pretreatment to 41.7 posttreatment. In a study that investigated between group differences after 57 participants participated in either a progressive neck exercise program or an interactive behavior modification physical therapy program, researchers reported that the group with behavior modification therapy had higher self-efficacy scores ($F = 2.0, p = 0.02$) and greater reductions in pain intensity ($F = 4.7, p = 0.05$) than the group that received only the progressive neck exercise program (Thompson, Oldham, & Woby, 2016).

Given the strong predictive relationship self-efficacy has with pain-related outcomes and the potential protective role it has in preventing future debilitating exacerbations, researchers strongly recommend that pain self-efficacy is assessed by PTs in patients with CP (Baets et al., 2019; Jackson et al., 2014; Thompson et al., 2016).

Pain catastrophizing. Pain catastrophizing describes a cognitive construct that is comprised of negative thoughts and emotional factors. It is characterized by beliefs and emotions about pain that lead to the intensification of the pain experience (Edwards, Dworkin, Sullivan, Turk, & Wasan, 2016; Meints & Edwards, 2018). Individuals with high levels of pain catastrophizing dwell excessively on pain, vocalizing concerns about the high intensity of the pain, their inability to influence their pain and heightened concerns that the pain is caused by a more serious, yet to be identified pathological process (Edwards et al., 2016; Meints & Edwards, 2018). While there is overlap between emotional processes such as depression, anxiety, helplessness, and pessimism, with cognitive processes such as a poor understanding of pain, low self-efficacy, and negative expectations, pain catastrophizing continues to hold a distinct and predictive effect on pain-related outcomes (Meints & Edwards, 2018). Both Edwards et al. (2016)

and Meints and Edwards (2018) investigated the role of psychosocial factors in CP, and surmised that pain catastrophizing may be the primary psychosocial factor driving the development and maintenance of longstanding pain, mediating the relationship between pain-related outcomes and other psychosocial factors.

Pain catastrophizing is a risk factor and a predictor of pain related disability, delayed return to work, elevated pain intensity, poor pain tolerance, poor response to intervention, and increased healthcare costs (Lluch et al., 2018; Meints & Edwards, 2018; Smeets, Vlaeyen, Kester, & Knottnerus, 2006). In their study of 211 patients with chronic low back pain, Smeets et al. (2006) found that changes in pain catastrophizing were mediated by pain related disability and pain intensity. The participants were divided into three treatment groups: 1) a cognitive-behavioral therapy (CBT) group, 2) an active physical therapy group, and 3) a combination of CBT and active physical therapy. In all treatment groups, pain catastrophizing scores decreased significantly and the reduction in pain catastrophizing score was found to mediate the relationship between disability and pain level (Sobel's $t = -2.754$, $p = 0.006$ and Sobel's $t = -2.526$, $p = 0.012$ respectively for the PT only group; Sobel's $t = -2.27$, $p = 0.023$ and Sobel's $t = -2.10$, $p = 0.035$ respectively for the CBT only group; and Sobel's $t = -2.278$, $p = 0.022$ and Sobel's $t = -2.081$, $p = 0.037$ for the PT and CBT group). This finding highlights the role that pain catastrophizing plays in pain-related treatment outcomes, the malleability of the thought system that generates catastrophic thinking, and the responsiveness of this system to intervention, underscoring the importance of assessing for pain catastrophizing in individuals with CP.

Expectations. Expectations, or beliefs about what might occur, exert a powerful influence over a patient's pain experience and are powerful predictors of treatment outcomes (Campbell, Smith, McGregor, & Sterling, 2018; Cormier, Lavigne, Choinière, & Rainville, 2016; McDevitt, Mintken, Cleland, & Bishop, 2018). In a systematic review conducted by Campbell et

al. (2018) on the development of chronic whiplash disorders, the belief that treatment would result in positive outcomes was associated with better treatment outcomes. Each of the four published articles on expectations that were eligible for inclusion demonstrated that believing pain would lessen and that treatment would be effective increased the chances of recovery. McDevitt et al. (2018) investigated the extent to which treatment expectations influenced treatment outcomes in 140 patients with shoulder pain receiving physical therapy. The participants rated their general expectations of symptom relief (complete or moderate relief from symptoms) and their expectations (categorized as high, neutral, or low expectations) on the benefit they may receive from specific treatment interventions (exercise, massage, manipulation, modalities, rest, and surgery) prior to receiving care. After one month of physical therapy and again at six months, participants rated their perceived Global Rate of Improvement and completed the Shoulder Pain and Disability Index. The expectation of moderate pain relief significantly predicted the 1- and 6-month Global Rate of Improvement, $\beta = 2.06$, $p = 0.018$ and 1.56 , $p = 0.05$ respectively. Individuals with moderate expectations (when compared to high or low expectations) had higher odds of rating the overall treatment outcome to be positive. The main effect of general expectations was also significant in predicting the shoulder disability score, $F = 5.12$, $p = 0.008$. Patients with neutral expectations for specific physical therapy interventions, as compared to high and low expectations, had lower disability scores. The findings of the study emphasized the importance of assessing for unrealistically high or low expectations of recovery and treatment effectiveness when managing individuals with CP.

In a study conducted by Cormier et al. (2016), positive expectations regarding pain and quality of life improvement prior to a multi-disciplinary pain management program was demonstrated to positively influence the perceived rate of improvement and disability score 6-months after initiating treatment. Prior to initiating care, the 2,272 participants were asked to rate

their expectations of the treatment's ability to reduce their pain, improve their quality of life, and change their functional capacity. Additionally, they were asked to rate their pain intensity, depressive symptoms, the global impact the pain was having on their daily function, and the level to which they catastrophized their symptoms. Corimer et al. (2016) found that higher expectations of pain resolution and quality of life at the outset of treatment were significant predictors of pain related outcomes, at $p < 0.001$. Positive expectations were associated with better treatment gains. It was suggested that positive expectations could reflect a general state of optimism the patient possesses, which is associated with better clinical outcomes. The evidence supporting the influence expectations have on treatment outcomes and the evidence that supports the positive influence providers can have on patients' expectations underscores the importance of assessing the expectations of individuals with CP prior to initiating treatment.

Pain experts advocate clinicians question patients on their thoughts concerning: 1) the anticipated course their pain will take (pain resolution, maintenance, and/or intensification), 2) the expected outcome of the intervention on patients' pain levels, and 3) the imagined outcome the intervention will have on the patient's ability to more fully participate in his/her life (Cormier et al., 2016; McDevitt et al., 2018; Meints & Edwards, 2018; Oostendorp et al., 2015). The survey questions pertaining to patients' expectations have been demonstrated to affect the outcome of treatment and pain experts recommend incorporating the questions into the history-taking portion of an initial visit.

Pain acceptance. A psychological disposition that supports the understanding that pain and suffering are an inherent part of the human experience, while at the same time believing that life must be lived in a manner consistent with one's values and goals in spite of the suffering is the foundation of the acceptance and commitment model discussed earlier. Pain is de-emphasized and the focus is instead directed towards acceptance and engagement in meaningful activity in

spite of the pain. The research supports the positive relationship between pain acceptance and function in persons with CP (Åkerblom, Perrin, Rivano Fischer, & McCracken, 2015; Edwards et al., 2016). In a study conducted by Akerblom et al. (2015), 409 patients participated in a multidisciplinary treatment protocol that incorporated CBT principles into the intervention. They found that pain acceptance significantly mediated the relationship between all reported outcome measures at $p < 0.05$. The outcome measures included pain interference, pain intensity, and depression. Researchers recommended targeting pain acceptance in treatment to improve outcomes, emphasizing the importance of assessing pain-related acceptance when evaluating persons with CP.

Motivation. In health behavior modification models, motivation is a complex psychological construct comprised of cognitive, emotional, and behavioral factors that influence a person's willingness to engage in health-promoting actions. The factors include the person's attitudes about the behavior, the person's perception of the subjective and social norms surrounding the behavior; the person's perception of factors that would make it easier or harder to participate in the behavior; and the person's intentions to participate in a behavior within a defined period of time (Brooks et al., 2018). People with CP often experience motivational challenges participating in health-promoting activities, such as physical activity (Brooks et al., 2018).

Brooks et al. (2018), in a study of 198 persons with CP conditions, examined the variance in the level of physical activity that could be explained by motivation, after controlling for pre-existing functional disability and pain intensity. Disability and pain intensity explained only 6.5% of the variance in exercise and activity while motivation to engage in exercise accounted for 36.5% of the total variance in physical activity and exercise. These findings emphasize the

importance of ascertaining the motivational level of patients to engage in pain mitigating, health promoting activities aimed at improving their participation in life, prior to initiating care.

Psychological-Emotional Subdomain

While there is ongoing debate among researchers in the field of psychology, the American Psychological Association defines emotion as, a complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event (American Psychological Association, 2018). The primary function of emotion is to focus an individual's attention to guide and motivate a change in the individual's physical and social environment in a manner that contributes to the well-being of the individual. The negative emotional states most often associated with CP are depression, anxiety, fear, and anger.

Emotions shape a person's interpretation of a noxious stimulus and govern the extent to which the painful stimulus will activate the vast neuromatrix (George et al., 2011; Han & Pae, 2015). Recent neuroimaging studies provide evidence of morphological and neurochemical changes in regions of the brain in individuals with persistent pain that typically are associated with negative emotional states such as depression and anxiety (Hooten, 2016). Vast regions of the brain that typically are associated with emotion are activated, providing a neurobiological explanation for the strong relationship that exists between longstanding pain and emotional disorders such as depression (Baliki, Schnitzer, Bauer, & Apkarian, 2011). Additionally, researchers have identified poor emotional regulation as a risk factor for the chronification of acute pain (Meints & Edwards, 2018). Finally, neuroimaging researchers report that when emotional disorders associated with persistent pain are targeted using CBT interventions, the thinning of gray matter in the emotional-pain processing regions of the central nervous system is

reversed (Lumley et al., 2011). Therefore, researchers recommend PTs identify and address maladaptive emotional responses to pain and treatment when managing patients with CP.

It is important to note that there is overlap among the respective negative emotional constructs, as well as a multidirectional relationship between emotion, cognition, and behavior. Studies addressing pain-related emotions typically address more than one psychological domain when investigating the influence emotion has on the pain experience. Additionally, pain-related emotion is often referred to as negative affect or emotional distress.

Depression. Depression is a serious mood disorder characterized by persistent sadness, feelings of hopelessness, a loss of interest in pleasure, difficulty with sleeping, and pain (Meints & Edwards, 2018). Rates of depression are higher in the CP population than they are in the general population, with estimates ranging from 5 to 100% depending on the pain condition and the method used to measure depression (Meints & Edwards, 2018). In patients with low back pain in physical therapy settings, up to 46% of patients displayed signs and symptoms of depression (George et al., 2011). In a study of 8,304 physical therapy patients with chronic musculoskeletal pain conditions across four anatomical regions, depressive symptoms were strongly associated with pain intensity and functional status (George et al., 2011). Pain intensity was measured using the 11-point Numerical Pain Rating Scale. Functional status was measured using computerized adaptive testing and was scored from 0 to 100. A higher score represented higher function. Individuals with severe depression had significantly higher mean pain intensity score (7.48), when compared to those that score in the normal range (5.57); and had significantly lower mean functional scores (37.9) when compared those with normal ranges scores (50.4). Depression was the strongest single predictor of pain intensity and functional status in the final multiple regression model. Variance in pain intensity accounted for by depressive symptoms varied by body region from 10.0% to 13.5%; and variance in functional status varied from 10.4% to 18.6%.

Depression has been demonstrated to be a significant cause of pain-related physical disability and when present is associated with an increase in health care costs (Turk, Fillingim, Ohrbach, & Patel, 2016). In a prospective study of 58 patients undergoing a lumbar fusion for spondylolisthesis, participants who scored in the upper half of the preoperative depression scores were one-third less likely to return to work. Of those participants, the individuals who did return to work took twice as long as the average participant to do so (Parker et al., 2012). George et al. (2011) reported that moderate to severe depressive symptoms, regardless of the location of the musculoskeletal pain, were associated with longer treatment session duration and more physical therapy visits.

The existence of depression in up to half of people with CP, and the documented impact depressive symptoms have on work status, function, pain intensity and healthcare costs supports the importance of PTs assessing for the presence of depression in patients with CP. The Patient Health Questionnaire-2 has been found to be a valid and reliable tool for PTs to screen for depression. It includes two questions: 1) have you been bothered by feeling down, depressed, or hopeless, and 2) have you been bothered by little interest or pleasure in doing things. The two questions have strong criterion and concurrent validity with other depression measures and researchers recommend PTs use these questions to screen for depression (Haggman, Maher, & Refshauge, 2004). These two questions were included in the survey created for this study.

Anxiety and fear. Anxiety and fear in persons suffering from longstanding pain are associated with an amplification of the pain experience, neurochemical, and structural changes within the central nervous system that amplify the pain experience, and poor functional outcomes (Meints & Edwards, 2018; Reis, Nijs, & Lundberg, 2016; Simons, Elman, & Borsook, 2014; Vlaeyen & Linton, 2012). Anxiety is a future-oriented emotional state in which feelings of worry and concern are directed towards a perceived threat that has yet to occur (Turk et al., 2016). Fear

is an emotional response to an identifiable, specific, and immediate threat that is perceived to be harmful and dangerous (Reis et al., 2016). A heightened state of anxiety can contribute to higher levels of pain-related fear (Meints & Edwards, 2018; Vlaeyen, Nijders, Boeren, & van Eek, 1995). Anxiety and fear of movement and re-injury in the CP population are associated with the development of maladaptive avoidant behaviors, and negative cognitive processes such as pain catastrophizing (Meints & Edwards, 2018; Vlaeyen & Linton, 2012).

Researchers have demonstrated that subjects in a heightened anxious state experience pain at lower pressure thresholds, which suggests that adverse emotions can suppress the inhibitory descending endogenous pain pathways (Reis et al., 2016). In a study conducted to investigate factors that predict recovery in patients receiving physical therapy for shoulder pain, the lack of anxiety was significantly associated with return to work (Karel et al., 2017). Additionally, higher anxiety levels are positively associated with pain catastrophizing and negatively associated with self-efficacy, cognitive factors that have been documented to predict disability levels in individuals with CP (Chester et al., 2018; Lluch et al., 2018).

The fear-avoidance pain model described earlier depicts the mechanism by which negative cognitive factors, emotional distress and pain catastrophizing condition persons in pain to associate specific activities and movements with pain. The negative association conditions the individual to escape from and avoid activities connected with pain. Due to a conditioned fear of pain/reinjury, individuals participate less fully in their lives, which lead to higher levels of disability. Numerous studies have demonstrated the strong association between fear of movement/reinjury and higher levels of disability (Meints & Edwards, 2018; Vlaeyen & Linton, 2012; Zale, Lange, Fields, & Ditre, 2013). In a meta-analysis conducted that investigated the relationship between pain related fear and disability, researchers reported a significant large to moderate association between the factors with $r = 0.5$, and 41.4% of the variance in disability

being attributable to fear (Zale et al., 2013). Furthermore, when CBT or graded exposure treatment techniques were utilized to address pain related fears, fear was significantly reduced extinguished and function and activity level improved (Simons et al., 2014; Zale et al., 2013). Given the preponderance of evidence supporting the detrimental effect anxiety and pain-related fears have on overall function and the improvements realized when fear is addressed, researchers recommend PTs assess pain-related fears and generalized anxiety level when assessing individuals with CP.

Anger. Psychological researchers have investigated the impact anger has on pain and determined it is not the intensity or frequency of anger, but instead it is anger control strategies individuals employ to manage and express anger that alter individuals' pain perceptions (Nisenzon et al., 2014). When anger is experienced and managed, individuals can experience a reduction in anger and the subsequent documented negative physiological effects. However, when anger is suppressed, pain sensitivity is heightened in persons with acute and CP (Nisenzon et al., 2014). In a study on chronic low back pain, individuals with effective anger control had significantly better physical therapy treatment outcomes when compared to individuals with poorer anger management, at $p < 0.01$. Anger did not significantly contribute to the predictive model when it was entered with other psychosocial factors; however, researchers noted that the mean score on the Anger Trait inventory used was similar to the general population (Nisenzon et al., 2014). This finding is consistent with the conclusion reached by Burns, Quartana, and Bruehl (2008). Generally, anger's contribution to pain is thought to occur through general emotional negative effects and is not considered a primary predictor of the experience of pain. However, the researchers note that the inhibition of anger, acknowledging the presence of anger but then attempting to suppress the experience or thoughts of anger —was moderately associated with heightened pain intensity in lab experiments, with reported correlation values ranging from 0.27

to 0.5 (Bruehl, Chung, & Burns, 2006; Burns, Quartana, & Bruehl, 2008). Additionally, multiple studies have demonstrated that those with effective anger management abilities consistently have better pain outcomes (Nisenzon et al., 2014). While further research is needed to assess the contribution anger has on the pain experience, a general assessment of the anger a patient is experiencing related to their pain condition is recommended (Nisenzon et al., 2014; Wijma et al., 2016).

Psychological-Behavioral Subdomain

It is important for PTs to assess adaptive and maladaptive coping strategies and behavioral adaptations secondary to pain when evaluating individuals with CP (Wijma et al., 2016). Pain behaviors are patterned responses to actual or anticipated stimuli. While the avoidance of pain-inducing activities or disuse of an injured limb is adaptive in the acute nociceptive phase of an injury, the maintenance of these behaviors in CP states are associated with higher pain intensity, lower quality of life, higher levels of disability, and functional structural and biochemical changes in the primary somatosensory region of the brain (Andrews, Strong, & Meredith, 2015; Louw, Schmidt, Louw, & Puente-dura, 2015). Chronic avoidant and disuse behaviors result in cortical restructuring, which reduces the representation or mapping of the body in the brain, and these changes are correlated with pain intensity and disability (Louw et al., 2015). As a result of the changed cortical representation of the body, two-point discrimination, laterality (the ability to differentiate between the right and left side of one's body), and poor touch localization are diminished in individuals with long-standing pain conditions; and varying degrees of hemineglect are present on the injured side of individuals with longstanding pain (Louw et al., 2015; Simons et al., 2014).

Pain behaviors are often fear-conditioned and formed as a result of previous pain-producing experiences, pre-conceived thoughts and beliefs about pain, and emotional responses

to activities that have resulted in pain (Vlaeyen & Linton, 2012). Interventions such as graded motor imagery, graded exposure therapy, sensory stimulation, visual-spatial and proprioceptive training, and CBT-focused treatments, lower disability levels and expand the body map in the primary somatosensory cortex, reversing the aforementioned somatosensory deficits (Louw et al., 2015; Simons et al., 2014). In order to implement a therapeutic intervention to affect long-term change, it is recommended that PTs have the knowledge to evaluate patients' adaptive and maladaptive pain behaviors and coping strategies (Louw et al., 2015; Vlaeyen & Linton, 2012; Wijma et al., 2016).

In addition to identifying activities patients are avoiding, researchers recommend determining which activities patients are participating in that are adversely affecting their pain and overall function (Andrews et al., 2015; Wijma et al., 2016). A behavior pattern displayed by a subset of individuals with CP is to exceed activity tolerance limits during periods when pain intensity is lower. As a result, the pain intensifies which then leads to prolonged periods of inactivity. Fordyce (1976) referred to this as overactivity and proposed that this pain behavior was the mechanism by which avoidant behavior was conditioned in persons with persistent pain. Andrews et al. (2015), in a study of 68 participants with longstanding pain, upheld the construct of overactivity. High levels of overactivity were significantly associated with greater variation in pain ($\beta = 0.26, p = 0.05$); persons with high levels of overactivity had statistically higher pain intensity scores when compared to individuals with low levels of overactivity, at $p = 0.03$ and a large effect size of $d = 0.88$ (Andrews et al., 2015).

Sleep. An estimated 50-90% of people with CP experience sleep disturbances and sleeplessness (Andrews, Strong, Meredith, & D'Arrigo, 2014). People with chronic low back pain are 18 times more likely to suffer from insomnia than those without low back pain (Nijs et al., 2018). Evidence suggests that healthy sleep enhances immune function, while impaired sleep

elicits a low-grade inflammatory response within the neurological system (Nijs et al., 2018). This immune response has been linked to increased sensitivity to pain and higher reported pain intensities in people with and without pain conditions, leading researchers to consider impaired sleep a risk factor for the chronification of acute pain (Nijs et al., 2018).

Sleep deprivation in healthy adults and persons with CP has been shown to be associated with hyperalgesia (Andrews et al., 2014; Curatolo et al., 2015; Schuh-Hofer et al., 2013). In a study conducted by Schuh-Hofer et al. (2013), Quantitative Sensory Testing was completed on 14 adult-aged subjects before and after one night of total sleep deprivation. Subjects developed statistically significant hyperalgesia to cold ($p < 0.01$), heat ($p < 0.05$), blunt pressure ($p < 0.05$), and pinprick ($p < 0.05$). Curatolo et al. (2015) measured the nociceptive withdrawal reflex thresholds to electrical stimulation on electromyography to assess pain hypersensitivity in 696 subjects with CP. A significant association ($p = 0.04$) between sleep deprivation and pain hypersensitivity was identified. In a study by Andrews et al. (2014), the sleep patterns of 50 participants with CP were assessed over a 5-day period. Average awake time measured the average number of minutes participants were awake after they had fallen asleep. The strongest predictor of awake time was the number of pain sites the participants had ($\beta = 0.28$, $p = 0.02$). The number of pain sites explained 19% of the variance in awake time.

Researchers concluded that improving sleep quality could decrease pain perception in persons with longstanding pain (Andrews et al., 2014; Curatolo et al., 2015; Nijs et al., 2018). Nijs et al. (2018) recommended that PTs explore patients' sleep behaviors and incorporate education and behavioral modification strategies aimed at restoring restful sleep into their treatment of persons with persistent pain. The Veteran Administration's comprehensive pain management strategy outlined in the *National Pain Strategy* upheld the importance of sleep by identifying sleep restoration as part of the first step in a multi-step pain management approach

(Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016). The abovementioned recommendations and findings underscore the importance of assessing sleep in individuals with CP.

Substance abuse. Numerous theories aimed at understanding substance abuse have been proposed. Self-medicating to lessen distressing sensations is a widely accepted explanation for the use of illicit substances and the abuse of alcohol and prescription drugs (Alford et al., 2016; Han et al., 2017). The exact incidence of substance abuse among United States individuals with CP is unknown; however, the 2015 National Survey on Opioid Abuse reported that 63.4% of adults who were prescribed opioids, misused the drugs to get relief from physical pain (Han et al., 2017). Alford et al. (2016), in a recent study on patients accessing primary care services, reported that 87% of participants who screened positive for drug use reported that they suffered from CP. Of the participants who reported using marijuana, cocaine, or heroin, 51% reported doing so to manage pain. Among respondents classified as heavy drinkers, 38% drank to lessen physical pain. Among participants categorized as high-risk drinkers, 79% did so to self-treat pain conditions (Alford et al., 2016).

Given the prevalence of drug use among patients seeking care from primary care providers and the association between substance abuse and pain relief, front line providers treating this patient population are encouraged to routinely screen for illicit drug use and alcohol abuse. In a study of 286 primary care patients, the question, “How many times in the past year have you used an illegal drug or a prescription drug for nonmedical purposes?” was 100% sensitive and 73.5% specific for the detection of drug use disorders (Smith, Schmidt, Allensworth-Davies, & Saitz, 2010). With some level of direct access to physical therapy available to patients in all 50 states, as frontline providers PTs should consider screening for substance abuse when evaluating patients with CP.

Social Domain

Social factors can have a positive or negative effect on a person's pain experience. The social domain includes people such as spouses/partners, family, friends, and co-workers/supervisors; the activities individuals partake in as community members; and the social roles individuals are required to fulfill within their social environment (Wijma et al., 2016). This community of people and the expectations placed upon people to fulfill social roles and activities influence the cognitive processes pertaining to pain thoughts and beliefs, and the emotional state of an individual. Thus, it can either reinforce or extinguish maladaptive pain behaviors. Additionally, individuals with CP rely upon their social network to provide physical and emotional support to ease the hardships associated with pain and to assist these individuals in fulfilling their social roles. For these reasons, it is important for PTs to consider the influences exerted by the members of the patient's social system.

Social support is associated with improved physical functioning, lower disability levels, and lower perceived pain intensity in persons with pain conditions; whereas, relational dysfunction within social spheres is associated with poor pain-related outcomes (Meints & Edwards, 2018; Roberts, Klatzkin, & Mechlin, 2015; Turk et al., 2016). Roberts et al. (2015), in a study investigating the relationship between social support and physiological pain-related measures, found that individuals with support had higher pain thresholds, reported lower pain intensities, and had lower cortisol levels than individuals with non-communicative social support and individuals without support (Roberts et al., 2015). The findings of this study are consistent with several studies on patients with amputations that found that individuals with social support had less phantom limb pain and lower levels of disability (Meints & Edwards, 2018).

Significant others exert a strong influence on pain outcomes. The interaction between partners shapes a person's interpretations of their pain experience. Multiple studies have

demonstrated that high levels of depression in a significant other are predictive of greater disability levels in subjects with longstanding pain (Burns et al., 2013; Turk et al., 2016). Burns et al. (2013) had participants record interactions with their spouse in electronic diaries. When subjects with pain recorded episodes of spousal criticism or judgement about their pain, their pain intensity was higher for hours after the negative interaction. Conversely, when subjects recorded that spouses were not critical of the participants' facial grimacing and pain utterances, participants reported lower overall pain levels for hours after the interaction.

It is also important to consider the impact that CP is having on the family unit. Ojeda et al. (2014) surveyed patients with moderate to severe pain and their families, to examine the impact the pain condition had on the patients and patients' family units. Of the 131 families interviewed, 51.2% of relatives reported that pain affected family life moderately or a lot. According to 42.7% of patients and 47.5% families, the factor that had the most significant impact on the family unit was altered leisure activities. Moreover, 22.1% relatives/partners reported that their own health had deteriorated as a result of caring for their relative, and 41.6% reported negative mood changes within themselves. These changes are consistent with previous studies that identified a decline in the quality of familial relationships and increased social isolation of the family and individual with pain (Breedon & Rowe, 2017; Ojeda et al., 2014). Furthermore, this decline has been linked to poor treatment outcomes in individuals with longstanding pain. As a result of the impact CP has on the family unit and the influence partners and relatives have on the perceptions of people with CP, researchers recommend providers adopt an approach that recognizes the role of the family and partner/spouse in a person's pain experience.

It is also important to understand the relationship the patient has with people at work. A lack of support by co-workers and an adversarial relationship with supervisors are strong

predictors of work-related disability (Meints & Edwards, 2018; Shaw, Main, & Johnston, 2011). Individuals with arthritis were more likely to suffer from depressive symptoms and work-related disability when they experienced job dissatisfaction, highlighting the significance of social support in the workplace (Meints & Edwards, 2018). Workers with low back pain, higher levels of job dissatisfaction, and a lack of social support in the workplace, experience longer work absences due to low back pain (Shaw et al., 2011). As a result, Shaw et al. (2011) recommended that PTs include questions about the patient's perceptions of organizational social support and their general views on their working life when evaluating individuals with CP conditions.

Finally, past interactions with healthcare providers have been found to influence patients' perceptions of their pain conditions and the relationship patients have with the healthcare system. In a study conducted on primary care physicians and PTs, De Ruddere et al. (2014) concluded that in the absence of objective medical findings that explained their patients' pain, providers underestimated patients' pain intensity, had less sympathy, and lower expectations for the effectiveness of pain management interventions. Additionally, patients with chronic pain without objective medical findings were evaluated in a less positive manner (average score calculated from providers rating of patient likability, provider sympathy, and believability of patients' complaints) and were rated as more likely to be involved in deception. In a qualitative study conducted by Gjesdal, Dysvik, and Furnes (2018), the experience patients with chronic musculoskeletal pain had when they interacted with healthcare providers was investigated. One of the themes that emerged from the semi-structured interview of the patients was that all participants had felt neglected as a person by healthcare providers. Patients felt providers did not listen to them; that consultation sessions were not long enough for patients to discuss their concerns; and that the patients perceived a sense of hopelessness that providers had about their conditions, left patients feeling hopeless. Gjesdal et al. (2018) concluded that patients with CP

were at risk of viewing themselves as victims of the healthcare system, and prone to feelings of hopelessness. Past interactions with healthcare providers can influence cognitive, emotional, and behavioral psychological stressors that contribute to a person's pain experience and should therefore be assessed by the evaluating PT.

Current State of Assessment of Psychosocial Factors by Physical Therapists

As a result of the 2011 NIH report *Relieving Pain in America* in which the consensus of the task force was that healthcare workers across all disciplines are often ill-prepared to diagnose, appropriately assess, and treat patients with chronic pain, a call was put forth for a transformation of the healthcare system that would improve the recognition, assessment, and treatment of the multidimensional nature of pain (Institute of Medicine, 2011). The findings of the 2011 report guided the development of the *National Pain Strategy*. The strategies were guided by the consensus statement that CP is a biopsychosocial condition that requires integrated, multimodal assessments and treatments. Primary objectives outlined in the strategy included improved pain literacy among healthcare providers of all disciplines, as well as ensuring that individuals with CP are assessed in a comprehensive manner.

In 2017, the American Physical Therapy Association adopted the IASP pre-licensure pain education competency domains for physical therapy curriculums. The second of the four competency domains states that PT students should be proficient in assessing and measuring the multidimensional nature of CP. This includes assessing for the psychosocial factors that contribute to an individual's pain experience. With the expectation that graduating PTs demonstrate proficiency in evaluating pain utilizing a BPS model and the National Pain Strategy's call for improved pain literacy among practitioners, it is important to understand what the current evaluation practice patterns are among practicing clinicians. No published studies

have examined the adherence to the recommended IASP competency guidelines of PTs in the United States when they assess and measure pain in adults with CP.

Quantitative and qualitative studies have investigated the degree to which PTs have integrated a BPS approach into the evaluation of patients with CP; however, the vast majority of these published studies were conducted in Europe. Few published studies have examined the actual history-taking practice patterns of PTs in the United States. The general consensus among researchers is there is a recognition among PTs that the multidimensional nature of pain requires an assessment approach that encompasses not only the biological, but also the psychological and social stressors that contribute to the pain experience. Yet, numerous studies report that the focus of PTs remains grounded in a biomedical tradition, with therapists gravitating towards history-taking questions that solicit information from the patient about mechanical factors that could be perpetuating their pain conditions (Gray & Howe, 2013; Synnott et al., 2015). The studies presented below provide an account of the aforementioned research findings and highlight the reported barriers to fully adopting a BPS paradigm when evaluating patients with CP.

Ladeira (2018) investigated the general psychosocial practice patterns of PTs in the United States. He recruited PTs from the Orthopedic Section of the APTA and the American Academy of Orthopedic Manual Therapists to participate in an electronic survey designed to ascertain whether providers correctly managed patients that presented with red (indicative of a serious medical condition that requires immediate referral to a physician), orange (psychiatric issues such as depression and anxiety that require referral to a specialist, but physical therapy intervention could still be provided), and yellow (maladaptive pain coping strategies that require behavioral interventions but do not require a referral to a psychological professional) flags. PTs were presented with patient vignettes and were asked to review the evaluation findings and select the most appropriate management strategies from a list of possible interventions. While the study

was not directly aimed at history-taking practices, it assessed the decision-making processes utilized by United States PTs when they established a plan of care following an evaluation. These findings provided insight into the competency level of United States providers to address psychosocial factors, when treating individuals with complex presentations. Of the PTs with no advanced specialization, 19% exhibited proper management of the patient presenting with signs of depression and anxiety (orange flag), and 22% appropriately managed the patient with yellow flags (initiated physical therapy intervention without referring the patient to a psychological specialist). Of all PTs surveyed, 78.3% recognized that the patient (the patient the presented with orange flags wept throughout the session due to the recent loss of his son) was presented with depression; yet, only a small percentage of the PTs reported they would refer the patient to a psychologist. While the vast majority of PTs recognized that the patient was depressed in this patient vignette, it was estimated that providers failed to recognize depression in up to 50% of patients (Ladeira, 2018).

Research has demonstrated that PTs focus on biomedical factors more heavily than psychological or social issues during the evaluation process. In part two of the Oostendorp et al. (2015) study, the researchers piloted the quality indicators they developed to evaluate the BPS history-taking practices of 20 Dutch PTs as the PTs independently evaluated five new patients. The PTs were recorded as they evaluated patients. Oostendorp et al. then scored the therapists using the quality indicators. The therapists were also asked to score themselves. Quality indicators (questions a PT could ask about psychosocial factors) were categorized into somatic, psychological—cognitive, emotional, and behavioral, and social domains. After analyzing the history-taking portion of 100 evaluations, Oostendorp et al. reported that participating PTs met 98.1% of the quality somatic indicators, 42.5% of the cognitive indicators, 26.8% of the emotional indicators, 37.9% the behavioral indicators, and 17.6% of the social indicators.

Furthermore, the PTs significantly overestimated their coverage of all the psychological subdomains and social domains in their self-assessment. The findings of this study highlight the discrepancy between what was determined to be the “best practice” coverage of psychosocial factors during history-taking and the actual history-taking practices of PTs from Holland. Oostendorp et al. (2015) found that emphasis was placed on the somatic representations of the patients’ pain conditions, as opposed to the psychosocial stressors .

In a systematic review of qualitative studies published in English, Synnott et al. (2015) investigated the perceptions physiotherapists held about identifying and managing the cognitive, psychological, and social factors in individuals with longstanding low back pain. Three overarching themes were identified in the metasynthesis of 12 studies: 1) there is limited recognition by PTs of the role that cognitive, psychological, and social factors play in low back pain, 2) some PTs stigmatize patients whose behavior indicates that psychosocial factors are influencing their low back pain, and 3) PTs view their role in dealing with psychosocial factors as limited. Subthemes of the first theme included the finding that PTs thought patients would be more comfortable with treatment grounded in the biomedical tradition. Additionally, PTs reported that they were more comfortable treating from a mechanical perspective that was consistent with their educational training. Subthemes of Theme Three included a limited willingness to discuss with patients the psychosocial factors that may influence low back pain. Additionally, PTs expressed concerns about their lack of psychosocial training and operating outside of the physical therapy scope of practice. Although training on the BPS model has increased, many argue that the continued overwhelming emphasis in entry-level curriculums and continuing education courses on the biomechanical contributions to pain sends a message to PTs that psychosocial factors are of lesser importance (Cowell et al., 2018; Foster & Delitto, 2011; Hoeger Bement & Sluka, 2015; Main, 2013; Synnott et al., 2015). PTs were more apt to ask questions consistent with a

biomechanical/biomedical approach; while, at the same time, acknowledging the theoretical importance of psychosocial stressors.

In a qualitative study, Opsommer and Schoeb (2014) investigated the manner in which Swiss French-speaking outpatient orthopedic PTs explored patients' pain experiences during the first visit. Understanding patients' pain was the primary focus of the evaluations. When the providers asked about psychosocial factors, they followed a checklist of questions, frequently asking closed-ended questions while typing on a computer. Researchers noted that this behavior was not patient-centered and did not encourage patients to expand upon concerns that they had. When PTs asked follow-up questions, the questions pertained to biomechanical complaints. This finding is consistent with those of other researchers, who describe PTs' tendencies to direct conversation away from psychosocial factors, towards more understandable and quantifiable biomedical units (Cowell et al., 2018; Cruz, Moore, & Cross, 2012). While experienced PTs were more responsive to patients' psychosocial needs, the researchers concluded that based on the types of questions asked, the message patients received was that the mechanical issues were the primary cause of their pain.

Cowell et al. (2018), in a qualitative study conducted in England, interviewed 10 PTs after they completed their treatment sessions that had been video recorded. Patients were selected for the study if they had a diagnosis of non-specific chronic low back pain, and if they had psychosocial risk factors (determined using the STarTBack Screening tool and the Orebro Musculoskeletal Pain Screening Questionnaire). Three primary themes emerged. First, therapists recognized the limitations of the biomedical model and the need to assess using a BPS perspective in this patient population. Secondly, therapists felt there were barriers to assessing psychological and social contributions to low back pain. The therapists felt they lacked the training to effectively assess and then manage these risk factors, especially given the limited time

that was available to conduct a thorough biomechanical evaluation. PTs experienced difficulties reconciling their own understanding of the importance of addressing psychosocial factors with the patients' expectations to receive care aligned with a biomedical approach. The PTs expressed concern about treating outside of their scope of practice and reported discomfort dealing with sensitive issues; therefore, they opted to avoid extensive discussion of these matters.

Singla et al. (2015) explored the assessment of psychosocial status in a qualitative descriptive study involving nine private outpatient PTs practicing in Australia. In addition to the themes already discussed, thematic analysis of the semi-structured interviews revealed two new themes. As the interviews progressed, it became clear to Singla et al. that the PTs had a limited understanding about the meaning of psychosocial. PTs reported that only certain categories of patients (WorkCover, insurance cases, severe chronic cases) were likely to suffer from complicating psychosocial issues. While there was verbal acknowledgment that pain was a multidimensional experience, the PTs interviewed implied not all patients presented with psychosocial involvement. Additionally, PTs reported making the determination about which patients suffered from complicating psychosocial factors based on a "gut feeling." PTs reported they sensed the psychosocial factors were contributing to the perpetuation of the patients' pain experience through their interaction with the patient, but they did not formally assess for these factors. As reported in previous studies, the participants reported that time and a lack of training prevented them from investigating for psychosocial factors.

While studies have demonstrated that PTs recognize the multidimensional nature of pain and that the focus of evaluations and subsequent treatment remains predominately focused on the biomechanical and physical impairments that contribute to the pain experience, researchers also found that PTs tend to direct discussion away from psychosocial factors and towards biomechanical issues (Sanders, Foster, Bishop, & Ong, 2013). In a qualitative study, Sanders et

al. (2013) interviewed 11 PTs in the United Kingdom to better understand how PTs integrated psychosocial stressors with patients' mechanical impairments when treating individuals with low back pain. As reported in earlier studies, PTs recognized the psychosocial aspects of the pain experience, but reported that they lacked the training to effectively address these concerns. Additionally, therapists questioned the legitimacy of persistent low back pain in patients, attributing poor treatment outcomes to secondary gain issues and/or a lack of compliance with the prescribed plan of care. Sanders et al. concluded that these stereotypes prevented PTs from fully exploring issues, such as psychosocial factors, that might have adversely affected patients' response to treatment. While therapists recognized the psychosocial dimension of low back pain, they reported it was challenging to counter the strongly held pain and health beliefs that their patients had. PTs were reluctant to engage in conversations about psychosocial issues, finding it difficult to fully deal with and manage the complexities of psychosocial factors with the biomechanical impairments. Instead of delving into the patients' psychological and emotional stressors and working to understand the patients' pain experience, PTs would redirect the focus of therapy towards function while maintaining a level of professional detachment.

Zangoni and Thomson (2017), in a qualitative study, interviewed eight PTs practicing in private orthopedic clinics in Italy, with the purpose of exploring and describing PTs' personal beliefs and knowledge surrounding their assessment of psychosocial factors in patients with chronic low back pain. As in previous studies, all participants were aware of the importance of psychosocial factors in chronic low back pain but considered the factors to be primarily limited to the patient's family/work environment and possible psychological problems. While most acknowledged that psychosocial factors played a role in back pain, few could describe the mechanism by which the factors contributed to a patient's pain experience. Concerning the evaluation, therapists described an iterative process in which information gathering about

psychosocial factors extended beyond the initial evaluation. The method used to question the patients was more conversational and no format of questioning was followed. Participants expressed the importance of conveying empathy and building trust during this first visit to form a therapeutic alliance with the patient. The final theme that emerged was the barriers therapists encountered in the assessment of the patient. Therapists struggled to counter patients' well-established negative pain beliefs and to convince patients of the contribution family and work stress can have on the pain experience. Furthermore, therapists held the perception that their patients come to PT expecting manual therapy and exercise interventions, not to talk about psychosocial stressors. To this end, therapists expressed fear about losing the patient to other providers who would deliver more traditional care. They expressed concerns that therapeutic alliance with the patient would be negatively impacted, due to the PTs asking questions of an overly personal nature. Finally, consistent with previous studies, the participants expressed concern about their perceived lack of knowledge to effectively evaluate and then address psychosocial factors.

Few studies have investigated actual practice patterns of PTs but have instead relied upon self-reported practice behaviors. Emilson et al. (2016) video recorded 12 PTs in Sweden as they evaluated patients with CP. The same therapists were then interviewed. The PTs claimed to utilize a BPS approach and to routinely use behavior modification strategies when treating patients; however, analysis of the video recordings revealed that all but one PT utilized a biomedical approach as he/she evaluated patients. While most therapists asked about psychological factors, therapists did not sufficiently follow-up on psychosocial complaints made by patients; only the one therapist investigated a psychosocial stressor sufficiently to identify the issue that was contributing to the patient's pain experience. The therapist who utilized a BPS approach was the only provider to incorporate psychological factors into his/her analysis of the

clinical problem and subsequent treatment plan. Consistent with earlier studies, therapists demonstrated difficulty integrating the assessment of psychosocial factors into their evaluations, reported that time limitations prevented them from digging deeper, and they lacked confidence in their ability to effectively address these factors (Synnott et al., 2015). This study underscored the need for direct observational studies when investigating practice patterns of PTs.

The studies described above have investigated PTs' evaluation practices as they assessed psychosocial factors as a collective. Given that maladaptive pain perceptions and beliefs are better predictors of disability in patients with chronic low back pain than any other psychosocial factors (Foster et al., 2010), investigating the PTs' evaluation of patients' pain perceptions and beliefs is essential (Glattacker et al., 2012; van Wilgen et al., 2014). To date, few published studies have examined the actual evaluation practices of PTs as they assess cognitive psychological factors. Van Wilgen et al. (2014) and Roussel et al. (2016) examined how PTs integrated discussions of patients' pain perceptions into the first visit; however, both studies were conducted in Europe.

In a qualitative study of practicing PTs in the Netherlands, Van Wilgen et al. (2014) audio recorded evaluations and analyzed the recordings for questions that pertained to the cognitive psychological subdomain. The general consensus was PTs did not adequately cover the cognitive or illness perception subdomain of the psychological domain. While PTs asked general questions about patients' perceptions surrounding the cause of their pain, the focus of these questions related to the mechanism of injury or onset of pain. Van Wilgen et al. commented that this line of questioning suggested that PTs might still largely attribute the patient's pain to the initial "tissue" injury. When discussing patients' understanding of their pain, PTs rarely asked about psychosocial factors, even after patients identified possible emotional or behavioral stressors within themselves that might have contributed to their pain. Additionally, PTs asked

patients about past healthcare providers' impressions about their pain more often than they asked patients about their understanding of pain. Moreover, patients' expectations were not fully explored, despite patients frequently mentioning expectations they had about their condition and the care they were to receive. Finally, questions about pain self-efficacy specifically addressed patients' confidence to participate in physical activity; however, the PTs did not address the patient's overall confidence level in their ability to independently manage their symptoms. Van Wilgen et al. concluded that the therapists predominately utilized a biomedical approach, which prevented them from adequately exploring pain cognitions. Given the evidence that supports that maladaptive pain beliefs are associated with poor pain-related outcomes, Van Wilgen et al. recommended that PTs investigate these issues in the CP population.

