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Role of Patient-Provider Communication on Clinical Outcomes of Rehabilitation for Chronic
Musculoskeletal Pain

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in

Public Health (Health Behavior)

by

Chelsea Reed Chapman

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2023

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Chair

University of California San Diego
San Diego State University
2023

EPIGRAPH

If we can share our story with someone who responds with empathy and understanding, shame can't survive.

Brené Brown

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3. Beach, W. A., Dozier, D., Allen, B. J., **Chapman, C.**, & Gutzmer, K. (2019). A White family's oral storytelling about cancer generates more favorable evaluations from Black American audiences. *Health Communication*, 1-11. doi:10.1080/10410236.2019.1652387. Impact Factor: 1.965
4. Beach, W. A., Gutzmer, K., & **Chapman, C.** (2017). Conversation analysis and medicine. *Oxford Research Encyclopedia of Communication*. doi:10.1093/acrefore/9780190228613.013.137
5. Clancy, R., Acio, B., Biggers, D., Hook, C., **Chapman, C.**, & Winslow, L. (2017). Empowering the marginalized: The challenges and opportunities of teaching communication in a women's detention facility. *Dialogues in Social Justice*, 2(2), 16-30.

ABSTRACT OF THE DISSERTATION

Role of Patient-Provider Communication on Clinical Outcomes of Rehabilitation for
Chronic Spine Pain

by

Chelsea Reed Chapman

Doctor of Philosophy in Public Health (Health Behavior)

University of California San Diego, 2023
San Diego State University, 2023

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Background: Chronic pain is highly prevalent, economically burdensome, and one of the most common reasons for seeking medical care in the United States (U.S.). Empathic communication is an understudied phenomena in pain management with potential to alleviate the psychological and affective burdens associated with chronic pain and improve pain outcomes.

Methods: This dissertation consists of three studies investigating empathic communication in physical therapy pain management care. Study 1 conducted a qualitative meta-synthesis of physical

therapist preferred communication behaviors in pain rehabilitation. Study 2 used conversation analysis to investigate how empathic communication was enacted by physical therapists. Study 3 calculated the frequency of empathic communication in the study sample and used repeated-measures, conditional linear mixed-effects models to determine if physical therapist empathic communication was associated with changes in pain intensity and interference across time. Studies 2 and 3 collected original data using a longitudinal observational study design of up to 4 audio recorded physical therapy visits and 4 repeated measures for patients with chronic musculoskeletal pain over 6 weeks of routine care in an outpatient private practice

Results: Study 1 found empathic communication to be one of eight preferred communication behaviors for physical therapists. Study 2 revealed three patterns physical therapists use to provide empathic support to patients expressing emotion. Study 3 found that across 99 recorded visits, physical therapists responded empathically 67% of the time. A significant interaction between empathic communication and time indicated that more frequent empathic communication was associated with a greater reduction in pain intensity across time.

Conclusion: Physical therapists were found to be empathic when managing patients with chronic pain and enacted empathic support in ways that met goals for physical therapy care. More frequent empathic communication by physical therapists was associated with lower ratings of pain intensity and interference by patients. Higher empathy was also associated with larger and more rapid decreases in pain intensity over time. These findings provide rationale for future clinical trials to investigate the efficacy of empathic communication training for physical therapists who manage patients with chronic pain, an innovative approach to improving conservative pain management.

CHAPTER 1: INTRODUCTION

In the United States, 20.4% of adults have chronic pain and 8% have high impact or highly disabling pain.¹ In low and middle income countries, chronic pain of any type occurs at a rate of 33% in the adult population and as high as 56% in the elderly population with low back pain representative across age groups: 18% (adults 18-65), and 31% (elderly over 65).² Chronic pain is taxing on individuals and society, as it is disabling³, leads to reduced quality of life³, is linked to opioid dependence⁴, and is one of the most common reasons for seeking medical care in the United States.⁵ Chronic pain is not only physically tolling, but burdens individuals financially as disability can interfere with job performance or even the ability to continue working.^{6,7}

One of the most important barriers to effective pain management is poor communication.⁸ Despite the perception that poor communication can impede pain care, research is sparse regarding the influence of patient-provider communication on treatment outcomes in chronic pain. Poor communication is highly prevalent in patient-provider interactions in a variety of healthcare settings.⁹⁻¹¹ Inadequate communication can lead to disappointment, misunderstanding, and important concerns not being addressed¹²⁻¹⁴ These are fundamental flaws that inhibit quality care. Patients have expressed that best practice approaches for effectively managing pain include communication that improves information exchange, encourages active participation, improves the relationship between patient and provider, and addresses fears regarding pain management.¹⁵

Chronic pain is highly correlated with emotional distress¹⁶⁻¹⁹ and affective disorders like depression and anxiety.²⁰⁻²³ Provider empathic communication is one opportunity for providers to intervene and attempt to alleviate emotional distress when it's expressed by patients during a clinical interaction.²⁴ Due to the established association between emotional distress and pain outcomes in adults with chronic pain, it is plausible that empathic communication could contribute to improvements in pain and other health outcomes.¹⁶ Communicating with empathy is one of the most important communication practices for improving patient-provider relationships.^{12-15,24-26} Communication works in complex ways, serving as an indirect influencer of proximal outcomes which can then lead to positive health outcomes such as improved pain management.²⁷ Empathic communication has been recognized as fostering a positive therapeutic

alliance between physical therapists and patients,²⁸ and many studies have explored how therapeutic alliance can directly influence clinical outcomes.²⁹⁻³³ However, studies have not yet identified how specific communication practices influence intermediate outcomes, like therapeutic alliance, which ultimately impact clinical outcomes.

Preferred provider communication has been linked to positive intermediary outcomes that could benefit treatment for chronic pain such as collaboration on tasks and goals^{34,35}, patient informational and emotional disclosures³⁴⁻³⁶, delivery of high quality patient-centered care by the physical therapist³⁵⁻³⁹, treatment adherence^{34,39}, and perceptions of quality service by the patient.³⁵ . Additionally, empathic communication aligns with patients' expressed best practice approaches for improving pain management.¹⁵

In qualitative studies that interviewing physical therapists about elements of quality care,^{38,40,41} preferred provider communication was cited as being linked to *therapeutic alliance*, which is defined by levels of agreement on goals and treatment, and strength of the affective bond between therapist and patient.⁴² However, detailed evidence for how to improve communication is limited in part because preferred communication is minimally operationalized in the extant literature.⁴³ There are some specific communication strategies physical therapists are beginning to incorporate into psychosocial interventions for chronic pain such as open ended questions and acknowledgement of emotional challenges. ⁴⁴⁻⁴⁷ However, the details for how these communication behaviors are enacted are limited. Also, the extent to which these specific communication practices impact the efficacy of physical therapy interventions for chronic pain and influence important factors related to pain outcomes like therapeutic alliance and is currently unknown. Physical therapists are a primary source of care for patients with chronic pain,⁴⁸ particularly musculoskeletal pain.⁴⁴ Although physical therapists have recognized the need for psychologically informed interventions⁴⁹ in the management of musculoskeletal pain, many clinicians feel insufficiently trained in communication practices required to implement these approaches.^{50,51}

This dissertation seeks to advance understanding of empathic communication in physical therapy pain care and its relationship with pain outcomes and other factors consequential to quality care. In chapter 2, we develop an evidence-based conceptual framework for preferred communication behaviors for physical therapists in pain rehabilitation. In chapter 3, we identify specific empathic communication

behaviors used in pain care interactions and explore how they are enacted by physical therapists in audio recorded interactions. In chapter 4, we measure the frequency of empathic communication in physical therapy over episodes of routine pain care and examine the relationship between physical therapist empathic communication and pain outcomes as well as other secondary factors important to pain management and physical therapy such as exercise adherence, emotional affect, therapeutic alliance, and physical therapy attendance.

REFERENCES

1. Dahlhamer J, Lucas J, Zelaya C, et al. Prevalence of chronic pain and high-impact chronic pain among adults—United States, 2016. *Morbidity and Mortality Weekly Report*. 2018;67(36):1001.
2. Jackson T, Thomas S, Stabile V, Han X, Shotwell M, McQueen K. Prevalence of chronic pain in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet*. 2015;385:S10.
3. Smith BH, Elliott AM, Chambers WA, Smith WC, Hannaford PC, Penny K. The impact of chronic pain in the community. *Family practice*. 2001;18(3):292-299.
4. Simon LS. Relieving pain in America: A blueprint for transforming prevention, care, education, and research. *Journal of pain & palliative care pharmacotherapy*. 2012;26(2):197-198.
5. Schappert SM, Burt CW. Ambulatory care visits to physician offices, hospital outpatient departments, and emergency departments: United States, 2001-02. *Vital and Health Statistics Series 13, Data from the National Health Survey*. 2006(159):1-66.
6. Piedrahita H. Costs of work-related musculoskeletal disorders (MSDs) in developing countries: Colombia case. *International journal of occupational safety and ergonomics*. 2006;12(4):379-386.
7. Hoy D, March L, Brooks P, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Annals of the rheumatic diseases*. 2014;73(6):968-974.
8. Griebing TL. Re: The Consequences of Poor Communication during Transitions from Hospital to Skilled Nursing Facility: A Qualitative Study. *The Journal of Urology*. 2014;191(5):1364-1365.
9. Robinson JD, Heritage J. How patients understand physicians' solicitations of additional concerns: implications for up-front agenda setting in primary care. *Health communication*. 2016;31(4):434-444.
10. Krupat E, Frankel R, Stein T, Irish J. The Four Habits Coding Scheme: validation of an instrument to assess clinicians' communication behavior. *Patient education and counseling*. 2006;62(1):38-45.
11. Marvel MK, Epstein RM, Flowers K, Beckman HB. Soliciting the patient's agenda: have we improved? *Jama*. 1999;281(3):283-287.
12. Easter DW, Beach W. Competent patient care is dependent upon attending to empathic opportunities presented during interview sessions. *Current Surgery*. 2004;61(3):313-318.
13. Epstein RM, Mauksch L, Carroll J, Jaen CR. Have you really addressed your patient's concerns? *Family practice management*. 2008;15(3):35.
14. Fiscella K, Meldrum S, Franks P, et al. Patient trust: is it related to patient-centered behavior of primary care physicians? *Medical care*. 2004:1049-1055.
15. Levenstein JH, McCracken EC, McWhinney IR, Stewart MA, Brown JB. The patient-centred clinical method. 1. A model for the doctor-patient interaction in family medicine. *Family practice*. 1986;3(1):24-30.
16. Lumley MA, Cohen JL, Borszcz GS, et al. Pain and emotion: a biopsychosocial review of recent research. *Journal of clinical psychology*. 2011;67(9):942-968.

17. Fernandez E, Milburn TW. Sensory and affective predictors of overall pain and emotions associated with affective pain. *The Clinical Journal of Pain*. 1994.
18. Keefe FJ, Lumley M, Anderson T, Lynch T, Carson KL. Pain and emotion: new research directions. *Journal of clinical psychology*. 2001;57(4):587-607.
19. Koechlin H, Coakley R, Schechter N, Werner C, Kossowsky J. The role of emotion regulation in chronic pain: A systematic literature review. *Journal of psychosomatic research*. 2018;107:38-45.
20. Arnow BA, Hunkeler EM, Blasey CM, et al. Comorbid depression, chronic pain, and disability in primary care. *Psychosomatic medicine*. 2006;68(2):262-268.
21. Asmundson GJ, Katz J. Understanding the co-occurrence of anxiety disorders and chronic pain: state-of-the-art. *Depression and anxiety*. 2009;26(10):888-901.
22. Bair MJ, Robinson RL, Katon W, Kroenke KJAoim. Depression and pain comorbidity: a literature review. 2003;163(20):2433-2445.
23. Castro M, Kraychete D, Daltro C, Lopes J, Menezes R, Oliveira I. Comorbid anxiety and depression disorders in patients with chronic pain. *Arquivos de neuro-psiquiatria*. 2009;67(4):982-985.
24. Suchman AL, Markakis K, Beckman HB, Frankel R. A model of empathic communication in the medical interview. *Jama*. 1997;277(8):678-682.
25. Nilan J, Doltani D, Harmon D. Assessment of patient concerns: a review. *Irish Journal of Medical Science (1971-)*. 2018;187(3):545-551.
26. Ruusuvoori J. Managing affect: Integration of empathy and problem-solving in health care encounters. *Discourse Studies*. 2007;9(5):597-622.
27. Street Jr RL, Makoul G, Arora NK, Epstein RM. How does communication heal? Pathways linking clinician–patient communication to health outcomes. *Patient education and counseling*. 2009;74(3):295-301.
28. Price PB, Jones EE. Examining the alliance using the Psychotherapy Process Q-Set. *Psychotherapy: theory, research, practice, training*. 1998;35(3):392.
29. Ferreira PH, Ferreira ML, Maher CG, Refshauge KM, Latimer J, Adams RD. The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Physical therapy*. 2013;93(4):470-478.
30. Higdon LJ. Patient hostility, the working alliance, and treatment outcome in a work hardening center. 1998.
31. Schönberger M, Humle F, Teasdale TW. Subjective outcome of brain injury rehabilitation in relation to the therapeutic working alliance, client compliance and awareness. *Brain Injury*. 2006;20(12):1271-1282.
32. Sherer M, Evans CC, Leverenz J, et al. Therapeutic alliance in post-acute brain injury rehabilitation: predictors of strength of alliance and impact of alliance on outcome. *Brain Injury*. 2007;21(7):663-672.
33. Zaproudina N, Hänninen OO, Airaksinen O. Effectiveness of traditional bone setting in chronic neck pain: randomized clinical trial. *Journal of manipulative and physiological therapeutics*. 2007;30(6):432-437.

34. Cowell I, O'Sullivan P, O'Sullivan K, Poyton R, McGregor A, Murtagh G. Perceptions of physiotherapists towards the management of non-specific chronic low back pain from a biopsychosocial perspective: a qualitative study. *Musculoskeletal Science and Practice*. 2018;38:113-119.
35. Øien AM, Steihaug S, Iversen S, Råheim M. Communication as negotiation processes in long-term physiotherapy: a qualitative study. *Scandinavian journal of caring sciences*. 2011;25(1):53-61.
36. Afrell M, Rudebeck CE. 'We got the whole story all at once': physiotherapists' use of key questions when meeting patients with long-standing pain. *Scandinavian journal of caring sciences*. 2010;24(2):281-289.
37. Cooper K, Smith BH, Hancock E. Patient-centredness in physiotherapy from the perspective of the chronic low back pain patient. *Physiotherapy*. 2008;94(3):244-252.
38. Gard G, Gyllensten AL, Salford E, Ekdahl C. Physical therapists' emotional expressions in interviews about factors important for interaction with patients. *Physiotherapy*. 2000;86(5):229-240.
39. Ruben MA, Meterko M, Bokhour BG. Do patient perceptions of provider communication relate to experiences of physical pain? *Patient education and counseling*. 2018;101(2):209-213.
40. Askew R, Kibelstis C, Overbaugh S, Walker S, Nixon-Cave K, Shepard KF. Physical therapists' perception of patients' pain and its affect on management. *Physiotherapy Research International*. 1998;3(1):37-57.
41. Papadopoulos I, Shea S, Taylor G, Pezzella A, Foley L. Developing tools to promote culturally competent compassion, courage, and intercultural communication in healthcare. *Journal of Compassionate Health Care*. 2016;3(1):2.
42. Hall AM, Ferreira PH, Maher CG, Latimer J, Ferreira ML. The influence of the therapist-patient relationship on treatment outcome in physical rehabilitation: a systematic review. *Physical therapy*. 2010;90(8):1099-1110.
43. Chapman CR, Woo NT, Maluf KS. Preferred Communication Strategies Used by Physical Therapists in Chronic Pain Rehabilitation: a Qualitative Systematic Review and Meta-Synthesis. *Physical Therapy*. 2022.
44. Babatunde OO, Jordan JL, Van der Windt DA, Hill JC, Foster NE, Protheroe J. Effective treatment options for musculoskeletal pain in primary care: a systematic overview of current evidence. *PLoS one*. 2017;12(6):e0178621.
45. Bostick GP. Effectiveness of psychological interventions delivered by non-psychologists on low back pain and disability: a qualitative systematic review. *The Spine Journal*. 2017;17(11):1722-1728.
46. Wood L, Hendrick PA. A systematic review and meta-analysis of pain neuroscience education for chronic low back pain: Short-and long-term outcomes of pain and disability. *European Journal of Pain*. 2019;23(2):234-249.
47. Archer KR, Devin CJ, Vanston SW, et al. Cognitive-behavioral-based physical therapy for patients with chronic pain undergoing lumbar spine surgery: a randomized controlled trial. *The Journal of Pain*. 2016;17(1):76-89.
48. Allen RJ. Physical agents used in the management of chronic pain by physical therapists. *Physical Medicine and Rehabilitation Clinics*. 2006;17(2):315-345.

49. Soelberg CD, Brown RE, Du Vivier D, Meyer JE, Ramachandran BK. The US opioid crisis: current federal and state legal issues. *Anesthesia & Analgesia*. 2017;125(5):1675-1681.
50. Nielsen M, Keefe FJ, Bennell K, Jull GA. Physical therapist–delivered cognitive-behavioral therapy: a qualitative study of physical therapists' perceptions and experiences. *Physical therapy*. 2014;94(2):197-209.
51. Hall A, Richmond H, Copsey B, et al. Physiotherapist-delivered cognitive-behavioural interventions are effective for low back pain, but can they be replicated in clinical practice? A systematic review. *Disability and rehabilitation*. 2018;40(1):1-9.

**CHAPTER 2: THE PREFERRED COMMUNICATION STRATEGIES USED BY PHYSICAL
THERAPISTS IN CHRONIC PAIN REHABILITATION: A QUALITATIVE SYSTEMATIC REVIEW AND
META-SYNTHESIS**

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ABSTRACT

Objective: Lack of clarity regarding effective communication behaviors in chronic pain management is a barrier for implementing psychologically informed physical therapy approaches that rely on competent communication by physical therapist providers. This study aimed to conduct a systematic review and meta-synthesis to inform the development of a conceptual framework for preferred communication behaviors in pain rehabilitation.

Methods: Ten databases in the health and communication sciences were systematically searched for qualitative and mixed method studies of interpersonal communication between physical therapists and adults with chronic pain. Two independent investigators extracted quotations with implicit and explicit references to communication and study characteristics following Standards for Reporting Qualitative Research and Strengthening the Reporting of Observational Studies in Epidemiology guidelines. Methodological quality for individual studies was assessed with Critical Appraisal Skills Programme, and quality of evidence was evaluated with GRADE-CERQual. An inductive thematic synthesis was conducted by coding each quotation, developing descriptive themes, and then generating behaviorally distinct analytical themes.

Results: Eleven studies involving 346 participants were included. The specificity of operationalizing communication terms varied widely. Meta-synthesis identified 8 communication themes: (1) disclosure-facilitating, (2) rapport-building, (3) empathic, (4) collaborative, (5) professional accountability, (6) informative, (7) agenda-setting, and (8) meta-communication. Based on the quality of available evidence, confidence was moderate for 4 themes and low for 4 themes.

Conclusion: This study revealed limited operationalization of communication behaviors preferred by physical therapists in chronic pain rehabilitation. A conceptual framework based on 8 communication themes identified from the literature is proposed as a preliminary paradigm to guide future research.

Impact: This proposed evidence-based conceptual framework for preferred communication behaviors in pain rehabilitation

Introduction

The prevalence of chronic pain worldwide is 30.3%¹, being one of the most common reasons adults seek medical care.² Chronic pain often presents with anxious or depressed mood³⁻⁵, and is associated with greater disability⁵, and reduced quality of life.⁶ Adverse health outcomes resulting from iatrogenic opioid dependence are also higher among individuals with chronic pain.^{4,7,8} Pain impacts the general population to the extent that international law recognizes pain management as a basic human right.⁹ The Institute of Medicine recognizes physical therapy (PT) as an effective non-pharmacological approach to treating chronic pain.¹⁰

Physical therapists (PTs) evaluate and treat patients with chronic pain stemming from a variety of health conditions, and have advocated for the adoption of psychologically informed physical therapy (PIPT) in chronic pain management.¹¹ PIPT combines traditional biomedical PT interventions (e.g., therapeutic exercise, physical modalities, manual therapies) with one or more behavioral elements adapted from evidence-based psychotherapies for pain management (e.g., Cognitive Behavioral Therapy (CBT)¹²⁻¹⁴, Acceptance and Commitment Therapy (ACT)¹³, Mindfulness Based Stress Reduction (MSBR)¹⁴). Despite evidence that chronic pain is impacted by the cognitive, emotional, social, and contextual factors targeted by PIPT, this approach has shown only small to moderate effects on pain and disability when implemented by PTs.^{15 16} We postulate that lack of confidence in managing psychosocial aspects of care through therapeutic pain communication may be one of several factors contributing to the limited impact of PIPT in clinical practice. The ability of PTs to recognize and implement “effective communication skills” is a key component of PIPT¹⁷, yet lack of confidence in communication skills has been cited as a reason for PTs not implementing PIPT approaches in chronic pain rehabilitation despite recognition of their value.^{18,19} Regardless of the therapeutic approach, patient-provider communication is a critical factor in fostering therapeutic alliance, which has been shown to improve pain outcomes in rehabilitation settings.²⁰

Communication is ubiquitous, as one “cannot not communicate”²¹, but competent communication^{22,23} is more rare. Communication competence is formally defined as “the degree to which meaningful behavior is perceived as appropriate and effective in a given context”; this judgement is influenced by a combination of the communicator’s motivation, knowledge, and skills.^{22,23} Competent

communication effectively and appropriately conveys meaning, and has been linked to more accurate patient reporting and disclosure, better treatment adherence, and improved clinical outcomes in a variety of healthcare settings.²⁴⁻²⁶ Several entry-level and post-professional training programs have recently been developed to advance physical therapists' competency in therapeutic pain communication.^{17,27} We propose that lack of clarity regarding what behaviors constitute competent communication in the field of pain rehabilitation presents a major barrier for such training initiatives.