In a mixed methods study, Roussel et al. (2016) investigated the extent to which 34 Dutch speaking PTs questioned patients with chronic low back pain about their pain perceptions and beliefs. Therapists were video recorded conducting an evaluation and then interviewed. Therapists asked an average of six questions regarding illness identity, which was comprised of questions about symptoms and pain (location, intensity, and duration). Beliefs about provoking factors were asked by 71% of PTs. While 56% of PTs asked about the patient's understanding of the cause of their condition, most questions pertained to biomedical causes of pain. Consistent with the findings of Van Wilgen et al. (2016), no questions about psychosocial contributions to the pain were posed by the PTs. None of the PTs asked patients about their expectations regarding the anticipated progression of their pain condition. Questions about the impact the pain condition had on patients' overall well-being were asked by 44% of PTs and most were centered around activities of daily living, work and leisure activities, and sleep. Pain self-efficacy was explored by 44% of the PTs and the questions primarily centered on what the patient could do to alleviate their pain (e.g., position change, stretch). Finally, very little attention was given to the

patients' overall understanding of their condition, with only four PTs inquiring about the patient's knowledge of their pain condition. Van Wilgen et al. and Roussel et al. concluded that the PTs observed did not sufficiently cover the cognitive subdomain of the psychological domain.

In summary, while PTs are aware of the multidimensional nature of pain and the role psychosocial factors play in the perpetuation of the pain experience, the general consensus among researchers investigating PTs' assessment of the psychological and social factors is that therapists are not sufficiently exploring the impact these factors have on their patients' pain conditions. History-taking predominately focused on the assessment of somatic complaints. Questions asked about psychosocial factors were from the perspective of function and activity avoidance; the underlying thoughts, beliefs, emotional responses, and behaviors were not consistently investigated. When patients expressed concerns of this nature, PTs would not follow-up on these concerns. Therapists asked closed-ended questions that directed the evaluation towards the therapists' biomechanical expertise. Therapists questioned whether assessing for and then treating psychosocial stressors was within their scope of practice. Finally, psychological-cognitive factors were not adequately addressed, despite evidence asserting that pain cognitions influenced pain-related outcomes more significantly than other psychosocial factors.

Factors that Influence Psychosocial History-Taking Practices of PTs

Across the studies reviewed, PTs reported that a number of obstacles prevented them from addressing psychosocial factors during the initial evaluation. Therapists reported that they lacked the time and training to adequately assess for these factors (Synnott et al., 2015). Consistently, therapist stated that evaluation time was limited, and that they struggled to address the biomechanical contributions to pain, let alone psychosocial factors. When issues arose, the PTs reported discomfort addressing matters of such a personal nature with the patients and feared losing control of the evaluation sessions and working outside of their scope of practice. Finally,

therapists reported that they used a “gut feeling” to decide whether a person’s CP experience was significantly influenced by psychosocial factors. The therapists did not employ a standardized approach to screening for psychosocial involvement, which was a barrier to adequately identifying and then addressing these factors.

The obstacles described in the aforementioned studies are thought to be reflective of underlying attitudes and beliefs held by the PTs about the relevance psychosocial factors have in the perpetuation of CP when compared to biomechanical contributors (Gardner et al., 2017). Providers’ pain attitudes and beliefs have been demonstrated to influence the approach providers take when managing persons with CP (Ostelo, Stomp-van, Vlaeyen, Wolters, & de Vet, 2003). In this section, the influence PTs’ pain attitudes and beliefs have on history-taking and the PTs’ subsequent treatment approach will be briefly reviewed. Additionally, the Pain Attitudes and Beliefs Scale-Physical Therapist (PABS-PT), a scale that measures the BPS and biomedical orientation of PTs was used in the dissertation study and discussed.

Pain Attitudes and Beliefs Scale-Physical Therapists

A PTs’ attitudes and beliefs about pain have been demonstrated to influence the self-reported and actual clinical practices of providers (Gardner et al., 2017; Ostelo et al., 2003). The theory of planned behavior states that behavior is influenced by the attitudes and beliefs a person has about the likelihood that the behavior will result in the desired outcome (Gardner et al., 2017). According to this theory, clinicians will engage in a treatment approach if they believe that: 1) the approach will lead to the desired outcome; 2) other clinicians whose opinions they value think that they should participate in the behavior; and 3) they have the resources necessary to carry out the treatment approach successfully. In spite of clinical practice guidelines such as the *Guide to Physical Therapist Practice 3.0*, and the IASP entry-level DPT pain competency guidelines that recommend the use of the BPS model, PTs have been slow to incorporate this

model into practice (Emilson, Åsenlöf et al., 2016; Gardner et al., 2017; Oostendorp et al., 2015; Singla et al., 2015; Wijma et al., 2016).

In spite of international educational campaigns designed to broaden PTs' understanding of pain, therapists' practice behaviors continue to reflect a treatment paradigm grounded in biomechanical/biomedical model of pain (Gardner et al., 2017). In an effort to understand the gap that exists between the guideline recommending the use of the BPS model and the current state of practice, researchers are examining factors that facilitate behavioral practice changes within clinicians. The literature supports that providers' attitudes and beliefs about pain can promote or prevent them from adopting treatment approaches such as the BPS (Eland, Kvale, Ostelo, De Vet, & Strand, 2019; Gardner et al., 2017; Nijs et al., 2013; Ostelo et al., 2003). Researchers hypothesize that clinicians pay selective attention to information that confirms their knowledge and beliefs and tend to pay less attention to material that they do not understand or that is inconsistent with the providers' belief systems (Petit, Begue, Richard, & Roquelaure, 2019).

Ostelo et al. (2003) devised an inventory to assess the treatment orientation of PTs in the Netherlands who treat low back pain. Using principal factor analysis, researchers identified two factors upon which a list of attitude and belief statements about low back pain loaded. A high score on Factor 1 was consistent with a biomedical orientation. The statements that were indicative of a biomedical orientation included prompts such as: "increased pain indicates new tissue damage or the spread of existing damage" and the "severity of tissue damage determines the level of pain" (Ostelo et al., 2003, p. 218). A high score on Factor 2 indicated a behavioral orientation, which is consistent with a BPS approach. The terms behavioral and BPS are used interchangeably in the literature when describing the treatment orientation associated with a high Factor 2 score. The statements that aligned with a high score on this factor included "mental stress can cause back pain even in the absence of tissue damage" and "the cause of back pain is

unknown” (Ostelo et al., 2003, p. 218). Each statement was scored on a 6-point Likert scale (1 = *totally disagree* and 6 = *totally agree*). The original inventory Factor 1 was comprised of 14 items and Factor-2 was comprised of 6 items and explained 25.2% and 8.2% of the variance in treatment orientation, respectively. In 2005 Houben et al., using principal factor analysis, shortened the inventory to 19 questions, of which 10 indicated a biomedical orientation and nine indicated a BPS orientation.

Bishop, Thomas, and Foster (2007) explored the association between treatment orientation, as measured by the PABS-PT, and the reported clinical behavior of PTs and general practitioners in the United Kingdom. After completing the PABS-PT, the 1042 participants were presented with a clinical vignette of a patient with non-specific low back pain. The clinicians were asked to provide their recommendations regarding return to work, physical activity level and the use of bedrest. Delayed return to work advice was significantly associated with a high score on Factor 1 (biomedical orientation) of the PABS-PT, at $F_{(1,986)} = 77.5, p < 0.0001$; and a lower score on BPS Factor 2 was significantly related to advice to not to return to work, at $F_{(1,981)} = 31.9, p < 0.001$. Providers with a stronger biomedical orientation were more likely to advise that patients with low back pain to wait longer before returning to work. This is in contrast to providers with a stronger behavioral/BPS orientation who were more likely to recommend that patients return to work regardless of the pain.

In a systematic review of the quantitative and qualitative literature, Gardner et al. (2017) investigated whether the attitudes and beliefs of providers that treat chronic low back pain influenced their clinical management of these patients. They concluded that higher biomedical orientation scores on the PABS-PT were associated with the advice to delay return to work (correlation coefficients ranged from $r = 0.21$ to 0.28). PABS-PT scores were predictive of work and activity recommendations (biomedical and BPS orientation explained 28% and 23%, of

variance in work recommendations, respectively). Finally, PABS-PT BPS scores were significant predictors of treatment recommendations, explaining 15.8% of the variance in treatment recommendations. In a review of the qualitative literature, the overarching themes that emerged were consistent with the obstacles identified in the previously reviewed studies on the BPS history-taking practices of PTs. PTs approached chronic low back pain from a biomedical perspective and reported that addressing psychosocial factors were outside of their scope. PTs believed they were inadequately prepared to effectively manage psychological factors; therefore, they did not routinely assess for the factors. The findings support the influence pain beliefs and attitudes have on the practice patterns of PTs treating patients with CP and validate the use of the PABS-PT to measure treatment orientation and to a lesser extent practice patterns of PTs.

Mutsaers et al. (2012) in their systematic review of the literature examined the reliability and validity of the 19-item PABS-PT. Test-retest reliability was determined to be good, with an intraclass correlation coefficient (ICC) of 0.81 for Factor 1, and 0.65 for Factor 2. (ICC = 0.84). The internal consistency of Factor 1 ranged from a Cronbach's alpha of 0.77 to 0.84 and 0.62 to 0.68 for Factor 2. Validity of the scale was considered positive, with the majority of studies demonstrating at least fair construct validity of both factors. The PABS-PT was strongly correlated with the Tampa Scale of Kinesiophobia for healthcare providers ($r = 0.79, p < 0.001$); however, the correlation between the PABS-PT and Health Care Providers' Pain and Impairment Relationship Scale (HC-Pairs) was weak ($r = 0.34, p < 0.05$). The HC-Pairs is a scale that measures the relationship between providers' beliefs about pain and impairment (Houben et al., 2004). The general consensus is that Factor 1 is the most responsive and stable of the two factors and that the BPS scale (Factor 2) remains in the development phase (Alessandro et al., 2018; Macdonald, Vaucher, & Esteves, 2018; Mutsaers, Peters, Pool-Goudzwaard, Koes, & Verhagen, 2012).

A challenge facing researchers when analyzing the PABS-PT is the limited spread in scores and small mean group differences on the biomedical and BPS factors (Eland et al., 2019; Houben et al., 2005). Eland et al. (2019) recognized the lack of variance in scores, which contributed to their finding that the PABS-PT lacked discriminative validity to differentiate between groups of PTs hypothesized to differ in their treatment orientation. Groups were created based on specialization, self-reported clinical approach, and demographic and professional factors that included but were not limited to age, years of experience, gender, and work setting. To address the lack of spread in the scores among PTs, Eland et al. (2019) combined Factor 1 and 2 scores to create a global treatment orientation score that improved the discriminative validity of the PABS-PT.

Researchers have used the PABS-PT scale to assess chronic neck and musculoskeletal pain (Alessandro et al., 2018; Mutsaers et al., 2014). Mutsaers et al. (2014) adapted PABS-PT to individuals with chronic neck pain by changing back pain to neck pain in the survey. Construct validity was determined by correlating the summed scores of Factor 1 (biomedical) with HC-Pairs. The adapted PABS-PT demonstrated moderate correlation with the HC-Pairs, ($r = 0.55, p \leq 0.05$), suggesting it was a valid measure of the biomedical orientation of providers when treating neck pain. Additionally, test-retest reliability was considered satisfactory, with an ICC = 0.73 for Factor 1 and 0.82 for Factor 2. Alessandro et al. (2018) validated an amended version of Factor 1 (biomedical scale) of the PABS-PT to assess healthcare providers' attitudes and beliefs about musculoskeletal pain in general. Items containing the phrase "back pain" were modified to read "musculoskeletal pain." Two cross-sectional samples of health care professionals participated in the study. The first group completed the PABS-PT low back version ($n = 1016$) and the second group ($n = 958$) completed the amended survey. The results were similar in the two samples. Researchers concluded that Factor 1 of the amended scale was unidimensional. The amended

biomedical scale displayed adequate psychometric performance for use across healthcare disciplines to assess providers' biomedical orientation towards musculoskeletal pain (Alessandro et al., 2018).

The survey has also been used to evaluate treatment orientation of healthcare providers for post-education intervention changes in attitudes about pain and general attitudes about CP within the chiropractic and osteopathic communities (Lady, Haas, Takagi, & Takaki, 2018; Macdonald et al., 2018). A study investigating the general treatment orientation of chiropractors in the United States used the PABS-PT as a measurement tool (Lady et al., 2018). When completing the scale, providers were asked to consider individuals with CP, in spite of the 12 items on the PABS-PT that explicitly asked about "back pain." MacDonald et al. (2018) utilized the HC-Pairs and PABS-PT scales for low back pain to investigate the attitudes and beliefs about CP held by osteopathic providers in the UK. The findings of these studies highlight the diverse use of the PABS-PT among researchers when examining attitudes and beliefs of providers.

Demographic Characteristics and Treatment Orientation

Studies that examined the relationship between demographic and professional characteristics of PTs and treatment orientations have yielded inconsistent results (Eland et al., 2019). The focus of this discussion will be on factors that will be considered when analyzing the results of the survey of psychosocial history-taking practices of PTs and the decision-making practices of PTs that evaluate the psychological-cognitive contributors to pain. These include work setting, years of experience, continuing education, age, and gender.

Work setting. Ostelo et al. (2003) found that PTs working in a private outpatient clinic scored higher on the biomedical factor and therapists working in a rehabilitation setting scored higher on the BPS factor. Petit et al. (2018) found that among French PTs, the largest difference in mean scores on the PABS-PT were between PTs practicing in a care network that specialized

in the management of pain and PTs practicing in one discipline PT practices; the care network PTs had a lower biomedical score ($p = 0.0097$) and higher BPS score ($p = 0.0042$). However, Hendrick et al. (2012), in their study on PTs in New Zealand, found no predictive relationship between work setting and treatment orientation (PABS-PT score). Further research is needed to examine the impact work setting has on treatment orientation.

Age and years of experience. Ostelo et al. (2003) found that PTs over the age of 42 had a higher biomedical score than PTs under 42. Petit et al. (2018) found that French PTs over the age of 40 had a significantly higher biomedical score than those under the age of 40 ($p = 0.005$); however, the mean BPS score was not significantly different between the two age groups. Other studies have found no relationship between age and treatment orientation (Eland et al., 2019; Hendrick, Mani, Bishop, Milosavljevic, & Schneiders, 2012).

In regard to length of practice, Petit et al. (2018) found that biomedical scores were significantly different based on length of practice (greater than or equal to 20 years, and less than 20 years). The group that practiced more than 20 years had a statistically significant higher biomedical score ($p = 0.001$); however, the scores on the BPS factor were not significantly different ($p = 0.09$). Conversely, Eland et al. (2019) and Hendrick et al. (2012) found no relationship between years of experience and treatment orientation.

Gender. The findings on the influence gender has on treatment orientation are inconsistent. Petit et al. (2018) found no significant differences in treatment orientation based on gender ($p = 0.31$). In contrast, Ostelo et al. (2003) found women scored statistically higher on the BPS factor ($p = 0.007$); however, the between gender differences in mean biomedical scores was not significantly different.

Pain science education. PTs with postgraduate training in the pain sciences had significantly higher BPS scores and lower biomedical factor scores (Petit et al., 2019).

Conversely, PTs with extensive continuing education in somatic-based, biomechanical continuing education courses (e.g., manual therapy, McKenzie) had significantly higher biomedical scores (Ostelo et al., 2003). Researchers have demonstrated changes in a provider's attitudes and beliefs after pain education programs (Beneciuk & George, 2015); however, there is a paucity of research investigating whether actual practice patterns change after the completion of BPS and/or pain science education courses.

Clinical Reasoning and Decision-Making During the Evaluation

In what researchers concluded was an effort on the part of PTs to redirect discussion towards PTs' area of expertise and perceived scope of practice, researchers noted that PTs, through their line of questioning, directed patients away from emotional and personal matters and towards somatic and biomechanical factors during the history-taking portion of the evaluation. Additionally, PTs reported using a "gut sense" to determine whether patients' pain conditions were impacted by psychosocial factors. Because PTs feared losing control of sessions, PTs made the decision to use primarily closed-ended questions. These observed behaviors are representative of not only the PTs' attitudes and beliefs, but also the clinical reasoning and decision-making strategies employed by them.

In an effort to better understand the decisions PTs make when formulating the questions they ask patients at their first visits, it is important to examine the clinical reasoning and decision-making processes PTs use when assessing adults with CP. The focus of this review is centered on the clinical reasoning practices and decision-making methods utilized by outpatient orthopedic PTs, as this is the population being investigated in Study Three of this dissertation. In order to provide a framework for the discussion, a brief overview of the philosophical constructs that the reasoning methods have evolved from is provided. Additionally, the most commonly used

reasoning and decision-making processes is described. Finally, factors that influence clinical reasoning are outlined.

Clinical Reasoning and Decision-Making

Clinical reasoning is a professional practice-based, context dependent method of decision-making. It is predicated upon a professional, scientific body of knowledge that prepares providers to recognize a general cluster of signs and symptoms that are associated with specific conditions (Edwards, Jones, Carr, Braunmack-Mayer, & Jensen, 2004). Providers interpret patients' findings using the professional knowledge base acquired through formal education and past patient encounters. It is through reasoning that clinicians synthesize and prioritize the data gathered about patients. This ordered list of impairments is what the PT uses to establish a diagnosis and develop the plan of care that will best address patients' movement-based disorders (Smith, Higgs, & Ellis, 2008).

Researchers use clinical reasoning and clinical decision making synonymously. Higgs et al. (2018) suggested that

Clinical reasoning (or practice decision making) is a context-dependent way of thinking and decision making in professional practice to guide practice actions. It involves the construction of narratives to make sense of the multiple factors and interests pertaining to the current reasoning task. It occurs within a set of problem spaces informed by the practitioner's unique frames of reference, workplace context and practice models, as well as by the patient's or client's contexts. It utilizes core dimensions of practice knowledge, reasoning and metacognition and draws on these capacities in others. Decision making within clinical reasoning occurs at micro, macro and meta levels and may be individually or collaboratively conducted. It involves meta skills of critical

conversations, knowledge generation, practice model authenticity and reflexivity (Higgs, Jensen, Loftus, & Christensen, 2018, loc. 943).

The reasoning strategies are grounded in a larger framework of human decision-making proposed by Daniel Kahneman, a Nobel Laureate and cognitive psychologist, on decision-making and judgement formation (Rivett & Jones, 2018). Kahneman, in his work investigating human decision-making, proposed that there are two general forms of thinking: System 1, automatic or fast thinking that relies upon first impressions (pattern recognition); and System 2, or slow analytical deliberation that require more time and effort. According to Kahneman, judgements reached using fast thinking often go unquestioned; the conclusion reached is incorporated into the person's belief system and drives a person to act. It is not until there is a discrepancy between the judgement reached using fast thinking and, in a clinical setting, the contradictory findings of an objective examination, that slow analytical thinking is employed.

While there are a number of clinical reasoning models, the general consensus among researchers is that PTs predominately utilize hypothetic-deductive, pattern recognition, and narrative reasoning when making clinical decisions (Edwards et al., 2004; Edwards, Jones, & Hillier, 2006; Smith et al., 2008). Theoretically, each method of reasoning is a distinct process; however, in practice PTs employ an integrative dialectic approach that incorporates aspects of each of the reasoning methods (Edwards et al., 2004; Huhn, Gilliland, Black, Wainwright, & Christensen, 2018). When assessing somatic complaints with the objective of establishing a diagnosis, research has shown that PTs utilize hypothetic-deductive and pattern recognition reasoning (Edwards et al., 2004). Whereas, when inquiring about issues of a personal nature and engaging in shared decision-making, PTs shift into narrative reasoning (Ajjawi & Higgs, 2012; Huhn, Gilliland, Black, Wainwright, & Christensen, 2018).

The cognitively oriented hypothetic-deductive and pattern recognition processes are based on the empirico-analytical research paradigm (Jones & Rivett, 2018). The empirico-analytical paradigm is predicated on the thought that reality is measurable and objective. Knowledge about reality is gained through experience, observing and experimenting, as opposed to revelation and/or inductive reasoning. Hypotheses are formed based on the observations and data. These hypotheses are then tested and revised based on the results of the testing. In medicine, the hypothetic-deductive model is most widely used by clinicians when working to establish a diagnosis during the assessment phase and by novice practitioners as they build mental patient data bases for future use (Smart & Doody, 2007; Wainwright, Shepard, Harman, & Stephens, 2011). Observations and information gathered by the provider during the history-taking portion of the first visit lead to the formation of preliminary hypotheses. These tentative hypotheses guide the evaluation process; the hypotheses are analyzed through testing and further questioning. As additional information is gathered, the hypotheses are fine-tuned until the PT arrives at a movement-based diagnosis. This method of reasoning has also been referred to as a backward reasoning (Edwards et al., 2004).

Pattern recognition, a reasoning method based in the empirico-analytical research tradition, is a faster method of reasoning used most often by experienced providers (Edwards et al., 2004; Huhn et al., 2018). Based on the PT's memory and experience, the PT instantly recognizes clusters of signs and symptoms, referred to as "illness scripts," that guide the PT through the evaluation process (Edwards et al., 2004; Huhn et al., 2018; Rivett & Jones, 2018). Questions and diagnostic tests are selected based on symptom clusters. Fewer tests and questions are needed as the therapist hones in on a shorter list of possible diagnoses that match patients' illness scripts. While experienced therapists utilize these faster reasoning skills, all providers

typically move between the hypothetic-deductive and pattern recognition methods of reasoning when arriving at a diagnosis (Edwards et al., 2004; Rivett & Jones, 2018).

In contrast to the empirico-analytical research paradigm is the interpretive research approach, which is the theoretical basis for narrative reasoning (Edwards et al., 2004; Huhn et al., 2018). An interpretative research approach is an inductive, context-dependent paradigm. It is based on the assumption that social reality is not objective, but instead shaped by context. Social reality is pluralistic, meaning it is derived by each person involved in the interaction. In order to understand the meaning, researchers embed themselves to experience the situation firsthand. It is this ground-level view that provides the researcher insight into a person's lived experience. The phenomenon is then interpreted using a collaborative "sense-making" process (Edwards et al., 2004; Edwards, Jones, Thacker, & Swisher, 2014). Through extensive observation and interaction with the subject, the researcher develops a sense of what the situation means to the subject. According to Edwards et al. (2004) and Edwards et al. (2014), narrative reasoning is derived from the interpretive research tradition and its aim is to understand a patient's perspective and story as it pertains to his/her pain experience. Within pain stories, patients' interpretation of their pain experience is shared with the therapist. The manner in which patients choose to structure stories, the language they use to describe their experience, the points that they choose to emphasize, and the elements that they opt not to share, all provide therapists with insight into the impact pain has on them as a "whole" person. The therapist strives to know the unique lived experience of patients; to understand how patients' limitations impact them in all aspects of their lives, the beliefs they hold about themselves as a person in pain, and the feelings they experience as they move through life with pain. Through the patient's story, the PT is temporarily "embedded" into the patient's experience with pain. Contrary to hypothetic-deductive and pattern recognition

reasoning, the PT's interpretation of the patient's experience is not validated with testing, but instead confirmed through communication until consensus between the PT and patient is reached.

Additional reasoning models used by PTs have been outlined by Edwards et al. (2004) and Rivett and Jones (2018). These include 1) *reasoning about procedure*, 2) *interactive reasoning*, 3) *collaborative reasoning*, 3) *reasoning about teaching*, 4) *predictive reasoning*, and 5) *ethical reasoning*. The focus of this discussion is on the reasoning methods that would influence a PT's decision, during the history-taking portion of the evaluation, to investigate the pain perceptions and beliefs patients hold about their pain condition. To this end, a brief description will be provided on each of these reasoning strategies, as the PT might employ these strategies when deciding whether to pursue a line of questioning about a patient's beliefs. However, an exhaustive review of the strategies is beyond the scope of this paper.

Edwards et al. (2004) and Rivett and Jones (2018) described *reasoning about a procedure* as the cognitive process PTs follow when deciding which treatments to implement and how to progress the treatments. *Interactive reasoning* is the reasoning used to guide the development of a therapeutic relationship and rapport with a patient. *Collaborative reasoning* is the type of reasoning PTs utilize when participating in shared decision-making about the goals of care, the type of treatment to be used, and the progression or cessation of care. Additionally, it refers to the reasoning strategy used when reasoning as part of a multidisciplinary team. *Reasoning about teaching* pertains to the reasoning affiliated with the development and implementation of individualized strategies designed to foster independent management of pain conditions or to change thoughts, beliefs or faulty pain behaviors. When making a judgement about prognosis of a specific intervention or patients' responses to PT, the therapist is participating in *predictive reasoning*. Finally, *ethical reasoning* is the strategy therapists use when confronted with a moral or ethical dilemma.

As the years of experience and levels of expertise increase, PTs seamlessly shift between the reasoning processes described above. Edwards et al. (2004) and Huhn et al. (2018) described this fluid movement as dialectical or integrative reasoning. When PTs synthesize and interpret patients' signs and symptoms to establish a diagnosis, cognitive-oriented, logic-based methods, such as hypothetic deductive and pattern recognition reasoning, are employed. Whereas, narrative reasoning is used to understand the impact the condition has on individuals, and to establish treatment goals and objectives that are consistent with patients (Edwards et al., 2004).

Reasoning Differences Between Novice and Experienced PTs

Given that an effort will be made to recruit PTs with varied experience levels, experience-based variations in clinical reasoning will be examined. Differences between novice and experienced providers in clinical decision-making have been demonstrated (Smart & Doody, 2007; Wainwright et al., 2011). Wainwright et al. (2011) reported that experienced PTs utilized feedforward reasoning (pattern recognition), which resulted in the use of fewer diagnostic tests. Providers used the patients' medical charts to confirm the therapists' working hypotheses. By contrast, novice practitioners relied on medical charts to formulate preliminary hypotheses regarding the manner in which patients would present. Additionally, during the evaluation, the novice practitioner utilized a trial and error method of testing that was rooted in the hypothetico-deductive approach. Expert clinicians integrated their past clinical experiences with their observations of the patients' psychological factors and neuromuscular movement disorders when making clinical decisions. This is in contrast to novice providers who reported feeling unprepared to manage psychoemotional stressors, while also attending to patients' movement-based impairments and deficits.

Smart and Doody (2007) investigated the clinical reasoning processes of experienced musculoskeletal PTs when presented with patients with three different pain patterns, and then

investigated the influence PTs' clinical reasoning about pain had on their decision-making. In this qualitative study, seven experienced PTs watched the videotaped history-taking sessions of three different patients. PTs were asked to verbalize their impressions of patients throughout the videotape, followed by explanations of their reasoning and the decisions they made based on their reasoning. All seven PTs demonstrated extensive biomedically oriented reasoning related to the anatomical and biomechanical source of pain when they generated a diagnostic label. When interpreting the contribution cognitive, emotional, behavioral, and social factors had on the patients' pain presentations, the PTs demonstrated what the researchers referred to as "extensive psychosocial-oriented reasoning." Six of the seven therapists verbalized that their subsequent plan of care would include interventions that considered the psychosocial stressors. Five of the seven used their assessment of the psychosocial stressors when making prognosis-based decision-making. One of seven PTs integrated reasoning related to the patients' chronicity level with the psychosocial and biomechanical factors. Researchers concluded that experienced musculoskeletal PTs demonstrated a dynamic reasoning process, instantaneously shifting between biomedical and psychosocial modes of reasoning. It is important to note that the PTs were not observed delivering care but were asked to describe how they would approach the patient.

Smith et al. (2008) investigated the self-reported key clinical reasoning processes that expert PTs and occupational therapists consider relevant when evaluating patients with shoulder pain. Researchers surmised that clinicians used a predominately hypothetic-deductive and pattern recognition method of reasoning when establishing a diagnosis. Information about the impact the shoulder pain had on the patients' lives was ascertained using narrative and shared reasoning strategies. Through the Delphi method, respondents generated a list of primary, secondary, and tertiary factors they considered important when evaluating patients' shoulder pain. Primary factors PTs considered included identifying general diagnostic categories, recognizing cluster

symptoms related to specific common diagnoses (rotator cuff pathologies, cervical involvement), and the finding of general physical examination (ROM, movement, and resisted testing). Secondary factors were related to specific physical examination tests. Finally, tertiary items included the consideration of less-common diagnoses and highly specific special tests. It is interesting to note that of the 15 items, not one of the items on the final list pertained to psychosocial factors.

Clinical Reasoning in Manual Therapists (Outpatient Orthopedic PTs)

As stated earlier, PTs utilize an integrative dialectic, logic-based method of reasoning during the evaluation of patients. Orthopedic outpatient PTs make clinical decisions utilizing the same strategies (Langridge, Roberts, & Pope, 2015; May, Greasley, Reeve, & Withers, 2008; Smith et al., 2008). In an effort to provide entry-level and residency students with a reasoning framework that will improve their early career decision-making, the focus of a number of the published studies pertain to understanding the reasoning strategies utilized by expert clinicians (Smart & Doody, 2007; M. Smith et al., 2008; Yeung, Woods, Dubrowski, Hodges, & Carnahan, 2015). Yueng et al. (2015) proposed developing international clinical reasoning assessment guidelines for candidates seeking post-graduate certification in outpatient manual therapy; however, few items related to psychosocial stressors. Using the Delphi method, four subgroupings of reasoning/clinical decision-making were identified as being most important to outpatient manual therapists: 1) data gathering/hypothesis generation, 2) self-reflection when managing patients (use of reflective thinking and metacognition), 3) critical use of knowledge about special tests and effective screening, and 4) critical and creative use of knowledge of orthopedic manual physical therapy. While five of the 80 assessment criteria identified by experts as “important” related directly to psychosocial contributions to pain, the categories identified as “most important” did not.

Additionally, studies examined the reasoning methods used by PTs when evaluating commonly treated orthopedic diagnoses. The focus was on PTs' reasoning methods during the differential diagnosis process, and the emphasis was on identifying the questions and special tests that ensured an accurate diagnosis (Baker et al., 2017; Hahn et al., 2014; Langridge et al., 2015; Maissan et al., 2018). Psychosocial factors were not mentioned or were viewed as "other contributory factors." In a case study on the use of Systematic Clinical Reasoning in Physical Therapy (SCRIPT) tool in orthopedic physical therapy, Bakers et al. stated that psychosocial issues should be considered and ruled out; however, these factors "should not be overly weighted in the differential diagnosis process" (Baker et al., 2017, p. 64). It is interesting to note that primary method of reasoning in these studies were the biomedical hypothetic-deductive and pattern recognition strategies. No mention was made of narrative reasoning strategies. No studies were identified that investigated the clinical reasoning strategies used by outpatient orthopedic PTs when evaluating patients' pain perceptions and beliefs.

It is important to note that physical therapy's definition and understanding of clinical reasoning is evolving. In a concept analysis study on clinical reasoning in physical therapy, Huhn et al. (2018) concluded that substantial work is needed in physical therapy to develop a unified understanding of clinical reasoning that also incorporates the role of movement. After analyzing existing studies, primary patterns and themes of reasoning were identified. Based on the concept analysis, researchers proposed that clinical reasoning in PT integrated cognitive, psychomotor skills, and affective skills. The cognitive sphere includes hypothetico-deductive and pattern recognition and it is influenced by the reflective and metacognitive practices of PTs. Psychomotor reasoning, a less developed strategy, recognizes that PTs often base early decisions on the observations they make of their patients in motion. Also, this strategy considers the decisions made when PTs use touch to assess patients. Affective reasoning skills related to the

emotional intelligence of a provider and the provider's interpretation of the patient's psychoemotional sphere.

Factors influencing clinical reasoning. A number of factors influence a PT's adeptness at clinical reasoning. According to Rivett and Jones (2018), those include: 1) critical thinking skills, 2) metacognitive awareness, 3) knowledge organization, 4) data collection and procedural skills, and 5) patient-clinician therapeutic alliance. Because these factors could influence the decision-making processes utilized by outpatient therapists when assessing patients' pain beliefs that are participating in Study Three, a brief discussion of each of these factors will be provided.

According to Higgs et al. (2018), critical thinking is the "healthy dose of skepticism" that promotes active questioning to ensure that the information gathered is accurate, complete, and relevant. Given that human thinking is largely influenced by fast thinking and that people have a tendency to attend to and collect data that confirms early assumptions (confirmation bias), it is essential that providers examine their assumptions (Higgs et al., 2018; Rivett & Jones, 2018). Sound clinical decisions must be based on the unbiased gathering and analysis of information; therefore, the quality of clinical decisions is grounded in the provider's ability to think critically.

In order to effectively reason, expert clinicians utilize reflective practices to determine whether their assumptions about patients, their working knowledge base, and the decisions they make, enable them to deliver the best possible care to their patients. Metacognition is the internal process that facilitates critical appraisal of one's thoughts, actions, performance, and knowledge (Huhn et al., 2018; Rivett & Jones, 2018). Using metacognition, clinicians expand their clinical reasoning skills by integrating new concepts into their existing knowledge base. Reasoning skills are enhanced when the provider reflects in and on action (Huhn et al., 2018). When a provider considers a patient's immediate response to a test and then in that moment alters the action he/she takes, the therapist is reflecting in action. Reflecting back on a treatment session to review

decisions made is reflection-on-action. A provider's metacognitive awareness directly influences the quality of decision-making and subsequent delivery of care, as changes cannot be made by the provider if he/she does not first recognize that knowledge deficits or errors in reasoning exist.

The manner in which a clinician organizes their knowledge influences clinical reasoning (Huhn et al., 2018; Rivett & Jones, 2018). Rivett and Jones (2018) and Higgs et al. (2018) distinguish between *propositional* (knowing that) and *non-propositional* (knowing how) knowledge. *Propositional knowledge* is acquired through education and research. *Non-propositional* knowledge is gained through clinical experience and can be further broken down into *craft knowledge* and *personal knowledge*. *Craft knowledge* includes profession specific information that is developed and better understood through clinical practice. An example would be applying the knowledge of biomechanics, anatomy, and histology when teaching patients therapeutic exercises. *Personal knowledge*, gained through life experience and shaped by social and cultural norms, forms one's perceptions, beliefs, and attitudes. The manner in which providers access and then apply their *propositional* and *non-propositional knowledge* to specific patient cases directs the decisions the clinicians then make. In order to effectively serve the needs of all patient populations, providers should continually examine how they integrate *personal knowledge* with *propositional knowledge* to ensure that the decisions that they make are not inadvertently biased (Higgs et al., 2018).

The information collected about a patient is dependent upon the PTs' data collection and procedural skills (Higgs et al., 2018; Rivett & Jones, 2018). Clinical reasoning that is based on data that was incorrectly collected will introduce error into the decision-making process. The scoring and subsequent interpretation of a psychosocial standardized inventory is an example of a procedural skill. When investigating potential psychosocial stressors in patients with CP, possessing conversational skills to go beyond patients' superficial accounts of their pain thoughts

and beliefs is essential to establishing a comprehensive understanding of patients' pain experience. The ability to effectively and directly ask for clarification of meaning is critical to accurately interpret a patient's lived experience of pain. Without strong data collection and procedural skills, the quality of information gathered will adversely affect the reasoning and clinical decision-making process.

Finally, the quality of the therapeutic alliance between patient and provider influences the patient's willingness to disclose personal and important information to the provider (Ferreira et al., 2013; Rivett & Jones, 2018). The clinician's questions, non-verbal mannerisms, response to patient's concerns, and level of empathy influence the patient's perception of the provider's level of concern and ultimately impact the rapport the patient and provider share (Higgs et al., 2018). Emotional intelligence, the ability to accurately perceive others' feelings and express emotions, enables a provider to better understand the influence pain has on a patient. The emotional intelligence of a provider influences the judgements that they make about a patient and the manner in which they communicate with patients. Effective communication and judgements are formed when the provider has high emotional intelligence that fosters the therapeutic alliance. Ferreira et al. (2016) found that a strong therapeutic alliance significantly predicted pain-related outcomes in patients with chronic low back pain, highlighting the importance of a positive rapport.

Finally, the patient-therapist therapeutic alliance is governed not only by ethical codes of practice—autonomy, non-maleficence, beneficence, and justice— but also an ethical responsibility to understand a person's lived experience of pain (Edwards et al., 2014). To this end, a person with pain has the right to reason and choose the direction of their care (Edwards et al., 2014; Rivett & Jones, 2018). Edwards et al. (2014) argued that “it is insufficient to provide health care without additional efforts to expand individuals' agency, including their ability to

engage with and navigate the health system and their environment” (p. 373). Ethical clinical decision-making recognizes an individual’s inherent right to direct her/his own care, to be actively involved in a shared decision-making process, and to have his/her lived pain experience recognized and understood by the healthcare community.

Conclusion

In the United States, CP afflicts 11.2 to 43.9% of the adult population and costs between \$560 and \$635 billion dollars annually (Gaskin & Richard, 2012; Institute of Medicine, 2011). CP is multidimensional in nature and is defined by the WHO as pain that lasts or recurs for longer than three months (World Health Organization, 2019). As of May 2019, CP is classified a separate condition in the ICD-11, with a coding structure that requires providers to evaluate the contribution of psychosocial stressors (Treede et al., 2019; World Health Organization, 2019). Psychosocial stressors include psychological and social factors. The psychological domain is further subdivided into cognitive, emotional, and behavioral factors, each of which is comprised of items that represent distinct, separate constructs that research has demonstrated to perpetuate the pain experience in persons with CP (Wijma et al., 2016).

The complexity of the pain experience requires providers to utilize a model that recognizes the unique impact that biological, psychological, and social factors have on the experience. The BPS model is a holistic, integrative model that is one of four constructs that informs physical therapy practice. The WHO, APTA, and clinical practice guidelines recommend providers implement this approach in the evaluation and treatment of persons with CP (*Guide to Physical Therapists Practice 3.0*, 2014; *International Classification of Functioning, Disability and Health*, 2001). However, little published research investigates how well PTs in the United States have integrated BPS model into their evaluation practice patterns. Research conducted in Europe suggests that PTs have not sufficiently incorporated this approach into practice and that

their evaluations are grounded in a biomedical tradition (Singla et al., 2015). Furthermore, there are no published studies in the United States or Europe on the clinical reasoning PTs utilize when deciding the types of questions to incorporate into the history-taking portion of an evaluation of adults with CP. The three studies that are part of this dissertation project investigated current psychosocial history-taking practices of PTs in the United States and the clinical decision-making PTs utilized when investigating psychological cognitive stressors.

CHAPTER III

THE RELIABILITY AND VALIDITY OF THE PSYCHOSOCIAL HISTORY-TAKING SURVEY

Background

Pain is defined by the IASP as an unpleasant sensory and emotional experience associated with actual or potential tissue damage ...pain is always subjective (IASP, 2018). It is a protective, evolutionary warning signal that motivates an individual to escape a potentially harm-producing stimulus (Institute of Medicine, 2011; Moseley, 2007). In the United States, the total societal cost of CP is estimated to be between \$560 to \$635 billion dollars annually and it is estimated that 11.2% to 43.9% of adults suffer from CP (Nahin, 2015; Tsang et al., 2008).

In 2001, the World Health Organization adopted the *International Classification of Functioning and Disability and Health* (ICF), a classification system that provides a process by which to study the association among health conditions, personal internal factors, and environmental factors on the individual and population health levels. The classification system was based on a BPS model— an integrative, inclusive model proposed by Engel in 1978 that accounts for the biological, psychological, and sociocultural aspects of health, disease, pain conditions, functioning, and disability. The BPS framework is one of four constructs that inform physical therapy practice (*Guide to Physical Therapists Practice 3.0*, 2014). In 2019, the ICD-11 recognized CP as a health condition in its own right; providers that use the ICD-11 will be required to code the level to which psychosocial factors contribute to patients' pain experiences (Treede et al., 2019). The 2011 National Institute of Health report *Relieving Pain In America*

discussed that healthcare workers across all disciplines are often ill-prepared to diagnose, appropriately assess, and treat patients with CP. In response, a primary objective outlined in the *National Pain Strategy* (2016) was to improve pain literacy among healthcare providers of all disciplines, to ensure that individuals with CP are assessed and treated in a comprehensive manner. The assessment of patients, which includes an in depth subjective history aimed at understanding patients' lived experiences of pain and objective physical examinations of pain, lays the foundation for the comprehensive management of individuals with longstanding pain (Wijma et al., 2016).

Studies have investigated the degree to which PTs have integrated a BPS approach into the evaluation of patients with CP; however, the majority of these published studies were conducted in Europe. Few published studies have examined the actual or self-reported psychosocial history-taking practice patterns of PTs in the United States. The European studies have been primarily qualitative in nature. From these studies, consistent themes have emerged on the history-taking practices of European PTs when evaluating persons with CP. While PTs are aware of the multidimensional nature of pain, the general consensus among researchers investigating PTs' assessment of the psychological and social factors is that therapists are not sufficiently exploring the impact these factors have on patients' pain conditions (Emilson et al., 2016; Oostendorp et al., 2015). Studies found that PTs recognize that a BPS model should be used when evaluating CP; however, when questioned, PTs were unable to explain how psychosocial factors contributed to the CP experience (Singla et al., 2015). Numerous researchers reported that the focus of questioning remains grounded in a biomedical tradition, with PTs gravitating towards questions that addressed somatic complaints and mechanical contributors to pain (Gray & Howe, 2013; Sanders et al., 2013; Synnott et al., 2015). PTs consistently questioned whether assessing for and then treating psychosocial stressors was within their scope of practice,

and they reported that they lacked time to explore psychosocial factors in addition to the biomechanical contributors to pain (Emilson, Åsenlöf, Pettersson, Bergman, Sandborgh, Martin, Demmelmaier, et al., 2016; Synnott et al., 2015). To date, no published studies have been conducted that have quantified the current psychosocial history-taking practices of PTs in the United States who evaluate adults with CP.

The attitudes and beliefs providers hold about pain shape their treatment orientation (biomedical or BPS approach), and inform PTs' self-reported and actual clinical practices (Gardner et al., 2017; Houben et al., 2005; Ostelo et al., 2003). Clinicians pay selective attention to information that confirms their knowledge and beliefs and tend to gather less information on issues that they do not understand or that are inconsistent with their belief systems (Gardner et al., 2017; Ostelo et al., 2003). The PABS-PT was developed by Ostelo et al. (2003) and modified by Houben et al. (2005) to measure the treatment orientation of providers based on their attitudes and beliefs about pain. The scale contains two factors— a high score on Factor 1 suggests a stronger biopsychosocial orientation and a high score on Factor 2 indicates a biomedical orientation.

The purpose of this study was to determine if a survey developed by the author to measure psychosocial history-taking practices of PTs who evaluate adults with CP is valid and reliable. The hypotheses were: 1) the survey, as determined by clinical and pain research experts, will represent a comprehensive list of the types of questions PTs could ask about psychosocial factors (face and content validity), 2) respondents will demonstrate consistent and stable responses with repeated testing (good to excellent test-retest reliability), 3) participants will respond in a consistent manner to the items within each psychological subdomain and social domain (good to excellent internal consistency reliability), and 4) that the composite scores on the

psychological/psychosocial survey would be negatively and moderately correlated with Factor 1 and positively and moderately correlated with Factor 2 of the PABS-PT.

Methods

Subjects

PTs practicing within the United States who evaluate adults with CP were eligible for inclusion in this study. Adults with CP are individuals 18-years or older who have had consistent pain for three or more months. All 50 physical therapy state licensing boards were contacted to obtain email addresses of actively licensed PTs. Approximately 30,000 email addresses were obtained. Additionally, all 50 state APTA chapters, the Academy of Acute Care Physical Therapy, and the Academy of Neurologic Physical Therapy were contacted. Snowball sampling was then used. Using a priori G*Power two-tailed analysis at an alpha level of .05, power of .95, and a correlation of 0.5, it was determined that a minimum of 46 subjects were needed to conduct test-retest reliability. A minimum of 10 subjects per item in Section 2 of the survey (35 items) were needed to conduct internal consistency and validity analysis (Morgado, Meireles, Neves, Amaral, & Ferreira, 2018).

Procedure

The study consisted of two phases: 1) development of the survey, and 2) validation and reliability testing of the survey. The development phase of the survey consisted of six phases: 1) extensive review of the literature with the purpose of defining psychological and social constructs from the perspective of the questions a PT might pose during the history-taking session of an evaluation of an adult with CP, 2) development of the survey in collaboration with Texas Woman's University (TWU) faculty with expertise in survey development and pain education, 3) expert review of the survey, 4) modification of the survey based on expert review, 5) expert review of the modified survey, and 6) final minor modifications of the survey.

Phase One: development of the survey. After an extensive review of the literature, a survey was developed to measure the psychosocial history-taking practices of PTs. The development of the survey was influenced by the work of Speck and Rodd (2004), Oostendorp et al. (2015) and Wijma et al. (2016) who used the SCEBS method (Somatic, Cognitive, Emotional, Behavioral, and Social) to categorize somatic and psychosocial factors that a provider could ask about in the history-taking portion of an evaluation of individuals with CP. The list of questions developed by the researcher is a compilation of themes and elements that define the factors that comprise the psychological and social domains. The psychological domain was further subdivided into a cognitive, emotional, and behavioral subdomains. The elements of the psychosocial domains are provided in Table 1. The principal investigator collaborated with two TWU faculty members with expertise in survey development and one with a background in pain science when constructing the initial list of questions. The survey was created in PsychData®.

Face and content validity of the survey were assessed in Phase 3 of survey development utilizing eight PTs with expertise in the pain sciences and clinical practice. The mean years of experience was 16 years, with a standard deviation of 11.5 years (minimum 2 years, maximum 36 years). See Table 2 for the demographic composition of expert reviewers.

Table 1

Elements of Psychosocial Subdomains

Cognitive	Emotion	Behavior	Social
understanding of pain	depression	adaptive pain behaviors	partner/spouse reaction to patient's pain
expectations about the progression of pain and the efficacy of therapeutic interventions	anxiety (future oriented emotional state)	maladaptive pain behaviors	friend and family reaction to patient's pain
perceptions surrounding movements that exacerbate and remediate pain	Fear (emotional response associated with an immediate and identified threat)	sleep patterns	healthcare providers' attitudes towards patient's pain
pain self-efficacy	anger	substance abuse	social engagement/isolation
pain catastrophizing	stress		fulfillment of social roles and functions
pain acceptance			
motivation to make a behavioral change			

Table 2

Expert Reviewer Demographic Composition

Reviewer	Years as PT	Clinical Specialty	Work Setting	Pain Science Education/Research
1	23	OCS	Academic	
2	17	OCS	Academic	x
3	8	OCS	Academic	
4	13	NCS	Academic	
5	5	WCS	Women's health	x
6	25		Acute care	
7	2		Outpatient orthopedics	x
8	36		Academic	x

A survey to assess face and content validity of the psychosocial survey was developed in PsychData® and administered to expert reviewers. The expert PT reviewers were asked to consider the following items when completing the face and content validity survey.

- To indicate the level to which the collection of questions represented the types of questions a PT could ask patients with CP about psychological (cognitions, emotions, and behaviors) and social factors at the first visit, (face validity). Reviewers used a 5-point Likert Scale that ranged from “excellent representation” to “very poor representation.”
- To indicate whether the item was relevant to the stated purpose of the study (yes/no).
- To indicate whether the items on the survey fully defined the respective subdomain/domain (yes/no).
- To indicate whether the item was clear and interpretable to the target population (yes/no).

Revisions to wording were made to the survey if more than one of the eight reviewers identified an issue. Table 3 summarizes the results of the final review of the survey and provides information regarding items that were added and deleted to the survey based on feedback.

Table 3

Final Expert Review Results

Subdomain	Content Validity			Face Validity	Revisions
	Relevant	Clear	Interpretable	Representation	
Cognitive	8/8	8/8	8/8	5/8 “Excellent” 3/8 “Good”	added question on beliefs about pain and rest
Emotional	*8/8	7/8	7/8	5/8 “Excellent” 2/8 “Good” 1/8 “Acceptable”	*Deleted item on feeling safe
Behavioral	8/8	8/8	8/8	4/8 “Excellent” 4/8 “Good”	Questions added on 1)sleep behaviors, 2) adaptive strategies, and 3)substance abuse
Social Domain	8/8	7/8	8/8	5/8 “Excellent” 3/8 “Good”	Question added on ability to fulfill social roles
^a The number of reviewers who indicated yes to the question posed is provided in cells.					

Instrumentation-final survey. Psychosocial history-taking practices of PTs were measured with the final version of the survey. Section One of the survey included the PABS-PT. This survey is a 19-question, 6-point Likert Scale based self-administered instrument developed to measure the strength of the biomedical and biopsychosocial treatment orientation of PTs who treat individuals with low back pain (Ostelo et al., 2003). The phrase “low back pain” was replaced with the word “pain” and respondents were instructed to consider the pain beliefs they have of adults with CP. Using principal factor analysis, researchers identified two factors upon

which a list of attitude and belief statements about low back pain loaded (Ostelo et al., 2003). PABS-PT has been utilized in studies investigating the treatment orientation of providers in broader patient populations to include CP (Macdonald et al., 2018b), chronic neck pain (Mutsaers et al., 2014), and chronic musculoskeletal pain (Alessandro et al., 2018). PABS-PT has been demonstrated to be reliable, with an intraclass correlation coefficient (ICC) of 0.81 for Factor 1 and ICC = 0.84 for Factor 2 (Mutsaers et al., 2012). Predictive and criterion validity of the Scale have been established, however, the discriminative validity of the PABS-PT has not been demonstrated (Eland et al., 2019; Eland, Kvåle, Ostelo, & Strand, 2017; Mutsaers et al., 2012; Mutsaers et al., 2014).

Section Two of the survey was comprised of questions designed to assess the frequency that PTs verbally ask patients questions that assess the psychological and social factors when taking the history of adults with CP. The psychological domain was divided into the cognitive (11 questions), emotional (8 questions), and behavioral (8 questions) subdomains; the social domain included eight questions. The questions were grouped by domain/subdomain and scored on a 5-point Likert scale (I asked ALL patients; I asked MOST patients; I asked SOME patients; I RARELY asked patients; and I NEVER asked patients). Respondents were asked to consider patients with CP that they evaluated in the last three months and to determine how frequently they verbally and directly asked patients about the indicated items when taking the verbal subjective histories. A high score on the survey indicated that the respondent consistently asked questions about psychosocial factors. Section 3 of the survey included demographic questions about the PTs' past educational and work experience.

Phase two- reliability and validity testing of the survey. After Institutional Review Board (IRB) approval was received from TWU-Houston, the link to the online survey was emailed to the 30,000 PTs whose email addresses were obtained from state licensing agencies.

Emails were sent on three separate occasions with at least one week between mailings between the months of July and September of 2019. The contact person for the APTA state chapter sections was sent the IRB approved social media post. Respondents gave informed consent when they advanced past the survey's landing page.

Participants for the test-retest reliability arm of the study were recruited at the end of the survey. Respondents were asked to provide an email address if they were interested in participating in the evaluation of the test-retest reliability of the survey. The respondents who volunteered to participate in the test-retest portion of the study were sent a link to the second survey 4 days after completing the first survey and they were instructed to complete the survey within the next 2-4 days. Test-retest participants were only required to complete Section 1 and Section 2 of the survey. Test-retest surveys were matched by the email addresses provided to ensure the identities were matched for the analysis.

All data was collected on PsychData® and then downloaded into both Excel 16.26 and SPSS 25. Analysis was conducted in both programs.

Data Analysis

Intratester test-retest reliability between time 1 and 2 was explored by calculating Pearson's correlation coefficients for the psychological subdomains, social domain, and psychological and psychosocial composite score. Bland-Altman plots were constructed to visualize the relationship between the survey responses during administrations one and two. Internal consistency and validity were assessed using the data collected from all survey respondents. Internal consistency of the factors for each respective psychological subdomain and social domain were evaluated using Cronbach's alpha. Concurrent validity was evaluated by analyzing the correlation of Factors 1 and 2 of the PABS-PT score with the composite psychological and psychosocial scores using Pearson's correlation coefficient. The principal

investigator assumed that respondents with a weaker biomedical and stronger BPS orientation would score higher on the respective subdomains/domains of the psychosocial survey. The alpha level for all analyses was set at 0.05. Cases were excluded from any analyses if they were missing relevant data.

Results

Test-Retest Reliability

Of the 221 PTs to complete the survey, 92 respondents volunteered to participate in the test-retest portion of the study, and 53% ($n = 49$) of those participants completed the survey twice. The average number of days between time 1 and 2 was 7.8 days (standard deviation [SD]) of 4.0 days). Respondents reported being directly involved in patient care as a licensed PT for an average of 18.64 years with a SD of 13.6 years (1 minimum and 48 maximum number of years). Additionally, 46.9% were APTA members; 25% held an American Board of Physical Therapy Specialization; and 58.3% of respondents had completed at least one course in pain neuroscience and/or the BPS model. Respondents were predominately (45.5%) from Ohio. The remaining respondents were from 11 states to include Arkansas, Florida, Louisiana, Maine, Missouri, North Carolina, South Carolina, Texas, West Virginia, and Wyoming. The demographic characteristics relevant to the analysis of Study Two are in Table 4.

Table 4

Demographic Composition of Respondents Included in Test-Retest Analysis (n = 48^a)

Attribute Variable	Group	N (Percentage)
Age (years)	25-34	19 (39.6)
	35-44	4 (8.4)
	45-54	7 (14.6)
	55-64	12 (25.0)
	65+	5 (10.4)
Gender	Female	39 (81.3)
	Male	8 (16.7)
Years licensed as PT	Less than 5	7 (14.6)
	5-10	14 (29.2)
	11-15	2 (4.2)
	16-20	2 (4.2)
	21-25	4 (8.3)
	26+	18 (37.5)
Work Setting	Outpatient Orthopedics	26 (54.2)
	Outpatient Neurologic	3 (6.3)
	Skilled Nursing	0 (0)
	Acute Care	4 (8.3)
	Academic Institution	3 (6.3)
	Inpatient Rehabilitation (IRF or ARF)	1 (2.1)
	Home Care	11 (22.9)
^a One respondent removed from the test-retest analysis.		

Linear model assumption testing was upheld for the subdomain/domain survey differences between time 1 and time 2, except for the cognitive and emotional subdomain of the psychological domain. The decision was made to remove one outlier case in the cognitive subdomain from analysis. In this case, the cognitive difference score between time 1 and time 2 was 21 points, which was 3.7 standard deviations above the mean and 10 points greater than the next largest difference. Removal of the case improved the normal distribution of the cognitive

difference scores as was indicated by the change in the Kolmogorov-Smirnov statistic from 0.060 to 0.200. Additionally, the Kolmogorov-Smirnov statistic for the emotion subdomain was significant at $p = 0.03$; however, visual inspection of the histogram and P-P plot revealed normal distribution of the data. It was determined that parametric statistical analysis of the emotional subdomain could be conducted.

A Pearson's correlation coefficient was calculated between time 1 and time 2 for each psychological subdomain, social domain, composite psychological score, and composite psychosocial mean score of the 48 respondents. All two-tailed correlations were significant and the association between test periods was strong (see Table 5). Bland-Altman plots were created for each psychological subdomain, the social domain, the composite psychological and psychosocial score, and Factors 1 and 2 of the PABS-PT. The Bland-Altman plots are provided in Figures 1-4. The mean difference, SD, 95% confidence interval (95% CI) of the mean difference, and percentage of difference scores that lie within the 95% CI are provided for each subdomain/domain in Table 5. Greater than 90% of the mean difference values fell within the limits of agreement. Visual inspection of the plots revealed higher time 2 scores when the cognitive mean score was between 15-30; lower time 2 scores when the mean behavioral score was less than 25; and higher time 2 scores when the psychosocial score was greater than 120.

Table 5

Mean and Correlation Coefficient Test-Retest

	Mean difference (SD)	Minimum, Maximum difference	Pearson's coefficient	95% CI mean difference	Percent cases within 95% CI
Cognitive	-0.063 (4.90)	-9, 11	0.81**	(-9.67, 9.54)	93.8%
Emotion	0.229 (3.89)	-11, 9	0.84**	(-7.40, 7.85)	93.8%
Behavior	0.021 (4.02)	-13, 6	0.74**	(-7.86, 7.90)	95.8%
Social	-0.063 (4.77)	-11, 12	.075**	(-9.41, 9.29)	91.7%
Psychological	0.188 (9.73)	-19, 22	0.86**	(-18.89, 19.26)	97.9%
Psychosocial	0.125 (12.31)	-27, 24	0.87 **	(-24.00, 24.25)	95.8%
** $p \leq 0.0005$					

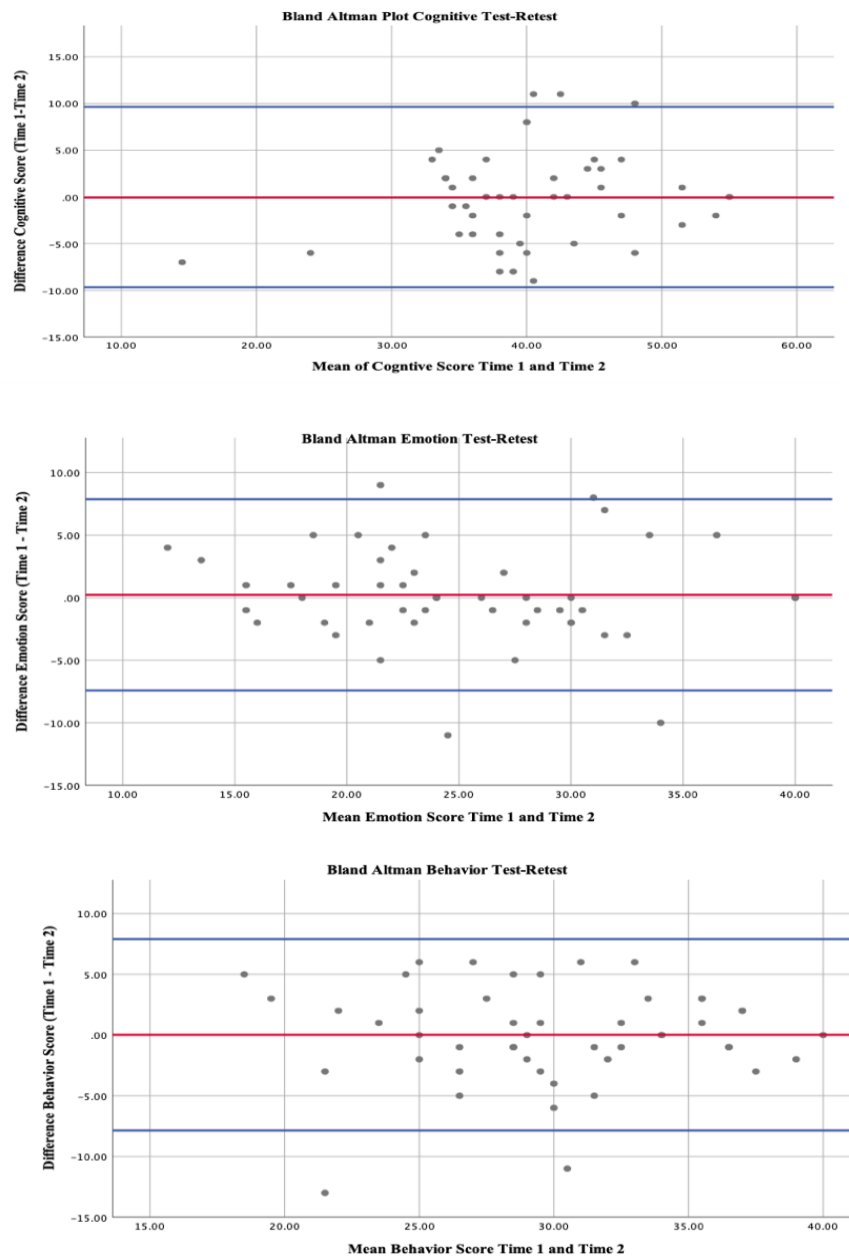


Figure 1. Bland Altman Plots by Psychological Subdomain. The relationship between the difference score between times one and two and the mean scores of times one and two.

- Difference Score
- Mean difference score between times one and two
- Limits of agreement (mean \pm 1.96(SD))

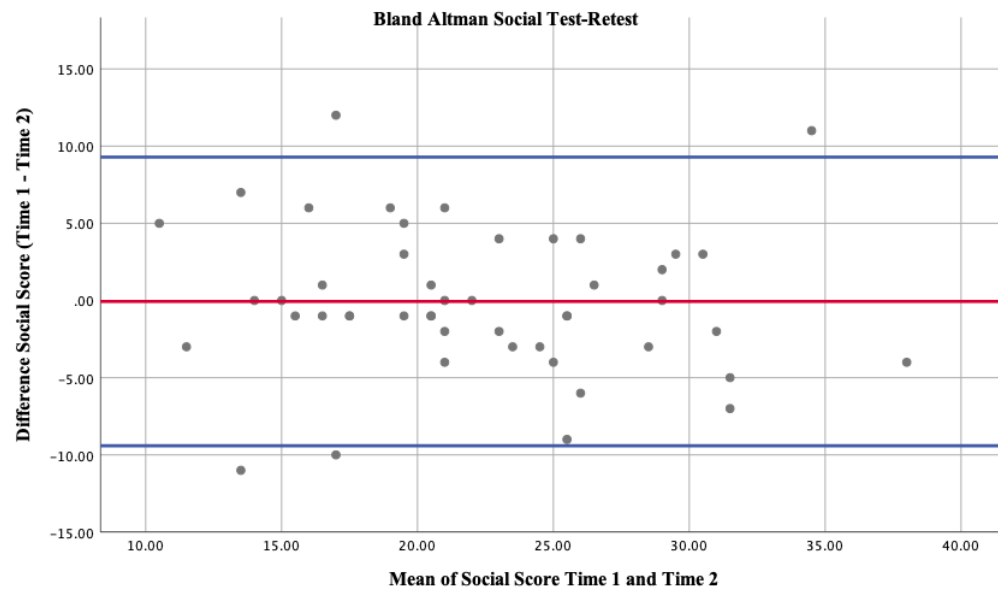
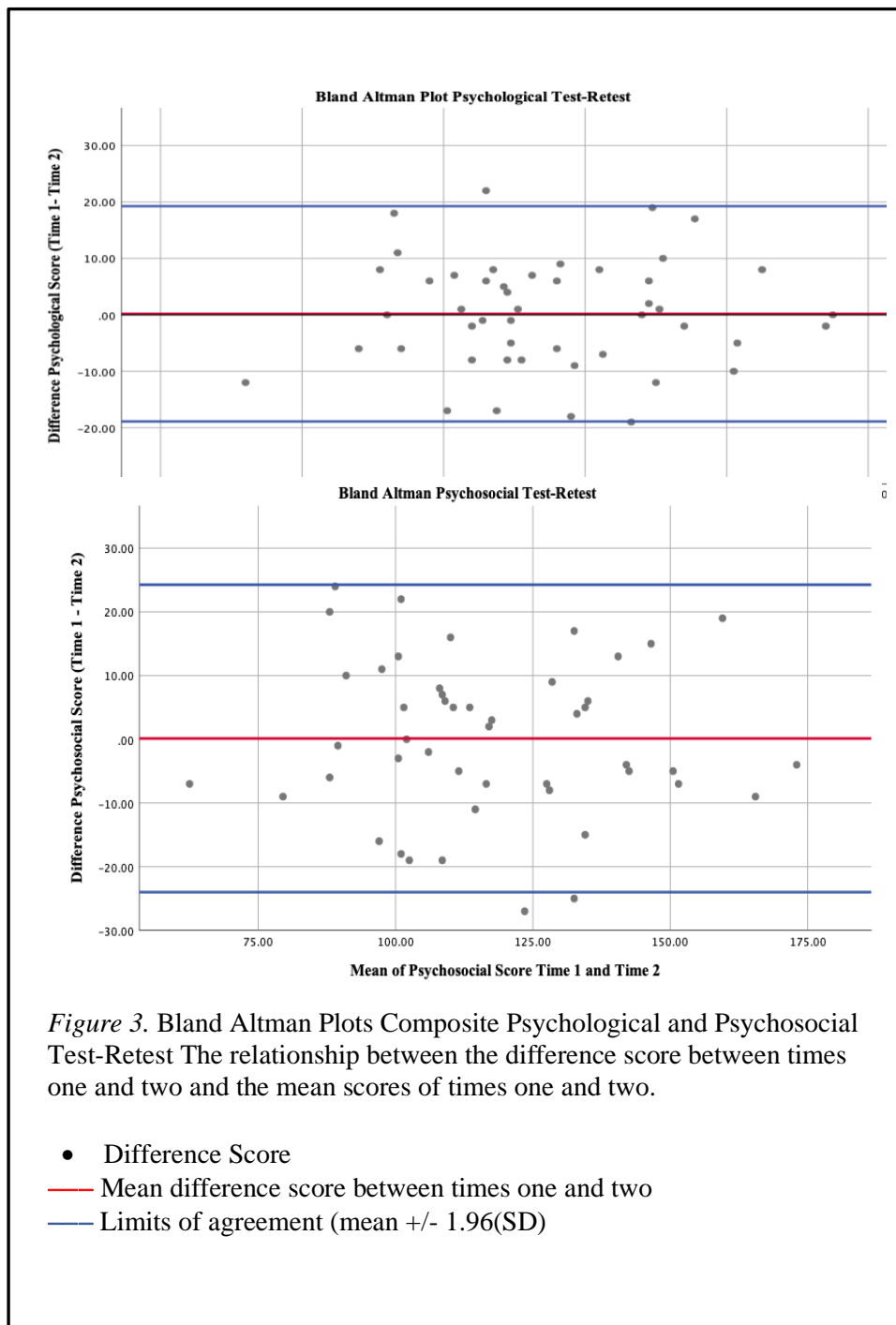


Figure 2. Bland Altman Plot Social Domain. The relationship between the difference score between times one and two and the mean scores of times one and two.

- Difference Score
- Mean difference score between times one and two
- Limits of agreement (mean \pm 1.96(SD))



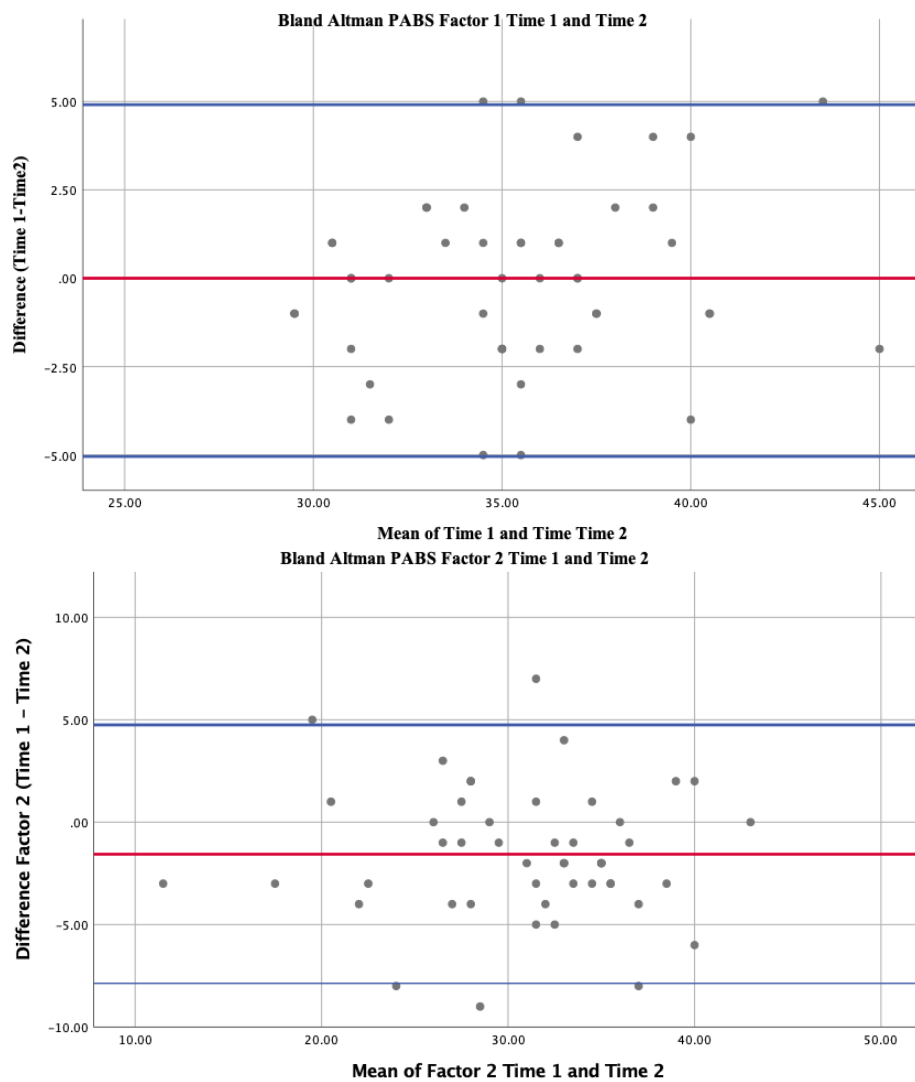


Figure 4. Bland Altman Plots PABS-PT Factors 1 and 2. The relationship between the difference score between times one and two and the mean scores of times one and two.

- Difference Score
- Mean difference score between times one and two
- Limits of agreement (mean \pm 1.96(SD))

Internal Consistency Reliability

Analysis of the internal consistency reliability and validity of the psychosocial survey and the PABS-PT were conducted using the data collected from 497 respondents. The demographic composition of this group is provided in Table 6. On average, the respondents were directly

Table 6

Demographic of Participants Internal Consistency and Validation Testing (n = 480)

Attribute Variable	Group	N (Percentage)
Age (years)	20-24	1 (0.2)
	25-34	122 (25.4)
	35-44	102 (21.2)
	45-54	118 (24.6)
	55-64	108 (22.5)
	65+	28 (5.8)
Gender	Female	364 (75.8)
	Male	112 (23.3)
	Other	1 (0.2)
	Prefer not to answer	3 (0.6)
Years licensed as PT	Less than 5	55 (11.5)
	5-10	94 (19.6)
	11-15	43 (9.0)
	16-20	59 (12.3)
	21-25	64 (13.3)
	26+	165 (34.4)
Work Setting	Academic Institution	11 (2.3)
	Acute Care	54 (11.3)
	Home Care	78 (16.3)
	Inpatient Rehabilitation	16 (3.3)
	Multidisciplinary Pain	4 (0.8)
	Outpatient Neurologic	21 (4.4)
	Outpatient Orthopedics	260 (52.2)
	Skilled Nursing	30 (6.3)
	Other	5 (1.0)

involved in patient care for 19.38 years ($SD = 12.1$ years, minimum = 1-year, maximum = 48 years). Additionally, 45.6% of participants were APTA members, 20.3% held an American Board of Physical Therapy Specialization, and 62.4% had completed at least one course pertaining to PNE and/or the BPS model. PTs from 33 of the 50 states participated in the study with 42.5% and 22.8% of respondents coming from Ohio and Florida, respectively. The average time required to complete the full survey was approximately 16.1 minutes ($SD = 5.1$ minutes).

Item analysis revealed strong internal consistency of all factors within the psychological subdomain/domain. The Cronbach's alpha for the cognitive, emotional, behavioral, and social subdomains were 0.88, 0.90, 0.83, and 0.89. Removal of any of the factors from the subdomains/domains resulted in a reduction of the Cronbach's alpha; therefore, no items were removed. Internal consistency of the 27-item psychological domain revealed a Cronbach's alpha of 0.942. Item-to-total correlation of the psychological domain revealed a moderate to strong relationship among the items to the total score with correlation coefficients ranging from 0.48 to 0.82. Removal of any item factor resulted in the reduction of the Cronbach alpha; therefore, no items were removed from the psychological domain.

Internal consistency of Factors 1 and 2 of the PABS-PT was analyzed. Item analysis of Factor 1 revealed a Cronbach's alpha of 0.48. Removal of items 4 and 8 increased the alpha level to 0.65. Item analysis of Factor 2 revealed a Cronbach's alpha of 0.83. Removal of item 10 improved the alpha level to .84.

Validation

Concurrent validity of the psychosocial survey was explored using the PABS-PT scale. A case was omitted from analysis if it was missing one or more relevant values and 497 cases were included in the analysis. The relationship between participants' scores on Factors 1 and 2 and the composite psychological and psychosocial scores were analyzed by one-tailed Pearson's

correlation coefficient. A positive relationship between the composite scores and a stronger biopsychosocial orientation (higher BPS score) would demonstrate that the survey and PABS-PT were assessing similar constructs. Mean values of each of the abovementioned factors are provided in Table 7. Significant relationships between Factors 1 and 2 and composite psychological and psychosocial scores were not present.

Analysis of the association between abovementioned variables was then conducted by omitting items 4 and 8 in Factor 1 and item 10 in Factor 2. The Pearson's correlation coefficient values are provided in Table 8 and are labeled "modified Factor 1" and "modified Factor 2." Removing the items that reduced the Cronbach's alpha did not change the relationship between the score on the PABS-PT and the psychological and psychosocial scores. No association between variables was present; thus, the concurrent validity of the psychosocial survey could not be established.

The mean PABS-PT scores between groups that scored high versus low on the survey were then examined. Respondents were grouped relative to the psychological/psychosocial mean score (see Table 9). Individuals with a score below the mean of the respective domain were placed in Group 1 and individuals with a score above the mean were placed in Group 2. There was no significant difference in the mean Factor 1 and 2 scores when individuals were grouped by higher psychological/psychosocial survey scores and compared to those with lower scores, indicating that there was little variability in PABS-PT scores.

Table 7

Mean Values PABS-PT, Psychosocial Survey Score (n = 497)

	N	Mean (SD)	Min, max
Factor 1	497	34.64 (3.77)	21, 46
Factor 2	497	31.56 (6.13)	10, 48
Psychological	497	95.34 (18.51)	32, 135
Psychosocial	497	117.76 (24.03)	40, 175

Table 8

Correlation Coefficients PABS-PT, Composite Survey Scores

		Psychological	Psychosocial
Biomedical Factor 1 N=497	Pearson r	0.03	0.03
	Sig. (1-tailed)	0.25	0.24
Biopsychosocial Factor 2 N=497	Pearson r	-0.06	-0.05
	Sig. (1-tailed)	0.09	0.12
Modified ^a Biomedical Factor 1 N=497	Pearson's r	0.20	0.02
	Sig. (1-tailed)	0.33	0.29
Modified ^b BPS Factor 2 N=497	Pearson's r	-0.05	-0.05
	Sig. (1-tailed)	0.12	0.14
^a Item 4 and 8 removed			
^b Item 10 removed			

Table 9

Mean PABS-PT Grouped by Mean Psychological/Psychosocial Score

	Factor 1 Mean (<i>SD</i>)	<i>t</i> -statistic (<i>p</i> -value)	Factor 2 Mean (<i>SD</i>)	<i>t</i> -statistic (<i>p</i> -value)
Psychological less than mean score (<i>N</i> = 251)	34.49 (3.53)		31.76 (5.73)	
Psychological greater than mean score (<i>N</i> = 246)	34.79 (3.99)	-0.87 (<i>p</i> = 0.38)	31.35 (6.52)	0.74 (<i>p</i> = 0.46)
Psychosocial less than mean score (<i>N</i> = 253)	34.50 (3.63)		31.69 (5.76)	
Psychosocial greater than mean score (<i>N</i> = 243)	34.79 (3.91)	-0.87 (<i>p</i> = 0.39)	31.42 (6.51)	0.48 (<i>p</i> = 0.63)

Discussion

This study investigated the psychometric properties of a survey designed to measure the psychosocial history-taking practices of PTs in the United States who evaluate adults with CP. The focus of this study was to assess the test-retest reliability, internal consistency, and validity of the cognitive, emotional, and behavioral subdomains of the psychological domain and the social and psychosocial domains of this survey. The hypotheses that the survey would display strong test-retest reliability and internal consistency of items within respective subdomains and domains were upheld. Face and content validity of the survey were established; however, concurrent validity using the PABS-PT Scale was not demonstrated.

Consistent with the recommended method of developing survey-based instrumentation, deductive and inductive methods were utilized throughout the development phase of the survey

(Lambie, Blount, & Mullen, 2017; Morgado et al., 2018). Deductive methods included an extensive review of the literature and inductive processes included incorporating the input and feedback from experts in survey development, the pain sciences, and clinical practice. The methods utilized ensured that the constructs measured were fully defined, relevant to the stated purpose of the study, and were clear and interpretable by PTs who evaluate adults with CP; thus, face and content validity of the psychosocial history-taking portion of the survey were supported.

A strong linear relationship between times 1 and 2 was found. The strong association between testing periods provides evidence of the reliability and stability of the survey with repeated testing; however, the correlation coefficient does not indicate the level of agreement between times 1 and 2 at the individual level for each respondent (Berchtold, 2016; Bland & Altman, 2010). For this reason, agreement between the two testing periods was investigated using the Bland Altman plot.

The graphic depiction of the variance between measures was plotted against the mean of the two measures (Bland & Altman, 2010). In this study, the Bland-Altman plots revealed that greater than 90% of the cognitive, emotional, and social subdomains, and greater than 95% of the behavioral subdomain, psychological, and psychosocial domain difference scores were within the 95% CI, which indicated a strong level of agreement between times 1 and 2. While outliers in the difference and mean composite scores are visible on the plots of all subdomain/domains, the decision was made to keep outliers that were less than 3 SD of the respective mean. Visual inspection of the plots revealed mild deviations in the clustering of data points around the mean difference score at varying levels of the mean subdomain/domain values of time 1 and time 2. However, the number of data points was small, and a larger sample size would be needed to assess for the presence of a trend or bias in the relationship between times 1 and 2.

The items in the subdomains/domains demonstrated good to excellent internal consistency (Cronbach's alpha ranged from 0.825 to 0.942), which indicates strong consistency of response within respective subdomains/domains. A high degree of internal consistency on a survey is necessary for the researcher to interpret the composite score as a reflection of the items on the respective scale (Streiner, 2003).

Statisticians caution interpreting alpha levels that are derived from constructs that contain a large number of items (Streiner, 2003; Vaske, Beaman, & Sponarski, 2017). Research has demonstrated that by increasing the number of items on a scale from 6 to 12 the alpha level increased from 0.30 to 0.72 (Streiner, 2003). Therefore, caution should be used when interpreting the alpha levels calculated for the psychological domain, as it is comprised of 27 items.

Additionally, researchers emphasized that a strong Cronbach's alpha is not an indication of the unidimensionality of a scale, as items that represent distinct constructs but are highly correlated will produce large Cronbach's alpha levels (Streiner, 2003; Vaske et al., 2017). To establish unidimensionality of a construct, confirmatory, exploratory, or principal factor analysis must be conducted (Vaske et al., 2017).

Validating the survey as a measure of the psychosocial history-taking practices of PTs proved to be a challenge. While research is available on the use of standardized inventories to assess for psychosocial factors, little has been published on the types of questions a PT would ask when conducting the history-taking portion of an evaluation. In the absence of a gold standard that measures the PTs' psychosocial history-taking practices, the PABS-PT was used as a reference standard. The principal investigator assumed that PTs who reported that they asked questions about psychosocial factors "always" to "often" utilized an approach aligned with the BPS model and those with a lower survey score utilized an approach based in the biomedical model. Following this line of reasoning, a higher score on the survey would be associated with a

lower score on Factor 1 and higher score on Factor 2; a lower score on the survey would be associated with a higher biomedical score and a lower BPS score. However, associations between the psychological/psychosocial composite score and the two factors of the PABS-PT Scale were not present. Furthermore, the relationship did not change when the analysis was repeated with the modified PABS-PT (the modified scale omitted items from Factors 1 and 2 that reduced the internal consistency of the respective factor).

A number of factors might have contributed to this finding. The PABS-PT has been demonstrated to be a reliable and valid measure of treatment orientation. However, validation studies have focused on the criterion validity of the PABS-PT (Mutsaers et al., 2014). In a 2019 study conducted by Eland et al. (2019) the discriminative validity of the PABS-PT was not supported. In Norwegian PTs, the PABS-PT was unable to discriminate between subsets of PTs based on treatment orientation. A primary issue that researchers were confronted with was the small between group differences in the PABS Factor 1 and 2 scores (Eland et al., 2019; Mutsaers et al., 2014). In the present study, when the respondents were grouped according to whether they were above or below the mean psychological/psychosocial score, there was no significant difference between the Factor 1 and Factor 2 scores. The small between group differences in this study are consistent with the findings of Eland et al. (2019). The lack of between group variance in the Factor scores may have contributed to the inability to validate the psychosocial survey using the PABS-PT. Further research is needed to assess the validity of the survey as well as the discriminative validity of PABS-PT.

Limitations

The generalizability of the results is enhanced by the heterogeneity of the respondents, as the instrumentation used in a study must be validated and determined to be reliable for the population of interest (Morgado et al., 2018; Polit, 2014). If respondents do not reflect the

population that they represent, generalizability of the test-retest results is reduced. In the test-retest analysis, the PTs with between 11-20 years made up 8.4% respondents, while those with greater than 26 years of experience made up 37.5% of respondents. In the validation study, PTs with 26+ years of experience made up 34.5% of respondents. The disproportionately high percentage of PTs with 26+ years of experience limits the generalizability of the findings.

Selection bias threatens the reliability, validity, and subsequent generalizability of the survey (Morgado et al., 2018; O'Reilly-Shah, 2017). The email invitation to participate in the survey was titled, "Psychosocial history-taking practices of PTs who treat adults with chronic pain." The title may have deterred individuals who do not utilize a BPS approach from opening the survey. Because participants self-select, it is possible that the findings of the survey do not fully cover the perspective of all PTs who evaluate adults with CP (Oberski, 2008). Individuals with a strong background in the subject matter or a distinct perspective may be more apt to participate in questionnaires or surveys that pertain to their area of interest (O'Reilly-Shah, 2017). The majority of respondents who participated in test-retest and the validation of the survey had taken a course on BPS and/or pain science in the last five years (58.3% and 62.4%, respectively), which suggests that individuals with familiarity with the survey topic were more likely to participate.

The premature termination rate is the percentage of respondents who do not complete the survey. It can be an indicator of respondent fatigue. In this study, 19.5% did not complete the survey after opening it (498 of the 611 respondents completed the survey). Respondent fatigue occurs when a questionnaire is too long and when the questions are complex. The survey in this study included approximately 90 questions and the majority of respondents (\pm 1 SD) required between 11 to 21.2 minutes to complete it. The quality of answers is diminished as the length of the survey increases, and research has shown that respondents highly invested in the subject

matter typically are more likely to complete a survey (O'Reilly-Shah, 2017). Given the length of the survey and the premature termination rate, the perspectives of PTs less invested in the subject matter may not have been captured and the population used to validate the survey may not fully represent the population of interest.

Memory bias is a concern when investigating the test-retest reliability of a survey. The mean time between interval between time 1 and time 2 was 7.8 days, with 68% of respondents completing the second survey within 3.8 to 11.8 days. This time period was in line with Matsauers et al. (2014) who performed test-retest of the PABS-PT with an interval that ranged from 48 hours to two weeks. The researchers hypothesized that attitudes are stable and do not change unless targeted with an intervention. The principal investigator of the present study hypothesized that practice patterns were stable provider attributes and that the average number of days between times 1 and 2 (7.8 days) was sufficient to control for memory bias.

Strengths

The large sample size of PTs with varied educational, work, regional, and professional backgrounds were strengths of this study. While PTs from outpatient orthopedics comprised the majority of respondents, providers from home health, inpatient rehabilitation, acute care, education, outpatient neurologic, vestibular rehab, and women's health also participated in the study. PTs from 11 of the 50 states participated in the test retest reliability of the survey; PTs from 33 of the 50 states participated in internal consistency and validation portion of the study. APTA members, a group frequently surveyed, represented the minority of respondents. The respondents' years of clinical practice were representative of the current PT work force, ranging from 1 to 48 years.

Internal consistency and validation analysis should be conducted with a minimum of 10 subjects per item (Morgado et al., 2018). In this study, the ratio was 14 subjects per item. The

aforementioned use of deductive and inductive methods to develop the survey is another strength. Morgado et al. (2018) reported that the limited use of target population opinions threatened the content validity of scales. In the development phase of the survey, the use of experts who were not only content experts, but also representative of the survey's intended audience, was a strength of the study.