The primary aims of this study were to (1) conduct a systematic review and meta-synthesis of qualitative studies describing communication behaviors utilized by PTs when treating adults with chronic pain, and (2) develop a conceptual framework to operationalize preferred communication behaviors in pain rehabilitation based on findings from the meta-synthesis. A secondary aim was to identify intermediary and terminal variables linking preferred communication behaviors with patient outcomes. We define *communication behaviors* as the act of using verbal or nonverbal means to convey meaning to another. In the absence of direct evidence supporting the clinical efficacy of specific communication behaviors, we use *preferred* communication as an umbrella term encompassing the varied terminology used for behaviors with implied benefit in patient-provider interactions (e.g., competent, effective, good, skilled, meaningful, etc.).

Methods

This review was registered in PROSPERO (CRD42020166258) and follows reporting guidelines from the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement.²⁸ Consistent with prior reviews in the field of pain rehabilitation^{11,29}, we conducted a meta-synthesis following procedures recommended by Sandelowski, Barroso, and Voils³⁰ as this method is particularly suited for synthesis of data from qualitative studies using varied methodologies.³¹ After a systematic search of the literature, meta-synthesis of included studies was conducted in 3 stages: (1) relevant findings were extracted; (2) data were grouped based on topical similarity using thematic synthesis; and (3) findings were abstracted and formatted to eliminate redundancies while preserving the complexity of their content. In lieu of frequency effect sizes³⁰, a sensitivity analysis was conducted to assess to the

contribution of included studies to the final set of abstracted communication themes. Each stage of the systematic review and meta-synthesis is further detailed below.

Data Sources and Searches

The following electronic databases were searched: MEDLINE (PubMed), CINAHL, Scopus, PsycINFO, ScienceDirect, SPORTDiscus, Linguistics and Language Behavior Abstracts (LLBA) (ProQuest), ComDisDome, PsycARTICLES, and Communication and Mass Media Complete. Variations of four primary search term criteria were used to identify relevant studies: (1) chronic pain, (2) physical therapy, (3) communication, and (4) qualitative research. A preliminary search of the literature was completed in December 2019 to pilot the study procedures. The full search was conducted from January to March 2020, and a final search was run on June 22 2021 to identify any recently published studies for inclusion prior to publication. Databases were searched from inception through the final search date. The search strategy (**Appendix 1**) was developed with assistance from a medical librarian. References were exported to Endnote (Version X9; Thomas Reuters, New York, NY), duplicates were removed, and titles and abstracts were independently screened by two investigators (CC and NW). Full text articles were obtained for potentially eligible studies and were independently reviewed by the same two investigators using pre-determined eligibility criteria. In cases of disagreement, a third investigator (KM) facilitated consensus regarding the selection of included studies.

Study Selection

Participants. Studies involving adult patients undergoing PT management of chronic pain were included. Chronic pain was defined as persistent or recurring pain anywhere in the body lasting 3 or more months.³² Provider groups in these studies could be exclusively or partially comprised of PTs. Only settings in which PT services were delivered face-to-face were included; studies using telehealth or other electronic platforms to deliver PT services were excluded.

Exposure and Study Design. We included qualitative and mixed methods studies exploring interpersonal communication used by PTs in interactions with adult patients treated for chronic pain. We excluded studies that focused exclusively on patient communication or communication between providers,

rather than between patient and provider. We also excluded studies with exclusively quantitative designs, and any study not published in English.

Communication Behaviors. We were primarily interested in extracting communication behaviors used by PTs during the rehabilitation of individuals with chronic pain. Communication behavior could be referenced explicitly (e.g., “open communication channels with the patients”) or implicitly (e.g., “the amount of support I give them in saying, ‘I’m gonna help you’ makes them believe they can get better”³³) by investigators, PTs, or their patients. Additionally, we extracted any intermediary or terminal variable linked with communication behaviors in the primary review and potentially important for patient outcomes, including but not limited to self-efficacy, therapeutic alliance, pain intensity, and pain interference. An additional targeted search was performed to extract quotations with an explicit or implicit reference to *nonverbal* forms of communication due to their unexpectedly limited representation in the initial round of extracted communication behaviors.

Data Extraction and Quality Assessment

Data Extraction. Two investigators (CC and NW) independently extracted study characteristics and PT communication behaviors from eligible studies into separate spreadsheets using a custom template, with a third investigator (KM) available to discuss and resolve any discrepancies. The template was developed using selected items from STROBE³⁴ to detail participant and setting characteristics, combined with the 21-item SRQR checklist to describe study aims, methodology, evidence, and main findings. Communication quotations from investigators, PTs, and patients were extracted with the provision that the communication referenced was identified as the PT’s (e.g., PT reflecting on his or her own communication, or patients reflecting on their PT’s communication).

Quality Assessment. Two investigators (CC and NW) independently assessed the methodological quality of included studies using the Critical Appraisal Skills Programme (CASP).³⁵ Discrepancies were resolved by a third investigator (KM). This tool has been used extensively in qualitative systematic reviews of rehabilitation research, as it allows raters to identify a range of limitations that can affect conclusions made by qualitative studies using various methodologies.^{29,36,37} The same investigators performed an independent sensitivity analysis of studies contributing to each theme and assessed quality of the evidence

using GRADE-CERQual^{38,39}. GRADE-CERQual critiques four areas for each theme: (1) methodological limitations (determined by CASP criteria), (2) adequacy of data, (3) coherence, and (4) relevance. The quality of evidence appraisal was performed to promote transparency of findings and to determine how much confidence to place in each theme.

Data Grouping and Abstraction: Thematic Synthesis

A thematic synthesis was conducted using methods proposed by Thomas and Harden (2008).⁴⁰ This method was chosen because it preserves the context that is integral to qualitative inquiry while providing succinct thematic results; anyone can follow the path of descriptive and analytic themes to form their own judgements since themes are provided alongside raw data quotes and contextual elements. Three stages of analysis included: (1) coding text in a targeted line by line fashion, (2) developing descriptive subthemes from the initial coding, and (3) generating analytical themes from the descriptive subthemes. This process is inductive in that the analysis starts at the micro level of each line of text and then broadens as subthemes and themes are discovered iteratively. Quotations were extracted that contained description or identification of communication behaviors used by PTs in chronic pain rehabilitation. We included primary data with verbatim quotations for all themes to enhance trustworthiness and transparency. Lines were analyzed if each investigator (CC and NW) independently identified that a communication behavior was used by a PT, regardless of whether the speaker was a PT or patient. Quotations were included if communication was mentioned explicitly or discussed implicitly (e.g., “admit your limitations” and “ask for help” are examples of implicitly referenced communication)⁴¹. Thematic synthesis is a method of data abstraction that identifies and develops an explicit link between lines of text analyzed and the conclusions presented. Subthemes and themes were analyzed and compared by the investigators to ensure agreement on quotation selection and theme assignment. Redundancies were removed by consolidating similar or overlapping subthemes, and the remaining subthemes were grouped into descriptive themes for preferred communication in pain rehabilitation. Results were formatted in a table to illustrate the topical similarity and thematic diversity of summarized findings. Any disagreements between investigators during the process of thematic synthesis were resolved through discussion and consensus of all authors.

Role of the Funding Source

The funders played no role in the design, conduct, or reporting of this study.

Results

Study Identification and Selection

A PRISMA flow diagram (**Figure 1.1**) details the process of study selection. We identified 3,028 articles from 4 of the 10 databases searched. After removing 158 duplicates⁴², we screened titles and abstracts for 2,870 studies, removing an additional 2,854. Sixteen studies were included for full text screening, and two additional articles were found by searching the reference lists of full text articles. Eleven studies fulfilled all inclusion criteria and were included in the meta-synthesis.^{33,41,43-51}

Characteristics of included studies

The 11 included studies were published between 1998 and 2019. The majority of studies were conducted in western countries^{33,41,43-49,51}. The studies involved 346 PT and patient participants representing a variety of chronic pain conditions and treatment settings. Conditions ranged from generalized chronic or persistent pain without serious causative or contributory disease to localized musculoskeletal pain in the low-back and/or neck, with one study of post-traumatic paraplegia chronic pain. Settings included primary care hospitals, outpatient rehabilitation centers, sports medicine clinics, private practices, and home health services. Data collection and analysis techniques also varied across studies. Seven studies used structured or semi-structured interviews^{33,44,45,49-52}, two used focus groups^{43,46}, and three were observational^{41,48,52} (one of these also used interviews)⁵². A detailed summary of study characteristics is presented in **Table 1.1**.

Operationalization of Communication Terminology

As most of the included studies aimed to explore communication as a phenomenon rather than operationalize terminology, communication terms differed across studies and the level of specificity operationalizing *communication* and *competent, effective, or preferred communication* varied widely (**Table 1.1**). The majority of included studies did not conceptualize or operationalize communication with replicable specificity. Only 3 of 11 studies^{44,50,52} operationalized communication terms prior to data collection, although there were widely differing presentations of communication as a phenomenon even among these

studies. Two studies acknowledged the interactive, reciprocal nature of communication and underscored its importance for clinical practice. These studies characterized communication as, “a two-way process between the physical therapist and the patient...necessary in order to understand each other”⁵⁰, and “physiotherapy and communication were inseparable processes. The physiotherapist and the patient concurrently participated.”⁵² The third study concluded, “good communication involved: taking time over explanations; using appropriate terminology; and encouraging the patient’s participation in the communication process.”⁴⁴ This definition of *good communication* was context-specific, supported by quotations, and descriptive enough to be easily understood and replicated. Five studies^{33,45,46,48,50} made no attempt to operationalize communication, instead using positively valenced but ultimately ambiguous terms such as “careful communication”⁴⁵, “effective communication”^{45,48}, “communication skills/style/process”^{33,48,50}, or “respectful communication”⁴⁶ without specifying why and how preferred communication was structured.

Thematic Findings for Communication Behaviors

By analyzing representative quotations and descriptions of communication used by PTs, we consolidated different terms for communication behaviors that had the same or similar meaning. We also separated communication behaviors with vague identifiers of effectiveness, such as “good communication” or “effective communication”, into behaviorally distinct categories for preferred communication behaviors. A preliminary analysis of communication behaviors identified 25 subthemes, which were then organized into eight emergent communication themes, named for their presumed purpose in interpersonal interactions between PTs and their patients: (1) disclosure-facilitating, (2) rapport-building, (3) empathic, (4) collaborative, (5) professional accountability, (6) informative, (7) agenda-setting, and (8) meta-communication. We present abstracted findings for preferred communication behaviors used by PTs during chronic pain rehabilitation in **Table 2**, organized by subthemes and themes, and supported by quotations extracted from included studies.

Theme 1: Disclosure-facilitating communication. PTs used a number of verbal and nonverbal communication behaviors to encourage patients to disclose personal information in interactions, such as using open-ended questions/formulations, gaze and nodding as conversation continuers, and asking about

lifestyle.^{43,45,48,50,51} Studies varied in their level of specificity when describing these communication behaviors. For example, one study was vague with their recommendation for disclosure-facilitating communication, underscoring the importance of *open lines of communication* and *availability* without describing how this was accomplished other than confirming it was a part of care: “my communication with the patients is open. Any time the patients can call me and tell me their problems.”⁵⁰ Another study described exactly how disclosure-facilitating communication was enacted, with pilot testing of specific open-ended questions used during pain rehabilitation.⁴³

Theme 2: Rapport-building communication. Much of this communication focused on PTs creating an atmosphere to foster trust. These studies relied on general recommendations and often did not identify what, specifically, about the communication enabled rapport. These articles recommended PTs “develop a good initial relationship with the patient”³³ and that “friendly and respectful behavior of physiotherapists was a predominant patient experience.”⁴⁶ The specific rapport-building practices discussed were listening⁴³, using humor⁴¹, and tailoring communication to the individual being treated.^{44,50} In this category, preferred and dispreferred communication were discussed in tandem: “specific approaches were more useful for some than others, suggesting that tailoring communication to the individual’s needs is important”, but that “written communication was also discussed, often in a negative manner, suggesting that care should be taken to issue information acceptable to the individual.”⁴⁴ Listening was emphasized alongside the negative consequences of not listening “if you don’t [listen] then you will never be able to pull them out because you aren’t listening.”⁴³

Theme 3: Empathic communication. Empathic communication emerged as a category distinct from rapport-building communication in that rapport-building was more focused on communicating in a way that fostered trust, whereas empathic communication was more focused on identifying and attending to emotional matters. Similar to rapport-building, listening was seen as a key communication behavior but with the stipulation that listening be paired with encouraging, working with, and not judging patients.³³ Empathic communication also involved using touch to communicate a strong and supportive relationship, and relaying personal pain experiences to patients.³³ Timing along with delivery were considered important in this category: “early follow-up support was considered optimal for reinforcement and to reassure anxious

patients”⁴⁵ and “the amount of time I spend with a patient...makes them believe they can get better.”³³ PTs acknowledged several challenges with empathic communication, such as difficulty responding to sad emotions displayed by their patients. PTs acknowledged that these situations were difficult, but they preferred their patients display their emotions because “expression of feelings in the clinic facilitates the physiotherapist’s understanding of the patient’s problems and influences the result of treatment positively.”⁴³

Theme 4: Collaborative communication. Collaborative communication included communication behaviors such as seeking common ground⁵², and treating communication as a two-way street.⁵⁰ One article described the importance of “collaboratively agreeing [upon] treatment goals”⁴⁵, which was identical in practice and definition to “shared decision making” in the healthcare literature, illustrating the lack of standardization when describing communication behaviors in clinical practice. Successful collaborative communication centered around the goal of ensuring patients felt involved in their own care, engaging in communication behavior like “taking time over explanations; using appropriate terminology; listening, understanding and getting to know the patient; and encouraging the patient’s participation in the communication process.”⁴⁴ Involvement did not necessarily require patients to be joint decision makers in their own care; patients were comfortable with their PTs making final decisions about their care “as long as they were accompanied by good explanations.”⁴⁴

Theme 5: Professional accountability communication. A few studies considered communication that involved admitting limitations in professional skills or knowledge and asking for help when needed to be an important indicator of a good PT. In one extracted quotation, a PT described in what context it would be appropriate to refer a patient to someone else and words that could be used to do so: “. . . there is somebody who has 10 years more experience than me, why don’t you go and see them. There are so many therapies about.”⁴⁹ Another PT recommended “not being afraid to admit your limitations and ask for help if it is needed.”⁴¹

Theme 6: Informative communication. PTs extracted and relayed information in different yet connected ways: providing education and information^{44,46}, reconciling patient perspectives^{45,51}, developing patient insights ⁴⁵, and reconciling information from verbal and nonverbal (e.g. postures/movements, pain

behaviors) communication cues during presentations of pain³³. Preferred communication was described as regular updates and correcting misguided patient beliefs. One study described how to correct patients' incorrect perceptions and face conflict to ensure quality care: "now I'm more inclined to say 'Listen, hold on a minute. Anyway I've just got to re-examine your point of view on this' and that can sometimes lead to conflict... but I think you sometimes need conflict for conceptual change."⁵¹ In this category, the term "effective communication" was often used when more specific terminology would be useful for PTs wanting to improve their skills in information exchange. For example, one article⁴⁵ used "effective communication" and "educating and developing patient insights" interchangeably.

Theme 7: Agenda-setting communication. Although only one study contributed to this theme⁴⁸, this type of communication was included as a standalone category because it is entirely distinct from the other behaviors identified in our analysis. Agenda-setting is a communication practice in which providers organize and guide conversations to prioritize selected topics or tasks during an interpersonal encounter that may be constrained by time; this can include shifting topics, shutting down a topic of conversation, or ensuring that a topic gets covered before the end of a visit.⁴³ PTs related that strategies to close down a pain conversation were to "summarize the consultation and to include a prognosis of the patient's problem."⁴⁸ PTs also described shifting from one topic to another through the strategic use of yes/no questions and "okay" terminators.

Theme 8: Meta-communication. A final emergent theme was the use of meta-communication, or communicating about communication. Because many of these studies interviewed PTs about their communication, interviewees were primed to contribute to this theme. Interestingly, PTs most often discussed using meta-communication as a tool for facilitating disclosure with their patients. We recognized this theme as distinct from disclosure-facilitating communication because it was mentioned by name in extracted quotations although meta-communication and disclosure-facilitating communication shared the same goals in some studies. In one study, PTs asked their patients the open-ended question "if pain could talk, what would it say?"— an aspect of metacommunication was introduced, where patient and physiotherapist together reflected, giving new perspectives on the experience of pain". In this example, PTs encouraged patients to communicate about their communication through a third party

anthropomorphized concept—their own pain as a human being with the ability to use language.⁴³ PTs acknowledged that “communication about communication, appeared as means to open locked dialogues, and was initiated by the physiotherapists and the patients” suggesting that both PTs and patients found meta-communication to be a helpful tool in furthering understanding.⁵²

Descriptive Findings for Secondary Variables

Intermediary and terminal variables cited as being linked to communication behaviors in the primary review and potentially important for patient outcomes are highlighted in **Table 2**. Overall, these variables were infrequently mentioned, varied widely across studies and communication themes, and were not operationally defined; thus, a thematic analysis was not performed. The most frequently cited intermediary variables included various terms related to the constructs of therapeutic alliance (encompassing trusting relationships/rapport^{33,41,49} and collaboration on tasks and goals^{45,52}); informational and emotional disclosures by the patient^{43,45,48}; and delivery of high quality patient-centered care by the PT^{41,43,44,50,52}. Less frequently cited intermediary variables included adherence^{45,50}, expectations for recovery^{45,52}, and perceptions of quality service by the patient⁵². Terminal patient outcomes were rarely cited as being directly impacted by communication behaviors, with only a single study identifying specific treatment outcomes (pain and activity)⁴⁵ and the remainder using vague descriptors such as “the result of treatment”⁴³.

Methodological Quality of Included Studies and Quality of Evidence

Results of the CASP methodological quality appraisal are presented in **Table 3**. Only two studies met all of the methodological criteria^{46,50} and one study failed as many as 5 of the 10 CASP criteria.⁴³ On average, the eleven studies failed 2.1(1.5) CASP criteria. Consideration of potential bias or influence in the relationship between the researcher and participants (Criterion 6, reflexivity) and thorough description of the study design (Criterion 3) were the most frequently violated criteria. All included studies provided a clear statement of aim, appropriate qualitative methodology for that stated aim based on SRQR criteria, and a statement of findings with claims supported by participant quotes (Criteria 1, 2, & 9).

Results of the sensitivity analysis are provided in **Appendix 2**. The greatest number of studies contributing to a theme was for *rapport-building communication* (6 studies), followed by *informative*

communication (5 studies), *disclosure-facilitating communication* and *collaborative communication* (4 studies each), and *empathic communication* (3 studies). The themes supported by the fewest number of studies were *professional-accountability* and *meta-communication* (2 studies each), and *agenda-setting communication* (1 study).

Based on overall quality of the available evidence from the GRADE-CERQual assessment, confidence was judged to be moderate for four communication themes (*disclosure-facilitating, rapport-building, empathic, and collaborative communication*) and low for four themes (*professional accountability, informative, agenda-setting, and meta-communication*; **Table 4**). Limited operationalization of communication (i.e., poor coherence) was the most common reason for lower confidence ratings, with moderate to serious concerns for all 8 communication themes. Lack of variety in rich quotations (i.e., poor adequacy of data) distinguished lower from higher quality evidence, with moderate to serious concerns for all communication themes judged to have low confidence and only minor concerns for themes with higher confidence. Moderate methodological concerns identified by CASP contributed to low confidence ratings for 3 of the 4 themes with this rating. Relevance of data to the phenomena of interest contributed least to confidence ratings, with moderate concerns for only 2 communication themes.

Discussion

Findings from the systematic review and qualitative meta-synthesis provide preliminary support for a conceptual framework comprised of eight communication behaviors preferred by PTs in chronic pain rehabilitation. Communication terms varied widely and only three of eleven studies operationalized communication as a phenomena *a priori*, supporting the need for a unifying framework to guide future research and clinical practice. Finally, links between communication behaviors and specific clinical outcomes or their mediators were rarely mentioned and not entirely consistent with mediators of treatment outcomes identified by quantitative studies. We first discuss methodological considerations for interpreting results of the meta-synthesis, followed by a discussion of the proposed conceptual framework for goal-directed communication in pain rehabilitation.

Methodological Considerations

Our study protocol included several strategies to ensure the trustworthiness of study findings as described by Lincoln and Guba⁵³. With respect to confirmability (aka, objectivity), it is important to recognize that our team comprised researchers with interdisciplinary expertise in physical therapy, biopsychosocial approaches in pain rehabilitation, health communication, and qualitative research. Although multiple perspectives were represented, implicit assumptions and biases guiding development of the research question as well as the coding, grouping, and interpretation of themes may have differed with a more diverse range of expertise. To bolster dependability (aka, replicability), each analytic step was independently completed by two investigators, with results discussed until consensus was reached. Additionally, all steps of the analysis were described in sufficient detail to allow for replication in future updates of the meta-synthesis as new research emerges.