Conclusion

The purpose of this study was to investigate the psychometric properties of the psychosocial history-taking practices of PTs surveyed. It was hypothesized that the survey would display strong test-retest reliability; good to excellent internal consistency; and that the composite scores on the psychological/psychosocial survey would be negatively and moderately correlated with Factor 1 and positively and moderately correlated with Factor 2 of the PABS-PT. Strong test-retest reliability was demonstrated. Small deviations in the distribution of the cognitive, behavioral, and psychosocial difference scores around the mean of were visualized; however, there was insufficient sample size to conclude if a trend or relationship was present. Good to excellent internal consistency between items was found for the psychological subdomains/domain and social domain. Concurrent validity was not established between the PABS-PT and the psychosocial survey. Further research is needed to establish the validity of the survey to measure psychosocial history-taking practices of PTs who evaluate adults with CP in the United States.

CHAPTER IV

SELF-REPORTS BY PHYSICAL THERAPISTS OF THEIR PSYCHOSOCIAL HISTORY-TAKING PRACTICES WHEN EVALUATING ADULTS WITH CHRONIC PAIN

Background

Pain is defined by the IASP as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage ...pain is always subjective” (IASP, 2018b). It is a protective, evolutionary, warning signal that motivates an individual to escape a potentially harm-producing stimulus (Institute of Medicine, 2011; Moseley, 2007). In the United States, the total societal cost of CP is estimated to be between \$560 to \$635 billion dollars annually and it is estimated that 11.2% to 43.9% of adults suffer from CP (Nahin, 2015; Tsang et al., 2008). In 2001, the World Health Organization (WHO) adopted the *International Classification of Functioning and Disability and Health* (ICF), a classification system that provides a process by which to study the association among health conditions, personal internal factors, and environmental factors on the individual and population health levels. The classification system was based on a biopsychosocial (BPS) model, an integrative, inclusive model proposed by Engel in 1978 that accounts for the biological, psychological, and sociocultural aspects of health, disease, pain conditions, functioning, and disability. The BPS framework is one of four constructs that inform physical therapy practice (*Guide to Physical Therapists Practice 3.0*, 2014). In 2019, the ICD-11 recognized CP as a health condition in its own right; providers that use the ICD-11 are required to code the level to which psychosocial factors contribute to patients’ pain experiences (Treede et al., 2019).

The 2011 National Institute of Health report *Relieving Pain in America* reported that healthcare workers across all disciplines are often ill-prepared to diagnose, appropriately assess, and treat patients with chronic pain. In response, a primary objective outlined in the *National Pain Strategy* (2016) was to improve pain literacy among healthcare providers of all disciplines and to ensure that individuals with CP are assessed and treated in a comprehensive manner. The assessment of patients, which includes an in-depth subjective history aimed at understanding the patient's lived experience of pain and an objective physical examination, lays the foundation for the comprehensive management of individuals with longstanding pain (Wijma et al., 2016).

Studies have investigated the degree to which PTs have integrated a BPS approach into the evaluation of patients with CP; however, the majority of these published studies were conducted in Europe. Few published studies have examined the actual or self-reported psychosocial history-taking practice patterns of PTs in the United States. The European studies have been primarily qualitative in nature. From these studies, consistent themes have emerged on the history-taking practices of European PTs when evaluating persons with CP. While PTs are aware of the multidimensional nature of pain, the general consensus among researchers investigating PTs' assessments of the psychological and social factors is that therapists are not sufficiently exploring the impact these factors have on patients' pain conditions (Oostendorp et al., 2015). Studies found that PTs recognize that a BPS model should be used when evaluating CP; however, when questioned, PTs were unable to explain how psychosocial factors contributed to the CP experience (Emilson et al., 2016; Singla et al., 2015). Numerous researchers reported that the focus of questioning remains grounded in a biomedical tradition, with PTs gravitating towards questions that addressed somatic complaints and mechanical contributors to pain (Gray & Howe, 2013; Morin Chabane, Coutinho, Laliberte, & Feldman, 2018; Sanders et al., 2013; Synnott et al., 2015). PTs consistently questioned whether assessing for and then treating

psychosocial stressors was within their scope of practice, and they reported that they lacked time to explore psychosocial factors in addition to the biomechanical contributors to pain (Emilsson et al., 2016; Synnott et al., 2015). To date, no published studies have been conducted that quantify the current psychosocial history-taking practices of PTs in the United States who evaluate adults with CP.

The attitudes and beliefs that PTs hold about pain shape their treatment orientation (biomedical or BPS approach) and inform PTs' self-reported and actual clinical practices (Gardner et al., 2017; Houben et al., 2005; Ostelo et al., 2003). Clinicians pay selective attention to information that confirms their knowledge and beliefs and tend to gather less information on issues that they do not understand or that are inconsistent with their belief systems (Gardner et al., 2017; Ostelo et al., 2003). The Pain Attitudes and Beliefs -Physical Therapist Scale (PABS-PT) was developed by Ostelo et al. (2003) and modified by Houben et al. (2005) to measure the treatment orientation of providers based on their attitudes and beliefs about pain. The scale contains two factors. A high score on Factor 1 suggests a stronger biopsychosocial orientation, whereas a high score on Factor 2 indicates a biomedical orientation. Studies have investigated the association between treatment orientation and provider characteristics, such as years of clinical experience, gender, American Board of Physical Therapy Specialties certification (ABPTS certification), and work setting, using the PABS-PT; however, these studies have yielded inconsistent results (Eland et al., 2019).

The aims of this study were to describe and analyze the self-reported psychosocial history-taking practices of PTs. The hypotheses were 1) gender, allowed evaluation time, ABPTS certification, and years of clinical experience will be significant predictors of the frequency with which PTs ask questions about psychosocial factors; 2) there will be a significant difference among groups in the composite psychosocial survey score when respondents are grouped by

years of clinical experience; and 3) there will be a significant difference in the respective composite scores for the cognitive, emotional, and behavioral psychological factors when PTs are grouped by work setting.

Methods

Subjects

PTs practicing within the United States who evaluate adults with CP were eligible for inclusion in this study. Adults with CP are individuals 18-years or older who had consistent pain for three or more months. All 50 physical therapy state licensing boards were contacted to obtain email addresses of actively licensed PTs; eight state licensing boards provided the researcher with email addresses. Approximately 30,000 email addresses were obtained. Additionally, all 50 state American Physical Therapy Association (APTA) chapters, the Academy of Acute Care Physical Therapy, and the Academy of Neurologic Physical Therapy were contacted. Snowball sampling was then used.

Instrumentation

Psychosocial history-taking practices of PTs were measured using a survey created in PsychData®. Section One of the survey included the PABS-PT. The PABS-PT is a 19-item instrument that is scored from 1 to 6 utilizing a Likert scale (6 = *strongly agree*, 1 = *strongly disagree*). It is a self-administered questionnaire developed to measure the strength of the biomedical and biopsychosocial treatment orientation of PTs who treat individuals with low back pain (Ostelo et al., 2003). Using principal factor analysis, researchers identified two factors upon which a list of attitude and belief statements about low back pain were loaded (Ostelo et al., 2003). A high score on Factor 1 is consistent with a behavioral/biopsychosocial orientation and a high score on Factor 2 is consistent with a biomedical orientation. In the present study, the phrase “low back pain” was replaced with the word “pain” and respondents were instructed to consider

the pain beliefs they have of adults with CP. The survey has been utilized in studies investigating the treatment orientation of providers in broader patient populations to include CP (Macdonald et al., 2018b), chronic neck pain (Mutsaers et al., 2014), and chronic musculoskeletal pain (Alessandro et al., 2018). PABS-PT has been demonstrated to be reliable, with an ICC of 0.81 for Factor 1 and ICC = 0.84 for Factor 2 (Mutsaers et al., 2012). Predictive and criterion validity of the scale have been established, however, the discriminative validity of the PABS-PT has not been demonstrated (Eland et al., 2019; Eland et al., 2017; Mutsaers et al., 2012; Mutsaers et al., 2014).

Section Two of the survey was comprised of questions designed to assess the frequency that PTs verbally ask patients about psychological and social factors when taking the history of adults with CP. Section Two of the survey was influenced by the work of Speck and Rodd (2004), Oostendorp et al. (2015), and Wijma et al. (2016) who used the SCEBS method to categorize somatic and psychosocial factors that a provider could ask about during the history-taking portion of an evaluation of individuals with CP. The psychological domain was divided into the cognitive (11 questions), emotional (8 questions), and behavioral (8 questions) subdomains. The social domain included eight questions. Table 10 provides the elements included in each of the respective subdomains.

The questions were grouped by subdomain and scored on a 5-point Likert scale (I asked ALL patients; I asked MOST patients; I asked SOME patients; I RARELY asked patients; and I NEVER asked patients). Respondents were asked to consider patients with CP whom they had evaluated in the last three months and to determine how frequently they asked patients about the indicated items when taking the verbal subjective history of adults with CP. The maximum possible score on the psychosocial composite was 175 (for each of the subdomains, the maximum possible score was cognitive = 55; emotion, behavior, and social = 40). A high score on the

survey indicated that the respondent consistently asked questions about psychosocial factors.

Section 3 of the survey included demographic questions about the PTs' past educational and work experience.

Psychometric testing of the survey established the face and content validity of the survey.

The survey demonstrated strong test-retest reliability, with a Pearson's correlation coefficient of 0.86 and 0.87 ($p \leq 0.0005$) for the psychological subdomain and psychosocial domain, respectively. Internal consistency of the psychosocial domain and subsequent subdomains was good to excellent (0.83 to 0.94). Criterion validity, using the PABS-PT, has not been established.

Procedures

After IRB approval was received from TWU-Houston, a link to the online survey was emailed on three separate occasions, with at least one week between mailings, between the months of July and September of 2019. An IRB approved social media post was sent to a contact person at the abovementioned sections of the APTA. Respondents gave informed consent when they advanced past the survey's landing page.

Table 10

Elements of Psychosocial Subdomains

Cognitive	Emotion	Behavior	Social
understanding of pain	depression	adaptive pain behaviors	partner/spouse reaction to patient's pain
expectations about the progression of pain and the efficacy of therapeutic interventions	anxiety (future oriented emotional state)	maladaptive pain behaviors	friend and family reaction to patient's pain
perceptions surrounding movements that exacerbate and remediate pain	Fear (emotional response associated with an immediate and identified threat)	sleep patterns	healthcare providers' attitudes towards patient's pain
pain self-efficacy	anger	substance abuse	social engagement/isolation
pain catastrophizing	stress		fulfillment of social roles and functions
pain acceptance			
motivation to make a behavioral change			

Data Analysis

Descriptive statistical analyses were used to describe the respondents' demographic characteristics and psychosocial history-taking practices. Cases were excluded from analysis if data was missing in a relevant field. Regression analysis was used to test the first hypothesis that gender, allowed evaluation time, ABPTS certification, and years of clinical experience would be significant predictors of the frequency with which PTs ask questions about psychosocial factors, a regression analysis was used. Gender and ABPTS certification were entered separately as dichotomous predictors, and years of clinical experience and evaluation time allowed were entered separately as continuous predictors. The four predictors were then entered into the regression analysis using the forced entry method.

An independent one-way ANOVA was conducted to test the second hypothesis that there would be a significant difference among groups in the composite psychosocial survey score when respondents are grouped by years of clinical experience, an independent. Four groups were created based on years of clinical experience: less than 5 years, 5-10 years, 11-15 years, and 16+ years. Post-hoc comparisons were conducted with an adjusted alpha level of 0.0125.

A 3x3 mixed ANOVA was conducted to test the third hypothesis that there would be a significant difference in the respective composite scores for the cognitive, emotional, and behavioral psychological factors when PTs are grouped by work setting. Three groups were created based on work setting: 1) outpatient rehabilitation- included respondents from orthopedic, neurological, women's health, and vestibular clinical settings; 2) inpatient rehabilitation- included respondents from neurological rehabilitation and long-term care settings; and 3) acute care. The percentage of actual to possible points was calculated for each psychological subdomain to standardize the respective scores and this value was used in the analysis. An alpha level of 0.05 was set for the main effects of work setting, psychological subdomain, and social domain. A

Bonferroni adjusted alpha level of 0.008 was set for post-hoc comparisons to control for family-wise error rate.

All data was collected on Psychdata and then downloaded into both Excel 16.26 and SPSS 25. Analysis was conducted in both programs.

Results

Characteristics of Respondents

Of the 611 respondents who initiated the survey, 501 completed the survey. The average time required to complete the full survey was 16.1 minutes ($SD = 5.1$ minutes). Respondents were directly involved in patient care an average of 19.4 years ($SD = 12$ years, minimum = 1-year, maximum = 48 years). Additionally, 47.5% of the participants were APTA members; 21.2 % held an ABPTS certification; and 51.4% completed at least one course pertaining to PNE and/or the BPS model. PTs from 33 of the 50 states participated in the study with 42.5% and 22.6% of respondents were from Ohio and Florida, respectively. The mean time respondents reported having to conduct an evaluation was 48.3 minutes ($SD = 16.57$ minutes). Additional demographic descriptive analysis is provided in Table 11. The mean percentage score for each psychosocial subdomain is provided in Table 12.

Table 11

Demographic Descriptive Statistics of Survey Respondents (n = 501^a)

Attribute Variable	Group	N (Percentage)
Age (years)	20-24	1 (0.2)
	25-34	122 (25.2)
	35-44	102 (21.0)
	45-54	121 (25.0)
	55-64	109 (21.8)
	65+	28 (5.8)
	Prefer not to say	1(0.2)
Gender	Female	367 (75.8)
	Male	113 (23.3)
	Other	1 (0.2)
	Prefer not to answer	3 (0.6)
Years licensed as PT (1 to 48 years)	Less than 5	55 (11.4)
	5-10	94 (19.4)
	11-15	43 (9.0)
	16-20	61 (12.6)
	21-25	65 (13.4)
	26+	166 (34.3)
Work Setting	Academic Institution	11 (2.3)
	Acute Care	54 (11.2)
	Home Care	79 (16.4)
	Inpatient Rehabilitation	17 (3.5)
	Multidisciplinary Pain	4 (0.8)
	Outpatient Neurologic	21 (4.3)
	Outpatient Orthopedics	262 (54.2)
	Skilled Nursing	30 (6.2)
	Other	5 (1.0)

^a Respondents did not answer all of the demographic questions.

Table 12

Mean Percentage Score of Respondents by Subdomain (n = 501)

Psychosocial subdomain	Mean (SD)	Min., max.
Cognitive	73.01 (14.72)	20, 100
Emotional	62.34 (17.47)	20, 100
Behavioral	75.42 (13.90)	25, 100
Social	55.97 (16.78)	20, 100

Note: a min. = minimum and max. = maximum**Predictors of Psychosocial History-Taking Practices**

Regression and multiple regression analyses were conducted to test the hypothesis that gender, ABPTS certification, allowed evaluation time, and years of clinical experience were significant predictors of the frequency with which PTs asked questions about psychosocial factors. The linear model assumptions were upheld. The predictors were entered independently and then together using the forced method entry in SPSS. Three respondents indicated that they preferred not to disclose their gender; these respondents were not included in the multiple regression and the gender regression analysis. The mean values of the psychosocial composite score by dichotomous predictors are provided in Table 13. Mean values and results of independent t-test analysis to compare mean PABS-PT Factor 1 and Factor 2 scores by gender and the attainment of an ABPTS certification are provided in Table 14. There were no significant between group differences in either PABS-PT factors when respondents were grouped by gender; however, there were between group differences in both Factors when respondents were grouped by ABPTS certification.

Table 13

Mean Psychosocial Score-Overall and by Predictors

		N	Psychosocial Mean (SD)	Min., max.
Overall mean		438	116.83 (24.07)	40, 175
Gender	Male	113	120.45 (23.07)	65, 175
	Female	367	116.57 (24.49)	40, 175
ABPTS certification	Yes	102	120.96 (22.06)	72, 175
	No	380	116.63 (24.65)	40, 175

Note: a min. = minimum and max. = maximum

Table 14

Mean PABS-PT by Gender and ABPTS Certification with Independent T-Test Results

		Factor 1 Mean (SD)	<i>t</i> -statistic (<i>p</i> -value)	Factor 2 Mean (SD)	<i>t</i> -statistic (<i>p</i> -value)
Gender <i>N</i> = 480	Female	34.62 (3.76)	0.01	31.58 (5.85)	0.78
	Male	34.66 (3.93)	(0.92)	31.00 (7.03)	(0.38)
ABPTS certification <i>N</i> = 482	Yes	35.47 (4.04)	6.38	28.31 (6.38)	36.91
	No	34.41 (3.69)	(0.012)	32.34 (5.81)	(0.0005)

A series of linear regression analyses indicated that years of clinical experience and evaluation time allowed independently predicted the psychosocial history-taking practices of PTs. Years of clinical experience and evaluation time allowed explained 5.3% and 5% of the variance in the psychosocial scores, respectively; as evaluation time allowed and years of clinical experience increased by one year, the psychosocial score increased by a factor of 0.33. and 0.46, respectively. Table 15 provides a summary of the independent linear regressions by predictor variable. Psychosocial score can be predicted using the following equations:

$$\text{Psychosocial score} = 101.48 + 0.33 (\text{evaluation time allowed})$$

$$\text{Psychosocial score} = 108.17 + 0.46 (\text{years in patient care})$$

Table 15

Linear Regression Results by Predictor Variable

Predictor	<i>N</i>	<i>F</i> -statistic (<i>p</i> -value)	Unstandardized Betas (constants)	Standardized Betas	<i>R</i> ₂
ABPTS certification	482	2.59 (0.11)	4.33 (125.29)	0.073	.005
Gender	480	2.26 (0.14)	-3.88 (120.45)	-0.068	.005
Evaluation time allowed	464	24.75 (≤ 0.0005)	0.327 (101.48)	0.224	.050
Years patient care	456	25.41 (≤ 0.0005)	0.458 (108.17)	0.230	.053

Multiple regression analysis indicated that the four predictors significantly predicted the psychosocial history-taking practices of respondents. The overall model was significant at $F_{(4,433)} = 15.05$, $p \leq 0.0005$, $R_2 = 0.122$. Gender and ABPTS certification did not contribute significantly to the model; however, evaluation time allowed and years of clinical experience explained 12.2% of the variance in the psychosocial score. Regression coefficients are provided in Table 16. The following regression equation can be used to predict the psychosocial score:

$$\text{Psychosocial score} = 92.15 + 5.05 (\text{certification}) - 3.92 (\text{gender}) + 0.53 (\text{years patient care}) + 0.34 (\text{evaluation time allowed})$$

Table 16

Multiple Regression Results (n = 438)

Predictor <i>N</i> = 441	Unstandardized Betas	Standard error	Standardized Betas	Sig. ^a <i>p</i> - value	95% CI
Constant	92.15	4.44		≤0.0005	83.43, 100.87
APTA ABPTS certification	5.05	2.66	0.09	0.06	-0.19, 10.28
Gender	-3.92	2.63	-0.07	0.14	-9.10, 1.26
Years patient care	0.53	0.09	0.26	≤0.0005	0.35, 0.71
Eval. time allowed	0.34	0.07	0.22	≤0.0005	0.21, 0.48

Note: ^a Sig. = significance level**Clinical Experience and Psychosocial History-Taking Practices**

A one-way independent ANOVA was used to determine if a significant difference existed in the psychosocial history-taking practices when respondents were grouped by years of clinical experience. Descriptive analysis of the respondents' mean psychosocial scores is provided in Table 17. Bonferroni procedure was used to investigate for significant between group differences post hoc. Linear model assumptions were upheld.

There was a significant between group difference in the mean psychosocial score, at $F_{(3,452)} = 10.60, p \leq 0.0005, \eta^2 = 0.07$. Post hoc comparisons revealed that there were significant mean differences in the frequency with which respondents reported asking questions about psychosocial factors when compared to respondents with less than 5 years of experience to respondents in each of the years of experience groups. After 5 years of clinical experience, the reported mean differences in the frequency which respondents reported asking questions about

psychosocial factors did not differ significantly. The results of the post hoc comparisons are provided in Table 18. Figure 5 provides a visual depiction of the between group differences.

The means of PABS-PT Factors 1 and 2 scores by years of clinical experience were compared to determine if there was a significant difference between groups using one-way ANOVA. There was no significant difference between groups on Factor 1, at $F_{(3, 452)} = 0.87, p = 0.46, \eta^2 = 0.006$. The groups differed significantly on Factor 2, at $F_{(3, 452)} = 2.81, p = 0.04, \eta^2 = 0.02$. Bonferroni procedures were used to analyze post hoc comparisons; however, no between group comparisons of mean Factor 2 scores were significant. The mean PABS-PT scores by years of clinical experience are provided in Table 19. Figure 6 provides a visual depiction of Factors 1 and 2 when grouped by years of clinical experience.

Table 17

Mean Psychosocial Score when Grouped by Years of Experience

Year Groups	N	Psychosocial Mean (SD)
		Min., max. ^a
Less than 5 years	48	99.58 (19.52) 65, 133
5-10 years	95	116.78 (22.14) 66, 166
11-15 years	42	121.29 (23.89) 67, 161
16+ years	271	119.59 (24.07) 40, 175

Note: ^a min. = minimum and max. = maximum

Table 18

Post Hoc Comparison of Mean Psychosocial Scores

Comparison group		Mean difference (<i>p</i> -value)	95% CI	Cohen's <i>d</i>
< 5 years	5 to 10 years	-17.20 (≤ 0.0005)	-28.06, -6.33	-0.82
	11 to 15 years	-21.70 (≤ 0.0005)	-34.67, -8.74	-0.99
	16+ years	-20.00 (≤ 0.0005)	-29.62, -10.40	-0.91
5 to 10 years	11 to 15 years	-4.51, (0.88)	-15.88, 6.86	-0.20
	16 + years	-2.81 (0.89)	-10.13, 4.51	-0.12
11 to 15 years	16+ years	1.70 (1.0)	-8.49, 11.87	0.07

Table 19

Mean PABS-PT Scores by Years of Clinical Experience

Year Groups	<i>N</i>	Factor 1 Mean (<i>SD</i>)	Factor 2 Mean (<i>SD</i>)
		Min., max _a	Min., max _a
Less than 5 years	48	35.08 (3.64) 28, 46	31.06 (5.57) 13, 41
5-10 years	95	34.97 (3.44) 26, 44	29.87 (6.72) 10, 47
11-15 years	42	35.10 (3.21) 29, 44	32.67 (6.58) 19, 46
16+ years	271	34.45 (3.99) 21, 46	31.74 (6.06) 10, 48

Note: _a min. = minimum and max. = maximum

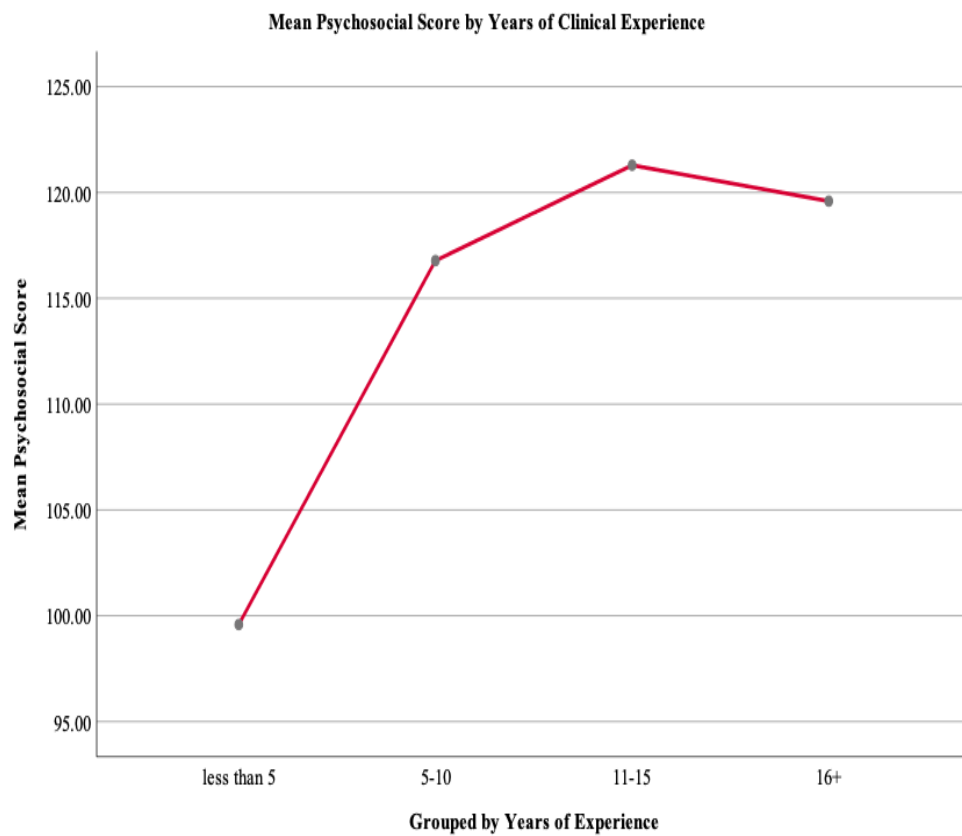
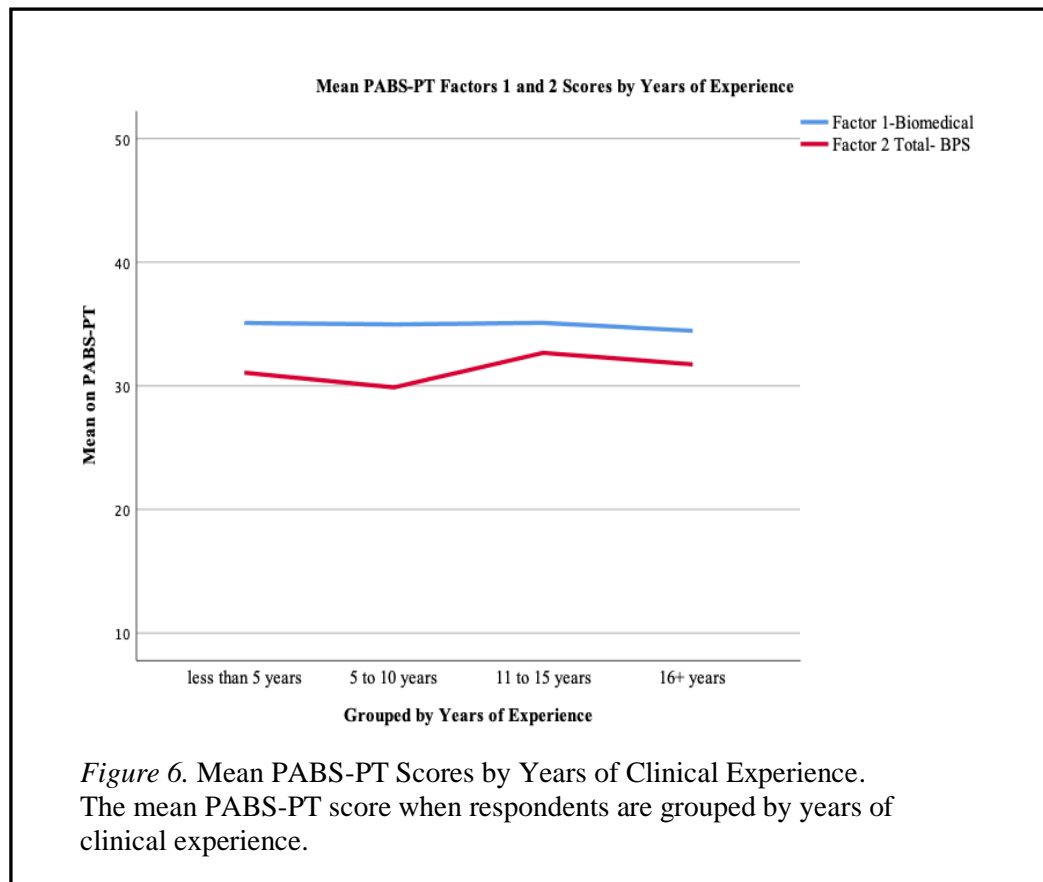


Figure 5. Mean Psychosocial Score by Years of Clinical Experience. The mean psychosocial score of respondents when grouped by years of clinical experience.



Work Setting and Psychological Factors

A mixed ANOVA was conducted to test the hypothesis that there would be a significant difference in the respective composite scores for the cognitive, emotional, and behavioral psychological factors when PTs were grouped by work setting. Skilled nursing and inpatient rehabilitation were combined to create an inpatient rehabilitation group. Outpatient orthopedics, women's health, vestibular outpatient rehabilitation, and outpatient neurological were combined to create the outpatient group. Psychological subdomain means by work setting are provided in Table 20.

The linear assumptions were upheld, with the exception of homogeneity of variance between groups on the behavioral factor (Levene's significant at $p = 0.023$). Blanca, Alarcon,

Bono, and Bendayan (2018) reported that F-tests were robust with heterogeneity of variance when used in comparisons of up to seven groups when the groups were equal in size. As a result, 47 outpatient and acute care cases were randomly selected for inclusion in the analysis; three groups equal in size ($n = 47$) were created.

There was not a significant interaction between work setting and psychological factor, with $F_{(4, 276)} = 1.97, p = 0.10$. The frequency of which respondents reported asking about cognitive, behavioral and emotional factors did not differ based on the work setting of the respondent. Further analysis of between and within group main effects was conducted. Table 20 provides the mean values of the psychological subdomains by work setting. Figure 7 provides a visual depiction of the relationship between psychological factor and work setting.

A significant main effect of psychological factor was found, $F_{(2,276)} = 126.83, p \leq 0.0005, \eta^2 = 0.48$. Pairwise comparisons of the repeated factor using a Bonferroni adjustment revealed a significant difference in means when comparing the cognitive and emotional factors (mean difference = 12.23, $p \leq 0.0005$, 95% CI [9.73, 14.74], $d = 0.80$); cognitive and behavioral factors (mean difference = -2.38, $p = 0.026$, 95% CI [-4.54, -0.22], $d = -0.17$); and emotional and behavioral factors (mean difference = -14.61, $p \leq 0.0005$, 95% CI [-17.09, -12.14], $d = -0.94$). Respondents, regardless of work setting, reported asking questions about behavioral factors more often than cognitive and emotional factors. Respondents reported asking questions about emotional factors less often than cognitive or behavioral factors. The marginal means by psychological subdomain are provided in Table 21.

Table 20

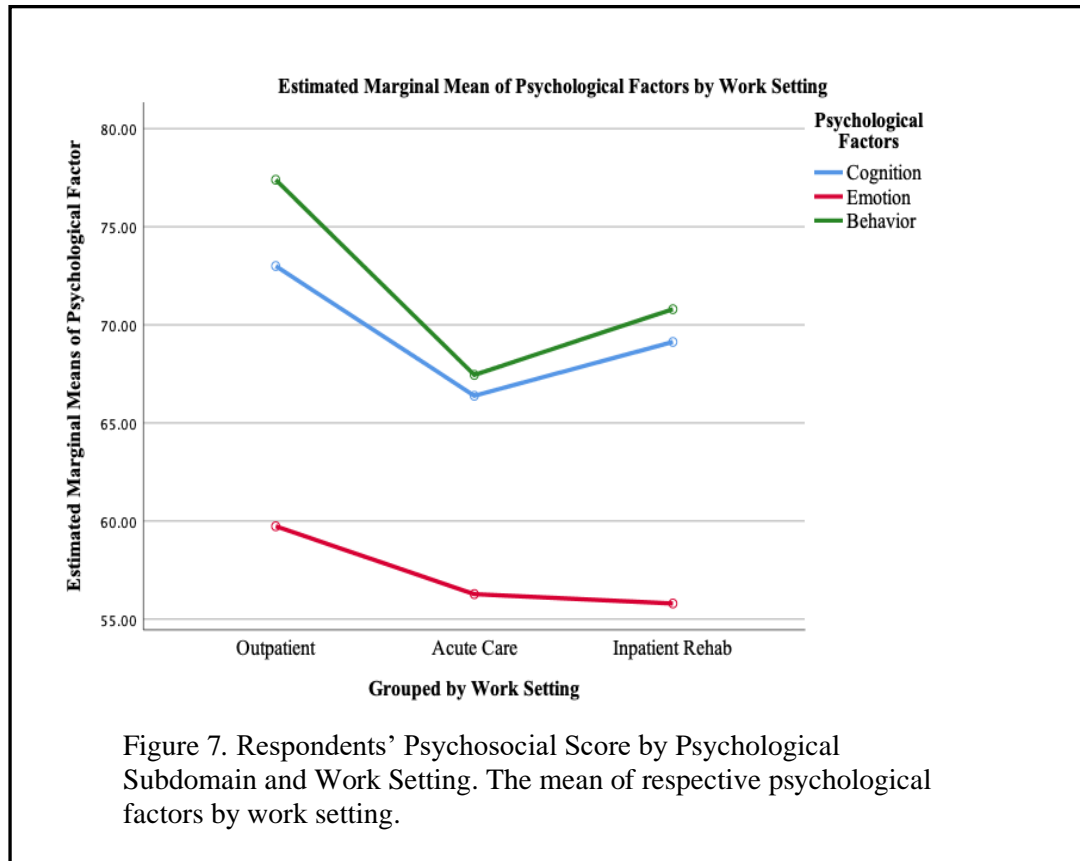
Psychological Subdomain Means by Work Setting (n = 47)

Psychological	Work Setting	Mean (SD)
Cognitive	Outpatient	73.00 (12.77)
	Acute Care	66.38 (15.61)
	Inpatient Rehab	69.13 (12.25)
Emotional	Outpatient	59.73 (14.87)
	Acute Care	56.28 (15.96)
	Inpatient Rehab	55.80 (18.45)
Behavioral	Outpatient	77.39 (10.45)
	Acute Care	67.45 (15.45)
	Inpatient Rehab	70.80 (14.46)

Table 21

Marginal Means by Psychological Subdomain (n = 47)

Psychological	Mean (SD)
Cognition	69.50 (13.80)
Emotion	57.27(16.47)
Behavior	71.88 (14.46)



There was a significant main effect of work setting, $F_{(1,138)} = 3.24, p = 0.042, \eta^2 = 0.05$. Dunnett's T3 procedure is considered a conservative method that tightly controls for Type I error when pronounced heterogeneity of variance is present (Shingala & Rajyaguru, 2015). Games-Howell procedure keeps error rate under control with unequal variances; however, it is considered to be too liberal when sample sizes are less than 15 (Shingala & Rajyaguru, 2015). The decision was made to run both methods and compare results. Post hoc comparisons revealed a significant difference between the outpatient and acute care group (mean difference = 6.67, 95% CI [.36, 12.98], $p = 0.035$, using Dunnett T3 procedures; and 95% CI [0.49, 12.85], $p = 0.031$, using Games-Howell, $d = 0.53$) regardless of psychological factor. There was no significant difference between outpatient and inpatient rehabilitation (mean difference = 4.80, $p = 0.19$) and inpatient

rehabilitation and acute care (mean difference = 1.87, $p = 0.89$). Outpatient respondents reported asking about psychological factors more frequently than acute care respondents; however, there was no significant difference between respondents in outpatient when compared to inpatient rehabilitation. The marginal means by work setting are provided in Table 22.

Table 22
Marginal Means by Work Setting (n = 47)

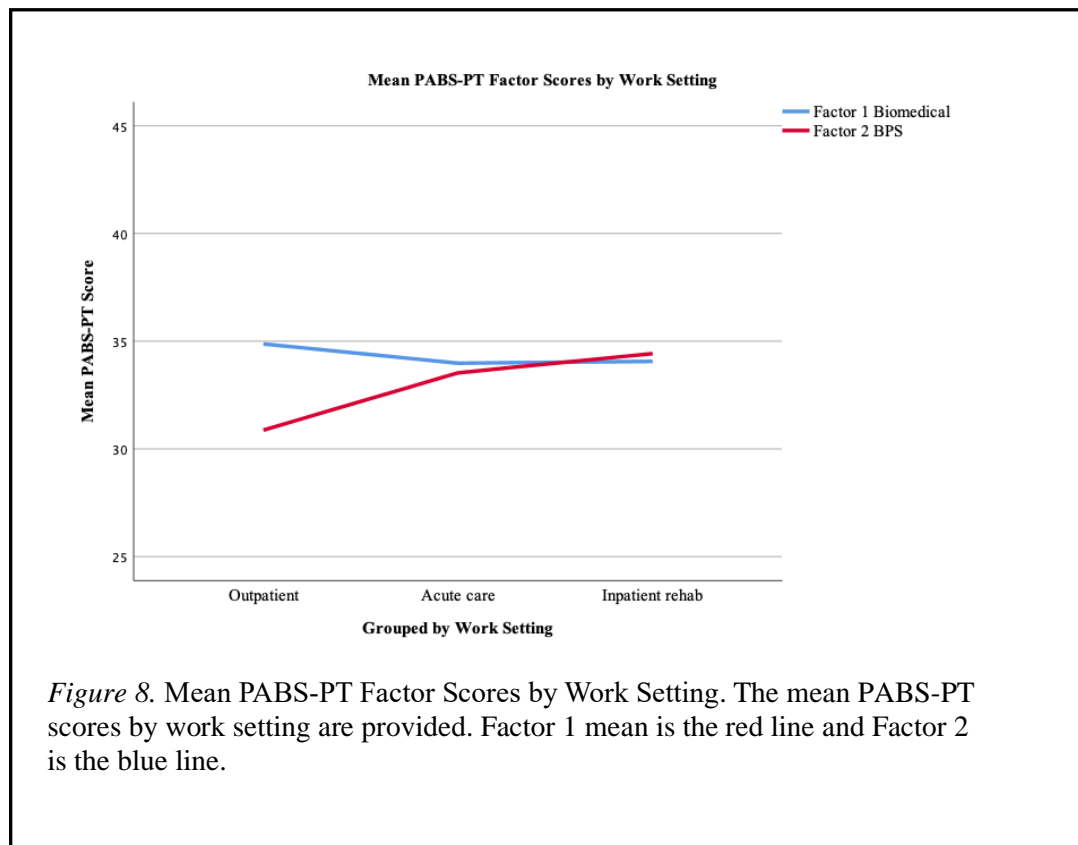
Work Setting	Mean (SD)
Outpatient	70.04 (10.66)
Acute Care	63.37 (14.20)
Inpatient Rehab	65.24 (14.15)

Mean Factors 1 and 2 PABS-PT scores were compared using one-way independent ANOVA analysis. There were no significant differences between groups on Factors 1, at $F_{(2, 138)} = 0.94$, $p = 0.40$. The groups differed significantly in the mean Factor 2 score, at $F_{(2, 138)} = 5.98$, $p = 0.003$, $\eta^2 = 0.08$. Using a Bonferroni adjustment to analyze post hoc comparisons, there was a significant difference in the mean Factor 2 score when comparing outpatient rehab to acute care (mean difference = -2.67, $p = 0.04$, 95% CI [-5.3, -0.97], $d = -0.49$) and outpatient rehab to inpatient rehab (mean difference = -3.55, $p = 0.003$, 95% CI [-6.14, -0.96], $d = -0.70$). There was no significant between group difference in mean Factor 2 PABS-PT score when inpatient rehab and acute care were compared. Outpatient rehab respondents scored lower on the BPS Factor than did the respondents from acute care and inpatient rehab. The mean PABS-PT scores by work setting are provided in Table 23. Figure 8 provides a visual depiction of the mean PABS-PT score differences by work setting.

Table 23
Mean PABS-PT Factor Scores by Work Setting

Work setting	<i>n</i>	Factor 1 Mean (<i>SD</i>) Min., max. ^a	Factor 2 Mean (<i>SD</i>) Min., max. ^a
Outpatient	47	34.87 (3.70) 26, 42	30.87 (5.55) 18, 41
Acute Care	47	33.98 (3.64) 28, 46	33.53 (5.33) 20, 46
Inpatient Rehab	47	34.06 (3.11) 28, 45	34.43 (4.62) 24, 47

Note: ^a min. = minimum and max. = maximum



Discussion

In the present study, the psychosocial history-taking practices of PTs who evaluate adults with CP in the United States were found to vary based on the respondents' years of clinical experience, allowed evaluation time, and work setting. Evaluation time and years of clinical experience were found to be significant independent predictors of respondents' psychosocial scores, and when entered with gender and ABPTS certification status, explained 12.2% of the variance in the scores. Individuals with less than 5 years of experience asked significantly fewer psychosocial questions than did the respondents with 5-10, 10-15, and 16+ years of experience. Finally, there was not a significant interaction between work setting and questions about cognitive, emotional, and behavioral factors. However, outpatient providers reported assessing

psychosocial factors at a higher rate than inpatient rehabilitation and acute care PTs. Also, behavioral factors were assessed more often than cognitive and emotional factors, and emotional factors were assessed less often than cognitive and behavioral factors, regardless of work setting.

In previous research, a lack of time at the first visit was a barrier that PTs consistently cited as a reason for why they did not explore psychosocial factors when evaluating persons with CP (Emilson et al., 2016; Singla et al., 2015; Synnott et al., 2015). Consistent with the alternative hypothesis that evaluation time allowed would predict the number of questions PTs asked about psychosocial factors, as evaluation time allowed increased, PTs coverage of psychosocial factors increased as well. This finding is not surprising, and it is consistent with themes that emerged in the qualitative studies conducted in Europe. When time was limited, PTs reported that they focused on the mechanical contributory factors and the resulting functional limitations of pain, as opposed to psychosocial factors (Sanders et al., 2013; Synnott et al., 2015; van Wilgen et al., 2014). Therapists did not have confidence in their ability to manage psychosocial factors; therefore, in time limited situations, they chose to remain within their area of perceived expertise (Synnott et al., 2015). The findings of this study indicate that time constraints also negatively influenced the psychosocial history-taking practices of PTs in the United States. With decreased reimbursement and increased productivity demands realized by PTs in the United States, PTs are under pressure to shorten patient visit times (Brun-Cottan, McMillian, & Hastings, 2018). The *National Pain Strategy* put forth a call to improve the comprehensive assessment of the multidimensional nature of pain, which includes psychosocial factors (Interagency Pain Research Coordinating Committee & Department of Health and Human Services, 2016). PTs using the ICD-11 will now need to code the contributory role psychosocial factors are playing in their patients' pain conditions (Treede et al., 2019). Certainly, standardized inventories can and should

be used to identify psychosocial risk factors; however, the findings of this study indicate that PTs require time during the first visit to thoroughly review the psychosocial status of patients.

Studies have investigated the association between treatment orientation and provider characteristics, such as years of clinical experience, gender, ABPTS certification, and work setting, using the PABS-PT; however, these studies have yielded inconsistent results (Eland et al., 2019). Instead of inferring the treatment orientation of providers based on their attitudes and beliefs about pain, respondents in this study were asked to rate their psychosocial history-taking practices using a survey that through expert review had been demonstrated to have face and content validity. The focus of this study was the analysis of the psychosocial survey results, not the PABS-PT scores. The research questions did not directly relate to the PABS-PT. However, PABS-PT results were provided because previous research that investigated the association among provider demographic factors and treatment orientation utilized the PABS-PT. For this reason, PABS-PT results based on the predictor variables used in the respective analyses were provided. However, extensive discussion of the PABS-PT findings is beyond the scope of this dissertation study.

In the present study, years of clinical practice was found to be a significant positive predictor of the psychosocial history-taking practices of PTs. PTs with more clinical experience asked a higher number of questions about psychosocial factors. Past researchers hypothesized that because PT education has traditionally been grounded in a biomedical model, those who have practiced longer would have less education in and exposure to the BPS framework (Petit et al., 2019). Petit et al. (2019), using the PABS-PT, found that biomedical scores were significantly higher in PTs who had practiced more than 20 years ($p = 0.001$) when compared to a group that had practiced less than 20 years; however, the scores on the BPS factor were not significantly different ($p = 0.09$). In contrast to Petit's survey based study, researchers observed that PTs in

Switzerland who had been in practice longer were more responsive to patients' psychosocial needs during evaluations (Opsommer & Schoeb, 2014). The findings of the current study are not consistent with Petit et al.'s findings and are aligned with the observations made by Opsommer and Schoeb (2014). It should be noted that in the present study the number of questions asked by providers peaked in the 11-15 years of experience group, after which there was an insignificant but downward trend in the number of psychosocial questions asked with increasing years of experience. Further exploration of the patterns that existed in the 16+ years group is warranted as 34% of respondents had greater than 26 years of experience.

While there was an upward trend in the number of questions PTs asked as years of experience increased, it is important to note that when respondents were grouped by years of clinical experience, the only significant between group differences in the mean psychosocial score were among groups that were compared to the "less than 5 years of experience" group and the effect size was large. This finding may be indirectly related to time, which was identified as a predictive factor of history-taking practices. As PTs progress from novice to expert providers, they utilize faster reasoning skills that allow them to instantly recognize clusters of signs and symptoms (Edwards et al., 2004; Huhn et al., 2018). Fewer tests and questions are needed for the therapist to determine the PT diagnosis that best matches the patients' illness scripts, which reduces the time needed to complete an evaluation; thus, the experienced PTs may have more time to explore psychosocial factors.

Gender and advanced clinical specialization did not significantly predict the psychosocial history-taking practice of respondents. The findings of this study are consistent with Petit et al. (2019); they found no significant differences in treatment orientation based on gender ($p = 0.31$). The findings are inconsistent with Ostelo et al. (2003) who found that women scored higher on the BPS factor ($p = 0.007$). ABPTS certification was not a predictor of psychosocial history-

taking practices. There are no published studies that examined the influence ABPTS certification has on history-taking practices; however, Ladeira (2018) investigated the effect ABPTS certification had on the management of patients who presented with psychosocial risk factors. Inconsistent with the findings of the present study, researchers found that 60% of PTs with ABPTS certifications appropriately managed patients (patient vignettes) who presented with maladaptive pain coping strategies (yellow flags) as compared to 22% of PTs with no ABPTS certification; however, this study utilized patient vignettes and may not reflect actual practice patterns. Given that the PABS-PT Factor 2 scores have been demonstrated to increase for PTs who complete PNE coursework (Beneciuk & George, 2015), future studies should explore whether completion of such courses would better predict the psychosocial survey score.

There were notable differences in the assessment of cognitive, emotional, and behavioral psychological factors among respondents that were consistent with the findings of previous researchers. Oostendorp et al. (2015) found that manual PTs assessed emotional factors less often than cognitive and behavioral factors: 42.5% of cognitive indicators, 26.8% of emotion indicators, and 37.9% of behavioral indicators were addressed during the subjective exam. Respondents in the present study reported a similar pattern in their history-taking practices; however, behavioral factors were assessed to a greater degree than cognitive factors. These results were also consistent with earlier qualitative research which found that PTs expressed discomfort dealing with sensitive issues and opted to avoid extensive discussion of these matters (Cowell et al., 2018); and that instead of delving into the patients' psychological and emotional stressors and working to understand the patients' pain experience, PTs would redirect the focus of therapy towards function and biomechanical issues, while maintaining a level of professional detachment (Gardner et al., 2017; Sanders et al., 2013; Synnott et al., 2015). In order to comprehensively evaluate patients' pain experiences and to fully address the contributions that

cognitive and emotional factors have in the perpetuation of the pain experience, it is imperative that PTs consider these factors when evaluating individuals with CP (Roussel et al., 2016; van Wilgen et al., 2014).

The nature of the behavioral questions and the respondents' interpretation of these questions may also have contributed to the high percentage of questions asked in this subdomain. The behavioral questions in this survey related to the conditioning of avoidant and disuse behaviors, sleep patterns, and thoughts and feelings that reinforced pain behaviors. Respondents may have perceived that these questions were asking about movements and activities that provoke pain and the functional limitations that result, not the underlying maladaptive pain behavior. Furthermore, when compared to other subdomains, behavioral indicators are easier to quantify and measure, which makes it easier for PTs to set objective and measurable behavioral goals. It is also important to note that the percentages reported by Oostendorp et al. (2015) are the actual observed values; the PTs' self-assessments of the quality indicators met were significantly higher, at 60%. The percentage of questions respondents reported that they covered in that study were high, ranging from 75% of behavioral factors to 62% of emotional factors. Given Oostendorp's findings, future observational studies are needed to confirm that the self-reported practices of the respondents in this study are a reflection of actual psychosocial history-taking practices.

In the present study, outpatient PTs were more likely to ask questions of a psychosocial nature, when compared to PTs working in acute care and inpatient rehabilitation settings. This is in contrast to a study conducted by Ostelo et al. (2003) that found that PTs who worked in outpatient clinics had stronger biomedical orientations than PTs from multi-discipline settings. Petit et al. (2018) reported that the largest difference in mean PABS-PT scores was between French PTs that worked in settings that specialized in the management of pain when compared to

PTs that practiced in one discipline practices; the care network PTs had a lower biomedical score ($p = 0.0097$) and higher BPS score ($p = 0.0042$). Actual practice patterns were not observed in either of the studies, and the findings were based solely on the PABS-PT survey and demographic questionnaires. Researchers speculated that PTs who had consistent exposure to providers from different disciplines had a greater awareness of the BPS model. While direct comparisons are difficult due to healthcare system differences among countries, it is important to note that in the present study respondents who worked with providers from different disciplines were less likely to ask about psychosocial factors than outpatient providers. With all but three states in the United States having some form of direct access, PTs in outpatient settings function as front-line providers. The PT may be the only provider involved in the management of the patient's pain condition. As a result, outpatient providers recognize the importance of asking about psychosocial factors. PTs in acute care and inpatient rehabilitation function as a member of a multi-discipline team. In these settings, nurses, social workers, and occupational therapists might be tasked with the responsibility of addressing psychosocial factors, PTs working in multi-discipline settings may be more BPS oriented, but routinely ask fewer psychosocial questions.

Limitations

Selection bias threatens the validity and generalizability of the results in the present study (Morgado et al., 2018; O'Reilly-Shah, 2017). The title of the email sent to potential respondents indicated that BPS history-taking practices of PTs was the topic of the survey. The topic of the survey could have encouraged or deterred individuals from completing the survey based on their familiarity with the BPS framework; therefore, the findings of the survey may not be representative of the perspectives of all PTs who evaluate adults with CP (Oberski, 2008).

Respondent fatigue, which may occur when a questionnaire is too long and when the questions are complex, may have been an issue in this study. Research has shown that

respondents highly invested or better versed in the subject matter are more likely to complete a long survey (O'Reilly-Shah, 2017). The survey in this study included approximately 90 questions and the majority of respondents (± 1 SD) required between 11 to 21.2 minutes to complete it. Of respondents who initiated the survey, 18% did not complete it. Additionally, 51.4% of respondents had completed coursework related to BPS and/or PNE in the last 5 years, which suggests that the majority of respondents were familiar with the BPS model. The perspectives of PTs less invested in the subject matter may not have been captured, which negatively affects the generalizability of the findings.

Responses on the survey may reflect respondents' knowledge of BPS framework rather than actual clinical practices. Additionally, social desirability bias occurs when respondents answer questions in the manner that they perceive to be favorable. PTs are aware of the BPS framework, however, in observational qualitative studies, PTs primarily asked about somatic complaints (Oostendorp et al., 2015; Singla et al., 2015). Oostendorp et al. (2015) found that PTs significantly overrated their utilization of the BPS framework when taking the history of persons with CP. The percentage of respondents who reported asking patients questions about the respective psychological subdomain factors in this study was relatively high, which suggests social desirability bias may have been an issue.

The demographic composition of the respondents was skewed in a few groupings. A disproportionately high number of respondents (34.5%) had 26+ years of experience. This resulted in a disparity in the group sizes in the one-way independent ANOVA that was used to analyze between group differences in mean psychosocial scores when respondents were grouped by years of clinical experience. When between group variance is similar, as it was in this age group comparison, unequal sample sizes do not affect the results of an ANOVA (Blanca et al., 2018; Shingala & Rajyaguru, 2015). Additionally, the majority of respondents (54.2%) practiced

in an outpatient orthopedic setting that resulted in a disparity in group sizes in the mixed ANOVA. A violation of the homogeneity of variance assumption in the behavioral factor further complicated this analysis. The decision was made to create equal group sizes by randomly selecting 47 outpatient and acute care cases to include in the analysis, which resulted in equal sized work setting groups. When equal group sizes are present, ANOVA has been found to be robust to violations of homogeneity of variance (Blanca et al., 2018).

Zangoni and Thomson (2017) reported that PTs felt that questions about psychosocial factors were often asked after a therapeutic rapport had been established with the patient. Thus, the history-taking practices of PTs at the first visit may not reflect PTs' actual utilization of the BPS model throughout the full course of care. Respondents may wait until later treatment sessions to explore psychosocial factors, especially emotional stressors that are perceived to be of a more personal nature.

Finally, ABPTS certification was the only postgraduate certification that was considered in the regression analysis. Advanced certifications from other educational organizations, fellowship training, and recent coursework in the pain sciences were not included but may also contribute to the prediction of respondents' psychosocial scores. Future studies should investigate if adding additional advanced training certifications and pain science coursework to the regression model improves the ability to predict respondents' psychosocial scores.

Strengths

The large sample size of PTs with varied educational, work, regional, and professional backgrounds was a strength of the present study. While PTs from outpatient orthopedics comprised the majority of respondents, providers from home health, inpatient rehabilitation, acute care, education, outpatient neurologic, vestibular rehab, and women's health also participated in the study. Respondents practiced in 33 of the 50 states. APTA members, a group frequently

surveyed, represented the minority of respondents. The respondents' years of clinical practice were representative of the current PT work force, ranging from 1 to 48 years. Finally, there are no known published studies that have attempted to quantify the current psychosocial history-taking practices of PTs in the United States. While studies directed at patient centered communication and history-taking have been conducted, this is the first known study to quantitatively assess the psychosocial history-taking practices of PTs in the United States.

Finally, respondents were asked to rate their psychosocial history-taking practices using a survey that, through expert review, had been demonstrated to have face and content validity. Instead of inferring the treatment orientation of providers based on their attitudes and beliefs about pain, the survey measured the self-reported psychosocial history practices of PTs. While further validation of the survey is indicated, this survey represents an important first step in better understanding the psychosocial history-taking practices of PTs in the United States.

Conclusion

This descriptive survey-based study investigated the psychosocial history-taking practice of PTs in the United States when evaluating adults with CP. The relationship between PTs' demographic characteristics and their psychosocial scores on the survey were explored. Years of clinical practice and evaluation time allowed were found to be significant independent predictors of the psychosocial score; gender and ABPTS certification were not significant independent predictors. When the predictors were entered together, years of clinical practice and evaluation time allowed explained 12.2% of the variance in the psychosocial score. The more time and experience providers have, the more questions they ask about psychosocial factors. A significant difference between respondents grouped by years of clinical experience was found; however, the greatest between group differences existed when groups were compared to the less than 5 years of clinical experience group. These findings are relevant to practice; they underscore the importance

of providing mentorship to new providers as they work to improve their history-taking and clinical reasoning skills. Additionally, the findings highlight the importance of allocating PTs sufficient time to assess psychosocial factors.

PTs who practice in outpatient therapy clinics asked more questions about psychological stressors than did providers in acute care and inpatient rehabilitation. While it is likely that PTs from these inpatient settings assume that other members of the team are addressing these factors, it is important that PTs who work across all continuums of care address psychosocial factors. Transformation of the health care system's assessment and management of CP is dependent on consistent messaging about the multidimensional nature of pain when interacting with patients in all settings. Finally, providers, regardless of work setting, assessed behavioral psychological factors to a greater extent than cognitive and emotional factors, and they assessed emotional factors least of all. Behavioral factors are aligned most closely with the functional, mechanical perspective PTs have been shown to take when managing patients with CP. It is important that providers consider the cognitive and emotional factors that contribute to the perpetuation of the pain experience.

CHAPTER V

THE DECISION-MAKING PROCESS PHYSICAL THERAPISTS USED WHEN
DECIDING HOW TO EXPLORE PAIN PERCEPTIONS DURING
THE INITIAL EVALUATION

Background

Chronic pain is the most frequently treated disorder by PTs (van Wilgen et al., 2014). Due to the multidimensional nature of CP, the BPS framework is required to fully assess the complexities of this condition (*Guide to Physical Therapists Practice 3.0*, 2014; IASP, 2018). In order to effectively manage all aspects of the pain experience, a thorough assessment of psychosocial factors during the history-taking portion of the initial evaluation is required (Wijma et al., 2016). Throughout the evaluation, PTs make many decisions about the depth to which they should assess the psychological and social factors. While it is important to understand the decision-making processes that PTs utilize when assessing biological and social factors, research has found that maladaptive beliefs about pain affect clinical outcomes and disability levels in people with CP to a greater extent than the actual level of tissue damage (Foster et al., 2008; Foster et al., 2010; Woby et al., 2007). For this reason, it is important that the decision-making processes that PTs use to decide how to investigate pain beliefs and perceptions and their associated factors are understood.

Perception-based constructs, such as catastrophic thinking, perceptions about the cause of pain, expectations about pain progression, pain management self-efficacy, and pain acceptance comprise the cognitive subdomain of the psychological domain and shape the interpretation of pain (Oostendorp et al., 2015; Roussel et al., 2016; van Wilgen et al., 2014; Wijma et al., 2016). Illness perceptions, self-efficacy, expectations, and pain acceptance were found to be stronger

predictors of disability than pain, depression, and fear avoidance behaviors in individuals with chronic low back pain; the four predictors accounted for 56.6% of the variance in disability (Foster et al., 2010). The published studies that have investigated PTs' assessments of pain cognitions were conducted in Europe. Van Wilgen et al. (2014) and Roussel et al. (2016) found that PTs predominately asked biomedically oriented questions and did not sufficiently cover the cognitive psychological domain during their history-taking sessions when evaluating individuals with CP. Few questions were asked about patients' overall understanding of their conditions and patients' expectations were not fully explored; for example, when questions were asked about pain self-efficacy, PTs narrowly interpreted the construct and asked about what the patient could do to alleviate their pain (e.g., position change, stretch; Roussel et al., 2016).

The importance of identifying maladaptive pain perceptions is critical to implementing evidence-based treatments (Russek & McManus, 2015; van Wilgen et al., 2014). For this reason, it is important to understand the decision-making processes that PTs utilize when deciding how to assess the pain beliefs and perceptions of patients with CP. Clinical reasoning, or practice decision-making, is a practice-based, profession-specific method of decision-making that is based on a scientific body of knowledge that prepares providers to recognize clusters of signs and symptoms associated with specific conditions (Edwards et al., 2004; Higgs et al., 2018). It is through reasoning that clinicians synthesize and prioritize the information to establish a diagnosis and develop the plan of care that will best address patients' movement-based disorders (Smith et al., 2008). While there are a number of clinical reasoning models, the general consensus among researchers is that PTs predominately utilize hypothetic-deductive, pattern recognition, and narrative reasoning when making clinical decisions (Edwards et al., 2004; Edwards et al., 2006; M. Smith et al., 2008). Hypothetic-deductive and pattern recognition reasoning are primarily used to establish a diagnosis (Edwards et al., 2004). The aim of narrative reasoning, an inductive

process in which the patient's lived experience of pain is understood through extensive observation and interaction with the patient, is to understand patients' pain stories (Edwards et al., 2004; Edwards et al., 2014).

There is a paucity of published research that has examined the decision-making processes utilized by PTs who practice in single discipline outpatient settings in the United States when deciding whether to explore psychological pain cognitions of adults with CP at the initial evaluation and how extensively to do so. The aims of this study were: 1) to explore the decision-making processes used by PTs during the initial evaluation to determine both the need for and scope of the assessment of psychological cognitive factors in adults with CP, 2) to understand what internal and external cues PTs attend to when evaluating a patient's thoughts and beliefs about their pain, and 3) to explore how those cues influence PTs' decision-making processes.

Methods

Theoretical Approach

Social constructionism upholds that there is not one reality, but instead that reality has been constructed through the interactions between and within members of a social group (Patton, 2015). Language is central to this shared reality. Language is considered a "precondition for thought" (Burr, 2015, p. 7). Meaning and understanding of reality are framed by the language used to categorize and describe the experience. Beliefs, attitudes, and patterned ways of thinking can be identified in verbal communication (Burr, 2015); thus, the reality of a group can be understood through analysis of the group's shared language (Burr, 2015; Patton, 2015).

Through experience and education, PTs are socialized to approach psychosocial history-taking in a specific manner. The process PTs have undergone to gain "membership" into the physical therapy profession shape their professional attitudes, beliefs, and behaviors. PTs share a common language. Analysis of the language used reveals an understanding of the way in which

PTs construct their understanding of patients' pain conditions and the psychosocial factors that contribute to that condition. The shared language provides context to better understand the thought processes PTs utilize when making clinical decisions about pain cognitions. The thought processes occur within the context of the shared language; therefore, through the analysis of language the thought process of the PT is revealed. Social constructionism informed the analysis of the current study.

Subjects

Purposeful sampling was used to recruit five PTs from one-discipline outpatient orthopedic physical therapy practices in the Northeastern region of the United States. A minimum of three years of outpatient orthopedic clinical experience was required to increase the likelihood that the PTs had developed methods of clinical reasoning and memory-based patient databases from which to make inferences. Efforts were made to recruit an equal number of male and female PTs with varied levels of clinical experience. Clinicians were contacted by phone and email; information about the purpose of the study and inclusion criteria was sent via email to the clinics. Interested participants contacted the principal investigator (PI) by email. No more than two therapists were interviewed at one site. PTs were observed evaluating English-speaking adults (18 years or older) who had pain for three or more months. The PTs selected the patient that the PI observed. The demographic data for PTs is provided in Table 24.

Table 24

Demographic Data Participants

PT	Gender	Years of Experience	Advanced Credentialing/ ABPT Specialization	Entry-level Education	Residency	Course on BPS/PNE	PABS Score (F1, F2 _a)
A	Male	7	Vestibular rehabilitation	Doctorate		no	(32, 31)
B	Female	20	Hippo therapy	Master's		no	(27,39)
C	Male	3	Level 1 Dry needling/OCS	Doctorate	Orthopedics	yes	(41, 25)
D	Female	3	Manual therapy certification/OCS	Doctorate		yes	(33, 19)
E	Female	28		Master's		no	(32, 41)

*Note::*_a F1 = Factor 1, F2 = Factor 2

Instrumentation

An online questionnaire created in Psychdata® was used to obtain the treatment orientation, educational background, and work experience of the PTs who participated in the study. The questionnaire consisted of the PABS-PT and approximately 25 demographic questions. The PABS-PT is a 19-item instrument developed by Ostelo et al. (2003) that is scored from 1 to 6 utilizing a Likert scale (6 = *strongly agree*, 1 = *strongly disagree*). It is a self-administered questionnaire developed to measure the strength of the biomedical and biopsychosocial treatment orientation of PTs who treat individuals with low back pain. Using principal factor analysis, Ostelo et al. (2003) identified two factors upon which a list of attitude and belief statements about low back pain was loaded. A high score on Factor 1 is consistent with a behavioral/biopsychosocial orientation and a high score on Factor 2 is consistent with a biomedical orientation (Ostelo et al., 2003). A Sony ICD-PX470 recorder was used to record the interviews.

Procedure

Recruitment of PTs was initiated after IRB approval was received from Texas Woman's University in the spring of 2019. The recruitment information and the informed consent form stated that the purpose of the study was to understand the evaluation practices of PTs when evaluating adults with CP. Prior to the observation of an evaluation and the interview, the PI obtained written informed consent from the PTs. The PTs completed the online questionnaire. The participating PT obtained initial verbal consent from the patient; after which, the researcher obtained informed consent in writing from the patient. The PI observed the PTs as they conducted the evaluation of the individual with CP. Written notes were taken during the observation by the PI and included the content and sequence of the questions posed by the PT during the evaluation. Notes about the observed interaction between the PTs and patients were also made. Following the

evaluation, a 30 to 45-minute semi-structured face-to-face interview of the PT was conducted by the PI in a private setting within the clinic. The interview questions are provided in (see Appendix E). The purpose of the study was revealed to the PTs after the third question. The interviews were audio recorded. After the interview, the PI recorded her reflections in the notes. This included the PI's perspective on the extent to which PTs covered the psychological cognitive factors during the evaluation. Throughout the data collection, analysis, and manuscript writing process, the PT maintained a journal to aide in the identification of bias.

Graduate students transcribed the interviews were transcribed verbatim. The graduate students signed IRB approved confidentiality statements prior to transcribing the interviews. The PI listened to the interviews and read through the transcripts three times. The PI then listened to the interview while checking the accuracy of transcription. A PhD nurse researcher with a background in qualitative research was consulted throughout the analysis and coding process. The PI shared the preliminary coding with the researcher and in consultation with her collapsed initial coding into the coding that will be presented in the results section. The nurse researcher was involved in the identification of a preliminary decision-making process. Member-checking was performed, and follow-up questions asked. Four of the five PTs responded and stated that they agreed with the findings.

Analysis

A multiple case study design was used. An inductive cross-case pattern thematic analysis was conducted. Analysis was informed by social constructionism and driven by the research questions. When conducting analysis of multiple case studies, the cases are examined for similarities and differences (Baxter & Jack, 2008).

The development of an initial list of codes was conducted by using open line-by-line coding of the transcripts. The PI conducted all preliminary coding. The PTs' responses to

individual questions were then entered into NVivo12 and word frequency analyses were conducted. Word clouds were created. The preliminary codes generated using open line-by-line coding of the transcripts, the NVivo word frequency charts were compared, and patterns were identified. After extensive discussion with the nurse researcher, the initial codes were collapsed into categories. Final categories that identified the cues and factors that the PTs attended to when assessing pain cognitions and the decision-making processes PTs utilized were developed after critical discussions with the PhD nurse researcher. The field notes were then reviewed and compared to the categories and processes identified through analysis of the transcripts.

Trustworthiness of a study's findings is demonstrated through 1) credibility, 2) dependability, 3) transferability, and 4) confirmability (Korstjens & Moser, 2018; Shenton, 2004). The following methods were utilized to increase the trustworthiness of the study's findings:

1) To establish credibility, the researcher maintained a reflexive journal to identify bias in the data collection and analysis phases. Collecting data in multiple sites ensured the triangulation of data. Investigator triangulation was accomplished by including the nurse researcher in the interpretation decisions. Method triangulation was done by using the data collected during the observation and the interview. The principal investigator is a PT who has treated CP patients in outpatient physical therapy clinics for over 20 years. She is familiar with the culture and environment of these types of settings, which lends to the credibility of the researcher's findings. Finally, member checking was used to confirm the results of the analysis of the transcripts and observations.

2) To establish dependability and confirmability, a clear explanation was provided of the analysis process to include data reduction decisions and the process that led to establishment of themes. Details regarding the methods employed and interview questions asked were provided.

3) To ensure the transferability of the results, the demographic profile of interviewed PTs was provided. The context of the case study was described in detail, which allows a future reader to determine whether the findings of the study are comparable. This also allows future researchers to reproduce the study; however, given that this is a multiple case study of PTs in outpatient clinics in the Northeastern region of the United States, the findings of a reproduced study may differ.

Results

Language

Analysis was driven by the research questions and informed by social constructionism. Social constructionism holds that a group's shared language shapes group members' understanding of reality. To this end, word-frequency analyses of the PTs' story syntheses and the initial observations of their patients were conducted to identify the language framework that shaped the PTs' thought processes prior to them learning the purpose of the present study. Words were grouped based on whether they belonged in the biological, psychological, or social sphere of the BPS framework. As can be seen in the word clouds in Figure 9, therapists primarily focused on issues in the biological domain, with an emphasis on words that described function and mobility. The word clouds in Figures 9 and 10 depict the frequency of PTs' word usage prior to learning the purpose of the study. As will be discussed in the PT/internal factors section of this paper, the use of biomechanically oriented language continued after the purpose of the study was revealed.

(1)

Those are like your kind of red flags saying like this person definitely needs pain science. PT-D

I will discuss with them you know we go through the pain cycle, this is what's going on,..."this is what's happening you know "this is what's going on with your brain is saying this... so now we need to retrain your brain in some way or another"I try to give them a little bit of a you know a little bit of education.

PT-E

That education part of it is really important and I think um pain science, it it should happen with everybody. PT-A

(2)

He definitely had high fear avoidance beliefs about his pain, because, he has not even exercised. umm and hasn't been using a cane anymore and umm is kind of fearful of of doing the things he used to be able to do with without problems. PT-D

He acknowledged that he should still be moving, but he hasn't been bending and lifting anything. So, there's clearly some sort of fear avoidance there. PT-C

Factors and/or Cues that Influence the Decision-Making Process

Given the exploratory nature of this study, there was insufficient data to fully answer the questions posed. The findings that did emerge indicated that there were PT related factors and

factors/cues external to the PT that influenced the decision-making processes of PTs. Those factors each had subthemes that are explained below. In addition to the concepts that emerged, a brief discussion will be provided to highlight how these factors influenced PTs as they reasoned through their decisions to explore pain beliefs.

PT related factors. Analysis revealed that the decision-making process was influenced by 1) evaluation practices, and 2) judgements, attitudes, and beliefs. Concerning evaluation practices, 1) PTs described the overall evaluation as an iterative process, especially when assessing psychological factors, 2) the PT's description and the observation of evaluation revealed that the evaluation was predominately biomedical in nature, and 3) the development of a therapeutic alliance was considered a primary objective of the first visit. Values, beliefs, and judgements that the PTs had developed through clinical experience also influenced the decision-making process.

Evaluation practices. Evaluation as an iterative process. History-taking was observed to be an iterative process that extended beyond the sit-down information gathering portion of the initial evaluation. All therapists continued to ask patients about their pain conditions in the objective portion of the evaluation. Additionally, four of the five therapists explicitly stated that the evaluation process of the patients' conditions, which included psychosocial factors, would continue over multiple sessions. No patterns were identified in the analysis between the prioritization of a therapeutic alliance and the demographics of the PTs. The PI observed one of the five PTs asking questions that pertained to pain beliefs and perceptions during the observed evaluations. The iterative nature of the evaluation of psychosocial factors would support the PI's observations of the PTs' evaluations. The quotes below demonstrate the PTs' thoughts about the assessment of patients' pain perceptions and beliefs at the first visit.

We didn't get to look into all of that today, but we will in the future....I didn't ask about his mental health at all. I'm sure he does have some of the depression along with you know having the medical diagnosis in the past, so we will dig more into that in the future. PT-D

In terms of pain management, it's rare that I will bring up pain science on day one unless it's clearly a chronic pain issue and the patient knows that they're here for chronic pain...Because I feel like that subjective exam is never over at day one... you build into that as you go...I'll bring it up (pain beliefs) with any patient....It's just the manner in which I bring it up... I might not do it (ask questions) in the first visit. I might plant seeds, I guess...and that is where the extended treatment sessions probably are best to address that. PT-C

I communicate with every patient differently, attempting to customize questions to their level of comfort in sharing with me intimate details at the first visit. I probe more if I believe the patient is ready to share with me. I wait with others, if they are less revealing about pain, until we have developed a relationship of trust over time. My experience has also been that as I get to know people over several visits they reveal more. PT-B

Let's, let's peel back a layer or two here we may not get all the way down but let's, let's start somewhere...I'm not trying to rule out everything I'm trying to find some place to get started and get moving and you know we'll peel it back from therePeople always look different the second visit...it's (the evaluation) is a snapshot...I'm not ruling anything in or out. I'm just trying to

get the arrow to point one direction or another and get you here and get you, get you bought in maybe to the idea that we know a little bit about what may be going on.... To me it happens every day. Every time you see them, you're trying to get them to talk about something that's really complex and hard to talk about, umm, it's variable...And, then tomorrow or the next time we see them I'll get another snapshot and another conversation and maybe they'll be more or less, maybe it'll be more consistent or less consistent. We will see what happens at that point. PT-A

Biomedical focus. The nature of the questions asked during the observed evaluations was predominately biomechanical/biomedical in nature. The word biomedical was used to describe all testing and data that PTs gathered which would indicate that the patient's pain condition could be attributed to tissue damage and/or an identifiable biological structure. All PTs' questions pertained to movements that produced pain, pain intensity, descriptions of pain, past medical history (PMH), diagnostic testing, and functional limitations. Three of the five PTs started with the question, "So, what brings you here today?" and two of the five started by asking about mechanism of injury (MOI). By the second question, all PTs had asked about MOI. Given the range of years of clinical experience among the providers, the questions asked were remarkably similar in content and sequence.

As discussed earlier, word-frequency analysis for the PTs' stories illustrated that the terms that pertain to the biomechanical/biomedical factors comprised the majority of words used by the PTs. When asked to tell a story about the patient they just evaluated, four of the five PTs' stories (1) pertained almost entirely to the patients' symptoms, PMHs, functional limitations, gait patterns, and the PT's objective findings. Two therapists (2) indicated through their stories that there were psychosocial factors involved.

(1)

She fell and she had injured her back. She has symptoms down her legs, and she knows that something is going on...my concern would be that she has not had a neuro consult yet. PT-E

He has pain from his lower middle back area, and then stiffness, more stiffness than complaint of pain in the neck limiting his ability to move his head and neck, or twist, as well as pain with bending or lifting movements, but mostly the first thing that struck me was that he had no upper extremity or lower extremity referral of his symptoms. PT-C

She has a history of arthritis... seems mobility is significantly more difficult for her recently... I don't get the feeling that she's able to move on her own that much. PT-A

(2)

He had pain and he seems not to be letting it bother him too much... he seems to still be exercising and enjoying his life...but he's just a little bit fearful of doing those things. PT-D

She lives alone in an apartment and she's very active in the community, volunteering and participating in exercise groups...she has pain in both joints, osteoarthritis in both joints and is only able to go out for an hour or two.. shopping or out to lunch. PT-B

When asked to share their initial impressions of the patient as the patient went from the waiting room to the treatment room, all therapists described the patients' gait patterns and general mobility. The word cloud in Figure 10 illustrates the frequency that the PTs mentioned gait, walk, and walking. When asked how the initial impressions shaped the types of questions that they asked the patients, all therapists acknowledged that their initial observations influenced the types of questions that they asked during the evaluation and influenced their understanding of the patients' conditions. Examples of PTs responses to the question are provided below:

I do keep it in the back of my mind so that when they tell me what happens.... I can try to figure out in my head what needs to be done...what needs to be treated...what needs to be tested. PT-E

What influenced me in terms of where I'm going to examine was umm.... I did, I did notice he was quite off balance, so I wanted to to look into that. We didn't get a chance to look into all of that today, but we will in the future. And I wanted to look more into his umm global strength because you could tell he was pretty weak. Umm and uhh just definitely the neuropathy issue. umm I just wanted to make sure I checked all of that. And his sensation... PT-D

So, I try to use that walk to figure out about half of what I need to know. PT-A

When asked to identify factors that would trigger them to explore patients' pain cognitions, in addition to other cues, all therapists referenced inconsistencies between biomechanical/biomedical factors and the patients' presentations. The PTs interpreted the pain cognitive factors through the lens of a biomedical/biomechanical conceptual framework. PTs frequently initiated their responses to the PI by describing the patient's objective exam. PT-A

went on to say that these observations were the reason he did not ask about the patient's pain beliefs. The following quotes highlight this finding:

She had no limp. She had no um apparent um difficulties in range of motion, and with you know sitting down, filling out the application, giving back to me, standing from her chair and coming back to sit in this chair. Because I observe all of those things without asking any questions because it's a functional activity. Um, but when I asked her about her pain she said, '10 out of 10. My whole body hurts except for my hands which are okay.' So, the fact that she walked in here without a device and had no limp started my wheels turning, like what are we talking about here? PT-B

I think specifically in terms of the back (pain), (her complaints were) sort of consistent with her directional preference in terms of... "well yeah that's no good and this is better" Sometimes we'll see some wild inconsistencies in connecting the directional (movement) preferences to the experience... But she seemed to have a pretty... "Oh yeah, yeah, yeah you're right sitting and standing" and and it it seemed like, as I started to talk a little bit about, umm... some things that she may do during her day What's it feel like in the morning? How do you feel sitting? What's tough for you?... you know, um, it seemed like she had a good understanding of that relationship" PT-A

Two of the five PTs emphasized that their focus with patients was primarily on function and that this focus was the backdrop for all decisions that they made about the patient. Their observations of patients' movement and functional abilities shaped their perspective of the patient

and framed the decisions that they made about the types of questions they asked them (see quote from PT-B directly above and below). Throughout the interview, when asked to explain why she chose to ask or not ask questions, PT-B frequently cited information that she gathered from questions she posed about function and activities of daily living. In this example, she demonstrated how she made inferences about the patient's motivation based on the patient's reported activity level. When asked to explain how she decided that she did not need to ask additional questions about motivation she stated:

She said a few things like "I've been in pain for a long time. I know what it is and I know how to deal with it. Um, and, I'm not going to let it stop me". She specifically said that. Um, she wants to ...the other ladies in her life are doing a whole list of things and she wants to try to keep up. I always use a question; I probably used it with her, of what's your daily routine like? I, I, I don't like to say to people "are you out of work?" because I think it's kind of a negative connotation. So I'll say to them 'What you do on a regular basis'... Um, so I let them tell me. 'What you do on a daily basis? PT-B

PT-A's discussion of pain perceptions and beliefs was also predominately centered around function. He drew a clear line of demarcation between pain and function throughout the interview and stated on multiple occasions that his focus was function. He stated that he was willing to discuss pain beliefs and perceptions and felt that they should be addressed but that his role as a PT was in the realm of function.

We're really working here to improve your function patient B , so that you can, you can hold your grandkids.' If we can affect this (referring to the patient B's

pain) great, but we may be less effective at that....It's um... it's, it's, it's all about function. That's the world I entered, it's not the world I constructed...what we're really trying to do here as a profession. PT-A

PT-C discussed the patient's pain beliefs and perceptions with the patient during the observed interview and the PT shared that he directly asked questions about pain beliefs and perceptions. He, too, indicated that when he educated the patient about their condition, the context with which he framed his explanation of the patient's condition was in the realm of the patient's symptoms and function.

I try to keep it more symptoms-related and function based than anything else.

PT-C

These findings provide context for the decision-making process. Through their patient stories, initial patient observations, and the cues that they attend to when deciding whether to assess patients' pain beliefs, analysis revealed that PTs predominately looked at patients through a biomechanical/biomedical lens.

Therapeutic alliance. Analysis revealed that the development of trust was a primary objective of PTs at the first visit. The PI did not ask questions about therapeutic alliance. The majority of PTs prioritized a therapeutic relationship over the assessment of pain cognitions at the first visit. Four of the five PTs explicitly stated during the interview that their focus was on forming a connection with the patient that would make the patient comfortable and open to the therapeutic process.

I want to make sure that um, it's starts fairly conversational...I find a little bit of that that that back and forth trying to... maybe, a little less clinical and a little

bit more conversational... I'm just trying to get you here and get you, get you bought in maybe to the idea that we know a little bit about what may be going on. That we're on your side. That we're going to get you moving in a way where you're going to be in charge. You're going to understand what you're doing and why you're doing it and why we think it may be helpful. And if not, we're going to talk about what's working and what isn't working and we're going to try something else. PT-A

On the way out she said I really like it here. Its very homey and you, you were so nice so to meokay... good that's a good thing, I want them to be comfortable. You want them to be comfortable when they come in. um so that they know that I, I understand what's going on. I get what, what they're going through...So it's a trust thing on that that so that fearful pain that they have... well, I think it's up to me to get them to trust me more so that I can get them to do what they need to do. PT-E

Four of the five PTs stated that at the first visit they prioritize developing trust and rapport with the patient over the exploration of pain beliefs. In the quote provided by PT-B, she stated she was not likely to investigate psychological factors until a therapeutic alliance had been established.

I think both (therapeutic alliance and pursuing psychological pain cognitions) are important, however depending on the patient I may focus on establishing a therapeutic relationship on day one and not explore their beliefs about pain just yet if I think they need more time to gain my trust. PT-B

Interestingly, PT-A considered the discussion of psychological factors part of the trust building process. By engaging in a conversation about personal factors, the PT felt the connection between the provider and patient deepened. However, he did acknowledge that he follows the lead of his patient and may opt not to discuss these issues if the patient does not yet appear comfortable with him.

You have to establish that relationship and I think that in some cases exploring their pain beliefs will be component of that and in some cases maybe not. PT-A

Values, judgements and beliefs. Analysis revealed that values, judgements and beliefs influenced PTs' decision-making processes. All PTs verbalized the (1) importance of understanding the contribution psychological cognitive factors had on their patients' pain conditions. However, statements were made during the interview that suggested that it was (2) best to address psychological factors indirectly and only when the psychological factors were interfering with the "real work" of PT. In the quotes provided below, the influence that the attitudes and beliefs had on the decision-making process is also demonstrated.

(1)

I think they (pain beliefs) need to be addressed in **everyone**. I think it's really **complex**. I think we all sort of start from that that tissue damage perceptive. I like to start talking about it with everyone. That um, um there can be a lot a lot of factors involved. So, I don't, I guess I don't necessarily wait for a red flag that says hey we need to talk a little bit about about um acute pain versus chronic pain. Let's just make that part of what we talk about when we start to talk about. PT-A

(2)

I think I wanted her to move on from that thought process... there's more we can do other than talk about this pain in this hour that we have together. And maybe give her a little success and a little functional mobility activity so that when she gets home or gets back into the car maybe she's not moving so gingerly anymore. Showing herself what she can do. PT-B

If the volume is cranked on the (pain) narrative and because we because we're so focused on this (pain) we're not doing any of the real work (function/movement based therapy) then well, 'well I haven't done any of my home exercises for 3 weeks, it just hurts too much' Well then we got to we got to get in it (conversation about pain). PT-A

One therapist shared an example of a patient that she had encountered who displayed signs of pain catastrophizing. When asked whether she decided to verbally explore the patient's pain perceptions and beliefs, the therapist stated that she shifted away from talk therapy towards movement and function. All PTs mentioned scenarios in which they would discontinue talking about pain and shift towards a focus on function.

I kind of move on from focusing on the pain at that point to more functional and getting started on the treatments... (later in the interview when asked what has influenced her approach) I've heard people speak with chronic pain and heard how they wanted to be pulled out of that. How they did not realize what they were doing until they felt a little better. Then they looked back and knew

that they were spending too much time just thinking about the pain and trying not to get out of it. PT-B

At no time did the PI ask about the veracity of patients' pain complaints. Three of the five PTs, when asked about factors that trigger them to consider psychological pain cognitions, shared stories of past patients with secondary gain issues.

With having years of experience, you can sometimes tell when they are not telling the truth. Sometimes just observing them and they tell you one thing but are showing me another thing.... that will trigger you. PT-E

I'd like to believe that people are trying to tell you the truth... until proven otherwise." But part of that can be tied to their past experiences with PT or another doctor, or, or, "boy am I struggling' to try to get some treatment here as well". So, there can be a lot of reasons for that as well. Again, I think it's our job to just to simply... remain open to the truth. How do we stay open to it so we don't miss it when it may come out? There may be some other stuff that happens along the, along the way. Let's, let's not shut down, Umm, let's we don't I don't look at it like an attorney where I don't have to prove you're lying today, I just have to prove you lied once and your testimony is no longer relevant because you lied in 1972. I I don't want to look at it that way because you may be talking about it um, um, one way or the other right now, let's let's remain sort of open and optimistic to that.... the the sort of the true experiences somewhere in there. PT-A

There were statements made through the PTs' word choices that provided insight into how they might perceive the psychological domain of the BPS model. PT-C used the phrase "dip my toe into that pool" when asked to discuss how the PT knows that pain beliefs and perceptions need to be assessed.

I don't need to necessarily need to bring up something like pain science just because it seems like ok this is more mechanical; you're responding well to some of the treatments even if you know their treatment or not. So, that's giving me a way of like ok we can do this without necessarily diving into that pool (pain science). Um... there are other patients where if the symptoms are kind of all over the place, they're not necessarily as responsive to certain tasks, now you're starting to think, ok well if everything's not lining up the way that, you know, as cleanly as like a perfect objective measurement might, that's when I would start to dip my toe in that pool. PT-C

When PT-A was asked to explain his thought process when he decided to shift from a mechanistic explanation of the person's pain presentation to exploring the person's relationship with his/her pain, the therapist responded...

So I think, I think, yeah, I think I'm thinking about that [pain cognitions] the whole time. I don't think um, um, I'm drawing a line in the sand that says boy once I get three things that don't make sense were going shift over here and and test for fibromyalgia. PT-A

PTs reported using clinical judgment to decide whether pain beliefs and perceptions should be discussed with patients at the time of the initial evaluation. While all PTs

acknowledged that they would eventually broach the topic with patients regardless of the circumstances, patients' receptiveness to the questions and message were frequently referenced as a cue for which PTs were watching. The PTs relied upon their clinical experience and ability to read patients to determine how to proceed.

Some people want to hear it all, they want to know all the science, some people couldn't care less....I feel that the people you have got to figure in the population that you're dealing with lately I think ...some people I treat would rather talk to me but most are doers (yeah). So, I have to juggle that to figure out which one. PT-E

Would that raise the stress level and potential pain mechanisms? Yeah, probably. It's not something I'm going to bring up right now because it's probably the last thing he wants to hear about is how his fault for the accident is also causing his pain. You know, right now he probably just needs reassurance that it can get better.... But essentially, yeah, that would probably come up later. Yeah, and for him specifically because I know him well enough, we could probably jump into that conversation maybe sooner than with other patients.

PT-C

When asked what had influenced their decision-making approaches, two of the five PTs stated that their own experience with pain influenced their understanding of the pain experience and the approach they took. While they stated that they recognized that their patients' experiences with pain might be different from their own, both suggested that they used their own experience as a barometer to gauge patients' progression through their condition.