To promote credibility (aka, validity), the study protocol was developed *a priori* and registered in PROSPERO. Standards for the Reporting of Qualitative Research guided the extraction of raw data elements and direct quotations from original studies; these data are available for audit and interpretation by individual readers, including members of the group from which data were solicited (i.e., physical therapists). Through iterative testing and clinical application of the proposed conceptual framework, we anticipate that salient themes will persist while those deemed irrelevant will be eliminated. Finally, the methodologic rigor of individual studies was evaluated with CASP, and overall quality of the evidence supporting each theme in the conceptual model was formally assessed using GRADE-CERQual. A primary goal of this evidence appraisal was to identify deficits in the existing body of literature to guide future research.^{38,39} Although included studies fulfilled 78% of CASP criteria, indicating acceptable methodological rigor, only 4 of 8 communication themes were supported by moderate evidence, with the remaining themes supported by low evidence. Limited operationalization of communication and lack of variety in rich quotations were the primary methodological issues contributing to lower evidence ratings. Future qualitative studies should address these concerns by providing explicit operational definitions for communication terminology, and then illustrating how these terms are enacted with a variety of direct quotations. Based on low to moderate quality of the available evidence, communication themes identified by the meta-synthesis should be considered preliminary.

In addition to enhancing credibility, the “thick description”⁵³ of communication phenomena with extracted quotations in the present study allows individual readers to assess transferability (aka, generalizability) of the present findings to other contexts. To further promote transferability, we included studies across a broad range of chronic pain conditions and clinical settings to obtain a comprehensive sample of communication behaviors. Had we limited our sample to a more specific population, we may have discovered communication themes more relevant for a given medical diagnosis or clinical setting, but would have risked incomplete investigation of broadly applicable themes transcending these contextual factors. We also included all qualitative methodologies and analytic techniques in our review, providing a broad perspective on how PT communication behaviors are identified within patient-provider interactions. This allowed us to characterize the variability in how communication is operationalized. For example, studies with multiple sources of data collection (e.g., field notes, recorded observations, interviews)⁵², multi-stage data analysis (e.g., framework analysis, process analysis)^{44,52}, or with recorded interactions^{48,52} provided the most comprehensive operational definitions and were the most descriptive in how competent communication was achieved. Methodologies like conversation analysis that prioritize richness of description rooted in naturally occurring video recorded data also yielded more specific descriptions of how preferred clinical communication was enacted⁴⁸ compared to studies with broader methodologies^{41,46} and those more reliant on investigator interpretations of interviews.^{33,43-45,49,50,52}

Despite its inclusive scope, this review yielded only 11 qualitative studies with relatively limited specificity in describing how PTs enact communication behaviors in clinical practice. Additionally, included studies originated from mostly English speaking countries and our meta-synthesis only included data (direct quotations) published in English. Culture and language substantially impact communication preferences in healthcare delivery⁵⁴⁻⁵⁶, therefore, future investigations should determine the extent to which the proposed communication themes can be generalized to cultures not well represented in our sample. Finally, our analysis focused exclusively on physical therapy providers. Although it seems likely that many themes identified in this review will prove broadly transferable to other health care disciplines involved in chronic pain rehabilitation, some communication behaviors and challenges may reflect the unique professional knowledge and training of PT providers. For example, discipline-specific training in human movement may predispose PTs toward greater reliance on information communicated through nonverbal cues and pain

related behaviors during movement when determining therapeutic action. Interestingly, we found a notable lack of nonverbal communication behaviors despite our initial assumption that such behaviors might emerge as a behaviorally distinct theme. Rather, nonverbal behaviors appeared as subthemes used alongside verbal strategies to achieve broader communication goals. For example, gaze and nodding was identified as a subtheme of disclosure-facilitating communication, and therapeutic touch was a subtheme of empathic communication. While nearly all articles discussed nonverbal communication in their review of the literature, only four of the eleven studies^{33,43,48,52} referenced nonverbal communication in their data/results. These references to nonverbal communication were often named as nonverbal but not further described; these also focused on *patient* nonverbal communication rather than *PT* nonverbal communication. Patient communication was excluded from the present review in an effort to focus only on communication behaviors that originated from and therefore can be modified by PTs. Due to the reciprocal and co-constructed nature of communication, including patient communication in future research is a valuable and necessary next step.

Impact of Communication Behaviors on Treatment Outcomes

Extracted quotations primarily focused on communication behaviors cited as *preferred* by patients and/or PTs, with very few quotations explicitly defining competent or effective communication. It is important to note that the *effectiveness* of communication behaviors on patient outcomes has not been established; therefore, we use the term *preferred* to refer to communication behaviors cited as being preferred by investigators, PTs, and/or patients. Intermediary and terminal variables answer the important questions of *if* and *how* specific communication behaviors impact treatment outcomes. While some intermediary and terminal variables were identified, they were infrequently supported by quotations from PTs or patients, largely because assessing these variables was not a primary objective of qualitative investigations included in the meta-synthesis. This reveals a need for future research to investigate the indirect and direct effects of specific communication behaviors on measurable patient outcomes. Although some constructs thought to be impacted by communication in qualitative literature support known mediators of treatment effects in chronic pain rehabilitation (e.g., self-efficacy⁵⁷, therapeutic alliance^{58,59}, and patient perception of quality care⁶⁰), these constructs were cited less frequently than others such as informational and emotional

disclosure by patients and the ability of PTs to provide patient-centered care. Thus, our review of qualitative literature revealed additional constructs that may further help explain how communication impacts treatment outcomes. These constructs should be explored as potential mediators of treatment effects in future studies.

Conceptual Framework of Goal-Directed Communication Behaviors in Chronic Pain Rehabilitation

After completing the meta-synthesis, we used thematic findings to develop a conceptual framework (**Figure 1.2**) of eight behaviorally distinct themes that characterize preferred communication behaviors which may be used alone or in combination to achieve broader interactional goals in chronic pain rehabilitation. The model was constructed using a grounded theory approach in which communication behaviors (subthemes) were grouped and named according to presumed interactional goals, creating preferred communication themes that we refer to in the model as *goal-directed communication behaviors*. These themes were generated through interpretation of included articles, extracted quotations, and the related body of broader health communication literature. For example, the Comskil Model for physician-patient communication⁶¹ similarly links the selection of communication strategies with predefined goals of the communication encounter. In primary care and oncology, the broader interactional goals of facilitating treatment^{62,63}, providing emotional support⁶⁴, and promoting honesty and transparency⁶⁵ (**Figure 1.2**) are viewed as communication-oriented priorities.

Providers and patients pursue interactional goals throughout an episode of care extending from the initial PT evaluation through discharge; our proposed conceptual framework is an initial endeavor to capture the unique elements of goal-directed communication behaviors used by providers in this context. Although we postulate that behaviorally distinct communication behaviors can be combined in a variety of ways to achieve different interactional goals, the extent to which these behaviors are mutually exclusive and strategies to optimize their combination remain unknown. As previously discussed, additional studies are also needed to address gaps in the quality and quantity of existing evidence to further refine and validate the conceptual framework proposed in **Figure 1.2**. For example, included studies did not discuss constructs such as displays of authority, expression of roles and responsibilities, or other communication behaviors that may also be relevant to goal-directed interactions.

Implications for Research and Clinical Practice

Our study provides researchers with a preliminary, evidence-based conceptual framework for goal-directed communication behaviors preferred by PTs in chronic pain rehabilitation. These findings can inform future qualitative investigations by providing a foundation for: (1) improving the operationalization of communication as a phenomenon, (2) describing elements of communication behavior in standardized and replicable ways, and (3) exercising greater methodological rigor. Identification of goal-directed communication behaviors drawn from qualitative literature can also inform future quantitative studies seeking to assess the impact of provider communication on intermediary (e.g., informational and emotional disclosures) and terminal (e.g., pain intensity, pain interference, physical activity) patient outcomes. Furthermore, the proposed conceptual framework can serve as a foundational step for designing evidence-based communication training interventions for PTs and other healthcare professionals involved in chronic pain rehabilitation. Finally, providers can use this conceptual framework as a guide for preferred communication behaviors to consider in their practice, and for reflecting on their existing communication practices.

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REFERENCES

1. Elzahaf RA, Tashani OA, Unsworth BA, Johnson MI. The prevalence of chronic pain with an analysis of countries with a Human Development Index less than 0.9: a systematic review without meta-analysis. *Current medical research and opinion*. 2012;28(7):1221-1229.
2. Schappert SM, Burt CW. Ambulatory care visits to physician offices, hospital outpatient departments, and emergency departments: United States, 2001-02. *Vital and Health Statistics Series 13, Data from the National Health Survey*. 2006(159):1-66.
3. Arnow BA, Hunkeler EM, Blasey CM, et al. Comorbid depression, chronic pain, and disability in primary care. *Psychosomatic medicine*. 2006;68(2):262-268.
4. Narita M, Kaneko C, Miyoshi K, et al. Chronic pain induces anxiety with concomitant changes in opioidergic function in the amygdala. *Neuropsychopharmacology*. 2006;31(4):739-750.
5. Solé E, Racine M, Tomé-Pires C, Galán S, Jensen MP, Miró J. Social Factors, Disability, and Depressive Symptoms in Adults With Chronic Pain. *The Clinical Journal of Pain*. 2020;36(5):371-378.
6. Hadi MA, McHugh GA, Closs SJ. Impact of chronic pain on patients' quality of life: a comparative mixed-methods study. *Journal of patient experience*. 2019;6(2):133-141.
7. Labianca R, Sarzi-Puttini P, Zuccaro SM, Cherubino P, Vellucci R, Fornasari D. Adverse effects associated with non-opioid and opioid treatment in patients with chronic pain. *Clinical drug investigation*. 2012;32(1):53-63.
8. Sullivan MD, Edlund MJ, Fan M-Y, DeVries A, Braden JB, Martin BC. Trends in use of opioids for non-cancer pain conditions 2000–2005 in commercial and Medicaid insurance plans: the TROUP study. *Pain*. 2008;138(2):440-449.
9. Lohman D, Schleifer R, Amon JJ. Access to pain treatment as a human right. *BMC medicine*. 2010;8(1):8.
10. Simon LS. Relieving pain in America: A blueprint for transforming prevention, care, education, and research. *Journal of pain & palliative care pharmacotherapy*. 2012;26(2):197-198.
11. Keefe FJ, Main CJ, George SZ. Advancing psychologically informed practice for patients with persistent musculoskeletal pain: promise, pitfalls, and solutions. *Physical therapy*. 2018;98(5):398-407.
12. Hajjhasani A, Rouhani M, Salavati M, Hedayati R, Kahlaee AH. The influence of cognitive behavioral therapy on pain, quality of life, and depression in patients receiving physical therapy for chronic low back pain: a systematic review. *Pm&r*. 2019;11(2):167-176.
13. de C Williams AC, Fisher E, Hearn L, Eccleston C. Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane database of systematic reviews*. 2020(8).
14. Petrucci G, Papalia GF, Russo F, et al. Psychological Approaches for the Integrative Care of Chronic Low Back Pain: A Systematic Review and Metanalysis. *International Journal of Environmental Research and Public Health*. 2021;19(1):60.
15. Silva Guerrero AV, Maujean A, Campbell L, Sterling M. A systematic review and meta-analysis of the effectiveness of psychological interventions delivered by physiotherapists on pain, disability

- and psychological outcomes in musculoskeletal pain conditions. *The Clinical journal of pain*. 2018;34(9):838-857.
16. Coronado RA, Brintz CE, McKernan LC, et al. Psychologically informed physical therapy for musculoskeletal pain: current approaches, implications, and future directions from recent randomized trials. *Pain reports*. 2020;5(5).
 17. Ballengee LA, Zullig LL, George SZ. Implementation of Psychologically Informed Physical Therapy for Low Back Pain: Where Do We Stand, Where Do We Go? *Journal of pain research*. 2021;14:3747.
 18. O'Sullivan P. It's time for change with the management of non-specific chronic low back pain. In: BMJ Publishing Group Ltd and British Association of Sport and Exercise Medicine; 2012.
 19. Synnott A, O'Keeffe M, Bunzli S, Dankaerts W, O'Sullivan P, O'Sullivan K. Physiotherapists may stigmatise or feel unprepared to treat people with low back pain and psychosocial factors that influence recovery: a systematic review. *Journal of physiotherapy*. 2015;61(2):68-76.
 20. Kinney M, Seider J, Beaty AF, Coughlin K, Dyal M, Clewley D. The impact of therapeutic alliance in physical therapy for chronic musculoskeletal pain: A systematic review of the literature. *Physiotherapy theory and practice*. 2020;36(8):886-898.
 21. Watzlawick P, Bavelas JB, Jackson DD. *Pragmatics of human communication: A study of interactional patterns, pathologies and paradoxes*. WW Norton & Company; 2011.
 22. Spitzberg BH. Communication competence as knowledge, skill, and impression. *Communication Education*. 1983;32(3):323-329.
 23. Spitzberg BH. (Re) Introducing communication competence to the health professions. *Journal of Public Health Research*. 2013;2(3).
 24. Zolnieriek KBH, DiMatteo MR. Physician communication and patient adherence to treatment: a meta-analysis. *Medical care*. 2009;47(8):826.
 25. Butow P, Sharpe L. The impact of communication on adherence in pain management. *PAIN@*. 2013;154:S101-S107.
 26. Turk DC, Okifuji A. Treatment of chronic pain patients: clinical outcomes, cost-effectiveness, and cost-benefits of multidisciplinary pain centers. *Critical Reviews™ in Physical and Rehabilitation Medicine*. 1998;10(2).
 27. NQF: National Quality Partners™ Opioid Stewardship action team. . https://www.qualityforum.org/National_Quality_Partners_Opioid_Stewardship_Action_Team.aspx. Accessed June 17, 2021.
 28. Tong A, Flemming K, McInnes E, Oliver S, Craig J. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC medical research methodology*. 2012;12(1):1-8.
 29. O'Keeffe M, Cullinane P, Hurley J, et al. What influences patient-therapist interactions in musculoskeletal physical therapy? Qualitative systematic review and meta-synthesis. *Physical therapy*. 2016;96(5):609-622.
 30. Sandelowski M, Barroso J, Voils CI. Using qualitative metasummary to synthesize qualitative and quantitative descriptive findings. *Research in nursing & health*. 2007;30(1):99-111.

31. Barnett-Page E, Thomas J. Methods for the synthesis of qualitative research: a critical review. *BMC medical research methodology*. 2009;9(1):1-11.
32. Treede R-D, Rief W, Barke A, et al. A classification of chronic pain for ICD-11. *Pain*. 2015;156(6):1003.
- *33. Askew R, Kibelstis C, Overbaugh S, Walker S, Nixon-Cave K, Shepard KF. Physical therapists' perception of patients' pain and its effect on management. *Physiotherapy Research International*. 1998;3(1):37-57.
34. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Annals of internal medicine*. 2007;147(8):573-577.
35. Critical Appraisal Skills Programme. CASP Systematic Review Checklist Web site. https://casp-uk.net/wp-content/uploads/2018/03/CASP-Qualitative-Checklist-2018_fillable_form.pdf. Published 2018. Accessed March 9, 2020.
36. Elvén M, Dean E. Factors influencing physical therapists' clinical reasoning: qualitative systematic review and meta-synthesis. *Physical Therapy Reviews*. 2017;22(1-2):60-75.
37. Alexanders J, Anderson A, Henderson S. Musculoskeletal physiotherapists' use of psychological interventions: a systematic review of therapists' perceptions and practice. *Physiotherapy*. 2015;101(2):95-102.
38. Lewin S, Glenton C, Munthe-Kaas H, et al. Using qualitative evidence in decision making for health and social interventions: an approach to assess confidence in findings from qualitative evidence syntheses (GRADE-CERQual). *PLoS Med*. 2015;12(10):e1001895.
39. Lewin S, Bohren M, Rashidian A, et al. Applying the GRADE-CERQual approach: making an overall CERQual assessment of confidence and creating a Summary of Qualitative Findings table. *Implement Sci*. 2018;13.
40. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC medical research methodology*. 2008;8(1):45.
- *41. Gard G, Gyllensten AL, Salford E, Ekdahl C. Physical therapists' emotional expressions in interviews about factors important for interaction with patients. *Physiotherapy*. 2000;86(5):229-240.
42. Kwon Y, Lemieux M, McTavish J, Wathen N. Identifying and removing duplicate records from systematic review searches. *Journal of the Medical Library Association: JMLA*. 2015;103(4):184.
- *43. Afrell M, Rudebeck CE. 'We got the whole story all at once': physiotherapists' use of key questions when meeting patients with long-standing pain. *Scandinavian Journal of Caring Sciences*. 2010;24(2):281-289.
- *44. Cooper K, Smith BH, Hancock E. Patient-centredness in physiotherapy from the perspective of the chronic low back pain patient. *Physiotherapy*. 2008;94(3):244-252.
- *45. Cowell I, O'Sullivan P, O'Sullivan K, Poyton R, McGregor A, Murtagh G. Perceptions of physiotherapists towards the management of non-specific chronic low back pain from a biopsychosocial perspective: a qualitative study. *Musculoskeletal Science and Practice*. 2018;38:113-119.

- *46. Del Baño-Aledo ME, Medina-Mirapeix F, Escolar-Reina P, Montilla-Herrador J, Collins SM. Relevant patient perceptions and experiences for evaluating quality of interaction with physiotherapists during outpatient rehabilitation: a qualitative study. *Physiotherapy*. 2014;100(1):73-79.
47. Øien AM, Steihaug S, Iversen S, Råheim M. Communication as negotiation processes in long-term physiotherapy: a qualitative study. *Scandinavian Journal of Caring Sciences*. 2011;25(1):53-61.
- *48. Opsommer E, Schoeb V. 'Tell me about your troubles': description of patient–physiotherapist interaction during initial encounters. *Physiotherapy Research International*. 2014;19(4):205-221.
- *49. Pincus T, Vogel S, Breen A, Foster N, Underwood M. Persistent back pain—why do physical therapy clinicians continue treatment? A mixed methods study of chiropractors, osteopaths and physiotherapists. *European Journal of Pain*. 2006;10(1):67-67.
- *50. Serpanou I, Sakellari E, Psychogiou M, Zyga S, Sapountzi-Krepia D. Physical therapists' perceptions about patients with incomplete post-traumatic paraplegia adherence to recommended home exercises: a qualitative study. *Brazilian Journal of Physical Therapy*. 2019;23(1):33-40.
- *51. Synnott A, O'Keeffe M, Bunzli S, et al. Physiotherapists report improved understanding of and attitude toward the cognitive, psychological and social dimensions of chronic low back pain after cognitive functional therapy training: a qualitative study. *Journal of physiotherapy*. 2016;62(4):215-221.
- *52. Øien AM, Steihaug S, Iversen S, Råheim M. Communication as negotiation processes in long-term physiotherapy: a qualitative study. *Scandinavian journal of caring sciences*. 2011;25(1):53-61.
53. Guba EG, Lincoln YS. Epistemological and methodological bases of naturalistic inquiry. *Ectj*. 1982;30(4):233-252.
54. Papadopoulos I, Shea S, Taylor G, Pezzella A, Foley L. Developing tools to promote culturally competent compassion, courage, and intercultural communication in healthcare. *Journal of Compassionate Health Care*. 2016;3(1):2.
55. Gibson D, Zhong M. Intercultural communication competence in the healthcare context. *International Journal of Intercultural Relations*. 2005;29(5):621-634.
56. Paternotte E, van Dulmen S, van der Lee N, Scherpbier AJ, Scheele F. Factors influencing intercultural doctor–patient communication: A realist review. *Patient education and counseling*. 2015;98(4):420-445.
57. Ruben MA, Meterko M, Bokhour BG. Do patient perceptions of provider communication relate to experiences of physical pain? *Patient education and counseling*. 2018;101(2):209-213.
58. Ferreira PH, Ferreira ML, Maher CG, Refshauge KM, Latimer J, Adams RD. The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Physical therapy*. 2013;93(4):470-478.
59. Zaproudina N, Hänninen OO, Airaksinen O. Effectiveness of traditional bone setting in chronic neck pain: randomized clinical trial. *Journal of manipulative and physiological therapeutics*. 2007;30(6):432-437.
60. Baker TA, O'Connor ML, Roker R, Krok JL. Satisfaction with pain treatment in older cancer patients: Identifying variants of discrimination, trust, communication, and self-efficacy. *Journal of hospice*

and palliative nursing: JHPN: the official journal of the Hospice and Palliative Nurses Association. 2013;15(8).

61. Brown RF, Bylund CL. Communication skills training: describing a new conceptual model. *Academic medicine.* 2008;83(1):37-44.
62. Anderson JN, Graff JC, Krukowski RA, et al. "Nobody Will Tell You. You've Got to Ask!": An Examination of Patient-provider Communication Needs and Preferences among Black and White Women with Early-stage Breast Cancer. *Health Communication.* 2021;36(11):1331-1342.
63. Robinson JD, Heritage J. How patients understand physicians' solicitations of additional concerns: implications for up-front agenda setting in primary care. *Health communication.* 2016;31(4):434-444.
64. Cherry MG, Fletcher I, O'Sullivan H. The influence of medical students' and doctors' attachment style and emotional intelligence on their patient-provider communication. *Patient Education and Counseling.* 2013;93(2):177-187.
65. Hillen MA, De Haes HC, Smets EM. Cancer patients' trust in their physician—a review. *Psycho-oncology.* 2011;20(3):227-241.