I know how I respond... I know my personal experiences with injury and how you, how you work through that as well and what activity does to me. Now, that doesn't mean that everybody responds the way I do but, but, how your your own life looks with ups and downs. At that, um... that where you are today, isn't... necessarily linear from where you were, in terms of pain in terms of what you going through, isn't isn't linear from a week ago. There's, there's some up and down to it as well. So, um, I think my own experiences with it umm have been helpful. PT-A

I've had my share of medical issues myself. I've had surgeries, I've had children. So, I think that's, I use my own point of reference for pain compared to other people with the same sort of injuries. PT-B

External influences/cues. Analysis revealed that external cues/factors influenced PTs' decision-making processes at the first visit. PTs described patient cues that prompted them to explore pain beliefs. Healthcare system factors were also cited.

Patient cues. Inconsistencies between patients' presentations and the findings of PTs' objective examination were the most commonly cited cue that PTs attended to when deciding whether to ask about pain beliefs. When asked to explain how what they read, heard, or observed made them think that a patient's pain beliefs should be assessed, the majority of PTs referenced biomedical/biomechanical factors.

If your starting to get some, some inconsistencies coming back, you can start, you can start to address those (pain beliefs) a little bit. ... I think I'm trying to look at it biomechanically sometimes...and just, umm, umm... you know, perhaps, just trying to understand... you know... "how hard you are working to

do that?” Then if you’re in another position where you’re talking about, umm, you know feeling an excruciating amount of pain ..umm... umm... in maybe a gravity minimized position where maybe you’re not working as hard. Umm, that may lead me to believe that there’s something else, something else going on in terms of how they’re thinking about, about their symptoms. PT-A

It depends on where the pain, where it is. It would depend on you know “are you able to do activities of daily living?” “can you sleep okay?” that type thing. “is this a sharp pain?” “is it a dull pain?” “is it a nagging pain?, is it a burning pain?”.. you know, all those specific types of questions, I would ask but you know then come back and ask them in a different way... you know and then go from there. And if their actions are different than um what they are telling me... then, um, I’m usually quiet about it... and I just try to observe some more to see if that’s what it truly is. PT-E

The less cut and dry my evaluation is, the more I’m starting to think of, well, there might be something else going on here. You know, the pain mechanisms might have more of a... more of a... a reason behind them being here... But I guess the more I would see on someone’s intake, the more... stuff would be there, I would start exploring different avenues...If their symptoms are kind of all over the place, they’re not necessarily as responsive to certain tasks...The intake honestly is a big one that I look at in terms of how someone maps their pain. If they are all over the place and they can’t be super specific about their pain I’m just like, oooh, alright, we need to get to the nitty gritty. And if its specific x’s and specific marks then at least you know... it, it seems a little bit

more narrowed in, in terms of treatment. If it's all over the place, then it's hard to... it's hard to conceive that something truly mechanical is going on... If it's affecting both shoulders down to the knees etc. Or, for example, I use I use that as an indicator. PT-C

Additionally, PTs reported patterns that indicated to them that pain beliefs should be addressed. These patterns included (1) atypical pain provocation patterns; (2) the manner in which patients characterized past healthcare encounters with providers; (3) heightened concerns about their pain condition relative to the injury and/or “hyper-focus” on pain (also demonstrated through increased focus on past diagnostic testing results and/or medication use); and (4) the chronicity of the patient's pain condition . The cue most frequently cited by all PTs was that the patient had heightened awareness or attention directed towards the pain conditions.

(1)

I mean, what, what brings on the symptoms in general. I mean if it's a... it's in like a, an 18 year old kid and he's, he's, he's throwing a baseball or he's like pitching or something immediately I would be thinking mechanical, but if I learn more about that patient as we go on, and his shoulder only hurts when he's pitching like when his dad is watching, that's completely different. That's a factor that can't really be measured via objective measurements. So, I don't know. It's hard because it's patient specific. PT-C

(2)

If they sit down and say, “I’ve tried everything”. And you know” I’ve done PT in the past and it hasn’t helped”. and “I’ve been to this doctor and this doctor” or “I’ve had surgery” or you know “they think I’m going to need surgery. PT-D

(3)

I guess the first word that would come to mind would be worried. He seemed concerned about what his symptoms meant...I mean he knew that it (pain) was affecting his ability to move his head and neck, but then I tried to get him to tell me well what’s the difference between stiffness and pain and he couldn’t really even tell me. So, I don’t really think he was differentiating anything... and he mentioned in his past medical history. I think he was concerned about, “ok how was this going to affect what happened to me previously” Um, so, you know, I think that goes, into even him bringing up like the steps he went through, like calling the surgeon to make sure everything was okay....Going through all the images and x-rays like that was pretty clear in his mind about all the, everything that happened. So, I think he was more concerned about his previous symptoms. And maybe “is this going to elicit or bring something back that was happening before. PT-C

If there are high fear avoidance belief, umm, pain catastrophizing things like that... as you know... They’re afraid to do something that hurts... umm. Or even looking at somebody doing something makes them hurt or umm. They’re

fearful of their return to work for this reason umm or They're, they're saying things like "will I ever get better or will I need surgery? PT-D

If they use pain in every other sentence... PT-E

Some people want to give you their list of their medications, and their milligrams, and how many times a day they take them. And, how long they've been taking them and when the prescription changed. That I can already tell is someone who's very focused on the pain. PT-B

(4)

One is the the chronicity of his pain, it's been going on for three years... I could tell it's, it's just definitely affecting his daily living.... The patient I just saw, she has more of an acute thing going on... So for her, I'm not going to talk much about pain science, but with anybody who's had pain for a long time, that's something that I will talk about. PT-D

Finally, four of the five PTs stated that patients' countenance and body language cued them to explore the psychological pain cognition subdomain.

You are going to see it in the body language..... PT-E

Sometimes it's just in their body language ...so just the way they look. Umm you can see people's emotions based on their body language... umm ...how they sit, how they walk, how they umm just present themselves in general... So it's just appearance, listening, and their body language. PT-D

Healthcare system. Three of the five therapists cited that the healthcare system influenced their decision-making processes at the first visit. The need to provide (1) documentation for the referring physician and (2) the insurance company influenced the nature of the questions they asked patients. Finally, one therapist stated that (3) the dominant biomedical perspective within the healthcare system influenced her to assess all contributions to the person's pain experience and to improve the pain literacy of the therapist's patients .

(1) When asked if the therapist further explored patients' pain beliefs, the therapists replied.

I mean what's also going on in my mind is what I have to document for the doctor. So, I need a whole lot more from her other than just her numbers on how much pain is in each body part. I need function. I need her strength. I need her activity tolerance. PT-B

(2)

When I try to get authorization for additional visits to work on somebody's limitations and I can't document what somebody wants to see in a cubicle somewhere, "But we're still really working on, um patient A's pain beliefs. Strength is great. Range of motion is great." Denied! Thanks for playing. Game, game over. And I'm not, I'm not saying that we're then coloring what we do. It's just that's the reality of the... of the reimbursement structure that we work within.... We work in a world created for us...what are the insurance companies willing to pay for. You can view that as either a silver lining or a dark cloud overhanging the whole process. Either way, we still have to be true

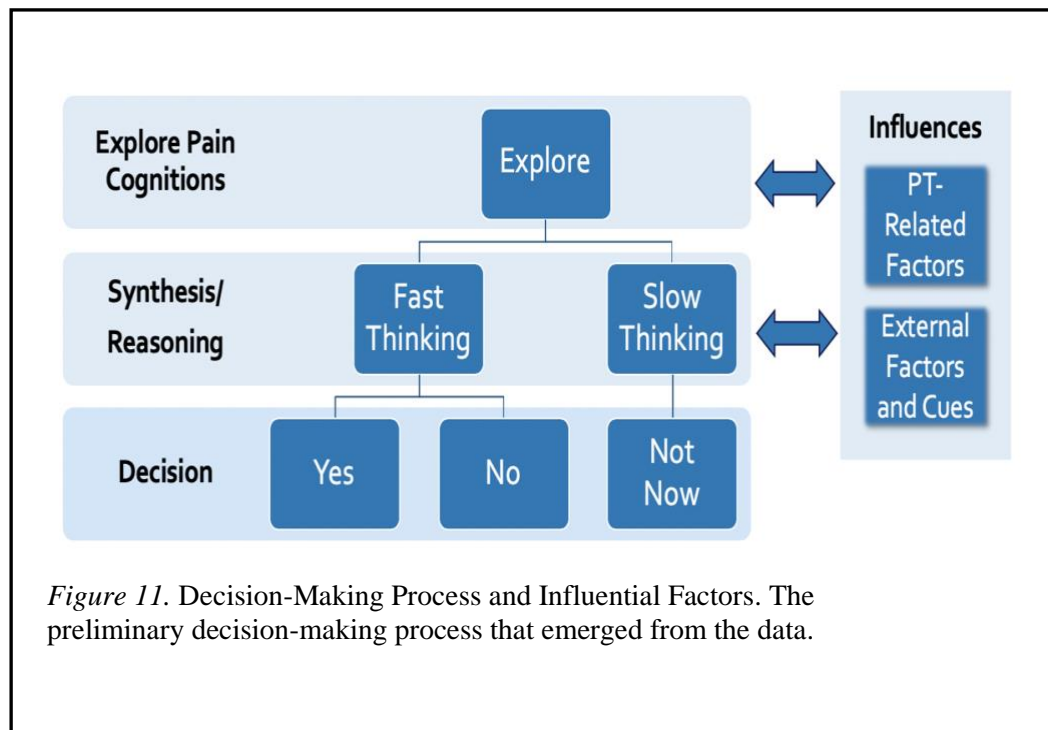
to the situation that we find ourselves in as clinicians... we have to be reimbursed so we can keep the doors open to help our patients. PT-A

(3)

The traditional healthcare system, it's it hasn't done a lot of good for people with the over prescription of the opioids and all that... that was going on. And, surgeries that a lot of times are unnecessary.... umm and doctors not spending a lot of time with patients... that's not their fault either ...but, umm... The biomedical model is is also scaring people and telling them the wrong information. My influence would be just trying to change the way we think about pain and trying to change patient's perspective on pain too. PT-D

Reasoning Strategies and the Influence Factors have on the Process

Analysis revealed that PTs made decisions utilizing fast thinking and slow thinking strategies. PTs shared instances in which they employed automatic or fast thinking when deciding whether to explore patients' pain perceptions and beliefs; however, there was insufficient information to identify distinct reasoning processes that would allow the PI to fully answer the first research question. The findings reported should be viewed as preliminary. Further exploration of decision-making is warranted. A preliminary decision-making process is outlined in Figure 11.



It is difficult to describe the thought processes without restating a number of the cues discussed above; therefore, the examples shared above will be incorporated into the reasoning descriptions. Also, PTs' reasoning methods were influenced by the factors described. In this section, when these factors influenced the thinking process, this was mentioned. Extensive reporting of the decisions made by the PTs is beyond the scope of this paper. Nevertheless, the decisions made in the examples presented were provided. The decisions PTs made fell into one of three categories: 1) yes, pain beliefs and perceptions needed to be addressed; 2) no, the pain perceptions did not need to be assessed; and 3) the pain perceptions did not need to be explored *now*. When the decision was yes, therapists chose to 1) ask follow-up questions to clarify the factor that was contributing to the maladaptive pain belief, or 2) stop and provide patient education about the patient's pain beliefs.

PTs offered numerous examples of instances where they employed fast thinking when deciding whether to explore patients' pain beliefs and perceptions. The decisions were centered around behavioral observations made or information offered by the patients that led PTs to make fast decisions about the need to explore pain cognitions. In these instances, the therapists made their initial decisions based on small amounts of information. In this example, when the PT was asked why she did not explore the patient's expectations for pain resolution and pain self-efficacy, she stated:

I didn't ask her why she thought that. She had already offered that. I felt she was realistic (in her expectations about pain resolution and therapy). She pretty much offered me that (information). She looked like she was someone who was pushing herself already. She wasn't holding back at all. Well and I think she even said something like "I'll take the Advil, and then I'll go, and I'll do my activity, and then I'll come home, then I'll rest, and I'll do the ice, and I'll take another Advil if I need it". She had already been doing that for a long period of time. PT-B

In the next exchange, PT-E shared why she did not feel the following pain beliefs and perceptions needed to be discussed. Based on the level which the patient reported that she was participating in her life, PT-E quickly assumed that the patient displayed signs of pain acceptance and motivation, which she then took to be an indication that the broader categories of pain acceptance and motivation did not need to be investigated further.

Willing to take part in life in spite of the pain... Well, I think she does. I think she does the things she, she has a son, so she, you know, she has to move. And

motivation, I think she's totally motivated in spite of her pain. I don't think she's one that um lets it stop her. And I don't think she's going to be the one that says, "oh I have so much pain". PT-E

In the next example, PT-E suggested that her clinical experience shaped her decision-making and that she often made decisions in the moment. She noted that inconsistencies between the patient's report and what she observed in the clinic would prompt her to explore pain cognitions. When pressed to explain her rationale, she struggled to pinpoint what it was in the patient's presentation that would prompt her. This is indicative of a fast thinking pattern; because it is automatic and not based on a linear set of circumstances and is based on past associations (Kahneman, 2011). She also noted that her visual observations of the patient's countenance and willingness to make eye contact would facilitate her decision-making process.

I think, its more my experience. um that I've had working with different people and in different settings.. So that type of experience has helped me a lot... And so you can't group them all and say ...“okay you're going to do this” you know um sometimes.... it's a call right then and there. If they are telling me one thing, but they are showing me another thing then,I will make a decision whether or not to ask them. I can't tell you specifically (what would make me go one way or the other). I have to look at them. Their, their facial expression um, if they can look at me in the eye and tell me. I'm okay with that, but if they're looking down, they're looking this way and that way... If they have that look of pain on their face, well because you can't fake that ...then I will ask.

PT-E

In this exchange PT-A surmised that the patient had a strong understanding of her condition, realistic expectations about the progression of her symptoms, and confidence in her ability to manage her pain, based on the patient's brief description of an earlier injury.

I think she has a pretty realistic idea of the pathology (left hip arthritis) involved. And she is active in finding solutions. "I had right hip pain and I had a total hip and it feels better. I'm starting to get the same thing on the left." Pretty realistic. And um, understanding of... of the movement factors involved. And yes, that there is a solution for her chronic back pain as well. (the patient said) "Let's, let's start with some injections to manage this". So, I think she's, I think she's got a pretty realistic connection to the stuff (pain condition).

When asked to provide the PI insight into his rationale, PT-A went on to say:

It seemed like she had a good understanding of, of that relationship... in terms of the back, it was consistent with her directional preference in terms of... "well yeah that's no good (PT demonstrates flexion and extension movement) and this is better." Sometimes we'll see some wild inconsistencies in connecting the directional preferences to the experience... But she seemed to have a pretty good understanding... "oh yeah, yeah, yeah you're right sitting and standing" It seemed like, as I started to talk about things that she may do during her day. "What's it feel like in the morning? how do you feel sitting? What's tough for you?... you know, um. Seemed like she had a good understanding of, of that relationship... So, seemed like umm, um, in that sense um she understood the mechanical process in terms of her back..." Oh, (I am) pretty comfortable here

and oh yeah, it really bugs me when I'm standing. and, I get that because it's just like the one, one (hip) on the right" So. It seemed like she understood that as well.

The patient's presentation was consistent with the diagnosis and the PT assumed that there was a mechanical explanation for the patient's condition; therefore, it was not necessary at that time to pursue pain beliefs and perceptions. Based on the consistency between the patient's presentation and reported understanding of her mechanical triggers, the PT decided that further exploration of the patient's pain perceptions was not necessary. He quickly decided based on a small amount of biomechanical information that the patient's understanding of her pain and pain self-efficacy did not need to be explored.

In this example, the PT-D recognized that the patient was displaying fear avoidance behavior through the patient's reported use of his cane and exercise cessation. She made a decision using fast thinking that pain catastrophizing and the resulting fear avoidance behaviors needed to be addressed as part of the PTs treatment. The patterns of behavior or pain scripts were recognized, which resulted in her decision to not explore the issue in greater depth. Instead, she decided that she had sufficient information about the patient's psychological pain cognitions to develop a plan of care that addressed these factors.

He definitely had high fear avoidance beliefs about his pain, because, he has not even exercised. And hasn't been using a cane anymore and umm is kind of fearful of of doing the things he used to be able to do with without problems...So a big part of our treatment will be you know talking more about that pain (neuropathic pain) and addressing techniques to try to desensitize his

nervous system through exercise and through just talking and umm through cognitive behavior therapy.

Slow decision-making is reflective and analytical. Slow thinking was described by all PTs. PT-C, in the following excerpt, described his general evaluation approach as it pertained to the assessment of pain cognitions. He referenced how his practical knowledge and experience shaped his approach. It is also apparent that his orientation towards the evaluation process was grounded in a biomedical/biomechanical model. Inconsistencies in mechanical factors were the “trigger” that pulled him out of that mechanical approach and led him to explore other factors.

Definitely, subjective reporting. Combined with the patient’s intake because the patient’s intake helps me drive my subjective exam. Early on out of school it was pretty much all objective. You want to make sure your hitting every single test and those, the responses to those tests basically determine what’s going on in in your treatment. But then the more that you treat you realize that there’s a lot of gray area there. So, I’ve found that I’ve gathered a lot from my subjective exam versus my objective exam. His objective exam was actually probably longer than what I usually do just because he was complaining of everything from his low back, mid back into the memory stuff. But, probably my subjective exam is where I gather most of that information um... and then looking for triggers, I guess. Cause if there are mechanical triggers that makes sense to me in terms of why that would bring on your pain, then, then, then we can go a certain way but if it’s a trigger that’s like oh, I don’t know why that would be causing you an issues, then I would explore that (factors to include psychosocial stressors) a little but more.

In the following example, the same PT provided a specific example of his thought process when he observed inconsistencies between the observed patient's reports and actions. These inconsistencies caused him to temporarily step out of the biomechanical assessment of his patient's pain condition and prompted him to explore the patient's pain beliefs surrounding movement and pain medication usage. This PT was well-versed in the pain sciences and had the language to describe what he was observing. He recognized patterns or illness scripts consistent with maladaptive pain beliefs. Recognition of these patterns shifted him into an intentional, methodical manner of questioning.

And he even acknowledged he didn't want to be using the pain medication. Yet, he was still using the pain medication. He acknowledged that he should still be moving, but he hasn't been bending and lifting anything. So, there's clearly some sort of fear avoidance there. Even though he's acknowledging that he shouldn't be doing some things even though he already he is. So that is an indicator that ok, well, maybe we need to go, maybe we need to talk about that because you're almost negating yourself, your actions. So, I guess, that inconsistency would be a big one that I look for....Um, medications obviously a big one. Just to see if someone... how reliant they are on the medication they've been prescribed; their beliefs in terms of what they expect medication to do....I would get him to identify, "What is alarming to you? What are your concerns?" I guess, fear avoidance versus symptom limiting, "Are you not doing this because it hurts?" Or "Are you not doing this because you think it will hurt?". Those are things I would usually start to tease out. PT-C

The final example of slow thinking was shared as it represented the process that four of the five PTs stated that they utilized in some manner when deciding how thoroughly to assess pain beliefs. After observing inconsistencies between the patient's pain complaints and the patient's movement pattern in the waiting room, PT-B in this example initiated a slow-thinking, methodical assessment that was grounded in a biomechanical perspective. The patient's disproportionate pain complaints relative to her observed impairments prompted the PT to launch an investigation of the patient's pain condition. She described employing repeated pain provocation and movement testing to recheck the patient's consistency of response to initial testing. Additionally, she compared the patient in this example to another patient that she had treated and noted the inconsistencies again between the two. This comparison prompted her to continue to dig. It is important to note that she did not address the patient's pain perceptions and beliefs but instead turned to the biomechanical objective testing for information. This example also highlighted the decision three of the five therapists stated that they made in situations where the patient reported an unexpectedly high pain intensity relative to their presentation and a hyper-focus on their pain conditions. When this occurred, the PTs reported that there was a tendency to stop talking about pain and to shift the focus towards treatment and function. The PTs' judgements and beliefs based on past experiences influenced them to direct treatment away from talking about pain, as it was viewed as counterproductive. The decision was then made to focus on the restoration of function. The following excerpt was the PT's response to the question- what do you see, hear, read, or observe that makes you think a patient's pain beliefs and perceptions need to be assessed? The PI did ask probing questions such as...did you consider asking her questions about her pain perceptions, given her pain intensity rating?

She had no limp. She had no um apparent um difficulties in range of motion,
and with you know sitting down, filling out the application, giving back to me,

standing from her chair and coming back to sit in this chair. Because I observe all of those things without asking any questions because it's a functional activity. Um, but when I asked her about her pain she said, '10 out of 10. My whole body hurts except for my hands are okay'. So, the fact that she walked in here without a device and had no limp started my wheels turning, like what are we talking about here? Because compared to the other patient who might have only said she was a 6 or 7, but she could barely walk from that chair to this chair. Um, so, I kind of stopped asking right away"what's your number of pain with this?" And I more did all the special tests that I knew would actually produce pain if you were having pain in those areas. So, for example, it was a whiplash (injury) but she also had lower back pain. Um, so then I tested I did the manual muscle testing on her shoulder to see whether it produced neck or shoulder pain by resisting neck or arm motions because it's not necessarily something that a patient might know. PT-B

The influence that clinical experience, judgements and beliefs, and focus on function had on the decision-making process can be seen in the following excerpt. When asked whether PT-B considered asking the patient questions about her pain perceptions, she responded:

I kind of move on from focusing on the pain at that point to more functional and getting started on the treatments. Because if maybe she can do the bike with her arms, maybe she can do the UBE for 5 minutes with me. and I am with her saying "it's okay you can do this, it's going to be alright, this is going to help you." Here is where your healing starts. Here's what's going to work for you. And here's what I, as a therapist, have seen work for other people. So let's

get to the next step now. So that's what I did with her was, you know. I felt I could have stayed back here with her for an hour talking about you know ... "rate your right arm, rate your left elbow, rate your neck when you turn to the right, rate your neck when you turn to the left." I could have been all day writing numbers, but I said, "let's get on the bike. Let's move. Let's do some heat. Let's do some massage", and then maybe my eval wasn't even finished before I did that, but maybe I finish it now, afterwards. Does that feel better? Does that feel worse? Do we stop halfway through the UBE because she is having that pain? Or did she now move on from that? Which she did. So, then we were able to work on some lower back stretches. PT-B

In the last excerpt, the PT-B's rationale for her decision was revealed. Her past experiences with patients with CP shaped her clinical judgements and beliefs, which influenced her to move away from a focus on pain and towards function. Instead of a conversation about pain self-efficacy, it seemed to be the PT's judgement that providing opportunities to successfully move without pain was sufficient to improve pain self-efficacy. When asked why she opted to not talk to the patient about pain beliefs and perceptions she responded:

I think I wanted her to move on from that thought process....there's more we can do other than talk about this pain in this hour that we have together. And maybe give her a little success and a little functional mobility activity so that when she gets home or gets back into the car maybe she's not moving so gingerly anymore maybe she's like "Hey I, I did this so now getting into the car is not going to trip me up as much as I thought it was going to". Showing herself what she can do...(later in the interview she revealed) I've heard people

speaking with chronic pain and heard how they wanted to be pulled out of that. How they did not realize what they were doing until they felt a little better. Then they looked back and knew that they were spending too much time just thinking about the pain and trying not to get out of it. PT-B

Interestingly, regardless of the manner in which the decisions were made (fast or slow thinking), PTs frequently decided to “tell” versus “ask” patients about their pain experience when the PT observed cues that they considered to be indicators of faulty pain perceptions and beliefs. All PTs described scenarios in which cues were observed that prompted them to provide patient education about pain perceptions instead of asking follow-up questions about the patient’s pain experience. In the next example, it was also clear that the decision to explore pain beliefs and perceptions was an evolving and ongoing process. After observing patient cues, PT-C described that at several points throughout the evaluation and based on the patient’s response to questions and/or objective tests that he was required to revisit the decision-making process. In this example, it is again apparent that the inconsistency between the biomechanical objective findings and the patient’s concern about his symptoms framed the thought process of the PT and subsequent conversation with the patient. PT-C was referring to the same patient that was described above. Earlier in the interview, the PT noted inconsistencies between the objective findings and the patient’s concerns about his injury. Instead of asking follow-up questions about the patient’s understanding of his condition and his heightened concerns about his injury, the PT chose to tell and provide education. Later in the evaluation, the PT was observed exploring the patient’s beliefs about his pain and medication use, which demonstrated how the decision-making process was ongoing.

And there were clear signs of that there were no neurological issues. There was nothing. There are no referral patterns. There's nothing like that. And then once you kind of established that mindset that it's good that you have nothing referred, there's nothing, there's no extremity involvement, which was an issue last time. We kind of talked about what he is feeling now and how that's not abnormal. And, I reassured him that this isn't, this isn't ... you're not the one percent of the one percent. There's not something crazy going on. "We see this, we treat it, people get better" At least separate that the two aren't the same. Yeah, so the pain you are feeling now is probably different than the pain you were feeling before and, if you were feeling something now that was similar to before then that would be a different case. But it's not what, what your experiencing now. PT-C

When asked to share her ways of knowing that pain beliefs needed to be explored, PT-D provided cues that she typically attended to and stated that when she heard the cues, she was often prompted to provide education. It is important to note that this therapist also described situations in which cues prompted her to further explore pain beliefs by asking follow-up questions.

If there are high fear avoidance belief, umm, pain catastrophizing things like that... as you know... They're afraid to do something that hurts... umm. Or even looking at somebody doing something makes them hurt or umm. They're fearful of their return to work for this reason umm or They're, they're saying things like "will I ever get better or will I need surgery? I'm hearing what they say and it triggers me to umm educate them on on these types of things. PT-D

When they talk about other things like stress and emotions and everything like that umm that also allows me to kind of just say in times where umm there or “what was going on when umm you started getting pain maybe ten years down the road” umm and “have you ever noticed that changes in stress or emotions can influence you pain?” Umm and “How has it influenced your pain?” and things like that. So, I’ll I’ll ask... They don’t necessarily have to tell me for me to start talking about it. I’ll ask about it too. PT -D

Discussion

Analysis revealed that PTs use both fast and slow thinking strategies when determining both the need for and scope of the assessment of psychological cognitive factors in adults with CP. The process was influenced by PT factors that included the PTs’ evaluation practices and their values, judgements and beliefs. PTs indicated that the evaluation of psychological factors was an iterative process that often extended beyond the first visit. The evaluation was predominately biomedically focused. At the first visit, the development of a therapeutic alliance was prioritized over the evaluation of pain beliefs. Additionally, factors external to the PT influenced their decision-making. External factors included 1) healthcare system issues such as documentation and reimbursement issues, and 2) patient cues to which PTs attended. The patient cue that PTs most frequently cited as an indicator that pain cognitions required attention was an inconsistency between biomechanical/biomedical factors and the patient’s overall presentation. These external factors included patient cues that the PT attended to and the influences exerted on the PT by the healthcare system. The entire process took place within the confines of a biomedically oriented and movement-focused shared language. Dominant conceptual frameworks emerged that shaped the manner in which the PTs

viewed the psychological cognitive realm and ultimately influenced their decision-making processes. There were elements of hypothetic-deductive, pattern recognition, and narrative reasoning displayed, which will be reviewed further in this discussion; however, there was insufficient evidence to propose that PTs utilized a specific reasoning strategy when deciding whether and to what depth to explore pain cognitions and beliefs.

Factors that Influenced Decision-Making

The influence that the biomedical/biomechanical shared language had on PTs' thought processes was apparent in all aspects of the analysis. PTs' stories about their patients at the outset of the interviews and their waiting room observations were primarily based on biomedical and biomechanical information. The majority of questions asked pertained to the patient's PMH, their MOI, the findings of diagnostic testing, pain provoking movements, how the referring physician characterized their pain condition, and the functional limitations that they were experiencing because of the pain condition. When asked to describe how they knew that pain beliefs needed to be explored, the majority of PTs reverted to a discussion of biomechanical objective findings prior to answering the PI's questions. Additionally, the PTs' interpretation of the cognitive factors was narrow and focused on movement and function-based observations. These findings are consistent with research that has investigated the psychosocial history-taking practices of PTs. The general consensus is that orthopedic PTs are biomedically oriented in their evaluation of patients with CP (Diener, Kargela, & Louw, 2016; Oostendorp et al., 2015; Opsommer & Schoeb, 2014; Synnott et al., 2015), and that PTs view pain cognitions through a biomechanical framework (Roussel et al., 2016; van Wilgen et al., 2014). It is interesting to note that the majority of these studies were conducted in Europe and the shared language used by PTs extends beyond cultural borders.

The majority of PTs referenced body language, facial expressions, and the overall manner in which patients presented as cues that they looked for when deciding whether patients' pain beliefs and perceptions should be explored. Interestingly, studies have found that physicians accurately identified mild depression and emotional distress 33.8% and 48.4%, respectively when they relied on clinical impressions (Mitchell, Rao, & Vaze, 2011). A study of PTs in the United States found a weak relationship between psychological inventories completed by patients and the use of clinical intuition to assess patients' level of psychological distress (Brunner, Dankaerts, Meichtry, O'Sullivan, & Probst, 2018). These findings highlight the inaccurate conclusions providers reach when relying upon clinical impressions and underscore the challenges associated with the use of observations of body language and facial expressions to make determinations about the assessment of pain cognitions. The reliance on clinical impressions is complicated by unlikelihood that patients with maladaptive pain beliefs will show pronounced visible signs of their pain perceptions. For this reason, it is recommended that PTs utilize standardized psychological inventories at the time of the evaluation to screen for psychological stressors (Brunner et al., 2018; Lentz et al., 2016). Consistent with the research that found that the majority of orthopedic PTs do not routinely screen for psychological stressors (Lentz et al., 2016), the majority of PTs in the present study did not indicate that they consistently used psychological inventories. The reported tendency for PTs in this study to rely upon observed inconsistencies between the objective examination and the patient's presentation, and patients' body language may indicate that PTs do not feel that they have the tools that they need to assess for maladaptive pain beliefs. Previous researchers did find that PTs did not feel that they were adequately prepared to assess psychosocial factors (Sanders et al., 2013; Zangoni & Thomson, 2017). Lentz et al. (2016) suggested that there may be confusion regarding which inventory to select given the high number of psychological inventories available.

It is important to note that all PTs in the present study recognized that the complexity of persistent pain required a holistic, patient-centered approach that utilized a framework that considered the multidimensional nature of CP. Additionally, all PTs acknowledged that pain beliefs and perceptions should be assessed. However, the majority of PTs did not ask questions about pain cognitions during the observed evaluation session. This finding is consistent with earlier research that concluded that, despite awareness of the role psychosocial factors played in the perpetuation of pain, PTs did not routinely assess these factors at the initial evaluation (Sanders et al., 2013; Singla et al., 2015; Synnott et al., 2015; Zangoni & Thomson, 2017).

Consistent with the findings of Zangoni and Thomson (2017), the PTs in the present study prioritized the development of a therapeutic alliance over the assessment of psychological factors at the first visit. In the Zangoni and Thomson's study, PTs stated that asking questions of an overly personal nature would negatively affect their relationship with patients. In the present study, PTs stated that they gauged the patients' receptiveness to discussing more personal matters and would wait until later sessions to address these factors if they determined the patient would be uncomfortable; all PTs explicitly stated that they did not want to jeopardize their relationship with the patient. Interestingly, recent studies have suggested that patients feel their relationship with PTs is stronger when patients feel that PTs understand the impact their pain condition has on their lives; patients reported that they wanted PTs to understand their lived experience of pain (Babatunde, MacDermid, & MacIntyre, 2017; O'Keeffe et al., 2016). Listening to and empathizing with patients' stories were factors that patients identified as attributes of a strong therapeutic relationship (Babatunde et al., 2017; O'Keeffe et al., 2016). Consistent with these findings, in the present study one of the five PTs (PT-A) acknowledged that the assessment of psychological factors may in fact be part of establishing a therapeutic alliance. Research has demonstrated the positive effect a strong alliance has on decision-making and patient outcomes.

Patients confided in PTs when they perceived PTs cared about them; thus, PTs make better informed clinical decisions (Jones & Rivett, 2018; O'Keeffe et al., 2016). Furthermore, patients' perceptions about the strength of the working alliance that they had with PTs have been shown to be a predictor of pain intensity and function in patients (Lakke & Meerman, 2016). These findings underscore the importance of the therapeutic alliance but call into question PTs' decision to postpone the assessment of psychosocial factors until a stronger relationship exists.

In addition to the biomedical conceptual framework, other dominant conceptual frameworks were referenced or described by all PTs. Within social constructionism, identifying dominant voices is important due to the powerful influence they exert on a social group's language and the subsequent conceptual framework with which they shape their understanding of reality (Burr, 2015). No questions were asked about their understanding of pain science; however, the PTs in the present study noted that patients benefited from pain science. Based on the descriptions, it seemed that the PTs were referring to PNE or therapeutic neuroscience education (TNE) a well-known pain education program created by a group of prominent PT researchers (Louw, Zimney, O'Hotto, et al., 2016). Additionally, a cue frequently noted by PTs was fear avoidance behavior. The emphasis on fear avoidance is likely due to the prominence of Vlaeyen and Linton's Fear-Avoidance Model in which fear and the construct of pain catastrophizing leads to the chronification of pain and disability through the development of avoidant behaviors (Vlaeyen & Linton, 2000). The frequency with which the PTs referenced these models indicates that these conceptual frameworks have become part of PTs' shared language; therefore, social constructionists would argue that these dominant voices shape the manner in which we think about and approach patients' pain beliefs and perceptions.

Decision-Making Processes and the Influence of Factors

Daniel Kahneman, a Nobel Laureate and cognitive psychologist who investigated human decision-making, proposed that there are two general forms of thinking: System 1, automatic or fast thinking that relies upon first impressions (pattern recognition); and System 2, or slow analytical deliberation that requires more time and effort (Kahneman, 2011). According to Kahneman, judgements reached using fast thinking often go unquestioned; the conclusion reached is incorporated into the person's belief system and drives a person to act. It is not until there is a discrepancy between the judgement reached using fast thinking and, in a clinical setting, the contradictory findings of an objective examination, that slow analytical thinking is employed. The reasoning strategies used by PTs are grounded in this larger framework of human decision-making (Rivett & Jones, 2018). As mentioned in the introduction, PTs tend to use hypothetic-deductive, pattern recognition, and narrative reasoning in clinical decision-making (Edwards et al., 2004).

There was insufficient evidence to identify a definitive reasoning process, but analysis revealed that there was consistency among PTs in the thinking strategies utilized. In the present study, PTs displayed fast and slow thinking strategies when deciding how to explore patients' pain beliefs and perceptions. These thinking strategies are aligned with the above-mentioned reasoning methods and this came through in the analysis of the current study's transcripts. However, further research is needed to identify the specific methods of reasoning PTs use when deciding whether pain cognitions should be assessed.

When used by expert clinicians to establish a diagnosis, fast thinking is a highly accurate method of decision-making (Kahneman, 2011; Phillips, Fletcher, Marks, & Hine, 2016). It is based on heuristics or cognitive short-cuts that allow for the processing of large amounts of information in a short period time (Norman et al., 2017). Clinicians with less experience or a less

developed knowledge base risk making errors unless they slow down and consider factors that are inconsistent with an identified pattern (Blumenthal-Barby & Krieger, 2015; Kahneman, 2011). While it is beyond the scope of this paper to address the accuracy of decision-making observed in the PTs, all therapists were observed and described utilizing fast thinking strategies at points in time when considering specific pain belief constructs. Similar to the participants in the Roussel et al. (2016) study, PTs in the current study decided that cognitive factors did not need to be explored based on a surface interpretation of the factor. PTs stated that observed cues such as a patient changing positions to alleviate pain and/or describing an awareness of movements that increased pain were indicators of strong pain self-efficacy. While a patient's ability to find positions of comfort is a component of having a strong sense of agency in her/his ability to manage pain, it represents a small part of the larger construct of pain self-efficacy. Previous research indicated that PTs have a surface understanding of the influence psychosocial factors have on the pain experience (Emilson et al., 2016; Roussel et al., 2016; Singla et al., 2015; Synnott et al., 2015; van Wilgen et al., 2014), which is a possible explanation of the finding in the present study. The observation of PTs conducting multiple evaluations and then following patients' progression through care would be required to determine whether the decisions made on limited information resulted in accurate decision performance.

The hypothetic-deductive reasoning method is an example of a slow-thinking reasoning process (Edwards et al., 2004; Norman et al., 2017). Interestingly, PTs in this study did describe using a hypothetic-deductive method to decide if pain cognitions were contributing to the patient's pain condition. While the methods of information gathering and testing differed, all PTs described a process they followed to rule in or out maladaptive pain beliefs. Studies have examined the reasoning methods used by orthopedic PTs when evaluating commonly treated orthopedic diagnoses. The focus was on PTs' reasoning methods during the differential diagnosis

process, and the emphasis was on identifying the questions and special tests that ensured an accurate diagnosis (Baker et al., 2017; Hahn et al., 2014; Langridge et al., 2015; Maissan et al., 2018). Psychosocial factors were not mentioned or were viewed as “other contributory factors.” In a case study on the use of Systematic Clinical Reasoning in Physical Therapy (SCRIPT) tool in orthopedic physical therapy, the authors stated that psychosocial issues should be considered and ruled out; however, these factors “should not be overly weighted in the differential diagnosis process” (Baker et al., 2017, p. 64). It is interesting to note that the method of reasoning described by PTs in the present study was aligned with the methods described by previous researchers.

Narrative reasoning is often described as psychosocial focused reasoning (Higgs et al., 2018). It is an inductive reasoning method in which the PT develops a sense of what the patient’s lived experience of pain is through extensive observation and interaction with the patient (Edwards et al., 2004; Edwards et al., 2014). Within pain stories, patients’ interpretation of their pain experience is shared with the therapist. Contrary to hypothetic-deductive and pattern recognition reasoning, the PT’s interpretation of the patient’s experience is not validated with testing, but instead confirmed through communication until consensus between the PT and patient is reached (Edwards et al., 2004; Rivett & Jones, 2018). In the present study, extensive narrative reasoning was not described in the interviews or observed during the evaluations. While it is possible that the dynamic between the PT and patient was changed due to the presence of the PI, it is important to note that extensive psychosocial focused storytelling by the PT or the patient was not observed. Most of the PTs observed in this study allowed the patients the opportunity to share their concerns; however, the questions posed by the PTs were biomedically oriented, which did not encourage storytelling. Interestingly, in a study that examined the effect that documenting on the computer had on patient sharing, researchers found that patients were less likely to disclose relevant and personal information due to the scripted nature of the evaluation and the lack of

responsiveness that the PT had towards patient statements that were outside of the scope of the forms used. The majority of PTs in the present study used a computer during the subjective portion of the evaluation (Opsommer & Schoeb, 2014). As referenced earlier, the sequencing and content of the questions asked was remarkably similar among the PTs. The lack of observed narrative reasoning could be due to the scripted nature of the history-taking session.

It is interesting to note that none of the PTs in the present study explicitly stated that time was a factor in their decision-making process. This finding is in contrast to previous qualitative studies in which PTs reported that there was insufficient time to assess for and address biomechanical issues as well as psychosocial factors; biomechanical issues were prioritized (Emilson et al., 2016; Singla et al., 2015). While PTs in the present study did not directly reference time, the iterative nature of the evaluation of psychosocial factors, the documentation requirements mentioned by two PTs, and the scripted history-taking questions all PTs were observed using may be strategies PTs utilized to compensate for time pressures PTs in outpatient practices encounter (Brun-Cottan et al., 2018). Thus, time may have driven the reported and observed evaluation practices of PTs in this study, even though it was not identified as a factor.

Incomplete or inaccurate information obtained through the subjective portion of the evaluation can compromise the decision-making process (Higgs et al., 2018). In order to understand the lived experience of pain, the therapist needs the language and interviewing skills to explore pain outside of the context of movement and function. While there is insufficient evidence in the present study to state with any degree of certainty that PTs lacked the interviewing skills, there were indications that this may be the case. As discussed earlier, PTs tended to explain the process of investigating pain beliefs using a biomedical conceptual framework and used biomedical/biomechanical language. Previous research has identified that PTs do not feel that they have the tools needed to assess psychosocial factors (Singla et al., 2015;

Zangoni & Thomson, 2017). Based on the previous research and the findings of this study, future research should examine whether PTs have the language needed and the tools necessary to fully explore the lived experience of pain within a psychological conceptual framework.

Finally, in the current study, the PTs who had completed coursework in PNE and/or the BPS framework demonstrated a form of mechanism-based reasoning. A mechanism-based approach “incorporates and builds on the BPS model by defining specific pathobiology in pain processing, pain-relevant psychological factors, and movement system dysfunction...pain mechanism is used to delineate factors that can contribute to development, maintenance, or enhancement of pain” (Chimenti, Frey-Law, & Sluka, 2018, p. 303). The signs identified by two of the five PTs are consistent with a nociplastic or centrally mediated pain mechanisms that are often present in patients with CP (Chimenti et al., 2018). While the pain mechanisms exist within the larger context of the movement system and psychosocial status, the signs are biological indicators that are used when pain typing patients using a pain mechanism-based reasoning model. It is a pain reasoning method that has been put forth in recent years, which is the likely reason the providers who had completed recent pain-related coursework had incorporated elements of this method into their reasoning; however, insufficient evidence was present to conclude to what degree the PTs utilized this method of reasoning when assessing for psychosocial factors. Further research is indicated.

An unexpected finding in this study was the observed and reported tendency for PTs to use “show and tell” strategies to address maladaptive pain beliefs during the evaluation. During the observation phase of the study, at times all PTs stopped asking questions to provide education about the influence psychosocial factors have on the patients’ pain conditions. It seemed that this was done in lieu of questioning. In addition to this, the majority of PTs described situations in which they shifted into a demonstration or showing mode with patients. Instead of talking about

pain beliefs, the decision was made to show the patient through graded exercises such as biking or walking on the treadmill that their pain beliefs had no basis. Further investigation into the decision-making process surrounding the use of show and tell strategies during an evaluation would provide further insight into decision-making processes of PTs.

Future studies that contrast the decision-making strategies used by PTs with varying levels of experience and continuing education backgrounds would provide insight into the influence each of these factors have on the decisions to explore pain cognitions. Given the reported iterative nature of PTs' assessments of pain beliefs, studies that examine how PTs' decision-making processes change over the course of patients' care would be beneficial. Additionally, studies that investigate the accuracy of decisions made by PTs at the time of the evaluation would provide insight into the effectiveness of the fast and slow thinking strategies displayed by PTs. It would also provide important information about the influence that experience and education has on the accuracy of decision-making.