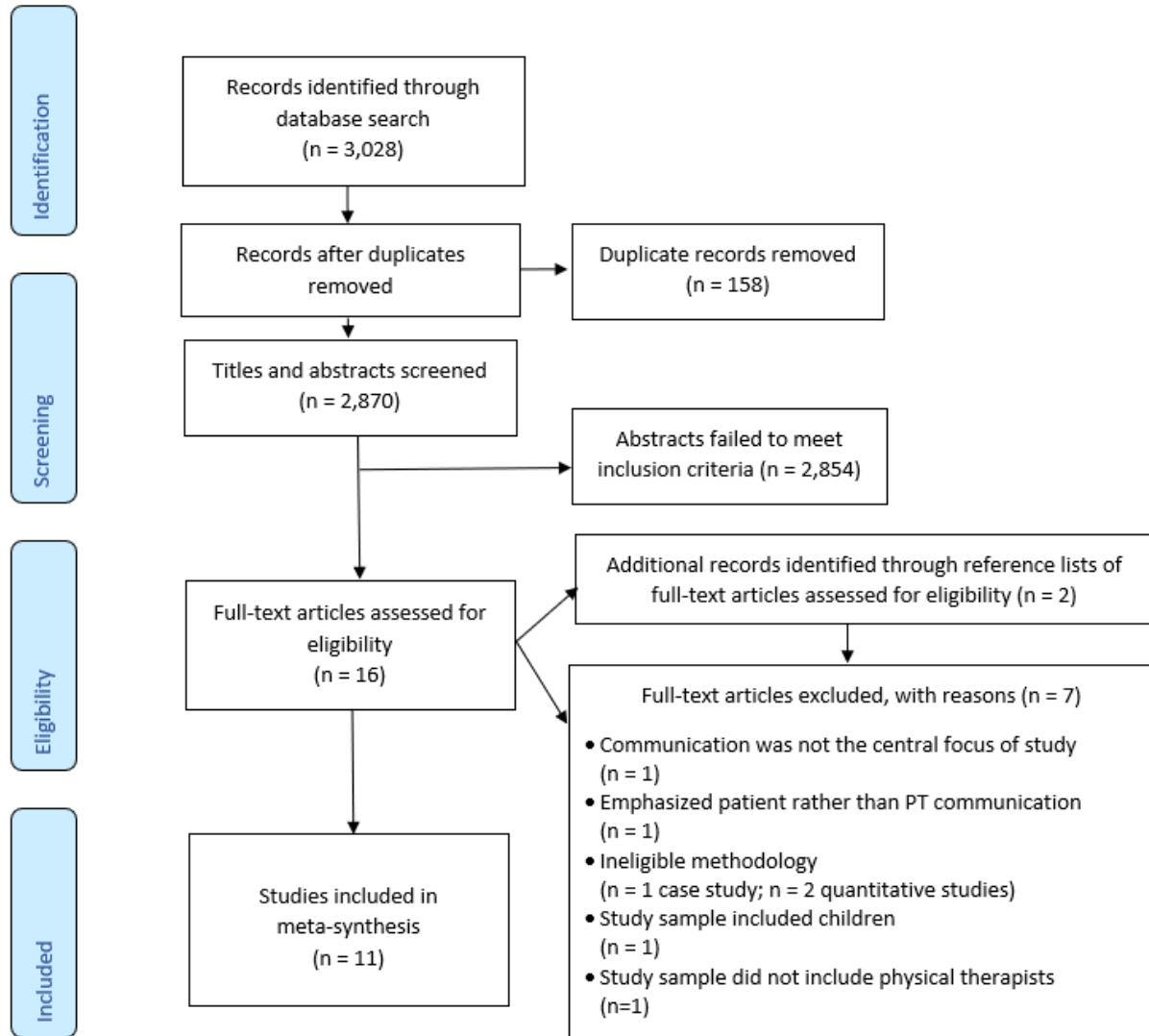


Figure 1.1 Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Flow Diagram for Study Inclusion

Table 1.1 Characteristics of Included Studies

** Table includes an abbreviated list of extracted data elements based on Standards for Reporting Qualitative Research (SRQR). The complete data extraction table is available upon request from the corresponding author.*

^a Values listed indicate range of minimum-to-maximum years, unless otherwise indicated. Mean and standard deviations (SD) only included for studies that reported these data.

*^b Sampling method applies to both PTs and patients where both groups were recruited
Abbreviations: NR = not reported; PT = physical therapist; M=male; F=female*

Study Aim(s)	N (PT: Patient)	PT Sex (M:F)	PT Age: Years of Clinical Experience (years) ^a	Patient Sex (M:F)	Patient Age (years) ^a	Pain Condition: Treatment Setting	Country	Sampling Procedure ^b	Data Collection Method(s)	Data Analysis Method(s)	Communication Operationalization
To find out how physiotherapists experienced the influence of systematically prepared key questioning on their relation to, and understanding of patients, with long-standing pain. Afrell & Rudebeck, 2010⁴³	6:80	NR	39-62: 10-25	Majority female	18-70	Chronic pain without serious causative or contributory disease: Pain rehabilitation clinics, primary care, Feldenkrais private practice	Sweden	Convenience	Focus group interviews	Phenomenography	<i>A priori</i> operationalization: "By communication method for the encounter between physiotherapist and patient we mean a method which combines an ethical attitude with conscious speech acts and sensitivity to the patient's body experience"
(1) To determine the factors that affected physical therapists' (PTs) perception of patients' pain and (2) to determine how this perception affected the management of patients. Askew et al., 1998³³	46:0	19:27	25-48: 2-25	NR	NR	Persistent pain: Pain management outpatient orthopedic and sports medicine clinics	USA	Convenience	Structured interviews	Coded, included quotes from interviews for thematic categories	No explicit operationalization
To define patient-centredness from the patient's perspective in the context of physiotherapy for chronic low back pain (CLBP). Cooper et al., 2008⁴⁴	0:25	NR	NR	5:20	18-65	Chronic low back pain: Physiotherapy department of National Health Service	Scotland	Purposive sampling based on location of physiotherapy practice (urban or rural), gender, age, and management style (group, one-to-one, or mixed)	Semi-structured interviews	Framework analysis—data management, descriptive analysis, and explanatory analysis	<i>Post hoc</i> operationalization: via interviewing physical therapists "Good communication involved: taking time over explanations; using appropriate terminology; and encouraging the patient's participation in the communication process"

Table 1.1 Continued

To contribute to the wider evidence base as to how physiotherapists understand, and deal with, NSCLBP disorders from a BPS perspective, and the perceived barriers to the provision of a BPS model of care delivery in a primary care setting. Cowell et al., 2018 ⁴⁵	10:0	7:3	18-70: 4-14+	NR	NR	NR	Non-specific chronic low back pain: Primary care	England	Purposive sampling based on sex, age, and clinical experience	Semi-structured face-to-face qualitative interviews	Thematic analysis	No explicit operationalization
To identify elements of the physiotherapist-patient interaction considered by patients when they evaluate the quality of care in outpatient rehabilitation settings. Del Baño-Aledo et al., 2014 ⁴⁶	0:57	NR	NR	33:24	18+	NR	Chronic musculoskeletal pain: Post-acute outpatient rehabilitation clinic	Spain	Purposive sampling based on age, gender, and clinical condition	Focus group interviews- audio taped	Thematic analysis using modified grounded theory approach	No explicit operationalization
To investigate how many and what verbally expressed emotions physiotherapists state during	10:0	0:10	44-62: 7-41	NR	NR	NR	Persistent pain: Clinical health tutors in primary health care, tutoring physiotherapy	Sweden	Purposive sampling based on clinical specialties	Qualitative case series	Cross-case analysis	A priori operationalization: Tomkins' (1962, 1984) and Izard (1977) categorization of emotions

Table 1.1 Continued

<p>interviews between physiotherapists and patients. Gard et al., 2000⁴¹</p> <p>To describe communicative patterns about change in demanding physio-therapy treatment situations. Øien et al., 2011⁵²</p>	6:11	1:5	44-68: 20-47	1:10	22-47	Chronic muscular pain located in the back and/or neck: Outpatient clinic	Norway	Convenience	Interviews, patients' notes, video-recorded treatment sessions, & researchers' field notes	Løvlie – Schibbye's part process analysis	<p><i>A priori</i> operationalization based on System Theory of Communication: "The theme is often verbally communicated. The meta-communication encompasses nonverbal emotional expressions related to the theme. The theme and the meta-communication structure and define the relationship... Communication is based on the observable manifestations of the relationship. All behaviour – including speech, tone of voice, silence, withdrawal, immobility or denial – is communication"</p>
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Table 1.1 Continued

<p>To explore how French-speaking physiotherapists and patients with low back pain explore and assess the patient's pain experience during initial encounters. Opsommer & Schoeb, 2014⁴⁸</p>	<p>2:6</p>	<p>NR</p>	<p>NR: 0-20</p>	<p>4:2</p>	<p>18+</p>	<p>Chronic low back pain: University hospital and private practice</p>	<p>Switzerland</p>	<p>Convenience</p>	<p>Videotaped initial encounters</p>	<p>Conversation analysis</p>	<p>Post hoc operationalization via conversation analytic components</p>
<p>To investigate the prevalence of long-term treatment, and to identify and classify the reasons why physical therapy clinicians continue to treat LBP patients in the absence of objective improvement. Pincus et al., 2006⁴⁹</p>	<p>21:0 for interviews; 354:0 for surveys</p>	<p>NR (interviews); 71:283 (surveys)</p>	<p>NR for interviews; 20-60+ for surveys: mean 12.8 (SD NR) for interviews; NR for surveys</p>	<p>NR</p>	<p>NR</p>	<p>Chronic low back pain: National Health Service Primary and Secondary care, or private practice</p>	<p>England</p>	<p>Combination of stratified and purposive sampling based on age, gender, and private/public practice setting</p>	<p>Interviews and Surveys</p>	<p>Mixed methods—grounded theory analysis</p>	<p>No explicit operationalization</p>
<p>To explore the physical therapists' perspectives about patients with incomplete post-traumatic paraplegia adherence to recommended home exercises. Serpanou et al., 2019⁵⁰</p>	<p>13:0</p>	<p>7:6</p>	<p>30-47: 5-22</p>	<p>NR</p>	<p>NR</p>	<p>Post-traumatic paraplegia: Home health services</p>	<p>Greece</p>	<p>Convenience</p>	<p>Semi-structured interviews</p>	<p>Qualitative content analysis</p>	<p>Post hoc operationalization from interviewing physical therapists: "All participants agree that good communication with the patient helps in overcoming obstacles. Communication is a two-way</p>

Table 1.1 Continued

<p>To answer the following research question "Question: What are physiotherapists' perspectives on managing the cognitive, psychological and social dimensions of chronic low back pain after intensive biopsychosocial training?" Synnott et al, 2016⁵¹</p>	13:0	9:4	30-47: mean 13 (SD 3.8)	NR	NR	Chronic low back pain: NR	Belgium, Australia, Denmark, Ireland	Purposive	Interviews— audio taped	Interpretive descriptive analysis	<p>process between the physical therapist and the patient, and it is necessary in order to understand each other's problems and expectations"</p> <p>No explicit operationalization</p>
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Table 1.2 CASP Appraisal of Methodological Quality for Included Studies

Study	Criterion 1: Clear statement of aim	Criterion 2: Qualitative methodology appropriate	Criterion 3: Appropriate research design	Criterion 4: Sampling	Criterion 5: Data collection	Criterion 6: Research reflexivity	Criterion 7: Ethical consideration	Criterion 8: Appropriate data analysis	Criterion 9: Clear statement of findings	Criterion 10: Research value
Afrell & Rudebeck, 2010 ⁴³	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Yes	Unclear
Askew et al., 1998 ³³	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes
Cooper et al., 2008 ⁴⁴	Yes	Yes	Unclear	Yes	Unclear	Yes	Yes	Yes	Yes	Yes
Cowell et al., 2018 ⁴⁵	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes
Del Baño-Aledo et al., 2014 ⁴⁶	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gard et al., 2000 ⁴¹	Yes	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Yes	Yes	Yes
Øien et al., 2011 ⁵²	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes	Yes
Opsommer & Schoeb, 2014 ⁴⁸	Yes	Yes	Unclear	Unclear	Yes	Unclear	Yes	Yes	Yes	Yes
Pincus et al., 2006 ⁴⁹	Yes	Yes	Unclear	Unclear	Yes	Unclear	Yes	Yes	Yes	Yes
Serpanou et al., 2019 ⁵⁰	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Synnott et al., 2016 ⁵¹	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Yes

Table 1.3 Reviews of Qualitative Research (GRADE-CERQual) Quality of Evidence Appraisal

†Cumulative total (percentage) of CASP criteria met for all included studies (e.g., x/50 for 5 supporting studies with 10 possible CASP criteria per study)

Goal-directed communication theme	Studies contributing to theme	Assessment of: Methodological limitations (CASP) [†]				Coherence	Relevance	Overall confidence	Rationale for judgement
		Methodological limitations (CASP) [†]	Adequacy of data	Adequacy of data	Coherence				
Disclosure-facilitating communication	Afrell & Rudebeck, 2010 ⁴³ ; Cowell et al., 2018 ⁴⁵ ; Opsommer & Schoeb, 2014 ⁴⁸ ; Serpanou et al., 2019 ⁵⁰ ; Synnott et al., 2016 ⁵¹	Minor concerns <ul style="list-style-type: none"> low⁴³, moderate⁴⁸, high^{19,45,50,51} 40/50 (80%) criteria met 	Minor concerns <ul style="list-style-type: none"> variety of rich quotes supportive of theme from 3/5 studies majority provided age majority provided sex 8 countries represented 	Moderate concerns <ul style="list-style-type: none"> 5 studies supported theme* 1/5 studies operationalized clearly and with direct support from quotes 	Minor concerns <ul style="list-style-type: none"> 4/5 studies assessed communication in PTs treating chronic pain as per inclusion criteria 1 study assessed chronic pain as a symptom in those diagnosed with post-traumatic paraplegia 	Moderate confidence	Moderate concerns about operationalization of communication, with only minor concerns for all other categories		
Rapport-building communication	Afrell & Rudebeck, 2010 ⁴³ ; Askew et al., 1998 ³³ ; Cooper et al., 2008 ⁴⁴ ; Del Baño-Aledo et al., 2014 ⁴⁶ ; Gard et al., 2000 ⁴¹ ; Pincus et al., 2006 ⁴⁹ ; Serpanou et al., 2019 ⁵⁰	Moderate concerns <ul style="list-style-type: none"> low⁴³, moderate⁴⁹, high^{33,44,46,50} 54/70 (77%) criteria met 	Minor concerns <ul style="list-style-type: none"> variety of rich quotes supportive of theme from all 7 studies majority provided age majority provided sex 6 countries represented 	Moderate concerns <ul style="list-style-type: none"> 7 studies supported theme* 2/7 studies operationalized clearly and with direct support from quotes 	Moderate concerns <ul style="list-style-type: none"> 4/7 studies assessed chronic pain as a symptom in rehabilitation, musculoskeletal disorders, post-traumatic paraplegia, or chronic pain without serious causative or contributory disease 1 study included osteopaths and chiropractors in interviews along with PTs 	Moderate confidence	Moderate concerns for methodological rigor, operationalization of communication, and focus on phenomena of interest		
Empathic communication	Afrell & Rudebeck, 2010 ⁴³ ; Askew et al., 1998 ³³ ; Cowell et al., 2018 ⁴⁵ ; Del Baño-Aledo et al., 2014 ⁴⁶	Minor concerns <ul style="list-style-type: none"> low⁴³, high^{33,45,46} 32/40 (80%) criteria met 	Minor concerns <ul style="list-style-type: none"> variety of rich quotes supportive of theme from 3/4 studies all provided age majority provided sex 4 countries represented 	Serious concerns <ul style="list-style-type: none"> 4 studies supported theme* none operationalized clearly and with direct support from quotes 	Minor concerns <ul style="list-style-type: none"> 1/2 studies assessed communication in PTs treating chronic pain as per inclusion criteria 2 studies assessed chronic pain as a symptom in musculoskeletal disorder or chronic pain without serious causative or contributory disease 	Moderate confidence	Serious concerns about operationalization of communication with only minor concerns for all other categories		

Table 1.3 Continued

Goal-directed communication theme	Studies contributing to theme	Assessment of: Methodological limitations (CASP)				Adequacy of data	Coherence	Relevance	Overall confidence	Rationale for judgement
		†								
Collaborative communication	Cooper et al., 2008 ⁴⁴ ; Cowell et al., 2018 ⁴⁵ ; Øien et al., 2011 ⁵² ; Serpanou et al., 2019 ⁵⁰	No or very minor concerns	<ul style="list-style-type: none"> high^{44,45,50,52} 35/40 (88%) criteria met 	<ul style="list-style-type: none"> variety of rich quotes supportive of theme from 3/4 studies half provided age all provided sex 4 countries represented 	<ul style="list-style-type: none"> Moderate concerns supported 4 studies 1/4 studies operationalized communication clearly and with direct support from quotes 	<ul style="list-style-type: none"> Minor concerns assessed 3/4 studies PTs treating chronic pain as per inclusion criteria 1 study assessed chronic pain as a symptom in post-traumatic paraplegia 	Moderate confidence	High methodological rigor and focus on phenomena of interest with moderate concerns for operationalization of communication		
Professional accountability communication	Gard et al., 2000 ⁴¹ ; Pincus et al., 2006 ⁴⁹	Moderate concerns	<ul style="list-style-type: none"> moderate^{41,49} 13/20 (65%) criteria met 	<ul style="list-style-type: none"> limited quotes from studies, and only 2 studies contributing to theme 1 provided age 1 provided sex 2 countries represented 	<ul style="list-style-type: none"> Serious concerns supported 2 studies none operationalized communication clearly and with direct support from quotes 	<ul style="list-style-type: none"> Moderate concerns assessed 2/2 studies communication in PTs treating chronic pain as per inclusion criteria 1 study included osteopaths and chiropractors in interviews along with PTs 	Low confidence	Moderate concerns with methodological rigor and focus on phenomena of interest with serious concerns for richness of quotes and operationalization of communication		
Informative communication	Askew et al., 1998 ³³ ; Cooper et al., 2008 ⁴⁴ ; Cowell et al., 2018 ⁴⁵ ; Del Baño-Aledo et al., 2014 ⁴⁶ ; Synnott et al., 2016 ⁵¹	Minor concerns	<ul style="list-style-type: none"> Low³³, high^{44-46,51} 41/50 (82%) criteria met 	<ul style="list-style-type: none"> limited quotes from all studies all provided age all provided sex 7 countries represented 	<ul style="list-style-type: none"> Serious concerns supported 4 studies none operationalized communication clearly and with direct support from quotes 	<ul style="list-style-type: none"> Minor concerns assessed 3/4 studies communication in PTs treating chronic pain as per inclusion criteria 1 study assessed chronic pain as a symptom in musculoskeletal disorder 	Low confidence	Despite high methodological rigor, moderate concerns with variety of quotes and serious concerns about operationalization of communication		

Table 1.3 Continued

Goal-directed communication theme	Studies contributing to theme	Assessment of: Methodological limitations (CASP) †				Overall confidence	Rationale for judgement
		Adequacy of data	Coherence	Relevance			
Agenda-setting communication	Opsommer & Schoeb, 2014 ⁴⁶	Moderate concerns <ul style="list-style-type: none"> • moderate⁴⁸ • 7/10 (70%) criteria met 	Serious concerns <ul style="list-style-type: none"> • rich quotes, but only 1 study contributing to theme • age not provided • sex not provided • 1 country represented 	Serious concerns <ul style="list-style-type: none"> • 1 study supported theme* • study did not operationalize communication clearly or with direct support from quotes 	No or very minor concerns <ul style="list-style-type: none"> • study assessed communication in PTs treating chronic pain as per inclusion criteria 	Low confidence	Despite strong focus on phenomena of interest, moderate concerns with methodological rigor and serious concerns with adequacy of data and operationalization of communication
Meta-communication	Afrell & Rudebeck, 2010 ⁴³ , Øien et al., 2011 ⁵²	Moderate concerns <ul style="list-style-type: none"> • low⁴³, high⁵² • 13/20 (65%) criteria met 	Serious concerns <ul style="list-style-type: none"> • rich quotes from studies, but only 2 studies contributing to theme • all studies provided age • majority provided sex • 2 countries represented 	Serious concerns <ul style="list-style-type: none"> • 2 studies supported theme* • 1/2 studies operationalized communication clearly and with direct support from quotes 	Minor concerns <ul style="list-style-type: none"> • 1/2 studies assessed communication in PTs treating chronic pain as per inclusion criteria • 1 study assessed chronic pain as a symptom in chronic pain without serious causative or contributory disease 	Low confidence	Though supporting quotes are rich, serious concerns with adequacy of data from 2 studies, with communication operationalized by only 1 study
CERQual Confidence Level		Definition					
High confidence	It is highly likely that the review findings are a reasonable representation of the phenomenon of interest						
Moderate	It is likely that the review findings are a reasonable representation of the phenomenon of interest						
Low	It is possible that the review findings are a reasonable representation of the phenomenon of interest						
Very low	It is not clear whether the review findings are a reasonable representation of the phenomenon of interest						

Supplementary Table 1.1 Thematic Contributions of Abstracted Data

Secondary outcomes (highlighted in bold) include any intermediary or terminal outcome cited as being impacted by communication and potentially linked to patient outcomes.

^aRefers to participant number 5 verbally expressing fear 5 times over the course of data collection.

Abbreviations: CFT= Cognitive functional therapy, SDM= Shared decision making, CLBP= Chronic low-back pain; P1=Participant 1

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
<p>(1) Disclosure-facilitating communication</p>	<p>Using open ended questions about pain</p>	<p>Afrel⁴³: Using a variety of open-ended questions led to success in the encounter, as patients were more likely to open up and disclose. This was mutually beneficial in that patients felt relief and comfort opening up to their PTs, and PTs were better able to diagnose and treat with information gained in these disclosures.</p>	<p>"The key questions offered a rich and rewarding dialogue which influenced not only the patients but also the physiotherapists...The questions gave comprehensive answers." (p. 284)</p> <p>"Open ended questions related to pain in focus groups; 1. What do you think your pains are caused by? 2. How did your pains change your life? Tell us about it. Tell us about parts of your life where the pain is not important and where it takes over. Describe situations. 3. Can you rely on your body? Tell us about it. Do you feel that your body is with you or against you? Tell us about it. Has it always been like that? 4. If pain could talk, what would it relate? 5. After the event, and now that you know what you feel like today, would you have acted differently if you had been given the chance to relive your life?" (p. 283)</p> <p>"Our' physiotherapists saw that the key questions started a process. The patients opened up inner 'closed doors' and feelings arose even though this was sometimes painful." (p. 286)</p>

Supplementary Table 1.1 Continued

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
		<p>Synnott⁵¹: Specific biopsychosocial training (Cognitive Functional Therapy, CFT) training shifted physiotherapists' communication style to being more open and unrestricted. This trend/shift was seen with training and with experience.</p>	<p>"The questions make the patient prepared to reflect together with the physiotherapist on his/her aching body and what it is like to live with it. The key questions have thus proved to be effective and to make dialogues about the body possible." (p. 287)</p> <p>"After completing the CFT training, participants reported a shift in their communication style from a rigid structured approach to an open and unrestricted style. Participants identified how an open communication style promoted an easiness and fluidity in the exploration of the cognitive, psychological and social dimensions with patients." (p. 218)</p>
Using open-ended formulations such as 'tell me about your troubles' or 'what's your story?' at the beginning of an encounter		<p>Opsommer⁴⁸: Successful communication encounters involved opening the visit with an open-ended question.</p> <p>Synnott⁵¹: Physical therapists with more experience begin their consultations with more open-ended formulations to patients.</p>	<p>"physiotherapist B used an open question in the beginning of the encounter 'tell me about your troubles?' ..." (p. 218)</p> <p>"Now I think I'm much more open-ended, so I kind of ask open ended questions like 'What's your story?' you know, or 'What brings you here?' (P1)" (p. 218)</p>

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
	Using gaze and nodding as continuers	Opsommer ⁴⁸ : Coupling gaze with facilitated disclosure and continuation of their narrative.	"One way for gathering information from patients was by means of a very open initial question, minimal acknowledgements of the patient's talk and the use of gaze and nods as continuers." (p. 210)
	Asking about lifestyle	Cowell ⁴⁵ : Part of a comprehensive biopsychosocial approach to diagnosis and treatment is learning about a patient's lifestyle and inviting them to disclose how their lifestyle impacts their pain and activity .	"I think my common route is trying to delve what their underlying fears are, if there's any other drivers, maybe more obvious drivers, so is there, is work an issue? So talking about work a little bit more. Anything going on at home? ... the stresses of lifestyle." (p. 115)
	Facilitating open lines of communication	Serpanou ⁵⁰ : Open lines of communication and availability were considered important elements for facilitating disclosure among patients.	"My communication with the patients is open. Any time the patients can call me and tell me their problems." (p. 37 Table 3)
(2) Rapport-building communication	Developing rapport and trust	Askew ³³ : Developing rapport was synonymous with developing a relationship with the patient ; this was seen as an essential component of care and key advice for new physical therapists.	"I think that is the most important thing, the level of communication between the therapist and the patient from the start ... finding out what is happening with the whole patient. There is more to pain than just the physical, there is a lot of mental and emotional aspects that are tied into pain" (p. 51)

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
			<p>"Over 80% of respondents replied that they would tell a new therapist to develop a good initial relationship with the patient" (p. 51)</p>
		<p>Pincus⁴⁹: Communicating in a way that establishes trust was important to physical therapists.</p>	<p>"Clinicians reported investing time and effort to create trust and an atmosphere in which patients felt able to discuss their fears" (p. 70)</p>
Friendly, respectful communication		<p>Afrell⁴³: A large component of respectful communication involved listening.</p>	<p>"You have to take everybody for who they are, listen to them, and try to get into their world and work with them because if you don't then you will never be able to pull them out because you aren't listening." (p. 50)</p>
		<p>Del Baño-Aledo⁴⁶: Friendly and respectful communication was both commonly experienced and preferred by patients.</p>	<p>"friendly and respectful behavior of physiotherapists was a predominant patient experience reported in all focus groups" (p. 76)</p>
Displaying positive emotion and humor		<p>Gard⁴¹: Humor was considered an effective therapeutic instrument, preferred by patients.</p>	<p>"Positive emotions such as interest and joy were expressed by most informants in the interview situation, when treatments had been successful, as joyful contacts with colleagues, or in situations where humour was used as a therapeutic instrument." (p. 237)</p>

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
	Individualizing communication	Cooper ⁴⁴ : Tailored communication resulted in more patient-centered care .	"specific approaches were more useful for some than others, suggesting that tailoring communication to the individual's needs is important" (p. 246)
			"Written communication was also discussed, often in a negative manner, suggesting that care should be taken to issue information acceptable to the individual" (p. 246)
			"Listening, understanding and getting to know the patient, and allowing the patient to explain their problem and to question the physiotherapist"" (p. 247)
		Serpanou ⁵⁰ : Individualizing and tailoring communication to the patient was important for addressing individual needs in the physical therapy plan of care .	"Physical therapists need to be prepared to address those obstacles and open communication channels with the patients and their families taking into account the individual's needs, capacities, and resources." (p. 39)

Supplementary Table 1.1 Continued

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
(3) Empathic communication	Using therapeutic, supportive touch	Askew ³³ : Touch was considered a marker of and a way to communicate a strong and supportive relationship.	"The amount of time I spend with a patient and the amount of touch that I provide, and the amount of support I give them in saying, 'I'm gonna help you' makes them believe they can get better. " (p. 52)
	Showing empathy	Askew ³³ : Physical therapists' personal experiences with pain helped them communicate about pain more empathically.	"... I have had [personal] experience with some back pain, just occasionally nothing major. But it really puts into perspective how scary it can be when something is minor and is really painful ... it really makes you appreciate what some other people are going through ... it makes me understand better what they're feeling ... I'm probably a little more sympathetic" ... "can put some of my own personal experience in it, always being active in my years and so forth. I think I was probably one of these guys who blew off pain, kind of worked through it. So when I am working with my patients, I have to be careful not to take their pain lightly." (p. 45)
	Providing emotional support	Del Baño-Aledo ⁶⁶ : Listening skills were key to showing emotional support to patients.	"Supportive care was perceived during dialog with therapists and by their willingness to listen to patients' viewpoints or concerns." (p. 76)

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
		<p>Askew³³: Physical therapists perceived emotional support to consist of listening, encouraging, working with, and not judging their patients.</p>	<p>"I guess what I have learned is that you can't sit back and judge people when you don't know what their story is. You have to take everybody for who they are, listen to them, and try to get into their world and work with them because if you don't then you will never be able to pull them out because you aren't listening. That's what these people need the most, they are looking for support, they need encouragement, they need somebody to work with them to help them." (p. 50)</p>
		<p>Cowell⁴⁵: Reassurance and emotional support was valued and needed within the direct context of patients' physical therapy treatment but with their health as a whole as well.</p>	<p>"They need that reassurance that actually, there isn't anything going on, particularly if you get people that have had a family history of cancer or they know someone that's had surgery and ended up in a wheelchair... until they've been given that all clear you can't actually move them forward no matter how hard you try" (p. 115)</p>
			<p>"physiotherapists felt that they required more time in the initial encounter to facilitate and support emotional disclosure" (p. 116)</p>

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
	Providing early follow-up support	Cowell ⁴⁵ : One unique benefit to physical therapy is the opportunity to provide early follow up; emotional support during these follow-ups was immensely beneficial to patients. Afrell ⁴³ : Physical therapists can experience difficulty responding to sad emotions elicited by patients through certain lines of questioning.	"early follow-up support was considered optimal for reinforcement and to reassure anxious patients, but was a luxury rarely afforded in primary care" (p. 116) "While 'our' physiotherapists appreciated that the key questions might make the patients open up, they sometimes also became frustrated. As professionals they could experience a sense of powerlessness when confronted with too much sorrow and suffering." (p. 286)
	Facing uncertainty when responding to patients' emotional displays	Afrell ⁴³ : Although certain expressions of emotions were difficult for physiotherapists to respond to, ultimately physiotherapists found that these emotional displays allowed them to better understand, and thus, treat their patients.	"This distancing may offer therapists a way to protect themselves, but it can make the patient feel dismissed and break the contact in the encounter" (p. 286) "Expression of feelings in the clinic facilitates the physiotherapist's understanding of the patient's problems and influences the result of the treatment positively " (p. 286)

Supplementary Table 1.1 Continued

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
(4) Collaborative communication	Seeking common ground	<p>Øien⁵²: Physical therapists cited the importance of checking in (both verbally and nonverbally) with patients to ensure they were on the same page, particularly with regard to the patient's experience of his/her body during movement. Understanding and 'common ground' were cited as key to quality therapeutic care.</p>	<p>"The physiotherapists described the importance of seeking for common ground of understanding. They aimed at exploring connections between tasks and goals of the treatment and being sensitive to the patient's need of readjustments. They said that they continually checked if verbal and nonverbal messages were interpreted in accordance with the intention of either the physiotherapist or the patient. The physiotherapists were constantly sensitive to the patient's experiences of her/his body." (p. 55)</p> <p>"In the clinical encounters, over time and to different extent, the physiotherapists and the patients contributed and gradually found common ground. This process was based on the exploration of movements and appeared as tentative or manifest negotiations between the participants. Their comments on the task and/or the relationship seemed to facilitate the collaboration." (p. 55)</p>

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
	Recognizing the importance of bidirectional communication	<p>Serpanou⁵⁰: Physical therapists recognized that bidirectional communication was necessary for understanding and delivering the best treatment.</p> <p>Cooper⁴⁴: Patients viewed the communication as "good" if they were involved, but they did not have to make treatment decisions (SDM) to feel this way.</p>	<p>"good communication with the patient helps in overcoming obstacles. Communication is a two-way process between the physical therapist and the patient, and it is necessary in order to understand each other's problems and expectations" (p. 38)</p> <p>"Good communication was related to participants feeling involved in the physiotherapy process, and participants who were not able to discuss their needs or who received poor explanations did not feel involved. According to the participants, good communication involved: taking time over explanations; using appropriate terminology; listening, understanding and getting to know the patient; and encouraging the patient's participation in the communication process"" (p. 247)</p> <p>"participants were happy for the physiotherapist to make most decisions as long as they were accompanied by good explanations" (p. 248)</p>
Collaboratively agreeing on treatment goals	Collaboratively agreeing on treatment goals	Cowell ⁴⁵ : Patients used the term "collaboratively agreeing treatment goals" which when applied, means the same as "shared decision making".	"Physical therapists used the term 'collaboratively agreeing treatment goals' which basically means 'shared decision making'" (p. 116)

Supplementary Table 1.1 Continued

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
(5) Professional accountability communication	Admitting limitations in professional skills or knowledge	Gard ⁴¹ : Admitting your limitation was considered an essential part of being a good physical therapist .	"Not being afraid to admit your limitations and ask for help if it is needed. ... Not feeling ashamed about not knowing everything (5:5) ^a " (p. 235)
		Pincus ⁴⁹ : Admitting limitations for the greater good of the patient was considered an important practice.	"...there is somebody who has 10 years more experience than me, why you don't go and see them. There are so many therapies about" (p. 72)
(6) Informative communication	Asking for help when needed Reconciling verbal communication with nonverbal communication cues during movement	Gard ⁴¹ : Asking for help was considered an important practice for physical therapists so that they could deliver the best treatment possible .	"It is important not to be afraid to admit your limitations [knowledge] and ask for help if it is needed (5:5) ^a " (p. 235)
		Askew ³³ : Physical therapists would compare nonverbal pain behaviors during posture and movement with verbal accounts of the pain experience to determine a course of therapeutic action ."	"if I feel that someone is not being honest with me in regards to the pain, often times I will discontinue to use modalities and pursue more of a therapeutic exercise and work hardening program in order to help me determine the patient's true level of pain and function ability" (p. 47)

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
			<p>"The theme of non-legitimate pain as perceived by physical therapists is reflected in the following: '...where their pain pattern does not appear to be appropriate for the type of injury or diagnosis they have, it influences how we treat them. We may ask them to work through their perceived pain differently than somebody else or we may ask them to go back to work despite their subjective complaints of pain' " (p. 47)</p>
			<p>"the biggest tickler would be a patient's presentation to the clinic, if they are displaying any type of muscle guarding, antalgic gait pattern, taking a look at how they position them-selves, their overall posture, and then correlating your observational skills to what the patient is telling you as far as descriptions of their pain, frequency of pain, their tolerance of pain, looking at the onset of their pain and then also getting a pain rating and see how that all correlates" (p. 44)</p>
Providing education and information		Del Baño-Aledo ⁴⁶ : Information provided frequently and openly with patients was preferred.	<p>"When physiotherapists were willing to provide patients with regular information and education about their plan of care or health status, this had a positive impact on patients' perceptions of service quality." (p. 77)</p>

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
		<p>Cooper⁴⁴: Patients found that information sharing amongst themselves (patients with the same condition) was helpful and preferred in addition to receiving information from their physical therapists.</p>	<p>"Some limitations of group rehabilitation have been presented; however, the most recurrent positive comment was that information sharing (particularly with other CLBP patients) was the most helpful part and should be done more frequently" (p. 248)</p>
		<p>Cowell⁴⁵: Having a trusting relationship allowed physical therapists to debunk incorrect beliefs and improve treatment for their patients.</p>	<p>"a trusting relationship facilitating patient disclosure...providing opportunities to reconcile patient unhelpful beliefs and enhancing adherence" (p. 116)</p>
Reconciling patient perspectives		<p>Synnott⁵¹: Physical therapists gave advice on the importance of having confidence in challenging their patients' false beliefs and to face conflict with direct communication.</p>	<p>"More specifically, many participants described how they were now confident to challenge the patient's belief system, even if this led to some conflict. Now I'm more inclined to say 'Listen, hold on a minute. Anyway I've just got to re-examine your point of view on this' and that can sometimes lead to conflict... but I think you sometimes need conflict for conceptual change. (P1)" (p. 219)</p>
		<p>Cowell⁴⁵: Investigators used the phrases "educating and developing patient insights" and "effective communication" synonymously.</p>	<p>"educating and developing patient insights...effective communication" (p. 116)</p>

Supplementary Table 1.1 *Continued*

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
(7) Agenda-setting communication	Using summaries, 'yes/no' questions, and 'okay' to shift to a new topic of conversation	Opsommer ⁴⁸ : Physical therapists were able to close down a pain conversation initiated by patients by summarizing the consultation and including a prognosis. Opsommer ⁴⁸ : Physical therapists were able to close an encounter using 'yes/no' formulations.	"summarize the consultation and to include a prognosis of the patient's problem" (p. 218) "...whereas he [physiotherapist B] finished the session with a final question 'did I forget to ask you a question?' The 'final concern' described in medical literature was observed with questions eliciting either 'yes' or 'no'-type responses and a preference for 'no'-type responses allowing a shift into closing of the encounter" (p. 218)
(8) Meta-communication	Engaging in communication about communication	Opsommer ⁴⁸ : 'Okay' with a rising pitch was used by a physical therapist to invite agreement by their patient. Afirell ⁴³ : Patients were encouraged to talk about talking about pain which led to further understanding of patients' pain by both patients and physical therapists.	"The patient in Extract 1.1 is invited to agree to the proposed plan ('okay' with a rising pitch)." (p. 208) " 'If pain could talk, what would it say?' – an aspect of metacommunication was introduced, where patient and physiotherapist together reflected, giving new perspectives on the experience of pain." (p. 286)

Supplementary Table 1.1 Continued

Preferred communication themes	Communication behavior subthemes	Data contributing to subthemes	Direct quotations describing communication behaviors
		<p>Øien⁵²: Both patients and physical therapists alike would comment on “demanding moments of collaboration” and contributed to improved therapeutic alliance.</p>	<p>“Part process analysis includes communication at three levels: Theme, meta-communication and definition of the relationship. The theme is often verbally communicated. The meta-communication encompasses nonverbal emotional expressions related to the theme. The theme and the meta-communication structure and define the relationship (33–35).” (p. 55)</p>
		<p>Øien⁵²: Both patients and physical therapists alike would comment on “demanding moments of collaboration” and contributed to improved therapeutic alliance.</p>	<p>“Communication about communication, appeared as means to open locked dialogues, and was initiated by the physiotherapists and the patients.” (p. 55)</p>

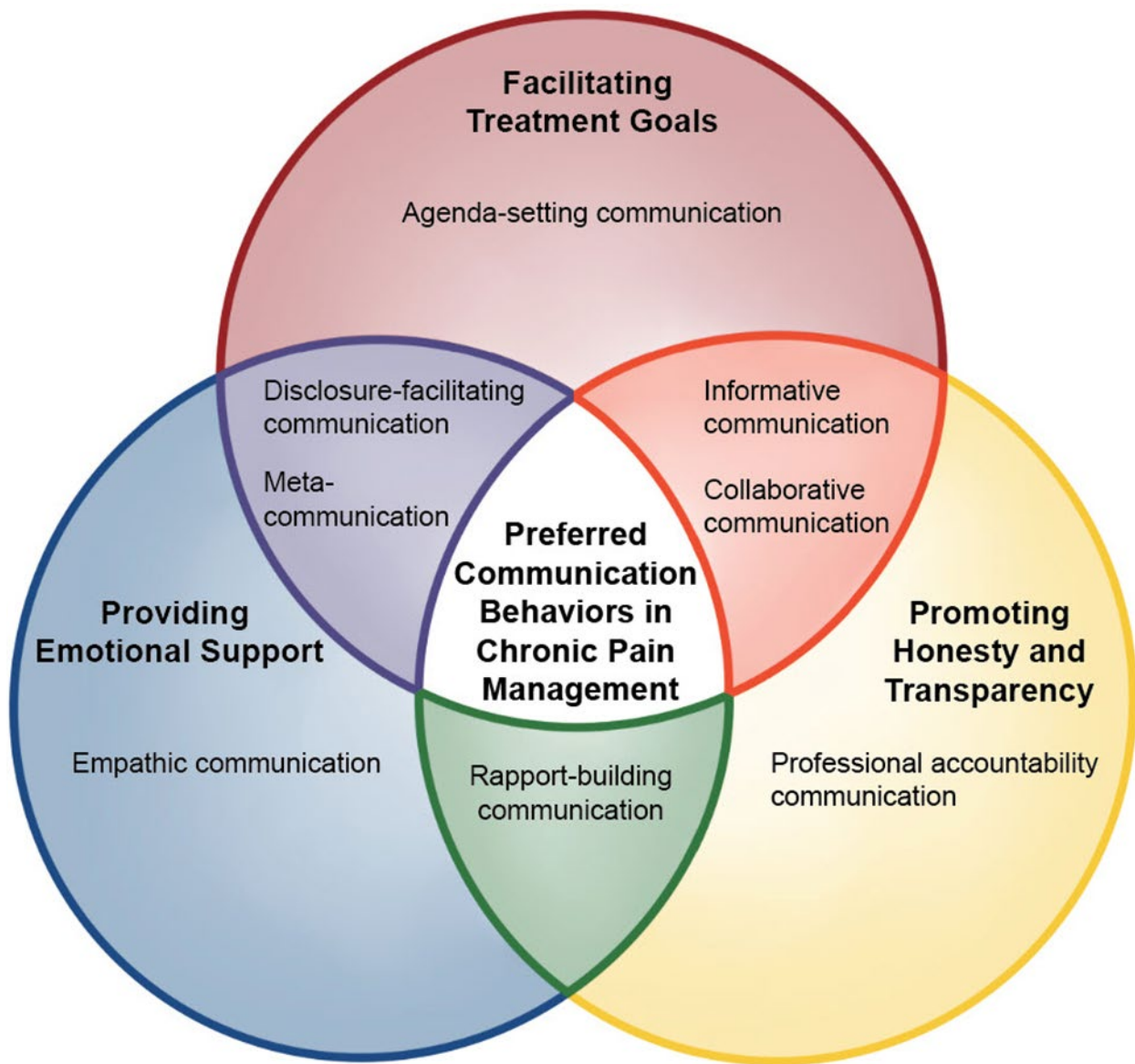


Figure 1.2 Conceptual Framework for Goal-Directed Communication Behaviors in Chronic Pain Rehabilitation

Eight behaviorally distinct themes derived from a qualitative meta-synthesis of the literature to characterize preferred communication behaviors that can be used alone or in combination to facilitate interactional goals in chronic pain rehabilitation. Preferred communication (white) combines behaviors that facilitate biomedical treatment goals (red circle), supplemented by communication behaviors that provide emotional support (blue circle) and promote honesty and transparency (yellow circle) in the delivery of pain rehabilitation. Overlapping regions (green, orange, purple) illustrate how behaviorally distinct communication behaviors may be combined in different ways to promote multiple interactional goals.