Strengths and Limitations

The strengths of the study include the steps that were taken by the PI to ensure trustworthiness and overall rigor. Rich detail was provided to allow for reproduction of this study. Finally, the study had strong ecological validity, as participants were observed in real world clinical settings.

The limitations of the study were that PTs were observed conducting one evaluation. It is difficult to know whether the evaluation observed was representative of the PTs' typical practice patterns. The observer's paradox may have affected the behavior of the PT and the patient being observed (Patton, 2015). To this point, PTs may have avoided exploring issues of a personal nature because the session was being observed. There were a small number of participants in the study. PTs with 10-20 years of experience were not represented thus limiting generalizability of

these results. With the exception of the PT with seven years of experience, PTs had less than five years of experience or more than 20 years of experience. Additionally, the PTs were from single discipline practices in the Northeastern region of the United States. The experience range and regional specificity of the study limit the transferability of the findings of the study. While the findings cannot be transferred to the broader population of PTs, they provide useful insights into the factors and cues that influence the decision-making process and the process that PTs utilize when deciding whether to evaluate pain cognitions at the first visit.

Conclusion

The aims of this study were 1) to explore the decision-making processes PTs use when deciding whether and to what depth to explore pain cognitions at the time of the first visit, 2) to identify the factors and cues that influenced the decision-making process, and 3) to explore how these cues and factors influenced the decision-making process. Data saturation did not occur and further research is needed to identify the reasoning processes used by PTs. Analysis of the findings revealed that during the exploration and reasoning phase of decision-making, PT factors and external cues/factors influenced the processes utilized by PTs. PT factors included 1) evaluation practice patterns, and 2) values, judgements, and beliefs. External cues/factors included 1) patient cues, and 2) the influences exerted on the process by the healthcare system. During the reasoning phase, PTs utilized fast-thinking and slow-thinking strategies. Fast-thinking strategies were aligned with pattern recognition reasoning. Slow-thinking strategies were aligned with hypothetic-deductive reasoning. PTs did reference that the evaluation of maladaptive beliefs continued through prolonged observation and continued conversations with patients over the course of their care. Finally, PTs displayed limited use of narrative reasoning.

Relevance

Given that maladaptive pain beliefs and thoughts are stronger predictors of pain-related disability in individuals with CP than depression and fear avoidance, it is important that the decision-making processes that PTs utilize and the factors that influence these processes are understood. The findings of this study can be used to guide future research. In this study, the predominant use of biomedical language, the superficial interpretation of pain cognitions, and the adherence to an evaluation script diminished PTs' ability to collect information about patients' maladaptive pain beliefs. Educational interventions aimed at the improved detection of signs and symptoms of maladaptive pain beliefs are needed to facilitate early identification of cognitive psychological contributions to patients' pain experiences. Additionally, instilling PTs with interviewing techniques that will encourage patients to share what their lived experiences of pain are would improve PTs' ability to make decisions about whether pain cognitions are contributing to the patients' interpretation of their pain. To this end, ensuring that PTs are equipped with the language needed to sufficiently explore pain as not only a function limiting experience but also a psychological experience may improve PTs' ability to ask about patients' lived experiences of pain.

CHAPTER VI

CONCLUSION

Statement of Problem

CP is the most frequently treated disorder by PTs (van Wilgen et al., 2014) (Institute of Medicine, 2011; Moseley, 2007). In the United States, the total societal cost of CP is estimated to be between \$560 to \$635 billion dollars annually and it is estimated that 11.2% to 43.9% of adults suffer from CP (Nahin, 2015; Tsang et al., 2008). The complexity of the pain experience requires that providers utilize a model that recognizes the unique impact that biological, psychological, and social factors have on the pain experience condition (*Guide to Physical Therapists Practice 3.0*, 2014; IASP, 2018). The BPS model is a holistic, integrative model that is one of four constructs that informs physical therapy practice. It is the approach that the World Health Organization, American Physical Therapy Association, and clinical practice guidelines recommend PTs utilize in the evaluation and treatment of persons with CP (*Guide to Physical Therapists Practice 3.0*, 2014; *International Classification of Functioning, Disability and Health*, 2001). In order to effectively manage all aspects of the pain experience, a thorough assessment of psychosocial factors during the history-taking portion of the initial evaluation is required (Wijma et al., 2016).

Little published research that investigates how well PTs in the United States integrate the BPS model into their evaluation practice patterns. Research conducted in Europe suggested that PTs have not sufficiently incorporated this approach into practice and that their evaluations are grounded in a biomedical tradition (Singla et al., 2015; Synnott et al., 2015). While PTs are aware of the multidimensional nature of pain and the role psychosocial factors play in the perpetuation

of the pain experience, the general consensus among researchers investigating PTs' assessment of the psychological and social factors is that therapists are not sufficiently exploring the impact these factors have on their patients' pain conditions (Oostendorp et al., 2015; Opsommer & Schoeb, 2014).

There are no published studies that have investigated the clinical reasoning PTs utilize when deciding whether and to what depth to explore the cognitive psychological factors that contribute to the pain experience. Cognitive factors pertain to the thoughts and beliefs people hold about their pain condition; research has found psychological cognitive factors affect clinical outcomes and disability levels in people with CP to a greater extent than the actual level of tissue damage (Foster et al., 2008; Foster et al., 2010; Woby et al., 2007).

Relevant and Significant Findings

The three dissertation studies investigated psychosocial history-taking practices of PTs when evaluating adults with CP in the United States, and the clinical decision-making PTs utilize when investigating psychological cognitive stressors. In Studies One and Two, psychosocial history-taking practices were measured using an author-developed online survey. Study One investigated the face, content, and criterion validity; and the test-retest and internal consistency reliability of the survey. Study Two explored the relationship between PTs' demographic characteristics and their psychosocial scores on the survey. Study Three explored the decision-making processes used by PTs when deciding whether and to what extent psychological pain cognitions should be explored in adults with CP during the first visit. The factors and cues that influence decision-making were also explored.

The first study investigated the psychometric properties of the psychosocial survey. Using expert review, it was determined that the survey represented the types of questions PTs would ask adults with CP about psychosocial factors. The cognitive, emotional, and behavioral

psychological subdomains of the survey were found to have strong test-retest reliability with Pearson's $r = 0.81, 0.84, 0.74$, respectively ($n = 49$). The composite psychological and psychosocial survey scores had strong test-retest reliability, with Pearson's $r = 0.86$, and 0.87 , respectively. Visual inspection of the Bland-Altman plots revealed that greater than 90% of the cognitive, emotional, and social subdomains, and greater than 95% of the behavioral subdomain, psychological, and psychosocial domain difference scores were within the 95% CI, which indicated a strong level of agreement between times 1 and 2. Item analysis revealed strong internal consistency of all factors within the psychological and social subdomains. The Cronbach's alpha for the cognitive, emotional, behavioral, and social subdomains and psychological domain were as follows: $0.88, 0.90, 0.83, 0.89$, and 0.94 ($n = 497$). The relationship between the Pain Attitude and Belief Scales Factor 1 (biomedical orientation) and Factor 2 (BPS orientation) scores and the psychological (Factor 1, $r = 0.03, p = 0.25$; Factor 2, $r = -0.06, p = 0.09$) and psychosocial composite survey scores (Factor 1, $r = 0.03, p = 0.24$; Factor 2, $r = -0.05, p = 0.12$) was not significant; thus, criterion validity of the psychosocial survey was not established. This study supported the use of the survey to measure psychosocial history-taking practices of PTs who evaluate adults with CP.

The second study was a descriptive survey-based study that investigated the psychosocial history-taking practices of PTs who evaluate adults with CP in the United States. A total of 501 PTs completed the survey and were included in the analysis described below when all relevant data was present. Years of clinical practice and evaluation time allowed were found to be significant independent predictors of the psychosocial score ($p \leq 0.0005$); gender and ABPTS certification were not significant independent predictors. The following regression equations predicted psychosocial score: Psychosocial score = $101.48 + 0.33$ (evaluation time allowed); and Psychosocial score = $108.17 + 0.46$ (years in patient care). When the predictors were entered

together, years of clinical practice and evaluation time allowed explained 12.2% of the variance in the psychosocial score ($p \leq 0.0005$). The following regression equation predicted change in the psychosocial score: Psychosocial score = $92.15 + 5.05$ (certification) $- 3.92$ (gender) $+ 0.53$ (years patient care) $+ 0.34$ (evaluation time allowed). A significant difference between respondents grouped by years of clinical experience was found $F_{(3,452)} = 10.60, p \leq 0.0005, \eta^2 = 0.07$. The greatest between group difference existed when groups were compared to the less than 5 years of clinical experience group and were as follows: 1) 5-10 years had a mean difference = -17.20, with $d = -0.82$; 2) 11 to 15 years had a mean difference = -21.70, with $d = -0.99$; and 3) 16+ years had a mean difference = -20.00, with $d = -0.91$ (all significant at $p \leq 0.0005$). Lastly, PTs who practiced in outpatient therapy clinics asked more questions about psychological stressors than did providers in acute care and inpatient rehabilitation ($F_{(1,138)} = 3.24, p = 0.042, \eta^2 = 0.05$). Post hoc comparisons revealed a significant difference between the outpatient and acute care group (mean difference = 6.67, 95% CI [.36, 12.98], $p = 0.035$, using Dunnett T3 procedures; and 95% CI [.49, 12.85], $d = 0.53$) regardless of psychological factor. Finally, providers, regardless of work setting, assessed behavioral psychological factors to a greater extent than cognitive and emotional factors, and they assessed emotional factors least of all ($F_{(2,276)} = 126.83, p \leq 0.0005, \eta^2 = 0.48$). Pairwise comparisons of the repeated factor using a Bonferroni adjustment revealed a significant difference in means when comparing the cognitive and emotional factors (mean difference = 12.23, $p \leq 0.0005$, 95% CI [9.73, 14.74], $d = 0.80$); cognitive and behavioral factors (mean difference = -2.38, $p = 0.026$, 95% CI [-4.54, -0.22], $d = -0.17$); and emotional and behavioral factors (mean difference = -14.61, $p \leq 0.0005$, 95% CI [-17.09, -12.14], $d = -0.94$). In summary, the results indicated that 1) evaluation time allowed and past clinical experience were significant predictors of the psychosocial score; 2) there were significant differences in all respondents when grouped by years of clinical experience and

compared to PTs with less than 5 years of experience; 3) when PTs were grouped by work setting, there were differences in the level to which they assessed specific psychological factors; and 4) individuals in outpatient rehabilitation assessed more psychosocial factors when compared to inpatient and acute care PTs.

The third study was a qualitative multiple-case study design informed by social constructionism. The aims of this study were 1) to explore the decision-making processes PTs use when deciding whether and to what depth to explore pain cognitions at the time of the first visit, 2) to identify the factors and cues that influence the decision-making process, and 3) to explore how these cues and factors influence the decision-making process. Each of the five PTs was observed conducting the evaluation of an adult with CP and participated in a 30-45 minute semi-structured interview. The PTs had a minimum of three years of orthopedic clinical experience. Analysis of the transcripts and observation notes revealed that during the exploration and reasoning phase of decision-making, PTs attended to PT-related factors (evaluation practices and values, judgements, and beliefs), external factors (patient cues and healthcare system factors). Evaluation practices of psychological factors occurred over multiple sessions; the questions asked by PTs were predominately biomedical in nature; and PTs prioritized the development of a therapeutic alliance over the assessment of psychological factors at that first visit. Fast and slow thinking strategies were used; however, there was insufficient evidence to identify specific reasoning methods. Elements of pattern recognition, hypothetic-deductive reasoning, narrative reasoning and mechanism-based reasoning were present; however, further research is needed to identify the specific reasoning methods utilized.

Clinical Relevance

The psychosocial survey developed by the author represented an important first step in better understanding the psychosocial history-taking practices of PTs in the United States.

Analysis of the survey revealed that the more time and experience providers have the more questions they ask about psychosocial factors. Additionally, differences were found in the psychosocial history-taking practices when PTs were grouped by work setting. These findings underscore the importance of providing mentorship to less experienced PTs as they work to improve their history-taking and clinical reasoning skills. Additionally, the findings highlight the importance of allocating PTs sufficient time to assess psychosocial factors. Transformation of the healthcare system's assessment and management of CP is dependent on consistent messaging about the multidimensional nature of pain when interacting with patients in all settings. It is important that providers consider the cognitive and emotional factors that contribute to the perpetuation of the pain experience.

The findings of Study Three can be used to guide future research. The predominant use of biomedical language, the superficial interpretation of pain cognitions, and the adherence to an evaluation script influenced PTs ability to collect information about patients' maladaptive pain beliefs. Educational interventions aimed at the improved detection of signs and symptoms of maladaptive pain beliefs are needed to facilitate early identification of cognitive psychological contributions to patients' pain experiences. Additionally, instilling PTs with interviewing techniques that will encourage patients to share their lived experiences of pain with them would improve PTs ability to make decisions about whether pain cognitions are contributing to the patients' interpretation of their pain. To this end, ensuring that PTs are equipped with the language needed to sufficiently explore pain as not only a function-limiting experience but also a psychological experience may improve PTs' ability to understand the impact patients' pain conditions have on their quality of life.

Future Implications

Prior to this research, the psychosocial history-taking practices of PTs in the United States were unknown. The following studies would contribute to the existing body of knowledge:

- Investigating the frequency that PTs ask questions about the respective constructs within each of the psychological and social subdomains.
- Exploring the relationship between PTs' scores on the psychosocial survey and their actual history-taking practices.
- Examining the impact that the completion of coursework within the pain sciences has on the history-taking practices of PTs.
- Exploring the interviewing techniques PTs utilize when exploring the lived experience of patients with CP.
- Further investigation of the decision-making processes PTs use to decide how to assess the psychosocial factors at the first visit are required.
- Exploring whether PTs are equipped with the language needed to fully explore pain as not only a function-limiting experience but also a psychological experience.

The information gained in the studies mentioned above would guide the development of entry-level and continuing education coursework to improve PTs' integration of the assessment of psychosocial factors into the first visit.

REFERENCES

- Ajjawi, R., & Higgs, J. (2012). Core components of communication of clinical reasoning: A qualitative study with experienced Australian physiotherapists. *Advances in Health Sciences Education*, 17(1), 107-119. doi:10.1007/s10459-011-9302-7
- Åkerblom, S., Perrin, S., Rivano Fischer, M., & McCracken, L. M. (2015). The mediating role of acceptance in multidisciplinary cognitive-behavioral therapy for chronic pain. *Journal of Pain*, 16(7), 606-615. doi:10.1016/j.jpain.2015.03.007
- Alessandro, C., Annette, B., Nadine, E., Kirsty, D., Ebenezer, A., Raymond, W., & Muirne, C. (2018). Item response theory evaluation of the biomedical scale of the Pain Attitudes and Beliefs Scale. *PLOS ONE*, 13(9), 1-17. doi:10.1371/journal.pone.0202539
- Alford, D., German, J., Samet, J., Cheng, D., Lloyd-Travaglini, C., & Saitz, R. (2016). Primary care patients with drug use report chronic pain and self-medicate with alcohol and other drugs. *Journal of General Internal Medicine*, 31(5), 486-491. doi:10.1007/s11606-016-3586-5
- American Pain Society. (2012). *Pain: Current understanding of assessment, management, and treatment*. Retrieved from American Pain Society website: <http://americanpainsociety.org/uploads/education/npc.pdf>
- American Psychological Association. (2018). *Definition of Emotion*. Retrieved from American Psychological website: <https://dictionary.apa.org/emotion>
- Andrews, N., Strong, J., & Meredith, P. (2015). Overactivity in chronic pain: Is it a valid construct? *Pain*, 156(10), 1991-2000. doi:10.1097/j.pain.0000000000000259
- Andrews, N., Strong, J., Meredith, P., & D'Arrigo, R. (2014). Association between physical activity and sleep in adults with chronic pain: A momentary, within-person perspective. *Physical Therapy*, 94(4), 499-510. doi:10.2522/ptj.20130302
- Babatunde, F., MacDermid, J., & MacIntyre, N. (2017). Characteristics of therapeutic alliance in musculoskeletal physiotherapy and occupational therapy practice: A scoping review of the literature. *BMC Health Services Research*, 17(1), 1-23. doi:10.1186/s12913-017-2311-3
- Baets, L., Matheve, T., Meeus, M., Struyf, F., & Timmermans, A. (2019). The influence of cognitions, emotions and behavioral factors on treatment outcomes in musculoskeletal shoulder pain: A systematic review. *Clinical Rehabilitation*, 33(6), 980-991. doi:10.1177/0269215519831056
- Baker, S., Painter, E., Morgan, B., Kaus, A., Petersen, E., Allen, C., . . . Jensen, G. (2017). Systematic clinical reasoning in physical therapy (SCRIPT): Tool for the purposeful practice of clinical reasoning in orthopedic manual physical therapy. *Physical Therapy*, 97(1), 61-70. doi:10.2522/ptj.20150482

- Baliki, M., Schnitzer, T., Bauer, W., & Apkarian, A. (2011). Brain morphological signatures for chronic pain (anatomical changes in chronic pain). *PLOS ONE*, 6(10), 1-13. [doi:10.1371/journal.pone.0026010](https://doi.org/10.1371/journal.pone.0026010)
- Bandura, A. (1994). *Self-efficacy. Encyclopedia of human behavior*. New York, NY: Academic Press.
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *Qualitative Report*, 13(4), 544.
- Beneciuk, J., & George, S. (2015). Pragmatic implementation of a stratified primary care model for low back pain management in outpatient physical therapy settings: Two-phase, sequential preliminary study. *Physical Therapy*, 95(8), 1120-1134. [doi:10.2522/ptj.20140418](https://doi.org/10.2522/ptj.20140418)
- Berchtold, A. (2016). Test-retest: Agreement or reliability? *Methodological Innovations*, 9(1), 1-7. [doi:10.1177/2059799116672875](https://doi.org/10.1177/2059799116672875)
- Bishop, A., Thomas, E., & Foster, N. (2007). Health care practitioners' attitudes and beliefs about low back pain: A systematic search and critical review of available measurement tools. *Pain*, 132(1), 91-101. [doi:10.1016/j.pain.2007.01.028](https://doi.org/10.1016/j.pain.2007.01.028)
- Blanca, M., Alarcón, R., Arnau, J., Bono, R., & Bendayan, R. (2018). Effect of variance ratio on ANOVA robustness: Might 1.5 be the limit? *Behavior Research Methods*, 50(3), 937-962. [doi:10.3758/s13428-017-0918-2](https://doi.org/10.3758/s13428-017-0918-2)
- Bland, J., & Altman, D. (2010). Statistical methods for assessing agreement between two methods of clinical measurement. *International Journal of Nursing Studies*, 47(8), 931-936. [doi:10.1016/j.ijnurstu.2009.10.001](https://doi.org/10.1016/j.ijnurstu.2009.10.001)
- Blumenthal-Barby, J., & Krieger, H. (2015). Cognitive biases and heuristics in medical decision making: A critical review using a systematic search strategy. *Medical Decision Making*, 35(4), 539-57. [doi: 10.1177/0272989X14547740](https://doi.org/10.1177/0272989X14547740)
- Breeden, K., & Rowe, N. (2017). A biopsychosocial approach for addressing chronic pain in everyday occupational therapy practice. *OT Practice*, 22(13), CE1-CE8. Retrieved from <https://search-proquest-com.ezp.twu.edu/docview/1923231667?accountid=7102>
- Brooks, J., Huck, G., Iwanaga, K., Chan, F., Wu, J.-R., Finnicum, C., . . . Estala-Gutierrez, V. (2018). Towards an integration of the health promotion models of self-determination theory and theory of planned behavior among people with chronic pain. *Rehabilitation Psychology*, 63(4), 553-562. [doi:10.1037/rep0000245](https://doi.org/10.1037/rep0000245)
- Bruehl, S., Chung, O., & Burns, J. (2006). Anger expression and pain: An overview of findings and possible mechanisms. *Journal of Behavioral Medicine*, 29(6), 593-606. [doi:10.1007/s10865-006-9060-9](https://doi.org/10.1007/s10865-006-9060-9)

- Brun-Cottan, N., McMillian, D., & Hastings, J. (2018). Defending the art of physical therapy: Expanding inquiry and crafting culture in support of therapeutic alliance. *Physiotherapy Theory and Practice*, 34, 1-10. doi:10.1080/09593985.2018.1492656
- Brunner, E., Dankaerts, W., Meichtry, A., O'Sullivan, K., & Probst, M. (2018). Physical therapists' ability to identify psychological factors and their self-reported competence to manage chronic low back pain. *Physical Therapy*, 98(6), 471-479. doi:10.1093/ptj/pzy012
- Burns, J., Peterson, K., Smith, D., Keefe, F., Porter, L., Schuster, E., & Kinner, E. (2013). Temporal associations between spouse criticism/hostility and pain among patients with chronic pain: A within-couple daily diary study. *Pain*, 154(12), 2715-2721. doi:10.1016/j.pain.2013.07.053
- Burns, J., Quartana, P., & Bruehl, S. (2008). Anger inhibition and pain: conceptualizations, evidence and new directions. *Journal of Behavioral Medicine*, 31(3), 259-279. doi:10.1007/s10865-008-9154-7
- Burr, V. (2015). *Social constructionism* (3rd ed.). London, UK: Routledge.
- Campbell, L., Smith, A., McGregor, L., & Sterling, M. (2018). Psychological factors and the development of chronic whiplash-associated disorder(s): A systematic review. *The Clinical Journal of Pain*, 34(8), 755. doi:10.1097/AJP.0000000000000597
- Chester, R., Jerosch-Herold, C., Lewis, J., & Shepstone, L. (2018). Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: A multicenter longitudinal cohort study.(Report). *British Journal of Sports Medicine*, 52(4), 269. doi:10.1136/bjsports-2016-096084
- Chimenti, R. L., Frey-Law, L. A., & Sluka, K. A. (2018). A mechanism-based approach to physical therapist management of pain. *Physical Therapy*, 98(5), 302-314. doi:10.1093/ptj/pzy030
- Clauw, D., Essex, M., Pitman, V., & Jones, K. (2019). Reframing chronic pain as a disease, not a symptom: Rationale and implications for pain management. *Postgraduate Medicine*, 131(3), 185-198. doi:10.1080/00325481.2019.1574403
- Conrad, R., Wegener, I., Geiser, F., & Kleiman, A. (2013). Temperament, character, and personality disorders in chronic pain. *Current Pain and Headaches Report*, 17(3), 1-9. doi:10.1007/s11916-012-0318-3
- Cormier, S., Lavigne, G., Choinière, M., & Rainville, P. (2016). Expectations predict chronic pain treatment outcomes. *Pain*, 157(2), 329. doi:10.1097/j.pain.0000000000000379
- Cowell, I., O'Sullivan, P., O'Sullivan, K., Poyton, R., McGregor, A., Murtagh, G. (2018). Perceptions of physiotherapists towards the management of non-specific chronic low back pain from a biopsychosocial perspective: A qualitative study. *Musculoskeletal Science and Practice*, 38, 113-119. doi:10.1016/j.msksp.2018.10.006

- Crofford, L. J. (2015). Psychological aspects of chronic musculoskeletal pain. *Bailliere's Best Practice & Research in Clinical Rheumatology*, 29(1), 147-155.
[doi:10.1016/j.berh.2015.04.027](https://doi.org/10.1016/j.berh.2015.04.027)
- Cruz, E., Moore, A., & Cross, V. (2012). Clinical reasoning and patient-centered care in musculoskeletal physiotherapy in Portugal – A qualitative study. *Manual Therapy*, 17(3), 246-250. [doi:10.1016/j.math.2012.02.007](https://doi.org/10.1016/j.math.2012.02.007)
- Curatolo, M., Müller, M., Ashraf, A., Neziri, A., Streitberger, K., Andersen, O., & Arendt-Nielsen, L. (2015). Pain hypersensitivity and spinal nociceptive hypersensitivity in chronic pain: Prevalence and associated factors. *Pain*, 156(11), 2373-2382.
[doi:10.1097/j.pain.0000000000000289](https://doi.org/10.1097/j.pain.0000000000000289)
- De Ruddere L., Goubert L., Stevens M., Deveugele M., Craig K. , Crombez G. (2014). Health care professionals' reactions to patient pain: Impact of knowledge about medical evidence and psychosocial influences. *Journal of Pain*, 15(3), 262-270.
[doi:10.1016/j.jpain.2013.11.002](https://doi.org/10.1016/j.jpain.2013.11.002)
- Diener, I., Kargela, M., & Louw, A. (2016). Listening is therapy: Patient interviewing from a pain science perspective. *Physiotherapy Theory and Practice*, 32(5), 356-367.
[doi:10.1080/09593985.2016.1194648](https://doi.org/10.1080/09593985.2016.1194648)
- Eccleston, C., & Crombez, G. (2007). Worry and chronic pain: A misdirected problem solving model. *Pain*, 132(3), 233-236. [doi:10.1016/j.pain.2007.09.014](https://doi.org/10.1016/j.pain.2007.09.014)
- Edwards, I., Jones, M., Carr, J., Braunmack-Mayer, J., & Jensen, G. (2004). Clinical reasoning strategies in physical therapy. *Physical Therapy*, 84(4), 312-330.
[doi:10.1093/ptj/84.4.312](https://doi.org/10.1093/ptj/84.4.312)
- Edwards, I., Jones, M., & Hillier, S. (2006). The interpretation of experience and its relationship to body movement: A clinical reasoning perspective. *Manual Therapy*, 11(1), 2-10.
[doi:10.1016/j.math.2005.10.002](https://doi.org/10.1016/j.math.2005.10.002)
- Edwards, I., Jones, M., Thacker, M., & Swisher, L. (2014). The moral experience of the patient with chronic pain: Bridging the gap between first and third person ethics. *Pain Medicine*, 15(3), 364-78. [doi: 10.1111/pme.12306](https://doi.org/10.1111/pme.12306)
- Edwards, R., Dworkin, R., Sullivan, M., Turk, D., & Wasan, A. (2016). The role of psychosocial processes in the development and maintenance of chronic pain. *Journal of Pain*, 17(9), T70-T92. [doi:10.1016/j.jpain.2016.01.001](https://doi.org/10.1016/j.jpain.2016.01.001)
- Eland, N. D., Kvale, A., Ostelo, R. W. J. G., De Vet, H. C. W., & Strand, L. I. (2019). Discriminative validity of the pain attitudes and beliefs scale for physical therapists. *Physical Therapy*, 99(3), 339. [doi:10.1093/ptj/pzy139](https://doi.org/10.1093/ptj/pzy139)

- Eland, N. D., Kvåle, A., Ostelo, Raymond W. J. G., & Strand, L. I. (2017). The pain attitudes and beliefs scale for physiotherapists: Dimensionality and internal consistency of the Norwegian version: Psychometric properties of the Norwegian PABS- PT. *Physiotherapy Research International*, 22(4), 1-11. doi:10.1002/pri.1670
- Emilson, C., Åsenlöf, P., Pettersson, S., Bergman, S., Sandborgh, M., Martin, C., & Demmelmaier, I. (2016). Physical therapists' assessments, analyses and use of behavior change techniques in initial consultations on musculoskeletal pain: Direct observations in primary health care. *BMC Musculoskeletal Disorders*, 17(1), 1-14. doi:10.1186/s12891-016-1173-x
- Engel, G. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, 196(4286), 129-136. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/847460>
- Ferrari, S. (2016). Can physical therapy centered on cognitive and behavioural principles improve pain self-efficacy in symptomatic lumbar isthmic spondylolisthesis? A case series. *Journal of Bodywork and Movement Therapies*, 20(3), 554-564. doi:10.1016/j.jbmt.2016.04.019
- Ferreira, P., Ferreira, M., Maher, C., Refshauge, K., Latimer, J., & Adams, R. (2013). The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Physical therapy*, 93(4), 470-478. doi:10.2522/ptj.20120137
- Fletcher, C., Bradnam, L., & Barr, C. (2016). The relationship between knowledge of pain neurophysiology and fear avoidance in people with chronic pain: A point in time, observational study. *Physiotherapy Theory and Practice*, 32(4), 271-276. doi:10.3109/09593985.2015.1138010
- Fordyce, W. E. (1976). *Behavioral methods for chronic pain and illness*. Saint Louis, MO: Saint Louis Mosby.
- Foster, N. E., Bishop, A., Thomas, E., Main, C., Horne, R., Weinman, J., & Hay, E. (2008). Illness perceptions of low back pain patients in primary care: What are they, do they change and are they associated with outcome? *Pain*, 136(1-2), 177-187.
- Foster, N., Delitto, A. (2011). Embedding psychosocial perspectives within clinical management of low back pain: Integration of psychosocially informed management principles into physical therapist practice-challenges and opportunities. *Physical Therapy*, 91(5), 790. doi: 10.2522/ptj.20100326
- Foster, N. E., Thomas, E., Bishop, A., Dunn, K. M., & Main, C. J. (2010). Distinctiveness of psychological obstacles to recovery in low back pain patients in primary care. *Pain*, 148(3), 398-406. doi:10.1016/j.pain.2009.11.002

- Gardner, T., Refshauge, K., Smith, L., McAuley, J., Hubscher, M., & Goodall, S. (2017). Physiotherapists' beliefs and attitudes influence clinical practice in chronic low back pain: A systematic review of quantitative and qualitative studies. *Journal of Physiotherapy*, 63(3), 132-143. [doi://dx.doi.org/10.1016/j.jphys.2017.05.017](https://doi.org/10.1016/j.jphys.2017.05.017)
- Gaskin, D. J., & Richard, P. (2012). The economic costs of pain in the United States. *Journal of Pain*, 13(8), 715-724. [doi:10.1016/j.jpain.2012.03.009](https://doi.org/10.1016/j.jpain.2012.03.009)
- George, S. Z. (2017). Beliefs, behavior, and back pain: Insights into psychologically informed management. *North Carolina Medical Journal*, 78(5), 333-334. [doi:10.18043/ncm.78.5.333](https://doi.org/10.18043/ncm.78.5.333)
- George, S. Z., & Beneciuk, J. M. (2015). Psychological predictors of recovery from low back pain: A prospective study. *BMC Musculoskeletal Disorders*, 16(1), 1-7. [doi:10.1186/s12891-015-0509-2](https://doi.org/10.1186/s12891-015-0509-2)
- George, S., Coronado, R., Beneciuk, J., Valencia, C., Werneke, M., & Hart, D. (2011). Depressive symptoms, anatomical region, and clinical outcomes for patients seeking outpatient physical therapy for musculoskeletal pain. *Physical Therapy*, 91(3), 358-372. [doi:10.2522/ptj.20100192](https://doi.org/10.2522/ptj.20100192)
- Gjesdal, K., Dysvik, E., & Furnes, B. (2018). Living with chronic pain: Patients' experiences with healthcare services in Norway. *Nursing Open*, 5(4), 517-526. [doi:10.1002/nop.2.160](https://doi.org/10.1002/nop.2.160)
- Glattacker, M., Heyduck, K., & Meffert, C. (2012). Illness beliefs, treatment beliefs and information needs as starting points for patient information: Evaluation of an intervention for patients with chronic back pain. *Patient Education and Counseling*, 86(3), 378-389. [doi:10.1016/j.pec.2011.05.028](https://doi.org/10.1016/j.pec.2011.05.028)
- Gray, H., & Howe, T. (2013). Physiotherapists' assessment and management of psychosocial factors (Yellow and Blue Flags) in individuals with back pain. *Physical Therapy Reviews*, 18(5), 379-394. [doi:10.1179/1743288X13Y.00000000096](https://doi.org/10.1179/1743288X13Y.00000000096)
- Guide to Physical Therapists Practice 3.0*. (2014). American Physical Therapy Association (Ed.). Retrieved from <http://guidetoptpractice.apta.org/>
- Haggman, S., Maher, C., & Refshauge, K. (2004). Screening for symptoms of depression by physical therapists managing low back pain. *Physical Therapy*, 84(12), 1157-1166. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/15563256>
- Hahn, T., Kelly, C., Murphy, E., Whissel, P., Brown, M., & Schenk, R. (2014). Clinical decision-making in the management of cervical spine derangement: A case study survey using a patient vignette. *Journal of Manual & Manipulative Therapy*, 22(4), 213-219. [doi:10.1179/2042618613Y.00000000058](https://doi.org/10.1179/2042618613Y.00000000058)

- Han, B., Compton, W. M., Blanco, C., Crane, E., Lee, J., & Jones, C. M. (2017). Prescription opioid use, misuse, and use disorders in U.S. adults: 2015 National Survey on Drug Use and Health. *Annals of Internal Medicine*, 167(5), 293-301. doi:10.7326/M17-0865
- Han, C., & Pae, C. (2015). Pain and depression: A neurobiological perspective of their relationship. *Psychiatry Investigation*, 12(1), 1-8. doi:10.4306/pi.2015.12.1.1
- Hendrick, P., Mani, R., Bishop, A., Milosavljevic, S., & Schneiders, T. (2012). Therapist knowledge, adherence and use of low back pain guidelines to inform clinical decisions – A national survey of manipulative and sports physiotherapists in New Zealand. *Manual Therapy*, 18(2), 136-142. doi:10.1016/j.math.2012.09.002
- Higgs, J., Jensen, G., Loftus, S., & Christensen, N. (2018). *Clinical reasoning in the health professions*. Boston, MA: Butterworth-Heinemann.
- Hoeger Bement, M., & Sluka, K. (2015). The current state of physical therapy pain curricula in the United States: A faculty survey. *Journal of Pain*, 16(2), 144-152. doi:10.1016/j.jpain.2014.11.001
- Hooten, W. M. (2016). Chronic pain and mental health disorders: Shared neural mechanisms, epidemiology, and treatment: Shared neural mechanisms, epidemiology, and treatment. *Mayo Clinic Proceedings*, 91(7), 955-970. doi:10.1016/j.mayocp.2016.04.029
- Houben, R., Ostelo, R., Vlaeyen, J., Wolters, P., Peters, M., & Stomp-van Den Berg, S. (2005). Health care providers' orientations towards common low back pain predict perceived harmfulness of physical activities and recommendations regarding return to normal activity. *European Journal of Pain*, 9(2), 173-183. doi:10.1016/j.ejpain.2004.05.002
- Houben, R., Vlaeyen, J., Peters, M., Ostelo, R., Wolters, P., & Stomp-van Den Berg, S. (2004). Health care providers' attitudes and beliefs towards common low back pain: Factor structure and psychometric properties of the HC-PAIRS. *The Clinical Journal of Pain*, 20(1), 37-44. doi:10.1097/00002508-200401000-00008
- Huhn, K., Gilliland, S. J., Black, L. L., Wainwright, S. F., & Christensen, N. (2018). Clinical reasoning in physical therapy: A concept analysis. *Physical Therapy*, 99(4), 440-456. doi:10.1093/ptj/pzy148.
- Institute of Medicine. (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*. Washington, D.C: National Academies Press. doi: 10.17226/13172.
- Interagency Pain Research Coordinating Committee & Department of Health and Human Services. (2016). *National Pain Strategy*. Retrieved from National Institute of Health website: http://iprcc.nih.gov/sites/default/files/HHSNational_Pain_Strategy_508C.pdf
- International Association for the Study of Pain. (2018). *IASP Terminology*. Retrieved from IASP website: <https://www.iasp-pain.org/Education/>

- Jackson, T., Wang, Y., Wang, Y., & Fan, H. (2014). Self-efficacy and chronic pain outcomes: A meta-analytic review. *Journal of Pain*, 15(8), 800-814. [doi:10.1016/j.jpain.2014.05.002](https://doi.org/10.1016/j.jpain.2014.05.002)
- Jensen, M. P., Turner, J. A., & Romano, J. M. (2007). Changes after multidisciplinary pain treatment in patient pain beliefs and coping are associated with concurrent changes in patient functioning. *Pain*, 131(1), 38-47. [doi:10.1016/j.pain.2006.12.007](https://doi.org/10.1016/j.pain.2006.12.007)
- Johannes, C. B., Le, T. K., Zhou, X., Johnston, J. A., & Dworkin, R. H. (2010). The prevalence of chronic pain in United States adults: Results of an internet-based survey. *Journal of Pain*, 11(11), 1230-1239. [doi:10.1016/j.jpain.2010.07.002](https://doi.org/10.1016/j.jpain.2010.07.002)
- Jones, M., & Rivett, D. (2018). *Clinical reasoning in musculoskeletal practice* (2nd ed.). Amsterdam: Elsevier.
- Kahneman, D. (2011). *Thinking, fast and slow* (1st ed.). New York, NY: Farrar, Straus and Giroux.
- Karel, Y., Verhagen, A., Thoomes-de Graaf, M., Duijn, E., van den Borne, M., Beumer, A., . . . Scholten-Peeters, G. (2017). Development of a prognostic model for patients with shoulder complaints in physical therapist practice. *Physical Therapy*, 97(1), 72-80. [doi:10.2522/ptj.20150649](https://doi.org/10.2522/ptj.20150649)
- Keefe, F. J., Main, C. J., & George, S. Z. (2018). Advancing psychologically informed practice for patients with persistent musculoskeletal pain: Promise, pitfalls, and solutions. *Physical Therapy Journal*, 98(5), 398-407. [doi:10.1093/ptj/pzy024](https://doi.org/10.1093/ptj/pzy024)
- Kennedy, J., Roll, J., Schraudner, T., Murphy, S., & McPherson, S. (2014). Prevalence of persistent pain in the U.S. adult population: New data From the 2010 National Health Interview survey. *Journal of Pain*, 15(10), 979-984. [doi:10.1016/j.jpain.2014.05.009](https://doi.org/10.1016/j.jpain.2014.05.009)
- Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, 24(1), 120-124. [doi:10.1080/13814788.2017.1375092](https://doi.org/10.1080/13814788.2017.1375092)
- Ladeira, C. E. (2018). Physical therapy clinical specialization and management of red and yellow flags in patients with low back pain in the United States. *The Journal of Manual & Manipulative Therapy*, 26(2), 66-77. [doi:10.1080/10669817.2017.1390652](https://doi.org/10.1080/10669817.2017.1390652)
- Lady, S. D., Haas, M., Takagi, R., & Takaki, L. (2018). A preliminary study of chiropractors' beliefs about biomedical and biopsychosocial pain: A survey of university of western states alumni. *Journal of Chiropractic Medicine*, 17(1), 16-21. [doi:10.1016/j.jcm.2017.09.002](https://doi.org/10.1016/j.jcm.2017.09.002)
- Lakke, S., & Meerman, S. (2016). Does working alliance have an influence on pain and physical functioning in patients with chronic musculoskeletal pain: A systematic review. *Journal of Compassionate Healthcare*, 3(1), 1-10. [doi 10.1186/s40639-016-0018-7](https://doi.org/10.1186/s40639-016-0018-7)

- Lambie, G. W., Blount, A. J., & Mullen, P. R. (2017). Establishing content-oriented evidence for psychological assessments. *Measurement and Evaluation in Counseling and Development*, 50(4), 210-216. doi:[10.1080/07481756.2017.1336930](https://doi.org/10.1080/07481756.2017.1336930)
- Langridge, N., Roberts, L., & Pope, C. (2015). The clinical reasoning processes of extended scope physiotherapists assessing patients with low back pain. *Manual Therapy*, 20(6), 745-750. doi:[10.1016/j.math.2015.01.005](https://doi.org/10.1016/j.math.2015.01.005)
- Lethem, J., Slade, P., Troupe, J., & Bentley, G. (1983). Outline of a fear-avoidance model of exaggerated pain perception-I. *Behavior, Research, and Therapy*, 21(4), 401-408. doi:[10.1016/0005-7967\(83\)90009-8](https://doi.org/10.1016/0005-7967(83)90009-8)
- Lentz, T., Beneciuk, J., Bialosky, J., Zeppieri, G., Dai, Y., Wu, S., & George, S. (2016). development of a yellow flag assessment tool for orthopaedic physical therapists: Results from the optimal screening for prediction of referral and outcome (OSPRO) cohort. *The Journal of Orthopaedic and Sports Physical Therapy*, 46(5), 327-343. doi:[10.2519/jospt.2016.6487](https://doi.org/10.2519/jospt.2016.6487)
- Linton, S., & Shaw, W. (2011). Impact of psychological factors in the experience of pain. *Physical Therapy*, 91(5), 700-711. doi:[10.2522/ptj.20100330](https://doi.org/10.2522/ptj.20100330)
- Lluch, E., Duenas, L., Falla, D., Baert, I., Meeus, M., Sanchez-Frutos, J., & Nijs, J. (2018). Preoperative pain neuroscience education combined with knee joint mobilization for knee osteoarthritis: A randomized controlled trial. *The Clinical Journal of Pain*, 34(1), 44. doi:[10.1097/AJP.0000000000000511](https://doi.org/10.1097/AJP.0000000000000511)
- Louw, A., Schmidt, S. G., Louw, C., & Puentedura, E. J. (2015). Moving without moving: Immediate management following lumbar spine surgery using a graded motor imagery approach: A case report. *Physiotherapy Theory and Practice*, 31(7), 509-517. doi:[10.3109/09593985.2015.1060656](https://doi.org/10.3109/09593985.2015.1060656)
- Louw, A., Zimney, K., O'Hotto, C., & Hilton, S. (2016a). The clinical application of teaching people about pain. *Physiotherapy Theory and Practice*, 32(5), 385-395. doi:[10.1080/09593985.2016.1194652](https://doi.org/10.1080/09593985.2016.1194652)
- Louw, A., Zimney, K., Puentedura, E. J., & Diener, I. (2016b). The efficacy of pain neuroscience education on musculoskeletal pain: A systematic review of the literature. *Physiotherapy Theory and Practice*, 32(5), 322-355. doi:[10.1080/09593985.2016.1194646](https://doi.org/10.1080/09593985.2016.1194646)
- Lumley, M., Cohen, J., Borszcz, G., Cano, A., Radcliffe, A., Porter, L., . . . Keefe, F. (2011). Pain and emotion: A biopsychosocial review of recent research. *Journal of Clinical Psychology*, 67(9), 942-968. doi:[10.1002/jclp.20816](https://doi.org/10.1002/jclp.20816)
- Macdonald, R., Vaucher, P., & Esteves, J. (2018). The beliefs and attitudes of UK registered osteopaths towards chronic pain and the management of chronic pain sufferers: A cross-sectional questionnaire-based survey. *International Journal of Osteopathic Medicine*, 30, 3-11. doi:[10.1016/j.ijosm.2018.07.003](https://doi.org/10.1016/j.ijosm.2018.07.003)