**CHAPTER 3: PROVIDING AND WITHHOLDING EMPATHIC SUPPORT DURING PHYSICAL
THERAPY MANAGEMENT OF CHRONIC PAIN**

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ABSTRACT

Questions: In what ways do physical therapists provide or withhold empathic support from patients who express emotions during routine care for chronic musculoskeletal pain? How is empathic communication enacted in clinical interactions between physical therapists and their patients?

Design: A selection of 11 excerpts were drawn from a corpus of 99 audiotaped interactions between physical therapists and their patients across 6 weeks of care at an outpatient physical therapy clinic. Conversation analysis was used to transcribe, analyze, and identify key social actions.

Participants: Five physical therapists and 7 patients with chronic musculoskeletal pain.

Outcome measures: The corpus is comprised of interactions where physical therapists provide or withhold empathic support following an explicit or implicit description of an emotion by a patient.

Results: Physical therapists provided empathic support to patients who expressed emotion in three distinct ways: communicating (1) *affective empathy* to affiliate with patients' emotional stances, *sharing empathy* by providing second stories to reassure patients who report troubles, and *nurturant empathy* as therapists solicit patients' engagement by inviting and encouraging them to raise, upgrade, or amend emotional concerns about their own care.

Conclusion: These findings reveal that empathic social actions can promote enhanced collaborative interactions between physical therapists and their patients. Providing empathic support not only validates patient emotions but can also increase patient engagement and create environments that provide additional opportunities for physical therapists to offer emotional support, encourage honesty and transparency, and display receptivity to concerns that patients might want to raise and discuss across an episode of care for chronic pain.

Introduction

Physical therapy is a cornerstone of comprehensive healthcare specializing in human movement systems (Sahrmann, 2014). Physical therapists examine, evaluate, diagnose, and manage impairments of body functions and structures, activity limitations, and participation restrictions to improve mobility and optimize quality of life ((APTA), 2022). Often exacerbated by chronic pain, patients' activity limitations are strongly associated with emotional distress impacting two key dimensions of care: how pain and disability get expressed and responded to during clinical encounters (Linton & Shaw, 2011; Svanberg et al., 2017), and behaviors influencing overall reactions to and satisfaction with physical therapy treatments (Chou & Shekelle, 2010; Hill & Fritz, 2011; Kent & Keating, 2008).

Evidence based clinical practice guidelines for chronic pain management recommend a multidisciplinary biopsychosocial approach which requires patient-centered communication by all members of the health care team (Qaseem, Wilt, McLean, Forciea, & Physicians*, 2017). Physical therapists play a prominent role in multidisciplinary pain rehabilitation, but their communication practices have not been well studied compared to other health care professionals including primary care and oncology physicians (Wayne A Beach, 2013; Wayne A. Beach, 2013; Heritage & Maynard, 2006), nurses (Wu, 2021), and psychotherapists (Peräkylä, Antaki, Vehviläinen, & Leudar, 2008).

This analysis focuses on key practices comprising physical therapists' empathic communication, a core tenet of patient-centered care addressing the emotional nature of chronic pain when managing bodily impairments and function. We first describe how minimal attention has been given to recorded interactional data documenting patient-centered communication during real-world physical therapy encounters. Second, we examine institutional speech exchange systems (e.g., see (Drew & Heritage, 1992) to show that patients undergoing and physical therapists providing treatment display more informal orientations than clinical encounters such as primary or oncological encounters. Third, we discuss similarities and differences in communication practices between physical therapy and other healthcare professions. For example, many types of patients raise emotional concerns about chronic pain indirectly, rather than explicitly expressing their emotional states (see (Chelsea R Chapman & Beach, 2020). Yet when responding to patients' emotional concerns, physical therapists will be shown to provide more affective assessments than previously demonstrated for most providers in other settings. Fourth, responses from three physical

therapists are closely examined to reveal how sequences enacting 'empathy' can be interactionally accomplished: *affective empathy* to affiliate with patients' emotional stances, *sharing empathy* by providing second stories to reassure patients who report troubles, and actions comprising *nurturant empathy* as therapists solicit patients' engagement by inviting and encouraging them to raise, upgrade, or amend emotional concerns about their own care. Finally, we discuss how our findings can enhance partnerships between physical therapists and their patients, and inform educational strategies to foster therapeutic alliances between patients, physical therapists, and other healthcare providers (Ferreira et al., 2013; McWhinney, 1989; Mead, Bower, & Hann, 2002; Paul-Savoie, Bourgault, Potvin, Gosselin, & Lafrenaye, 2018; Debra L. Roter et al., 1995).

Perspectives on 'Empathy' During Clinical Encounters

Empathic communication is associated with more accurate patient disclosure, improved treatment adherence, and better clinical outcomes across several healthcare settings (Chelsea R. Chapman, Stone, & Monroe, 2023, "Manuscript in preparation"; Turk & Okifuji, 1998; Zolnierek & DiMatteo, 2009). Historically, four of the prominent approaches to studying 'empathy' during clinical encounters have involved (1) examining perceptions, such as "the ability to perceive the feelings of another and to communicate that understanding, helping them to feel understood" (Bas-Sarmiento et al., 2020); (2) coding or scoring providers' actions, including how speakers "paraphrase, interpret, recognize or name the other's emotional state" (Deborah L. Roter, 1991); (3) asking physicians to self-rate their empathy while reflecting on their medical practice (Hojat et al., 2002); and (4) coding or using conversation analysis to identify how physicians respond 'empathically' to "a direct and explicit or indirect and implicit description of an emotion by a patient" (Bylund & Makoul, 2005; Suchman, Markakis, Beckman, & Frankel, 1997, p. 678) by using actions displaying "the accurate understanding of the patient's feelings by the clinician and the effective communication of that understanding back to the patient so that the patient feels understood" (Suchman et al., 1997, p. 678). Such moments were initially described as windows of empathic and potential empathic opportunities, which may be responded to or avoided through termination or withholding by the provider (Beckman & Frankel, 1984).

Contradictory approaches to studying empathy include psychological orientations emphasizing individuals' perceived capacities to be empathic, and observational studies of naturally occurring

interactions giving priority to co-authored interactions during moments when patients raise and providers respond to varied concerns, emotions, and displays of suffering (Frankel, 2017). Conversation analytic (CA) research focuses on social actions such as when providers avoid addressing patients' concerns by drawing attention away from patients' emotions, pursuing biomedical topics and 'official' agendas not anchored or aligned with patients' subjective and lived experiences (Beach & Mandelbaum, 2005; Stivers & Heritage, 2001). Interactionally, analytic priorities have also been given to three-part sequences addressing subtle details of how patients raise emotions, providers' responses, and patients' orientations to receiving or having empathy withheld (Ford, Hepburn, & Parry, 2019; Frankel, 2009). Actions that do not acknowledge, and in other ways attend to patients' emotional concerns and circumstances, have been shown to constrain transformative change and healing outcomes (Peräkylä, 2019).

CA researchers have also examined how empathy is used to accomplish clinical goals such as supporting a treatment decision in primary care (Ruusuvoori, 2007), displaying understanding yet also returning to clinically relevant topics in child-protection helpline calls (Hepburn & Potter, 2007), and bridging the gap between patient and provider perspectives in palliative care (Ford et al., 2019). More recently, a study focused on how a patient displays woundedness arising from recurrent metastatic breast cancer (Beach, 2022). With empathic and compassionate responses, attention is given to how an oncologist does not avoid or dismiss but recognizes patient's condition as legitimate suffering meriting shared commiseration and personalized care. A range of social actions are examined such as affirming, supporting, encouraging, having commiseration with and compassion for patient disclosures about troubling matters (Beach, 2022).

These studies are particularly relevant and timely for better understanding how empathy is enacted during physical therapy management of chronic pain. Alongside efforts to promote psychologically informed approaches in pain rehabilitation (Keefe, Main, & George, 2018; Main & George, 2011), more attention is being given to how physical therapists can provide empathic, patient-centered care while balancing clinical (e.g., time constraints) and psychosocial demands (Foster & Delitto, 2011; Wijma et al., 2017). A recent qualitative meta-synthesis (Chelsea R Chapman, Woo, & Maluf, 2022) found that few studies of physical therapists' communication in chronic pain management have investigated the organization of social actions

during clinical interactions. Therefore, a need exists to better understand how empathic interactions are enacted during naturally occurring encounters between physical therapists and their patients.

Though patients prioritize empathic communication with their physical therapists (O'Keeffe et al., 2016), therapists sometimes struggle with how best to identify and address patients' psychosocial needs (Sanders, Foster, Bishop, & Ong, 2013). This may be partially attributed to patients' use of subtle cues to indicate emotional concerns rather than directly or explicitly stating them (Beach & Dozier, 2015; Levinson, Gorawara-Bhat, & Lamb, 2000). Several studies have addressed related issues such as the impact of interview question design on agenda-setting during pain management (Cowell et al., 2021; Opsommer & Schoeb, 2014) and the importance of communication when treating musculoskeletal disorders (Keel & Schoeb, 2017). However, close attention has not yet been given to how patients raise and physical therapists respond to emotional expressions.

Data & Method

Data for this secondary conversation analysis were drawn from our prior study of the relationship between empathic communication and clinical outcomes of pain rehabilitation (Chelsea R. Chapman et al., 2023, "Manuscript in preparation"). This study was conducted in collaboration with a private-practice outpatient orthopedic physical therapy clinic in the Southwestern United States. Study procedures were approved by the Institutional Review Board (IRB) at San Diego State University with written informed consent obtained from physical therapists and patients prior to participation. Study procedures are described in detail by Chelsea R. Chapman et al. (2023, "Manuscript in preparation"). Briefly, up to four physical therapy encounters for patients with chronic musculoskeletal pain were audio recorded across six weeks of care that included the initial physical therapy examination and periodic follow up treatments scheduled at least one week apart. To minimize observation bias, small audio devices clipped to physical therapists' collars digitally recorded conversations between physical therapists and their patients during routine clinical care with no researchers present. Data collection occurred from March 9, 2020 to July 8, 2022.

Our primary study produced a corpus of 99 recorded encounters (31 initial examinations and 68 follow-up treatment sessions) involving 8 physical therapists and 31 adult patients referred for physical therapy management of chronic musculoskeletal pain(Chelsea R. Chapman et al., 2023, "Manuscript in

preparation"). From these recordings, a sample of 11 transcribed moments involving 7 patients and 5 physical therapists were selected for detailed examination using conversation analysis. These moments were selected by consensus of the authors to illustrate how patients raise emotions during pain management encounters, and how physical therapists provide and withhold empathic support in response.

Physical therapists included in the present analysis were predominantly female (80%), White (100%), ranged in age from 26-30 years ($M = 28$, $SD = 2$), and had 6 months to 3 years of clinical experience. The majority of patients were female (57%), White (71%), and ranged in age from 40-76 years ($M = 64$, $SD = 13$). Patient participants reported chronic pain in upper extremity ($n = 3$, 43%) or lower extremity ($n = 4$, 57%) and upon enrollment self-rated their pain intensity from 5 to 9 out of 10 on the Numeric Pain Rating Scale (NPRS)(Childs, Piva, & Fritz, 2005) with "0" representing "no pain" and "10" representing "worst pain imaginable" ($M = 6.4$, $SD = 1.4$). Only in-person encounters were recorded, as telehealth communication creates alternative speech exchange systems considered beyond the scope of this study.

All audio recordings were processed into verbatim transcribed files through automated transcription using NVivo (March 2020, QSR International, Burlington). Excerpts selected for conversation analysis were manually transcribed in detail using Jefferson's interactional notation system (Hepburn & Bolden, 2017; Jefferson, 2004). Conversation analytic (CA) methods were employed using repeated listenings and careful analysis of transcribed interactions to identify key social actions displayed by participants. This inductive and naturalistic method is well suited to reveal specific practices enacted by patients and physical therapists when organizing interactions comprising talk and care for chronic pain, the sequential environments in which these actions are situated, and comparisons with institutional interactions across diverse medical interviews (Wayne A. Beach, 2013; Heritage & Maynard, 2006).

Prioritizing the Biomedical Agenda: A Missed Empathic Opportunity Response

Across a variety of healthcare settings, it is common for providers to neglect recognizing patient emotions in favor of pursuing the biomedical agenda (Beach, Easter, Good, & Pigeron, 2005; Beach & Mandelbaum, 2005; Chelsea R Chapman & Beach, 2020; Johnson Shen et al., 2019; Park et al., 2020). Biomedical agendas focus on treating the physical and mechanical dimensions of disease or disorder without attending to social, psychological, or behavioral dimensions (Engel, 1992). Commonly, this

sequence begins with a patient raising an empathic opportunity (explicitly stated emotion) or potential empathic opportunity (implicitly referenced emotion) followed by a provider using an “Okay” prefaced response before shifting from the patient’s concerns back to the provider’s own agenda (Beach, 1993, 1995). A single study of physical therapists identified this pattern in low back pain consultations (Cowell et al., 2021), and the present study confirms this pattern in physical therapy management of chronic knee pain. In Excerpt 1, the patient makes an affective statement about the condition of his knee.

***1) PA027_V1: p. 15 (00:12)**

1 Patient It’s still (.) my knee is sti:ll (0.4) cry:in at me.=
 2 PT =Ka:y. (0.4) You can also- (.) if you're gonna uh- strap the ba:nd around a-
 3 > a bed frame or whatever it is to do the one pulling ↑u:p you can also
 4 just do it in that position with (0.2) all the other ones. <

*All excerpt headers indicate the following information in sequence: (1) analytic excerpt number, (2) patient participant identifier, (3) visit number (e.g., “1” is initial visit through follow-up visits (2-4)), (4) page number the excerpt is found within the verbatim transcript, and (5) length of excerpt audio clip in minutes and seconds.

This is a potential empathic opportunity where emotions are implied, including frustration with the ongoing nature of his condition “it’s still” and “is still” (line 1) alongside distressing pain with anthropomorphizing his knee’s “cry:in” (line 1). The physical therapist’s “=Ka:y” (line 2) is used to shift from the patient’s implied emotions to the next-positioned matter that is biomedical in nature, describing how the patient can perform an exercise (lines 2-4) (Beach, 1993). While the exercise is an important matter to address, the physical therapist’s response “that immediately follows a potential empathic opportunity and directs the interview away from the implied emotion” leaves the patient’s implied emotions unaddressed resulting in a potential empathic opportunity terminator (Suchman et al., 1997, p. 679).

The Okay-prefaced response and shift to next-positioned biomedical matters can also occur after several patient-initiated actions (PIAs) raising implicit emotions.

2) PA012_V1: p. 6 (00:27)

1 Patient Ma:ny years ago=um (.) I was in a he:licopter cra:sh.
 2 PT On the ri:ght.
 3 Patient Yeah I was uh- the whole- my whole body [is]
 4 PT [Ok]ay.=
 5 Patient =all messed up.=
 6 PT =Oka[y].
 7 Patient [But u::m (1.0) This is not- I haven't had pa::in like this (0.7) in my shoulders.
 8 (0.4) This is fairly new. This is within a year.=
 9 PT =Oka:y.=
 10 Patient =A year- year an [a half.
 11 PT [So it was different.
 12 Patient ↑Yeah.

13 PT What happened in the crash. Did you u:m= like hit the door?

The patient in Excerpt 2 states that he was in a helicopter crash and proceeds to describe the impact of this experience on his body over time. Noticeably absent in the physical therapist's response is an assessment to mark a telling as extreme as a helicopter crash as newsworthy. Outside of healthcare institutions, it is very typical for speakers to provide an assessment when receiving news, however, physicians commonly withhold assessments instead offering an acknowledgement token or no response (Beach, 2015; Jones, 2001). Instead the free standing "[Ok]ay.=" (line 4) is preparatory to "Okay + fuller turn" in which questions about the next-positioned biomedical matter of bodily impact of the crash are asked (line 13).

Physical therapists also use 'Okays-in-a-series' to more forcefully transition from patient expressions of troubling topics to their own agendas (Beach, 1993).

3) PA005_V1: pp. 3-4 (1:04)

1 Patient U:m (0.2) the only thing (0.3) when I'm modifying this ↑a:nkle (.) is I'm a go:lfer.
2 PT Oh uh [huh.
3 Patient [I- I haven't been on the golf course be↑ca:use of this a:nkle.
4 PT O::↓ka:y.
5 Patient [U::mm.
6 (0.8)
7 PT So if ↑you had to cook like (.) a ↑me:al for everyone

((PT asks questions about cooking, standing, and chores "that you are not doing well because of the ankle"...))
((15 lines omitted))

8 Patient But I just- (0.2) this ankle has to get better. =This- I go so:: far an then after goin so
9 far I gotta go back.
10 PT Okay = o↑ka:y. And so like, do- do you (0.2) go ↑shopping? Do you buy ((continued))

In Excerpt 3, the patient implies emotions related to loss, frustration, and sadness as her ankle pain has prevented her from golfing (lines 1 & 3) an activity central to her claimed identity "I'm a go:lfer" (line 1). The prosodically marked and expanded "O::↓ka:y." (line 4) treats the patient's telling as "disagreeable, aggravating, and worthy of resistance, odd, or bizarre" (Beach, 2020, p. 152). This prosodically marked okay is also shift-implicative and serves to move away from the patient's concern and towards the next-positioned matter of assessing her activity limitations using standardized questions about housework limitations. The patient's concerns are fully terminated with 'double-marked' "Okay = o↑ka:y." (line 10),

which often displays impatience, enforcement, or even a rush-through of closure to pivot to the physical therapist's agenda, in this case the next standardized question about other activities of daily living (line 20).

Types of Empathic Responses

Although physical therapists sometimes terminate emotional or potentially emotional topics with patients in sequentially congruent ways that are similar to providers in other healthcare settings, this is not the typical response. We previously reported that among the 899 emotional moments (implicit or explicit) raised by patients in this corpus, physical therapists responded empathically 67.1% of the time (Chelsea R. Chapman et al., 2023, "Manuscript in preparation"). Findings from the present analysis revealed three distinct practices used by physical therapists to respond empathically to patients' emotional experiences: (1) affective responses, (2) reassurance through narrative, and (3) invitations for patient engagement. These empathic responses support goals such as providing emotional support, facilitating treatment, and building therapeutic alliance (Chelsea R Chapman et al., 2022).

Affective Responses Affiliating with Patient Emotional Experiences

When patients display emotions, offering experiences and events as newsworthy and significant, physical therapists use affective responses to affiliate with what patients have communicated as meaningful. These affective responses are produced through (1) surprise tokens (*Wo::w, cra:zy, ESPECIALLY*), (2) guttural displays of acknowledgement (non-lexical and paralinguistic utterances such as *Ugh, ooof*, and groaning), and (3) response cries such as invoking deities (*oh my goodness, OH MY GOSH*). Collectively, these actions are employed as interactional resources for accomplishing affiliation, marking tellings as newsworthy, and documenting impacts of having heard what patients stated (Freese & Maynard, 1998). Excerpts below will illustrate how these affective responses facilitate patient disclosures and provide emotional support by marking patients' lived experiences as worthy of attention.

In Excerpt 4, patient is being examined for knee pain, but recounts his experience with physical therapy in childhood when being treated for a herniated disc. In line 1 physical therapist asks a closed-ended yes-no question to assess whether the patient had ever been to a physical therapist before:

4) PA013_V1: p. 4 (00:40)

1 PT SO: .hhh have you ever been to a physical therapist be:fore?
2 Patient Nah- uh-↑Q:h no actually I did= whe:n I was a chi:ld. h[eh
3 PT [Huh] Okay.

4 Patient Uh I had a-uh (0.2) pinched ne:rve thing where they (0.4) I had a herniated disc in the back.
5 PT When you were a ↑KI:D?
6 Patient O:h it was sca:ry [like the-
7 PT [WO::W.]
8 Patient [like the] whole side a my body went °numb.°=
9 PT =Tha:t's cr↑a::zy.
10 Patient [An I couldn't feel](.) FOR YE:ARS. In fact, I still have a we:ird like nu:mb \$(are:a).\$
11 PT [Wo::w]
12 Patient [\$That I can't ↑fe:l.\$] [Um
13 [Espe]cially as a kid(0.2) That's cra:zy.
14 Patient So they put=I think it wuz cuz I was a skateboarder. I think it [wuz a
15 PT [O::h.
16 Patient you know the] fa:lling.
17 PT [Mm hmm.]
18 Patient Uh but they put me on a thing called tra:ck=
19 PT =Traction? [Mhmm.
20 Patient That was-] heh hoh \$I did not like that.\$
21 PT \$Ye:eah.\$ ((shared laughter))
22 Patient \$It's like a to:rture de:vice.\$ ((shared laughter))
23 PT [Hah hah hah] hoh

The patient initially answers that he had not previously seen a physical therapist, but then performs a self-repair as he remembers his experience with physical therapy as a child when being treated for a pinched nerve from a herniated disc. In line 5, physical therapist's question displays surprise marked by rise in pitch and loudness: "↑KI:D?" is produced as newsworthy and inviting elaboration (Selting, 1996; Wilkinson & Kitzinger, 2006), which patient next provides by reporting the experience as "sca:ry" (line 6). With "WO::W" (lines 7 & 11), "Tha:t's cr↑a::zy" (lines 9 & 13), and "[Espe]cially" (line 13) physical therapist repeatedly treats the patient's fearful experience as legitimate and worthy of special consideration displaying "that she supports the affective stance expressed" (Lindstrom & Sorjonen, 2013, p. 351).