- Main, C. (2013). The importance of psychosocial influences on chronic pain. *Pain Management*, 3(6), 455-466. doi:[10.2217/pmt.13.49](https://doi.org/10.2217/pmt.13.49)
- Maissan, F., Pool, J., de Raaij, E., Mollema, J., Ostelo, R., & Wittink, H. (2018). The clinical reasoning process in randomized clinical trials with patients with non-specific neck pain is incomplete: A systematic review. *Musculoskeletal Science and Practice*, 35, 8-17. doi:[10.1016/j.msksp.2018.01.011](https://doi.org/10.1016/j.msksp.2018.01.011)
- Malfliet, A., Kregel, J., Meeus, M., Roussel, N., Danneels, L., Cagnie, B., . . . Nijs, J. (2018). Blended-learning pain neuroscience education for people with chronic spinal pain: Randomized controlled multicenter trial. *Physical Therapy*, 98(5), 357-368. doi:[10.1093/ptj/pzx092](https://doi.org/10.1093/ptj/pzx092)
- May, S., Greasley, A., Reeve, S., & Withers, S. (2008). Expert therapists use specific clinical reasoning processes in the assessment and management of patients with shoulder pain: A qualitative study. *Australian Journal of Physiotherapy*, 54(4), 261-266. doi:[10.1016/S0004-9514\(08\)70005-9](https://doi.org/10.1016/S0004-9514(08)70005-9)
- McCracken, L., & Vowles, K. (2014). Acceptance and commitment therapy and mindfulness for chronic pain. *American Psychologist*, 69(2), 178-187. doi:[10.1037/a0035623](https://doi.org/10.1037/a0035623)
- McDevitt, A., Mintken, P., Cleland, J., & Bishop, M. (2018). Impact of expectations on functional recovery in individuals with chronic shoulder pain. *Journal of Manual & Manipulative Therapy*, 26(3), 136-146. doi:[10.1080/10669817.2018.1432541](https://doi.org/10.1080/10669817.2018.1432541)
- Meints, S., & Edwards, R. (2018). Evaluating psychosocial contributions to chronic pain outcomes. *Progress in Neuropsychopharmacology & Biological Psychiatry*, 87(Pt B), 168-182. doi:[10.1016/j.pnpbp.2018.01.017](https://doi.org/10.1016/j.pnpbp.2018.01.017)
- Melzack, R. (2001). Pain and the neuromatrix in the brain. *Journal of Dental Education*, 65(12), 1378-1382. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/11780656>
- Melzack, R. (2005). Evolution of the Neuromatrix Theory of Pain. The Prithvi Raj Lecture: Presented at the Third World Congress of World Institute of Pain, Barcelona 2004. *Pain Practice*, 5(2), 85-94. doi:[10.1111/j.1533-2500.2005.05203.x](https://doi.org/10.1111/j.1533-2500.2005.05203.x)
- Mitchell, A., Rao, S., & Vaze, A. (2011). Can general practitioners identify people with distress and mild depression? A meta-analysis of clinical accuracy. *Journal of Affective Disorders*, 130(1-2), 26-36. doi:[10.1016/j.jad.2010.07.028](https://doi.org/10.1016/j.jad.2010.07.028)
- Morgado, F., Meireles, J., Neves, C., Amaral, A., & Ferreira, M. (2018). Scale development: Ten main limitations and recommendations to improve future research practices. *Psychology: Research and Review*, 30(1), 1-20. doi:[10.1186/s41155-016-0057-1](https://doi.org/10.1186/s41155-016-0057-1)
- Morin Chabane, S., Coutinho, F., Laliberte, M., & Feldman, D. (2018). Outpatient physiotherapists' attitudes and beliefs toward patients with chronic pain: A qualitative study. *Physiotherapy Theory and Practice*, 36(1), 85-94. doi:[10.1080/09593985.2018.1481161](https://doi.org/10.1080/09593985.2018.1481161)

- Moseley, G. (2007). Reconceptualizing pain according to modern pain science. *Physical Therapy Reviews*, 12(3), 169-178. doi.org/10.1179/108331907X223010
- Mutsaers, J., Peters, R., Pool-Goudzwaard, A., Koes, B., & Verhagen, A. (2012). Psychometric properties of the Pain Attitudes and Beliefs Scale for Physiotherapists: A systematic review. *Manual Therapy*, 17(3), 213-218. [doi:10.1016/j.math.2011.12.010](https://doi.org/10.1016/j.math.2011.12.010)
- Mutsaers, J., Pool-Goudzwaard, A., Ostelo, R., Peters, R., Koes, B., & Verhagen, A. (2014). The psychometric properties of the PABS-PT in neck pain patients: A validation study. *Manual Therapy*, 19(3), 208-214. [doi:10.1016/j.math.2013.12.004](https://doi.org/10.1016/j.math.2013.12.004)
- Nahin, R. L. (2015). Estimates of pain prevalence and severity in adults: United States, 2012. *The Journal of Pain*, 16(8), 769-780. [doi-org.ezp.twu.edu/10.1016/j.jpain.2015.05.002](https://doi.org.ezp.twu.edu/10.1016/j.jpain.2015.05.002)
- Nahin, R. L. (2016). Categorizing the severity of pain using questions from the 2012 National Health Interview Survey. *Journal of Pain Research*, 1(9), 105-113. [doi:10.2147/JPR.S99548](https://doi.org/10.2147/JPR.S99548)
- National Center for Health Statistics. (2019). *National Health Interview Survey*. Retrieved from Center for Disease Control website: <https://www.cdc.gov/nchs/nhis/index.htm>
- Nijs, J., Mairesse, O., Neu, D., Leysen, L., Danneels, L., Cagnie, B., . . . Goubert, D. (2018). Sleep disturbances in chronic pain: Neurobiology, assessment, and treatment in physical therapist practice. *Physical Therapy*, 98(5), 325. [doi:10.1093/ptj/pty020](https://doi.org/10.1093/ptj/pty020)
- Nijs, J., Roussel, N., Van Wilgen, C. P., Koke, A., & Smeets, R. (2013). Thinking beyond muscles and joints: Therapists' and patients' attitudes and beliefs regarding chronic musculoskeletal pain are key to applying effective treatment. *Manual Therapy*, 18(2), 96-102. [doi:10.1016/j.math.2012.11.001](https://doi.org/10.1016/j.math.2012.11.001)
- Nisenzon, A., George, S., Beneciuk, J., Wandner, L., Torres, C., & Robinson, M. (2014). The role of anger in psychosocial subgrouping for patients with low back pain. *The Clinical Journal of Pain*, 30(6), 501-509. [doi:10.1097/AJP.0000000000000019](https://doi.org/10.1097/AJP.0000000000000019)
- Norman, G., Monteiro, S., Sherbino, J., Ilgen, J., Schmidt, H., & Mamede, S. (2017). The causes of errors in clinical reasoning: Cognitive biases, knowledge deficits, and dual process thinking. *Academic Medicine*, 92(1), 23-30. [doi:10.1097/ACM.00000000000001421](https://doi.org/10.1097/ACM.00000000000001421)
- Oberski, D. (2008). *Self-selection bias versus nonresponse bias in the perceptions of mobility survey*. The Netherlands Institute for Social Research. Retrieved from https://www.scp.nl/english/Publications/Publications_by_year/Publications_2008
- Ojeda, B., Salazar, A., Dueñas, M., Torres, L. M., Micó, J. A., & Failde, I. (2014). The impact of chronic pain: The perspective of patients, relatives, and caregivers. *Families, Systems, & Health*, 32(4), 399-407. [doi:10.1037/fsh0000069](https://doi.org/10.1037/fsh0000069)

- O'Keefe, M., Cullinane, P., Hurley, J., Leahy, I., Bunzli, S., O'Sullivan, P. B., & O'Sullivan, K. (2016). What influences patient-therapist interactions in musculoskeletal physical therapy? Qualitative systematic review and meta-synthesis. *Physical Therapy*, 96(5), 609-622. [doi:10.2522/ptj.20150240](https://doi.org/10.2522/ptj.20150240)
- O'Reilly-Shah, V. N. (2017). Factors influencing healthcare provider respondent fatigue answering a globally administered in-app survey. *PeerJ*, 5(9), e3785. [doi:10.7717/peerj.3785](https://doi.org/10.7717/peerj.3785)
- Oostendorp, R., Elvers, H., Mikołajewska, E., Laekeman, M., van Trijffel, E., Samwel, H., & Duquet, W. (2015). Manual physical therapists' use of biopsychosocial history-taking in the management of patients with back or neck pain in clinical practice. *The Scientific World Journal*, 1-8. [doi:10.1155/2015/170463](https://doi.org/10.1155/2015/170463)
- Opsommer, E., & Schoeb, V. (2014). 'Tell me about your troubles': Description of patient physiotherapist interaction during initial encounters. *Physiotherapy Research International*, 19(4), 205-221. [doi:10.1002/pri.1585](https://doi.org/10.1002/pri.1585)
- Ostelo, R., Stomp-van, D., Vlaeyen, J., Wolters, P., & de Vet, H. (2003). Health care provider's attitudes and beliefs towards chronic low back pain: The development of a questionnaire. *Manual Therapy*, 8(4), 214-222. [doi:10.1016/S1356-689X\(03\)00013-4](https://doi.org/10.1016/S1356-689X(03)00013-4)
- Parker, S., Zuckerman, S., Shau, D., Mendenhall, S., Godil, S., & McGirt, M. (2012). Extent of preoperative depression is associated with return to work after lumbar fusion for spondylolisthesis. *The Spine Journal*, 12(9), S119-S120. [doi:10.1016/j.spinee.2012.08.321](https://doi.org/10.1016/j.spinee.2012.08.321)
- Patton, M. Q. A. (2015). Qualitative research & evaluation methods : Integrating theory and practice (4th ed.): Thousand Oaks, CA: Sage.
- Petit, A., Begue, C., Richard, I., & Roquelaure, Y. (2019). Factors influencing physiotherapists' attitudes and beliefs toward chronic low back pain: Impact of a care network belonging. *Physiotherapy Theory and Practice*, 35(5), 437-443. [doi:10.1080/09593985.2018.1444119](https://doi.org/10.1080/09593985.2018.1444119)
- Phillips, W., Fletcher, J., Marks, A., & Hine, D. (2016). Thinking styles and decision making: A meta-analysis. *Psychological Bulletin*, 142(3), 260-290. [doi:10.1037/bul0000027](https://doi.org/10.1037/bul0000027)
- Pitcher, M. H., Von Korff, M., Bushnell, M. C., & Porter, L. (2019). Prevalence and profile of high-impact chronic pain in the United States. *The Journal of Pain*, 20(2), 146-160. [doi:10.1016/j.jpain.2018.07.006](https://doi.org/10.1016/j.jpain.2018.07.006)
- Polit, D. (2014). Getting serious about test-retest reliability: a critique of retest research and some recommendations. *International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, 23(6), 1713-1720. [doi:10.1007/s11136-014-0632-9](https://doi.org/10.1007/s11136-014-0632-9)

- Raffaelli, W., & Arnaudo, E. (2017). Pain as a disease: An overview. *Journal of Pain Research*, 10, 2003-2008. doi:10.2147/JPR.S138864
- Reis, F., Nijs, J., & Lundberg, M. (2016). Exercise prescription in chronic pain: Do manual therapists need to understand emotion? *Manual Therapy*, 25, e17-e18. doi:10.1016/j.math.2016.05.014
- Rivett, D., & Jones, M. (2018). *Clinical reasoning in musculoskeletal practice*. Amsterdam: Elsevier.
- Roberts, M., Klatzkin, R., & Mechlin, B. (2015). Social support attenuates physiological stress responses and experimental pain sensitivity to cold pressor pain. *Annals of Behavioral Medicine*, 49(4), 557-569. doi:10.1007/s12160-015-9686-3
- Roussel, N., Neels, H., Kuppens, K., Leysen, M., Kerckhofs, E., Nijs, J., Beetsma, A., & Van Wilgen, P. (2016). History taking by physiotherapists with low back pain patients: Are illness perceptions addressed properly? *Disability and Rehabilitation*, 38(13), 1268-1279. doi:10.3109/09638288.2015.1077530
- Russek, L., & McManus, C. (2015). A practical guide to integrating behavioral and psychologically informed approaches into physical therapist management of patients with chronic pain. *Orthopedic Physical Therapy Practice*, 27(1), 8-16. Retrieved from <http://web.b.ebscohost.com.ezp.twu.edu/ehost/pdfviewer/>
- Sanders, T., Foster, N. E., Bishop, A., & Ong, B. N. (2013). Biopsychosocial care and the physiotherapy encounter: Physiotherapists' accounts of back pain consultations. *BMC Musculoskeletal Disorders*, 14(65), 1-10. doi:10.1186/1471-2474-14-65 .
- Schuh-Hofer, S., Wodarski, R., Pfau, D. B., Caspani, O., Magerl, W., Kennedy, J. D., & Treede, R.-D. (2013). One night of total sleep deprivation promotes a state of generalized hyperalgesia: A surrogate pain model to study the relationship of insomnia and pain. *Pain*, 154(9), 1613-1621. doi:10.1016/j.pain.2013.04.046
- Setchell, J., Costa, N., Ferreira, M., Makovey, J., Nielsen, M., & Hodges, P. (2017). Individuals' explanations for their persistent or recurrent low back pain: A cross-sectional survey. *BMC Musculoskeletal Disorders*, 18(1), 1-9. doi:10.1186/s12891-017-1831-7
- Shaw, W., Main, C., & Johnston, V. (2011). Addressing occupational factors in the management of low back pain: Implications for physical therapist practice. *Physical Therapy*, 91(5), 777-789. doi:10.2522/ptj.20100263
- Shenton, A. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), 63-76. doi:10.3233/EFI-2004-22201
- Shingala, M., & Rajyaguru, A. (2015). Comparison of post hoc tests for unequal variance. *International Journal of New Technologies in Science and Engineering*, 2(5), 22-33. Retrieved from <https://www.semanticscholar.org/paper/Comparison-of-Post-Hoc-Tests-for-Unequal-Variance-Shingala/0b8a2ee4e38c6c4c41417bc30f4a1ccfb736451f>

- Siemonsma, P., Stuive, I., Roorda, L., Vollebregt, J., Walker, M., Lankhorst, G., & Lettinga, A. (2013). Cognitive treatment of illness perceptions in patients with chronic low back pain: A randomized controlled trial. *Physical Therapy*, 93(4), 435-448. [doi:10.2522/ptj.20110150](https://doi.org/10.2522/ptj.20110150)
- Simons, L. E., Elman, I., & Borsook, D. (2014). Psychological processing in chronic pain: A neural systems approach. *Neuroscience and Biobehavioral Reviews*, 39, 61-78. [doi:10.1016/j.neubiorev.2013.12.006](https://doi.org/10.1016/j.neubiorev.2013.12.006)
- Singla, M., Jones, M., Edwards, I., & Kumar, S. (2015). Physiotherapists' assessment of patients' psychosocial status: Are we standing on thin ice? A qualitative descriptive study. *Manual Therapy* (20)2, 328-344. [doi:10.1016/j.math.2014.10.004](https://doi.org/10.1016/j.math.2014.10.004)
- Smart, K., & Doody, C. (2007). The clinical reasoning of pain by experienced musculoskeletal physiotherapists. *Manual Therapy*, 12(1), 40-49. [doi:10.1016/j.math.2006.02.006](https://doi.org/10.1016/j.math.2006.02.006)
- Smeets, R., Vlaeyen, J., Kester, A., & Knottnerus, J. (2006). Reduction of pain catastrophizing mediates the outcome of both physical and cognitive-behavioral treatment in chronic low back pain. *Journal of Pain*, 7(4), 261-271. [doi:10.1016/j.jpain.2005.10.011](https://doi.org/10.1016/j.jpain.2005.10.011)
- Smith, M., Higgs, J., & Ellis, E. (2008). Characteristics and processes of physiotherapy clinical decision making: a study of acute care cardiorespiratory physiotherapy. *Physiotherapy Research International*, 13(4), 209-222. [doi:10.1002/pri.419](https://doi.org/10.1002/pri.419)
- Smith, P. C., Schmidt, S. M., Allensworth-Davies, D., & Saitz, R. (2010). A single-question screening test for drug use in primary care. *Archives of Internal Medicine*, 170(13), 1155-1160. [doi:10.1001/archinternmed.2010.140](https://doi.org/10.1001/archinternmed.2010.140)
- Speckens, A. E. M., van Hemert, A. M., Spinhoven, P., Hawton, K. E., Bolk, J. H., & Rooijmans, H. G. M. (1995). Cognitive behavioural therapy for medically unexplained physical symptoms: A randomised controlled trial. *BMJ*, 311(7016), 1328. [doi:10.1136/bmj.311.7016.1328](https://doi.org/10.1136/bmj.311.7016.1328)
- Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80(1), 99-103. [doi:10.1207/S15327752JPA8001_18](https://doi.org/10.1207/S15327752JPA8001_18)
- Synnott, A., O'Keeffe, M., Bunzli, S., Dankaerts, W., O'Sullivan, P., & O'Sullivan, K. (2015). Physiotherapists may stigmatize or feel unprepared to treat people with low back pain and psychosocial factors that influence recovery: A systematic review. *Journal of Physiotherapy*, 61(2), 68-76. [doi:10.1016/j.jphys.2015.02.016](https://doi.org/10.1016/j.jphys.2015.02.016)
- The Joint Commission on Accreditation of Healthcare Organizations, & The National Pharmaceutical Council. (2001). *Pain: Current Understanding of Assessment, Management, and Treatment*. Retrieved from American Pain Society website: <http://americanpainsociety.org/uploads/education/npc.pdf>

- Thompson, D., Oldham, J. A., & Woby, S. (2016). Does adding cognitive-behavioural physiotherapy to exercise improve outcome in patients with chronic neck pain? A randomised controlled trial. *Physiotherapy*, 102(2), 170-177. [doi:10.1016/j.physio.2015.04.008](https://doi.org/10.1016/j.physio.2015.04.008)
- Tracey, I., & Bushnell, M. (2009). How neuroimaging studies have challenged us to rethink: Is chronic pain a disease? *Journal of Pain*, 10(11), 1113-1120. [doi:10.1016/j.jpain.2009.09.001](https://doi.org/10.1016/j.jpain.2009.09.001)
- Treede, R., Rief, W., Barke, A., Aziz, Q., Bennett, M. I., Benoliel, R., . . . Wang, S. (2019). Chronic pain as a symptom or a disease: The IASP classification of chronic pain for the international classification of diseases (ICD-11). *Pain*, 160(1), 19-27. [doi:10.1097/j.pain.0000000000001384](https://doi.org/10.1097/j.pain.0000000000001384)
- Tsang, A., Von Korff, M., Lee, S., Alonso, J., Karam, E., Angermeyer, M., . . . Watanabe, M. (2008). Common chronic pain conditions in developed and developing countries: Gender and age differences and comorbidity with depression-anxiety disorders. *Journal of Pain*, 9(10), 883-891. [doi:10.1016/j.jpain.2008.05.005](https://doi.org/10.1016/j.jpain.2008.05.005)
- Turk, D., Fillingim, R., Ohrbach, R., & Patel, K. (2016). Assessment of psychosocial and functional impact of chronic pain. *Journal of Pain*, 17(9), T21-T49. [doi:10.1016/j.jpain.2016.02.006](https://doi.org/10.1016/j.jpain.2016.02.006)
- Van Wilgen, P., Beetsma, A., Neels, H., Roussel, N., & Nijs, J. (2014). Physical therapists should integrate illness perceptions in their assessment in patients with chronic musculoskeletal pain: A qualitative analysis. *Manual Therapy*, 19(3), 229-234. [doi:10.1016/j.math.2013.11.006](https://doi.org/10.1016/j.math.2013.11.006)
- Vaske, J., Beaman, J., & Sponarski, C. (2017). Rethinking internal consistency in Cronbach's alpha. *Leisure Sciences*, 39(2), 163-173. [doi:10.1080/01490400.2015.1127189](https://doi.org/10.1080/01490400.2015.1127189)
- Vlaeyen, J., & Linton, S. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain*, 85(3), 317-332. [doi:10.1016/S0304-3959\(99\)00242-0](https://doi.org/10.1016/S0304-3959(99)00242-0)
- Vlaeyen, J., & Linton, S. (2012). Fear-avoidance model of chronic musculoskeletal pain: 12 years on. *Pain*, 153(6), 1144-1147. [doi:10.1016/j.pain.2011.12.009](https://doi.org/10.1016/j.pain.2011.12.009)
- Vlaeyen, J., Nijders, A., Boeren, R., & van Eek, H. (1995). Fear of movement/ (re)injury in chronic low back pain and its relation to behavioral performance. *Pain*, 62, 363-372. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/8657437>
- Vowels, K., & Thompson, M. (2011). Acceptance and commitment therapy for chronic pain. *Journal of Contextual Behavioral Science*, 3(2), 74-80. [doi:10.1016/j.jcbs.2014.04.003](https://doi.org/10.1016/j.jcbs.2014.04.003)
- Wainwright, S., Shepard, K., Harman, L., & Stephens, J. (2011). Factors that influence the clinical decision making of novice and experienced physical therapists. *Physical Therapy*, 91(1), 87-101. [doi:10.2522/ptj.20100161](https://doi.org/10.2522/ptj.20100161)

- Wijma, A. J., Van Wilgen, C. P., Meeus, M., & Nijs, J. (2016). Clinical biopsychosocial physiotherapy assessment of patients with chronic pain: The first step in pain neuroscience education. *Physiotherapy Theory and Practice*, 32(5), 368-384.
[doi:10.1080/09593985.2016.1194651](https://doi.org/10.1080/09593985.2016.1194651)
- Woby, S. R., Roach, N. K., Urmston, M., & Watson, P. J. (2007). The relation between cognitive factors and levels of pain and disability in chronic low back pain patients presenting for physiotherapy. *European Journal of Pain*, 11(8), 869-877.
[doi:10.1016/j.ejpain.2007.01.005](https://doi.org/10.1016/j.ejpain.2007.01.005)
- World Health Organization. (2001). *International Classification of Functioning, Disability and Health*. Retrieved from the World Health Organization website:
<https://www.who.int/classifications/icf/en/>
- World Health Organization. (2019). *ICD-11 Mortality and Morbidity Statistics: Chronic Pain*. Retrieved from World Health Organization website: <https://icd.who.int/browse11/>
- Yeung, E., Woods, N., Dubrowski, A., Hodges, B., & Carnahan, H. (2015). Establishing assessment criteria for clinical reasoning in orthopedic manual physical therapy: A consensus-building study. *Journal of Manual & Manipulative Therapy*, 23(1), 27-36.
[doi:10.1179/2042618613Y.00000000051](https://doi.org/10.1179/2042618613Y.00000000051)
- Zale, E. L., Lange, K. L., Fields, S. A., & Ditre, J. W. (2013). The relation between pain-related fear and disability: A meta-analysis. *Journal of Pain*, 14(10), 1019.
[doi:10.1016/j.jpain.2013.05.005](https://doi.org/10.1016/j.jpain.2013.05.005)
- Zangoni, G., & Thomson, O. (2017). 'I need to do another course' - Italian physiotherapists' knowledge and beliefs when assessing psychosocial factors in patients presenting with chronic low back pain. *Musculoskeletal Science and Practice*, 27, 71-77.
[doi:10.1016/j.msksp.2016.12.015](https://doi.org/10.1016/j.msksp.2016.12.015)

APPENDIX A

Subject Recruitment Studies One and Two

Subject Recruitment Studies One and Study Two

All 50 state licensing boards and state APTA chapters were contacted. The following organizations provided lists or services free of charge.

Table 1.

Participating State Licensing Boards

State	Estimated Number of Email Addresses Received
Arkansas	2000
Florida	17,500
Ohio	10,000
Oklahoma*	2000
Rhode Island	700
West Virginia	1556
Wyoming	650

Note: The state licensing boards providing email addresses of active providers at no cost, and the approximate number of email addresses obtained.

* Oklahoma will email blast the survey upon receipt of IRB approval and the link to the survey.

Table 2.

State APTA Chapters

State	Email Blast	Social Media Platform
Arizona	X	
Arkansas		X
Florida		X
Nevada	X	
New York		X
Montana	X	
Washington		X

Note. State APTA chapters agreeing to distribute survey to its members and the method of distribution.

APPENDIX B

Section One of the Survey: PABS-PT

PABS-PT Factor 1

Please indicate your level of agreement with the following statements.

	Totally Disagree	Strongly Disagree	Disagree	Agree	Strongly Agree	Totally Agree
The severity of tissue damage determines the level of pain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased pain indicates new tissue damage or the spread of existing damage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain is a nociceptive stimulus, indicating tissue damage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If pain increases in severity, I immediately adjust the intensity of my treatment accordingly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If patients complain of pain during exercise, I worry that damage is being caused.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patients with pain should preferably practice only pain free movements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain reduction is a precondition for the restoration of normal functioning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If therapy does not result in a reduction in pain, there is a high risk of severe restrictions in the long term.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain indicates the presence of organic injury.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the long run, patients with pain have a higher risk of developing impairments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Note: A higher score indicates a stronger biopsychosocial orientation

PABS-PT Factor 2

Please read each of the following statements and indicate your level of agreement with each statement.

	Totally Disagree	Strongly Disagree	Disagree	Agree	Strongly Agree	Totally Agree
Learning to cope with stress promotes recovery from pain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A patient suffering from severe pain will benefit from physical exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Even if the pain has worsened, the intensity of the next treatment can be increased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercises that may be back straining should be avoided during the treatment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Therapy may have been successful even if pain remains.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cause of pain is unknown.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Functional limitations associated with pain are the result of psychosocial factors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no effective treatment to eliminate pain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mental stress can cause pain even in the absence of tissue damage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Note: A higher score indicates a stronger biomedical orientation

APPENDIX C

Section Two of the Survey

Psychological Domain
Cognitive Subdomain

Consider the patients with **chronic pain** you evaluated **in the last 3 months** when answering questions below.

When taking the **verbal subjective** history of adult chronic pain patients, how frequently did you **verbally** and **directly** ask patients about their...

		I asked ALL patients	I asked MOST patients	I asked SOME patients	I RARELY asked patients	I NEVER asked patients
20)	perceptions about the effect movement has on their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21)	perceptions about the effect rest has on their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22)	perceptions surrounding the cause of their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23)	understanding of the effect stress, depression, and anxiety have on their pain experience?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24)	confidence in their ability to independently manage their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25)	exaggerated concerns that their pain is a sign of a more serious issue (pain catastrophizing)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26)	overall expectations regarding the resolution of their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27)	expectations for the outcome of physical therapy, as it pertains to a change in their pain level?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28)	expectations for the outcome of physical therapy, as it pertains to a change in their willingness to more fully participate in their life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29)	willingness to take part in their life in spite of the pain (e.g., pain acceptance)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30)	motivation to make the changes necessary to engage in life in spite of their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Psychological Domain
Emotional Subdomain

Consider the patients with **chronic pain** you evaluated **in the last 3 months** when answering questions below.

When taking the **verbal subjective** history of adult chronic pain patients, how frequently did you **verbally** and **directly** ask patients about

Add Question or Text

		I asked ALL patients	I asked MOST patients	I asked SOME patients	I RARELY asked patients	I NEVER asked patients
32)	recent bouts of sadness, feeling down, depressed, or hopeless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33)	their interest in participating in activities that bring them pleasure?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34)	feelings of anxiety or excessive worrying?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35)	feelings of anger they are experiencing related to their pain condition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36)	the emotional state that they were in at the time of their injury (e.g., in a stressful work situation or while participating in a fun sporting event)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37)	their fear of movement (e.g. fear avoidance beliefs)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38)	their fear of re-injury?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39)	their stress level?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Psychological Domain
Behavioral Subdomain

Consider the patients with **chronic pain** you evaluated **in the last 3 months** when answering questions below.

When taking the **verbal subjective** history of adult chronic pain patients, how frequently did you **verbally** and **directly** ask patients about

<div> <div>Edit</div> <div>Delete</div> <div>Move</div> </div>					
	I asked ALL patients	I asked MOST patients	I asked SOME patients	I RARELY asked patients	I NEVER asked patients
41) movements that they avoid because of the pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
42) activities that they avoid because of the pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
43) thoughts that they have about the activities that they avoid?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
44) emotions that they experience if they participate in an activity that is painful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
45) how often they have difficulty sleeping because of the pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
46) how often they have used substances such as alcohol, illicit drugs, or prescription drugs not prescribed to them to manage their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
47) techniques they use to manage their pain (e.g., specific exercises, home remedies) that have made it easier for them to cope with their pain condition?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
48) techniques that they continue to use to manage their pain experience (e.g., specific exercises, home remedies) despite an adverse or neutral response to the technique?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey- Social Domain

Consider the patients with **chronic pain** you evaluated **in the last 3 months** when answering questions below.

When taking the **verbal subjective history** of adult chronic pain patients, how frequently did you **verbally** and **directly** ask patients about

		I asked ALL patients	I asked MOST patients	I asked SOME patients	I RARELY asked patients	I NEVER asked patients
50)	the attitude/beliefs previous healthcare providers had about the patient's pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
51)	their partner/spouse's reaction towards their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
52)	their friends and family's reaction towards their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
53)	the reaction the people they work with have towards their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
54)	the support network they have to manage the challenges they experience because of their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
55)	the impact the pain has on their ability to participate in social functions?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
56)	the impact the pain has on their ability to fulfill their social roles (e.g. partner, parent, family member, employee)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
57)	their feelings of social isolation due to their pain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX D

Section Three of the Survey- Demographic Questions

Section Three-Demographic Questions



TEXAS WOMAN'S
UNIVERSITY™

Part III. Demographics

Thank you for responding to the above questions. This is the last section of the survey. We want to learn more about your educational history and work experience. This section should take less than 10 minutes.

Add Question or Text

Edit Delete Move Add Logic

66) With which gender do you identify?

- ☐ Female
- ☐ Male
- ☐ I prefer not to answer this question
- ☐ Other (please specify)

Add Question or Text

Edit Delete Move Add Logic

67) What is your age (years)?

- ☐ 20-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65+
- ☐ I prefer not to answer this question

68) How many years have you been licensed as a physical therapist?
Please choose the option that best describes your situation.

- ☐ not yet licensed
- ☐ less than 5
- ☐ 5-10
- ☐ 11-15
- ☐ 16 - 20
- ☐ 21-25
- ☐ 26+

Add Question or Text

Edit Delete Move

69) Please indicate the educational level of your INITIAL entry-level physical therapy program?

- ☐ Bachelor's
- ☐ Master's
- ☐ Doctorate

Add Question or Text

Edit Delete Move Add Logic

70) What is your highest educational degree?

- ☐ Bachelor's
- ☐ Master's
- ☐ DPT
- ☐ PhD
- ☐ ScD
- ☐ DSc
- ☐ EdD
- ☐ Other (please specify)

71) If your highest educational degree is NOT in physical therapy, please indicate the area of study.

Add Question or Text

DeleteMove

Page Break

Add Question or Text

EditDeleteMoveAdd Logic

72) In what state do you currently practice?

--Select--

Other:

Add Question or Text

EditDeleteMoveAdd Logic

73) Which of the following setting types BEST describes where you CURRENTLY and MOST often practice?

☐ Outpatient orthopedic based practice
☒ Outpatient neurological based practice
☐ Academic institution (post-secondary)
☐ Acute care (in hospital)
☐ Inpatient rehabilitation facility (IRF or ARF)
☐ Skilled nursing facility
☐ Home care
☐ Multidisciplinary pain management center
☐ Other (please specify)

Add Question or Text

EditDeleteMove

74) How many YEARS as a licensed physical therapist have you been directly involved in patient care?

EditDeleteMoveAdd Logic

75) On average, how many hours a week do you treat patients?

☐ < 10 hours

☐ 10-20 hours

☐ 21-30 hours

☐ > 30 hours

Add Question or Text

EditDeleteMoveAdd Logic

76) In a typical week, what percentage of your patient care time is spent treating individuals with chronic pain?

☐ < 25%

☐ 26-50%

☐ 51-75%

☐ > 75%

Add Question or Text

EditDeleteMoveAdd Logic

77) In a typical week, what percentage of your patient care time is spent treating individuals with work related injuries?

☐ < 25%

☒ 26-50%

☐ 51-75%

☐ > 75%

Add Question or Text

EditDeleteMove

78) In your current practice setting, on AVERAGE, how many MINUTES do you have to perform an evaluation (do not include documentation time)?

79) In your current practice, what setting best describes the location where you typically conduct the evaluation of individuals with chronic pain?

- ☐ a private treatment room- unable to hear or see other patients
- ☐ an open area that is separated from the larger room by a curtain but other patients can still be heard
- ☐ an open area where other patients are present
- ☐ Other (please specify)

Add Question or Text

Edit Delete Move Edit Logic

80) Have you ever practiced in a multidisciplinary pain treatment center?

- ☐ Yes
- ☐ No

Question Logic

If [Yes] is selected, then skip to question [#81]

If [No] is selected, then skip to question [#82]

Page Break

Add Question or Text

Edit Delete Move

81) How many years did you practice in a multidisciplinary pain center?

Add Question or Text

Edit Delete Move Edit Logic

82)

Do you have an American Board of Physical Therapy Specialties Certification (e.g. NCS, OCS)?

- ☐ Yes
- ☐ No

Question Logic

If [Yes] is selected, then skip to question [#83]

If [No] is selected, then skip to question [#84]

Page Break

83) Please indicate the American Board of Physical Therapy Specialist Certification(s) you currently hold (choose all that apply).

- ☐ Cardiopulmonary and Pulmonary
- ☐ Clinical Electrophysiology
- ☐ Geriatric
- ☐ Neurology
- ☐ Oncology
- ☐ Orthopedic
- ☐ Pediatric
- ☐ Sports
- ☐ Women's Health

Add Question or Text

Edit Delete Move Edit Logic

*84) Have you completed a residency program?

- ☐ Yes
- ☐ No

Question Logic

If [Yes] is selected, then skip to question [#85]
If [No] is selected, then skip to question [#88]

Page Break

Add Question or Text

Edit Delete Move

85) In what area(s) did you complete your residency program? Check ALL that apply.

- ☐ Acute care
- ☐ Cardiovascular & pulmonary
- ☐ Geriatrics
- ☐ Neurology
- ☐ Oncology
- ☐ Orthopedics
- ☐ Pediatrics
- ☐ Sports
- ☐ Women's health
- ☐ Wound management
- ☐ Other (please specify)

86)

Was your residency American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE) certified?

- ☐ Yes
☐ No
☐ Don't know
☐ Other (please specify)

Add Question or Text

Edit Delete Move Add Logic

87) What year did you complete the residency program? If you completed more than one program, indicate the year you completed the first program.

Add Question or Text

Edit Delete Move Edit Logic

*88) Have you completed a fellowship program?

- ☐ YES
☐ NO

Question Logic

If [YES] is selected, then skip to question [#89]

If [NO] is selected, then skip to question [#92]

Page Break

89) In what area(s) did you complete a fellowship program? Check ALL that apply.

- ☐ Critical care
- ☐ Hand therapy
- ☐ Movement Systems
- ☐ Neonatology
- ☒ Orthopedic manual physical therapy
- ☐ Performing arts
- ☐ Spine
- ☐ Sports division 1
- ☐ Upper extremity athlete
- ☐ Other (please specify)

Add Question or Text

Edit Delete Move Add Logic

90) Was your fellowship American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE) certified?

- ☐ YES
- ☐ NO
- ☐ Don't know
- ☐ Other (please specify)

Add Question or Text

Edit Delete Move Add Logic

91) What year did you complete the fellowship program? If you completed more than one program, indicate the year you completed the first program.

--Select--

Add Question or Text

Edit Delete Move Edit Logic

*92) Do you have any additional advanced credentialing or certification(s) in an area of practice (e.g. manual therapy, vestibular rehabilitation)?

- ☐ Yes
- ☐ No

Question Logic

If [Yes] is selected, then skip to question [#93]

If [No] is selected, then skip to question [No logic applied]

Page Break

93) Please indicate all of the advanced credentialing or certifications you currently hold.

Add Question or Text

Edit Delete Move Add Logic

94) In the last 5 years, have you taken continuing education courses or attended seminars/conferences related to the pain neurosciences or the utilization of the biopsychosocial model?

- ☐ Yes
☐ No

Add Question or Text

Edit Delete Move Edit Logic

*95) Are you currently a member of any American Physical Therapy Association chapters or sections (e.g. state chapters, specialty sections)?

- ☐ Yes
☐ No

Question Logic

If [Yes] is selected, then skip to question [#96]

If [No] is selected, then skip to question [#97]

Page Break

Edit Delete Move

96) Please indicate to which of the following APTA sections/chapters you currently belong? Check ALL that apply.

- ☐ State chapter(s)
☐ Acute care
☐ Aquatics
☐ Cardiovascular and Pulmonary
☐ Clinical electrophysiology and wound care
☐ Education
☐ Federal
☐ Geriatrics
☐ Hand and upper extremity
☐ Health policy and administration
☐ Home health
☐ Neurology
☐ Oncology
☐ Orthopedics
☐ Pediatrics
☐ Private practice
☐ Research
☐ Sports
☐ Women's health

APPENDIX E

Interview Questions Semi-Structured Interview

Interview Questions Semi-Structured Interviews

The PTs will be told that the purpose of the interview is to better understand the decision-making processes of PTs when evaluating adults with chronic pain. The interviews will be semi-structured. The numbered questions below will be asked of each physical therapist; the bullet points under a question are possible prompts to elicit more information from the physical therapist, if needed. The questions have been piloted and revised.

The questions are as follows:

1. For my first question, I want you to imagine that I am a clinician and a professional friend, but I am not a physical therapist. We meet for lunch. I ask you to tell me about the patient you just evaluated- I want to hear about things that struck you, about your general impressions of the patient. In a way, I want you to tell me a story about the patient you just evaluated. And, the story must be true.
2. For this next question, I want you to consider the time period between you approaching the patient to meet him/her for the first time to the point where you asked the first question of your formal evaluation. Describe to me all the things you observed about that patient.
3. You arrive in the room with the patient and you are about to begin the subjective portion of your evaluation. Share with me how those observations influenced the types of questions that you decided to ask the patient during the history portion of your evaluation.
 - a. Possible prompt if the PT has not mentioned this: Do you prioritize the questions?
 - i. Based on what factors would you prioritize the questions you ask?

Principal Investigator:

I am specifically interested in your decision-making process when evaluating a patient's pain beliefs and thoughts. [The physical therapist will be provided with a list of questions that are representative of the types of questions a physical therapist could ask about a patient's pain perceptions and beliefs (see Appendix F)]. During the remaining interview, I want to learn more about and understand the decision-making process you follow when deciding whether a patient with chronic pain's pain perceptions and beliefs need to be explored and to what depth you need to explore a person's pain beliefs. I want to understand your thought process and I want to understand the mannerisms, behaviors, and characteristics that you might notice within the patient that would cue you to further explore these issues. I also want to understand the reasons you might choose to NOT explore a person's pain perceptions and beliefs.

4. Let's talk about the patient that you just evaluated. And let's focus on your impressions of the patient's relationship with their pain- specifically as it pertains to their thoughts/beliefs/perceptions about their pain. Describe to me your general impressions of the thoughts and beliefs that you think the patient holds about their pain?
 - a. Specifically, what made you think that?
 - i. How did the observations that you identified earlier influence the types of questions you did or did not ask about the patient's pain beliefs you asked of the patient in the evaluation you just completed?
 - b. How did this influence the questions that you asked the patient during the history-taking portion of the interview?
 - c. Were there questions that you opted not to ask?

- i. (if yes) Please describe the thought process you followed to make this decision?
 - d. Are there specific factors that if you hear them, see them, read them make you suspect that faulty pain perceptions might be contributing to the perpetuation of the patient's pain experience?
 - e. What are your thoughts on incorporating psychologically based, pain thought/perception altering interventions into your care?
 - i. How does this influence the types of questions you ask during the subjective portion of your evaluation?
- 5. I want to talk about ways of knowing. To make sure that we share the same understanding of what is meant by this, I want to define ways of knowing for you. Ways of knowing are the ways in which knowledge becomes apparent to us. We know things because we sense them—we feel, hear, see, and smell things; we use language to describe them; we read about things; and we remember similar past experiences. Using reason, we then arrive at conclusions and then formulate our understanding of whatever it is we are considering. For example, imagine you are in your house during daytime hours and the window is open. You hear what you think might be rain hitting the windows and the roof; you smell what you think might be rain; you see a puddle forming on the sill of the open window; perhaps you see that there is no longer sunlight in the room; and you feel an increase in the humidity in the room. You reason, without actually looking out the window, based not only on what you notice in this very moment, but also on all of your past experiences with rain, that it is raining outside. As PTs we know things about our patients, and we arrive at our perceptions about our patients in a number of different ways. I want to learn more about your ways of knowing about your patient—specifically your ways of knowing whether your patient's pain beliefs need to be addressed. Please describe to me your ways of knowing that a patient's pain beliefs need to be addressed.
 - a. How do your ways of knowing influence the way you address/view the psychosocial portion of the assessment?
 - b. What has influenced your personal thought process—in regard to how you approach the pain belief portion of your history-taking portion of your evaluation—the most?
 - c. Can you describe other outside factors that have influenced your decision to approach the subjective pain perception history-taking portion of the evaluation in the manner that you do?
- 6. Describe factors that might prevent you from asking questions about a person's pain beliefs?
 - a. Possible prompts include:
 - i. Are there questions you just will not ask about a person's pain experience and pain beliefs?
 - ii. Please describe why you will not ask the question?
 - iii. Please share your thought process with me.
 - iv. Describe your level of confidence to manage a patient's psychosocial issues
 - v. What factors impact your willingness to ask questions pertaining to the patient's pain perception and beliefs?

APPENDIX F

List of Pain Cognitions Used in Interviews

List of Pain Cognitions Used in Interviews

Below is a list of factors that comprise the cognitive factors of a patient with chronic pain that a physical therapist may consider exploring during an initial evaluation.

The patient's....

- perceptions about the effect movement has on their pain.
- perceptions about the effect rest has on their pain.
- perceptions surrounding the cause of their pain.
- understanding of the effect stress, depression, and anxiety have on their pain experience.
- confidence in their ability to independently manage their pain.
- exaggerated concerns that their pain is a sign of a more serious issue (pain catastrophizing).
- overall expectations regarding the resolution of their pain.
- expectations for the outcome of physical therapy, as it pertains to a change in their pain level.
- expectations for the outcome of physical therapy, as it pertains to a change in their willingness to more fully participate in their life.
- willingness to take part in their life in spite of the pain (e.g. pain acceptance).
- motivation to make the changes necessary to engage in life in spite of their pain?