Due in part to having his experiences and emotions validated, patient volunteers epistemic knowledge about his symptoms from the experience (line 8). He continues to volunteer clinically relevant information about his symptoms over time, including information relevant to his care in the present day – persistent numbness (line 10) – a sensory impairment he attributes to skateboarding and frequent falls as a child (lines 14 & 16). Unprompted, he discloses receiving traction for his prior injury (line 18), and states his dispreference for this treatment by comparing it to a "to:rture de:vice" (line 22).

To summarize, serial and clinically important disclosures by patient were facilitated by physical therapist expressions of emotionally validating surprise and appreciation not only for patient's reconstructed

childhood experiences, but also for how patient connected his past history of injury with present impairments and treatment preferences. In just 40 seconds, physical therapist's affective responses created an opportunity and encouragement for volunteered disclosures from patient, which included relevant information for creating a personalized plan of care to address challenges faced by this specific individual.

As shown in Excerpt 5, physical therapists' affective responses can also take form through simple guttural acknowledgements ("U:GHH" in line 18) or responses accompanying a low groaning voice (line 6). These responses were offered as patient describes an emotionally laden narrative about her father's poor health and eventual addiction to Vicodin (lines 1-6, 8-10, & 12):

5) PA006_V1: p. 3 (1:06)

- 1 Patient Well I watched my da:d. ↑He ha:d (0.4) spi:nal surgery on the base of his spine to take out bo:ne
 2 spurs? (0.2) .hhh An' he got a really ba:d in↑fection. An' he ha:d a ho:le in the back of his ne:ck
 3 that was re:ally re:ally dee:p. .hhh And it affected his a::rm. An' (0.2) my brothers an' everybody
 4 >a:h the:re's nuthin' wro:ng with yo:u<(0.2) it doesn't hu:rt. ((mimicking her brothers' voice))
 5 .hhhhh He was alwa:ys hu:rtin'=he got addicted ta Vico[din an' =
 6 PT [=Mm mmm.↓= ((low groaning voice))
 7 Patient =Lo:rta] an (.) got in a really bad way(0.2) An' it didn't- nothin' he:lped his arm.
 8 He lo:st use of his a:rm becuz of it= I mean (0.2) his hands was a:ll gn:arled and
 9 .hhhh (0.2) but this was back in (0.2) e:ighty (0.2) fi:ve?
 10 PT Mhm.
 11 Patient He's at the VA. He caught a sta:ph infe:ction.
 12 PT Mmm. ((low groaning voice))
 13 Patient It was re:ally really ba:ad.
 14 PT Yeah definitely. (0.2) Well I don't think that's gonna happen to you.
 15 Patient Oh I kno:w it's not. No (.) I'm not worried about that.
 16 PT Okay.
 17 Patient \$We jus got ba:d genes.\$ hah hah hoh [he
 18 PT [U:GHH] don't you love those genetics.
 19 Patient Oo:h Go:d I ha:te it.
 20 PT ↓I kno:w. ((low groaning voice))

To legitimize her reporting, patient emphasizes her father's extreme condition with upgrades like "re:ally" (e.g., line 3) and extreme case formulations like "He was alwa:ys hu:rtin'" (line 5) or "nothin' he:lped" (line 7) (Pomerantz, 1986). Patient makes the case for her father's pain and suffering, including his "sta:ph infe:ction" (line 12), which physical therapist's guttural presentation of "Mmm" (line 12) with a low groaning voice also acknowledges as a difficult health challenge. This guttural and affective response aligns with patient's own displayed concern about what her father endured. As a social action, physical therapist's low groaning displays emotional engagement and resonance with the patient, transforming the troubling

realities of a staph infection beyond imagining and into actual feelings shared by both patient and physical therapist (Duan & Hill, 1996; Ruusuvuori, 2005, 2007). Next, in response to patient explicitly stating “It was re:ally really ba:ad” (line 13), physical therapist reassures patient that she doesn’t think such a severe situation will happen to her (line 14).

Patient agrees with PT, stressing that she knows that fate will not befall her, and that she is not worried about it (line 15). By laughing it off as “ba:d genes” (line 17), patient nevertheless raises her concern as a potentially delicate and troubling issue (Beach & Prickett, 2017; Glenn, 2003; Jefferson, 1984). Physical therapist’s next, guttural response is an even louder “[U:GHH]” that prefaces a bid for shared commiseration that both speakers hate “genetics” (lines 18-19). Invocations of deities such as “Go:d” (line 19) can occur when speakers lack control in times of trouble (Beach, 2009). By stating “↓I knə:w” and groaning (line 20), physical therapist further confirms not only patient’s stance but claims her own position about the difficulty of coping with predetermined problems related to genetics (Heinemann & Traverso, 2009; Lindstrom & Sorjonen, 2013).

An important distinction between sympathy and empathy is that “empathy involves maintaining a dual perspective, imagining oneself in the same situation as the other” (Ruusuvuori, 2005, p. 205). Physical therapists enact empathy as affective responses with surprise tokens, guttural acknowledgements, and making assessments that align and affiliate with the emotive speaker. In Excerpt 6, patient relates a traumatic yet endearing story of her husband dying in her arms (line 1):

6) PA036_V1: p. 17-18 (01:42)

- 1 Patient He basically died in my a:rms at ho:me.
- 2 PT pt ((Name Redacted)). I am so: sorry.
- 3 Patient But he didn’t .hhh ha:ve ta go to the hospital- be hooked up(.) that wuz his bi:ggest [fear.
- 4 PT [↓Ye:ah.]
- 5 Patient Don’t let em hook me] up to- °I said no:..°
- 6 PT Oh my gosh.
- ((Patient continues describing husband’s decline including panic attacks and oxygen dependency))
- ((11 lines omitted))
- 7 Patient It was like something was ca:lling him. I mean I said please [ple:ase
- 8 PT [Hmm.]] ((low groaning voice))
- 9 Patient don’t go do:wn. Don’t use-
- 10 Going down while he was- on his hands an’ knees >I can’t get you up< (0.4) hhhhh
- 11 I said I’m trying >but he was so:< ca::lm.
- 12 PT .hhh OH MY=GOSH. OH [MY GOSH. ((pained voice))
- 13 Patient [He just] kept sa:ying he said °I’m try:ing° I just kept telling
- 14 him I loved him (0.2) By the time- I mean I called emergency an’ I kept saying
- 15 >please hurry please hurry< hhhhh (0.2) They kept sa:ying get him on his bed but

16 he was LO:DGED. Like against the bathroom door into the se:parate toilet area.
 17 PT O:h my gosh. OH MY GO:SH.
 ((Patient describes how her husband went peacefully and commending the ambulance workers and police officers on scene. PT comments on how you wouldn't want to see someone not go peacefully.))
 ((6 lines omitted))
 18 Patient I'm gla:d in a way they didn't bring him back because then he woulda had to a been hooked
 19 up to some[thing] .
 20 PT [Ri:ght.] Ye:eah.
 21 An he: (0.4) .hhh di:dn't want that at all. .hhhh ((struggling to speaking while choking up))
 22 Patient My daughter said mo:m (.) .hhh I could've never made that de↑cision.
 23 PT I kno:w. [I kno:w.
 24 Patient [I could've never made] that decision.
 25 PT I know. That's horrible- Well-
 26 Patient -he'll rest peacefully and he's in a mu::ch better place now.

PT initially responds to this emotional moment by addressing the patient by name and offering a “so: sorry” condolence (line 2). A sensitive understanding is displayed of both the husband’s death and patient’s traumatic caregiving experience. The patient continues telling the story of her husband’s death, recounting his fear of being hooked up to machines as he died (line 3). With “Oh my gosh” (line 6) Physical therapist provides initial oh-prefaced shock validating patient’s emotional hardship (Heritage, 1984, 1998) – my-world assessments that are subsequently repeated with vocal emphasis (lines 12 & 17). Patient is speaking tearfully and choking up throughout (lines 3, 5, 7, 9-10, 21), episodes that are often characterized by moments of awkward silence, aspiration directly before or after speech as a speaker attempts to talk through their crying, whispered talk, wobbly voice, and plosive sounds (Hepburn & Potter, 2007, 2012).

Each of these features are displayed by the patient as she attempts to tell her story while regaining composure. As patient recounts her difficult experiences physical therapist closely monitors, responds, and offers what Frank (1995) describes as compassionate witnessing. Physical therapist repeats “I kno:w” not to claim epistemic authority over patient, but again to fully acknowledge “That’s horrible.” (lines 23 & 25). These actions acknowledge that patient’s emotional telling, and crying, are reasonable given the arduous circumstances.

Reassurance through Narrative

One of the most effective displays of affiliation and empathy is the “second story” (Sacks, 1992): Speakers respond to a prior troubles-telling by sharing their own personal or anecdotal experiences (Lerner, 1992). Just as patients’ elaborations are often constrained during medical interviews (Beach &

Mandelbaum, 2005; Stivers & Heritage, 2001), providers also withhold elaborations designed to align with and support patients' circumstances. Yet observational studies suggest that while they rarely occur, providers' second stories can have powerful empathic impacts (Ruusuvuori, 2005, 2007).

The excerpts below exemplify how second stories communicate empathy by providing physical therapists' own or related experiences to offer reassurance about patients' stated or implied concerns. Excerpt 7 involves a patient with chronic ankle pain who has been advised by her physical therapist to wear a foot and ankle orthotic and compression sock. This is the patient's second encounter with her PT. Previously, this patient expressed feeling self-conscious of these outwardly visible markers of her pain. In line 1, patient expresses concern about how other people will view her wearing the orthotic and pressure sock (line 1):

7) PA005_V2: pp. 4-5 (00:35)

- 1 Patient But you (have tons of people out here lookin' at you.)
- 2 PT You kno:w wha:t. pt .hh I learned a lo:ng time ago that pe:ople do:n't spend a lot of
- 3 time thi:nking about other people.
- 4 Patient Well that's good.
- 5 PT You know? ↑Like how many times you walk past some- some we:irdo. And-
- 6 Patient You could care less.
- 7 PT You could care- yeah. Yo:u forget about them as soon as you=maybe you te:ll one story.
- 8 But when was the la:st time you told a story about someone else's hands or
- 9 feet (0.3) \$ mmphff hhhh \$or their funny lookin' ear.\$
- 10 Patient That's [true.
- 11 PT [You never know]. Ri:ght?
- 12 PT I find tha:t (2.0) we all are mo:re aware of our own flaws than o:ther people [are of ours.
- 13 Patient [I know] I am.

PT responds to the implied embarrassment in patient's "tons of people" utterance by initiating a position about what "I learned a lo:ng time ago" (line 2): a series of utterances designed to reassure patient that other people will not spend time thinking, or telling stories about, "someone else's hands or feet" (lines 8-9) . Alternating between "I" and "you" language, physical therapist works to convince patient that other people do not notice our flaws (e.g., ankle supports and compression socks) as much as we ourselves do (line 13). Physical therapist invites agreement through "You know?" (line 5), a question with an affirmation preference (Hayano, 2013), which patient accepts and displays (line 6) through collaborative completion of the physical therapist's sentence (Lerner, 2004). Physical therapist continues to invite patient to agree with her, asking "Ri:ght?" (line 11), and the patient does agree (line 13).

To summarize, physical therapist invites agreement and proffers reassurance throughout this extended sequence. These actions are serially accepted by patient, enhancing her ability to recognize that potential embarrassment about what others think can be minimized. By physical therapist's taking a position and sharing a story about what people do/do not think and talk about regarding others' flaws, physical therapist's treatment goals and patient's acceptance of treatment recommendations are better aligned.

At times patients initiate stories not directly related to physical therapy clinical goals, soliciting next-positioned empathy or compassion through troubles-tellings or raising emotional topics (Ruusuvuori, 2007). Recipients of these tellings "are expected to show affiliation with the emotional stance displayed by the storytellers" (Peräkylä et al., 2015, p. 301).

In Excerpt 8, following a tearful discussion of her dog's passing earlier in the encounter, patient concludes her story by reflecting on dogs' unconditional love for their owners (lines 1 & 3) and how her dog "wuz part of the fa:mily" (line 5). These topics may be considered outside the professional scope of physical therapy practice, yet it is extremely relevant to patient's lived experiences and treated as such by PT:

8) PA006_V3: p. 5 (00:46)

1	Patient	They <u>go:</u> , you know, you can (0.6) <u>unconditionally</u> , [unconditional love fer
2	PT	Mmhmm]
3	Patient	a-a pet has fer his ow[ner.
4	PT	Exa:ctly.]
5	Patient	Well] he wuz part of the <u>fa:mily</u> .
6	PT	↑Yea. No, I mean, <u>de:finitely</u> . ↑And they a:ctually they <u>di::d um-</u> research.
7		>I was readi:ng (.) I du:nno some article popped up< and they've done rese:arch
8		<u>basically</u> that have sho:wn .hhh tha:t u:m pt with <u>do:gs</u> at least (1.0) u:hh
9		their ↑ <u>he:art</u> rates will <u>in</u> crease ju:st(.) by <u>look</u> ing (0.2) at their <u>own</u> er?
10		.hhh A:nd then <u>also</u> when the owner says I love you to the dog their <u>he:art</u> rate will
11		incr[ease.
12	Patient	[↑ <u>Re:[ally?</u>]
13	PT	[because] they're just so: <u>ha:ppy</u> .
14		Awwwww (1.0) That's <u>cool</u> . Ye:ah.
15	PT	↑Ye::ah.
16	Patient	Do:gs are <u>ama:zing</u> .

In response, physical therapist not only strongly agrees, but shares a second story about research showing physiologic evidence of dogs' love for their owners (lines 6-11). Patient reacts to this information with "[↑Re:[ally?]" (line 12), a powerful response cry (Goffman, 1981) displaying emotions flooding out with surprise and joy. Evidence is provided that dogs are "just so: ha:ppy" (line 13) when their owners show them love.

These pivotal moments reveal how physical therapist does not disregard or avoid addressing patient's grief and loss, but instead reports information that affirms and comforts patient. In turn, patient's response cries "evoke and claim a degree of empathic union and affiliation between teller and recipient" (Lindstrom & Sorjonen, 2013, p. 355). Patient also offers a positive assessment with "Awwwww (1.0) That's cool. Ye:ah" (line 14). The orientations by physical therapist and patient are shared: "Do:gs are ama:zing" (line 16).

Following this interaction, patient volunteers additional and unprompted information of relevance for physical therapist's clinical decision making. Patient discloses she is resistant to undergoing MRI scans, various lifestyle factors that impact her movement, and tools she uses at home to treat her pain (e.g., massage gun). Having affiliated strongly and connected through powerful empathic moments regarding "dogs", these subsequent disclosures suggest that physical therapist and patient are better situated to further discuss clinically relevant personal matters that might not have been raised if talk about "dogs" had not occurred.

Invitations for Patient Engagement

In attempts to create environments that facilitate accurate disclosure of patients' health problems and actively engage in their own care, physical therapists encourage patients to be honest when reporting the severity and impact of their pain. In Excerpt 9, physical therapist invites patient to rate her pain intensity and "put a number on it" (line 1). Patient next reports "m- mo:derate" and "Mild to [mo:derate" (lines 3 & 5), and agrees with physical therapist's "Like a five?] (0.2) four or five?" rating (lines 6-7):

9) PA008_V1: p. 4 (1:07)

- | | | |
|----|---------|---|
| 1 | PT | So if you were to put a number on it <u>currently</u> how would you <u>ra:te</u> it? |
| 2 | Patient | Ha- so whe:n I turn my <u>he:ad</u> (again trying to push out) even now(.) u:m ↑ye:ah you |
| 3 | | could say m- mo: <u>derate</u> ? |
| 4 | PT | <u>Okay.</u> |
| 5 | Patient | Mild to [mo:derate. |
| 6 | PT | [Okay.] Like a five?] (0.2) four or five? |
| 7 | Patient | Ye::ah? four or five yeah. |
| 8 | PT | °Okay° (0.6) <u>O:kay</u> . And (.) you kno:w ((clears throat)) I find a lot of <u>people</u> |
| 9 | | <u>do:wn</u> play their pa:in. |
| 10 | Patient | Mhmmm. |
| 11 | PT | Because we <u>go:tta</u> = get (.) through <u>li:fe</u> and we don't get there by you [know |
| 12 | Patient | [Mhm] |
| 13 | PT | thi- thinking about our <u>pa:in</u> all the time, ↑ <u>bu:t</u> ↑ <u>somethi:ng</u> was concerning to you. |
| 14 | | <u>Somethi:ng</u> brought you here and <u>somethi:ng</u> wasn't <u>no:rml</u> (.) so in he:re like in the |
| 15 | | rest of the wo:rld I kno:w you- you'd gri:n [and bear it. |
| 16 | Patient | [Mhmm.]= |

17 PT =An do that. ↑But he:re if something's unco:mfortable let me kno:w becuz uh
18 that's not no:rml and I wanna make sure that I'm communicating that- that it's-
19 we're not just (0.2) you know, gunna le:ave you like tha:t. hhh heh heh \$by the time
20 we're done.\$=
21 Patient =That's why I ca:me. You can fix me. You can [fix my leg.
22 PT [\$Yeah.\$]
23 Patient Heh heh heh
24 PT Ye:ah, well you know (0.2) You did the ha:rd work. I jus' guided the- .hh the activities
25 and you made it ha:ppen. So uh that was really- give yourself more credit than me
26 fixing you. heh hah heh heh heh

In lines 8-9, as physical therapist begins to describe how “I find a lot of people do:wnplay their pa:in.”, she initiates a series of actions revealing strong empathic concern for patient’s condition. First, physical therapist avoids accusing patient of downplaying pain by referencing her experience with “a lot of people”. Second, physical therapist explicitly recognizes that patient is seeking assistance because she was concerned that “somethi:ng wasn’t no:rml” (line 14). Third, while many patients “gri:n [and bear it ” (line 15), physical therapist encourages patient to let her know if “something’s unco:mfortable” (line 17) during physical therapy treatment sessions. physical therapist also explicitly states that “we’re not just (0.2) you know, gunna le:ave you like tha:t” (line 19) – a commitment to “fix” patient’s leg, which is patient’s stated reason for seeking treatment: “That’s why I ca:me” (line 21). Finally, physical therapist compliments patient for actively engaging in her own recovery by doing the “ha:rd work”, and in so doing downgrades her own efforts while empowering patient to recognize that she deserves “more credit” (lines 25-26).

To summarize, physical therapist encourages patient’s honesty to inform the care she provides for a painful leg. Patient is invited to tell physical therapist if discomfort arises rather than withholding and bearing pain, which provides physical therapist with information necessary to either adjust treatment or offer additional emotional support. Physical therapist gives attention to relieving chronic leg pain, while also edifying patient whose own efforts contribute significantly to the healing process. Collectively, these actions invite patient to collaborate in honest pain disclosure, share confidence that healing will occur, and take personal credit for patient’s own efforts rather than relying on medical authority as the sole or even primary reason for alleviating symptoms. In these ways, physical therapist holds herself accountable for diagnosis and pain management_(Perakyla, 1998) without imposing medical authority in a manner diminishing patient’s contributions.

In Excerpt 10, physical therapist invites patient to express her comfort or discomfort with pressure she applies to her shoulder during manual therapy (line 1). Patient responds with “Ye:a:h i:t hurts” (line 2) indicating that she is “okay” with the amount of pressure but that it does in fact “hurt”:

10) PA006_V1: p. 1 (1:04)

1 PT You okay with that pre:ssure.
2 Patient Ye:a:h i:t hurts.
3 PT Ka:y. I'm just gonna hang out right here an' I just want you to bre:::athe hhhh
4 So: it's re:ally ti:ght. hhhhh
5 Patient I've noticed that I've (.) got nodules in my thyroid?
6 PT Mhmm.
7 Patient An' I've noticed that the:y've hhh huh heh (.) pre:ttly ↓ la:arge today.
8 PT ↓Yeah. ↑Today's just an off day just for you physically, [hu:h?]
9 Patient [Ye:ah.] Yeah.
10 PT Any particular re:ason?
11 Patient No:h? I've (0.2) No (.) Just-
12 PT -Just sometimes that happens?
13 Patient Yea:h.
14 PT Okay. We:ll you just keep me info:rmed. hhh So (0.2) you know (.) iff-

PT recognizes the pain associated with manual therapy and reassures patient that she will maintain but not increase pressure. Patient is advised to cope with the pain by breathing, and physical therapist validates patient's pain by examining and providing “online commentary” (Heritage & Stivers, 1999) that her shoulder is “re:ally ti:ght” (line 4) and thus a potential factor contributing to her pain.

In response to this validation, patient voluntarily draws attention to a separate health condition: enlarged “nodules” in her thyroid (lines 5 & 7). This disclosure reflects patient's recognition that physical therapist is receptive to not just hearing about the presenting health condition (i.e., shoulder pain), but other troubling health concerns (i.e., thyroid) as well. In line 7, patient makes available her vulnerability to physical therapist with delicate laughter (“huh heh”) reflecting experienced troubles (Beach & Prickett, 2017), and a falling voice displaying worry about the size of her “nodules”. Patient's offering is explicitly acknowledged by physical therapist who draws the conclusion that today is “an off day just for you physically, [hu:h?]” (line 8), inviting patient to elaborate on her condition. Though patient agrees with physical therapist's assessment (line 9), she does not elaborate further despite probing questions from physical therapist (lines 10 & 12). Physical therapist does, however, leave the door open for future input or volunteered information from the patient by stating “We:ll you just keep me info:rmed” (line 14). So doing displays physical therapist's

receptivity to topics patient might want to pursue, yet does not impose authority to pressure or mandate disclosures from patient.

To summarize, physical therapist invited patient to engage in her care by expressing comfort or discomfort about pain experiences during treatment, and also showed receptivity to other health concerns considered relevant by patient (e.g., enlarged thyroid nodules). Recognizing patient's emotional distress and inviting elaboration displayed sensitivity to patient's experiences and a willingness to further discuss concerns if and when patient should choose to offer additional information. When patient elected not provide additional information in the moment, physical therapist further invited patient to "keep me informed" (line 14) and thus displayed a willingness to hear and incorporate patient's concerns into ongoing treatment.

In the following excerpt with the same physical therapist and patient, physical therapist displays sensitivity about patient's comfort level with shoulder pain during manual therapy. She solicits patient's feedback by stating that if it is "too: much" she can "de:finitely e::ase o:ff" (lines 1 & 3):

11) PA006_V1: p. 2 (00:14)

- | | | |
|---|---------|--|
| 1 | PT | So I'm just <u>gu:nna-</u> just ha:ng o:ut right here=You just let me know if this is too: much. |
| 2 | Patient | <u>Mka:y.</u> |
| 3 | PT | I can <u>de:finitely e::ase o:ff.</u> |
| 4 | Patient | I try to endu:re it but it- so:meti:mes-I me:an it ge:ts= |
| 5 | PT | = <u>De:finitely.</u> |
| 6 | Patient | Re:ally re:ally [painful. |
| 7 | PT | ↑ <u>Especiallly</u>] you've been dealing with it for <u>awhile.</u> |

Patient acknowledges this offer (line 2), but does request that pressure applied during manual therapy be reduced. Instead, patient states she tries to "endu:re it" even though at times it becomes "Re:ally re:ally [painful]" (lines 4 & 6). In response to patient's extreme case formulation, which legitimizes both her condition (Pomerantz, 1986) and ability to endure the pain, physical therapist first fully acknowledges with "=De:finitely", then continues with an explicit recognition of the chronic nature of patient's condition (lines 5 & 7).

This brief excerpt illustrates how patient retains control over the intensity of manual therapy, while also taking the opportunity to elaborate by describing that her pain can become extreme. This offering is accepted and empathized with by PT, "↑Especiallly" given the amount of time patient has been dealing with chronic shoulder pain. While patient does not directly accept the invitation to have her physical therapist apply less pressure, she does acknowledge the invitation to do so by disclosing her pain experiences.

These actions create opportunities for physical therapist to commiserate with patient about her pain levels as manual therapy continues unaltered.

Discussion

Findings from conversation analysis of representative excerpts in the present study indicate that empathic support is provided through affective responses to affiliate with patient's emotional stances, providing second story narratives to reassure patients who report troubles, and using invitations to solicit patient engagement in their own care, inviting them to raise, upgrade, or amend emotions and concerns. The criterial attributes of these types of empathic support are examined and discussed as interactional phenomena unique to physical therapy healthcare encounters.

These findings about how patients raise and physical therapists respond to emotional concerns during pain assessment and management reveal that empathic social actions can promote enhanced collaborative interactions between physical therapists and their patients that increase patient engagement and personal disclosures about their health conditions and treatment, and create environments that provide additional opportunities for physical therapists to offer emotional support, encourage honesty and transparency, and display receptivity to concerns that patients might want to raise and discuss across an episode of care for chronic pain (Chelsea R Chapman et al., 2022; O'Keeffe et al., 2016; Poitras, Blais, Swaine, & Rossignol, 2005).

Physical therapists, like providers in other healthcare settings (Beach, 2015; Beach & Mandelbaum, 2005), can at times employ actions such as "okay" to shift away from raised emotions and transition to next positioned matters. However, this is not the typical response in the physical therapy sessions we examined. Physical therapists provided empathic support in 67% of emotional moments identified in the primary dataset for this investigation (Chelsea R. Chapman et al., 2023, "Manuscript in preparation"),

At times myths about what is needed to provide efficient, effective care are debunked through this analysis. For example, providers in healthcare environments are generally not expected to state their own problems, as these are seen as detracting from clinical tasks (Holm, 1984). The present study confirms Ruusuvuori (2005, 2007) findings in general practice and homeopathic clinics that empathic communication, particularly engaging patients with second stories that parallel their own experiences, can be a helpful tool for providers to affiliate with patients during troubles-telling accounts. Findings from our

group and others collectively suggest that empathic communication is not at odds with accomplishing clinical goals, but rather can serve as a tool to facilitate cooperation toward common goals by simultaneously attending to emotional needs while pursuing biomedical treatment agendas. Healthcare providers outside of physical therapy are also more constrained in their responses when providing empathic support with little interactional evidence to support empathic strategies found in our analysis like affective responses. The present analysis supports frequent use of affective and at times even guttural responses by physical therapists to validate patient emotions that has not been documented in prior studies of interactional communication practices by other healthcare professionals.

Our findings demonstrate that patients who had their emotions recognized and supported empathically often volunteered information relevant to clinical decision making, such as lifestyle behaviors, past treatment experiences, related impairments and health concerns, and resistance or dispreference for treatment modalities. Importantly, even “off topic” interactions in which patients raised emotions unrelated to treatment were found to provide opportunities for empathic support before pivoting to other clinically relevant topics. The pivot from providing empathic support to an “off topic” matter to clinically relevant matters was not time consuming; in observed cases from this analysis, this pivot occurred in under 2 minutes. Although not documented in physical therapy, inadequate time with patients is a perceived barrier to delivering psychosocial care in oncology (Kayser, Brydon, Moon, & Zebrack, 2020). It is possible that this perception of time limitation occurs across healthcare settings.

Physical therapists inviting patients to participate in their own care provides opportunities for patients to volunteer clinically relevant information or adjust aspects of treatment. Even when physical therapist invitations are not followed up upon by patients, these invitations still display a supportive sensitivity to patients’ concerns and input. In primary care, Street, Krupat, Bell, and Haidet (2003) found that many cases of active patient participation occurred only after prompting by providers. Excerpt 10 provides evidence of a similar phenomenon in physical therapy practice. In this excerpt, the physical therapist invited her patient to control the level of pressure applied during treatment to facilitate her autonomy, potentially helping her patient tolerate a painful yet beneficial treatment she might otherwise have refused. In addition to responding empathically to explicit expressions of emotions by patients, proactive displays of sensitivity and inviting patients to make decisions about potentially disagreeable

treatment recommendations provides empathic support that can help validate emotions relevant to patients' experience which they may not otherwise express interactionally.

Interactional research on communication during pain management by physical therapists has been limited primarily to initial clinical encounters (Cowell et al., 2021; Opsommer & Schoeb, 2014) and one notable study analyzed clinical encounters for up to five visits (Schoeb, Staffoni, Parry, & Pilnick, 2014). These existing studies have explored goal setting and troubles-talk as interactional achievements in physical therapy and have been limited geographically to French-speaking Switzerland and England. The present findings explore empathic support provided during initial and follow up encounters across 6 weeks of care in a U.S. outpatient clinic. This more inclusive approach to data collection provides opportunities such as examining how patients raise emotional concerns in follow up care that they did not express initially, and how empathic support can occur after physical therapists have had time to treat the patient and tailor their communication to that individual. Ongoing comparisons of empathic communication during physical therapy sessions in European countries, the U.K., and across U.S. settings are needed to enhance global networks for refining quality care in physical therapy.

Limitations of this investigation provide several opportunities for future research. First, patients' emotional expressions, particularly when relating to physical pain, embody key social actions that accompany talk-in-interaction including "demonstrable suffering" (Heath, 1989, 2002). While some elements of non-vocal behaviors can be captured through audio recording (e.g., prosody, pauses, silences, laughter), video recording is required to access behaviors such as gaze, gestures, posture, movement, touch, and facial expressions which are likely to communicate critical information in the context of pain rehabilitation. Past studies have used video data to analyze initial physical therapy encounters (Cowell et al., 2021; Schoeb et al., 2014), but it is difficult to video record follow up encounters due to the open gym design of most outpatient physical clinics which requires consent from every person in the frame. Future studies should identify strategies to video record follow up encounters to investigate both verbal and non-vocal communication of empathy as a longitudinal interactional achievement across multiple encounters. Understanding how empathic moments are co-authored and built over time, from initial encounters throughout the course of care, will provide key insights into the evolving nature of trust and disclosures as patients and physical therapists form therapeutic alliances to achieve shared goals.

The primary limitations of observational research are the inability to draw causal inferences, potential for bias, and inability to control for confounding variables (Wang, Bolland, & Grey, 2015). However, the benefits of this research design provide the detail necessary to understand *how* empathy is communicated rather than *how much* empathy is perceived or whether it is *associated* with other factors. Conversation analysis provides rich and nuanced understanding of empathic communication as well as exact language drawn from recorded interactions that, in terms of detail, strikingly outperforms broader coding schemes more typical of observational healthcare research such as the Roter Interactional Analysis System (Deborah L. Roter, 1991). This detailed qualitative work can inform the development of empathic communication training interventions which can be tested in randomized controlled trials (RCTs). Future RCTs can test the effectiveness of empathic communication training and determine whether there is a causal relationship between physical therapist empathic communication, pain outcomes, and other clinically relevant factors.

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Chapter 3, in full, is in preparation to be submitted to *Qualitative Health Research*. Chelsea R. Chapman, Wayne A. Beach, and Katrina S. Monroe. The dissertation author, Chelsea Chapman, led all aspects of the analysis and is the primary author on this manuscript.

REFERENCES

*References for this manuscript are presented alphabetically in APA format as that is the requirement for the journal we plan to submit to

- (APTA), A. P. T. A. (2022). *Guide to Physical Therapist Practice*. Retrieved from <https://guide.apta.org/>
- Bachelor, A. (1988). How clients perceive therapist empathy: A content analysis of "received" empathy. *Psychotherapy: Theory, Research, Practice, Training*, 25(2), 227.
- Bas-Sarmiento, P., Fernandez-Gutierrez, M., Baena-Banos, M., Correro-Bermejo, A., Soler-Martins, P. S., & de la Torre-Moyano, S. (2020). Empathy training in health sciences: A systematic review. *Nurse Education in Practice*, 44, 102739.
- Beach, W. A. (1993). Transitional regularities for 'casual' "Okay" usages. *Journal of Pragmatics*, 19(4), 325-352.
- Beach, W. A. (1995). Conversation analysis: "Okay" as a clue for understanding consequentiality. *The consequentiality of communication*, 121-161.
- Beach, W. A. (2009). "Shit...Yeah I know": Sharing commiserative space and claiming epistemic authority. In *A natural history of family cancer: Interactional resources for managing illness* (pp. 211-234). Cresskill, New Jersey: Hampton Press, Inc.
- Beach, W. A. (2013). Patients' efforts to justify wellness in a comprehensive cancer clinic. *Health Communication*, 28(6), 577-591.
- Beach, W. A. (2015). Doctor-patient interaction. *Encyclopedia of language and social interaction*, 476-493.
- Beach, W. A. (2020). Using prosodically marked "Okays" to display epistemic stances and incongruous actions. *Journal of Pragmatics*, 169, 151-164.
- Beach, W. A. (2022). Enacting Woundedness and Compassionate Care for Recurrent Metastatic Breast Cancer. *Qualitative Health Research*, 32(2), 210-224.
- Beach, W. A. (Ed.) (2013). *Handbook of patient-provider interactions: Raising and responding to concerns about life, illness, and disease*. New York, NY: Hampton Press, Inc.
- Beach, W. A., & Dozier, D. M. (2015). Fears, uncertainties, and hopes: Patient-initiated actions and doctors' responses during oncology interviews. *Journal of health communication*, 20(11), 1243-1254.
- Beach, W. A., Easter, D. W., Good, J. S., & Pigeron, E. (2005). Disclosing and responding to cancer "fears" during oncology interviews. *Social science & medicine*, 60(4), 893-910.
- Beach, W. A., & Mandelbaum, J. (2005). "My Mom Had a Stroke": Understanding How Patients Raise and Providers Respond to Psychosocial Concerns. *Narratives, health, and healing: Communication theory, research, and practice*, 343-364.
- Beach, W. A., & Prickett, E. (2017). Laughter, humor, and cancer: Delicate moments and poignant interactional circumstances. *Health Communication*, 32(7), 791-802.
- Beckman, H. B., & Frankel, R. M. (1984). The effect of physician behavior on the collection of data. *Annals of internal medicine*, 101(5), 692-696.

- Bylund, C. L., & Makoul, G. (2005). Examining empathy in medical encounters: an observational study using the empathic communication coding system. *Health Communication, 18*(2), 123-140.
- Chapman, C. R., & Beach, W. A. (2020). Patient-initiated pain expressions: Interactional asymmetries and consequences for cancer care. *Health communication, 35*(13), 1643-1655.
- Chapman, C. R., Stone, M. D., & Monroe, K. S. (2023). Ecologically Assessed Empathic Communication is Associated with Patient-Reported Outcomes of Pain Rehabilitation. *Manuscript in preparation*.
- Chapman, C. R., Woo, N. T., & Maluf, K. S. (2022). Preferred Communication Strategies Used by Physical Therapists in Chronic Pain Rehabilitation: a Qualitative Systematic Review and Meta-Synthesis. *Physical therapy*.
- Childs, J. D., Piva, S. R., & Fritz, J. M. (2005). Responsiveness of the numeric pain rating scale in patients with low back pain. *Spine, 30*(11), 1331-1334.
- Chou, R., & Shekelle, P. (2010). Will this patient develop persistent disabling low back pain? *Jama, 303*(13), 1295-1302.
- Cowell, I., McGregor, A., O'Sullivan, P., O'Sullivan, K., Poyton, R., Schoeb, V., & Murtagh, G. (2021). How do physiotherapists solicit and explore patients' concerns in back pain consultations: a conversation analytic approach. *Physiotherapy theory and practice, 37*(6), 693-709.
- 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.
- Drew, P., & Heritage, J. (1992). Analyzing talk at work: An introduction. In P. Drew & J. Heritage (Eds.), *Talk at work: Interaction in institutional settings* (pp. 3-65). Cambridge: Cambridge University Press.
- Duan, C., & Hill, C. E. (1996). The current state of empathy research. *Journal of counseling psychology, 43*(3), 261.
- Engel, G. L. (1992). The need for a new medical model: A challenge for biomedicine. *Family Systems Medicine, 10*(3), 317.
- Ferreira, P. H., Ferreira, M. L., Maher, C. G., Refshauge, K. M., Latimer, J., & Adams, R. D. (2013). The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Physical therapy, 93*(4), 470-478.
- Ford, J., Hepburn, A., & Parry, R. (2019). What do displays of empathy do in palliative care consultations? *Discourse Studies, 21*(1), 22-37.
- Foster, N. E., & 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), 790-803.
- Frank, A. W. (1995). *The Wounded Storyteller*. Chicago, IL: University of Chicago Press.
- Frankel, R. M. (2009). Empathy research: A complex challenge. *Patient education and counseling, 1*(75), 1-2.
- Frankel, R. M. (2017). The evolution of empathy research: Models, muddles, and mechanisms. *Patient education and counseling, 100*(11), 2128-2130.

- Freese, J., & Maynard, D. W. (1998). Prosodic features of bad news and good news in conversation. *Language in Society*, 27(2), 195-219.
- Glenn, P. (2003). *Laughter in interaction*. Cambridge: Cambridge University Press.
- Goffman, E. (1981). Footing. In *Forms of talk* (pp. 124-159): University of Pennsylvania Press.
- Hayano, K. (2013). Question design in conversation. In J. S. T. Stivers (Ed.), *The handbook of conversation analysis* (First ed., pp. 395-414): Blackwell Publishing Ltd.
- Heath, C. (1989). Pain talk: The expression of suffering in the medical consultation. *Social Psychology Quarterly*, 113-125.
- Heath, C. (2002). Demonstrative suffering: The gestural (re) embodiment of symptoms. *Journal of Communication*, 52(3), 597-616.
- Heinemann, T., & Traverso, V. (2009). Complaining in interaction. *Journal of Pragmatics*, 41(12), 2381-2384.
- Hepburn, A., & Bolden, G. B. (2017). *Transcribing for social research*: Sage.
- Hepburn, A., & Potter, J. (2007). Crying receipts: Time, empathy, and institutional practice. *Research on Language and Social Interaction*, 40(1), 89-116.
- Hepburn, A., & Potter, J. (2012). Crying and crying responses. *Emotion in interaction*, 195-211.
- Heritage, J. (1984). A change-of-state token and aspects of its sequential placement. *Structures of social action: Studies in conversation analysis*, 299-345.
- Heritage, J. (1998). Oh-prefaced responses to inquiry. *Language in Society*, 27(3), 291-334.
- Heritage, J., & Maynard, D. W. (Eds.). (2006). *Communication in medical care: Interactions between primary care physicians and patients*. Cambridge: Cambridge University Press.
- Heritage, J., & Stivers, T. (1999). Online commentary in acute medical visits: a method of shaping patient expectations. *Social science & medicine*, 49(11), 1501-1517.
- Hill, J. C., & Fritz, J. M. (2011). Psychosocial influences on low back pain, disability, and response to treatment. *Physical therapy*, 91(5), 712-721.
- Hojat, M., Gonnella, J. S., Nasca, T. J., Mangione, S., Vergare, M., & Magee, M. (2002). Physician empathy: definition, components, measurement, and relationship to gender and specialty. *American Journal of Psychiatry*, 159(9), 1563-1569.
- Holm, U. (1984). Empathy in Doctor-Patient Relationship. *Uppsala Studies in Education*, 24.
- Jefferson, G. (1984). On the organization of laughter in talk about troubles. In J. M. Atkinson & J. Heritage (Eds.), *Structures of social action: Studies in conversation analysis* (pp. 347-369). Cambridge: Cambridge University Press.
- Jefferson, G. (2004). Glossary of transcript symbols with an introduction. . In G. Lerner & J. Benjamins (Eds.), *Conversation analysis: studies from the first generation* (pp. ix-xvi). Amsterdam/Philadelphia.

- Johnson Shen, M., Ostroff, J. S., Hamann, H. A., Haque, N., Banerjee, S. C., McFarland, D. C., . . . Bylund, C. L. (2019). Structured analysis of empathic opportunities and physician responses during lung cancer patient-physician consultations. *Journal of health communication, 24*(9), 711-718.
- Jones, C. M. (2001). Missing assessments: Lay and professional orientations in medical interviews. *Text & Talk, 21*(1-2), 113-150.
- Kayser, K., Brydon, D. M., Moon, H., & Zebrack, B. (2020). Institutional capacity to provide psychosocial care in cancer programs: Addressing barriers to delivering quality cancer care. *Psycho-Oncology, 29*(12), 1995-2002.
- 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, 98*(5), 398-407.
- Keel, S., & Schoeb, V. (2017). Patient participation in action: patients' interactional initiatives during interdisciplinary goal-setting meetings in a rehabilitation clinic. *Text & Talk, 37*(2), 213-241.
- Kent, P. M., & Keating, J. L. (2008). Can we predict poor recovery from recent-onset nonspecific low back pain? A systematic review. *Manual therapy, 13*(1), 12-28.
- Lerner, G. H. (1992). Assisted storytelling: Deploying shared knowledge as a practical matter. *Qualitative sociology, 15*(3), 247-271.
- Lerner, G. H. (2004). Collaborative turn sequences. *Pragmatics and beyond new series, 125*, 225-256.
- Levinson, W., Gorawara-Bhat, R., & Lamb, J. (2000). A study of patient clues and physician responses in primary care and surgical settings. *Jama, 284*(8), 1021-1027.
- Lindstrom, A., & Sorjonen, M.-L. (2013). In J. Sidnell & T. Stivers (Eds.), *The handbook of conversation analysis* (pp. 350-369). West Sussex, UK: Blackwell Publishing Ltd.
- Linton, S. J., & Shaw, W. S. (2011). Impact of psychological factors in the experience of pain. *Physical therapy, 91*(5), 700-711.
- Main, C. J., & George, S. Z. (2011). Psychologically informed practice for management of low back pain: future directions in practice and research. *Physical therapy, 91*(5), 820-824.
- McWhinney, I. (1989). The need for a transformed clinical method. *Communicating with medical patients, 9*, 25-40.
- Mead, N., Bower, P., & Hann, M. (2002). The impact of general practitioners' patient-centredness on patients' post-consultation satisfaction and enablement. *Social science & medicine, 55*(2), 283-299.
- NVivo. (2020). [Mobile application software]. Retrieved from <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>
- O'Keeffe, 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.
- 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.

- Park, J., Beach, M. C., Han, D., Moore, R. D., Korhuis, P. T., & Saha, S. (2020). Racial disparities in clinician responses to patient emotions. *Patient education and counseling*, 103(9), 1736-1744.
- Paul-Savoie, E., Bourgault, P., Potvin, S., Gosselin, E., & Lafrenaye, S. (2018). The impact of pain invisibility on patient-centered care and empathetic attitude in chronic pain management. *Pain Research and management*, 2018.
- Peräkylä, A. (1998). Authority and accountability: The delivery of diagnosis in primary health care. *Social psychology quarterly*, 301-320.
- Peräkylä, A. (2019). Conversation analysis and psychotherapy: Identifying transformative sequences. *Research on Language and Social Interaction*, 52(3), 257-280.
- Peräkylä, A., Antaki, C., Vehviläinen, S., & Leudar, I. (2008). *Conversation analysis and psychotherapy*: Cambridge University Press.
- Peräkylä, A., Henttonen, P., Voutilainen, L., Kahri, M., Stevanovic, M., Sams, M., & Ravaja, N. (2015). Sharing the emotional load: Recipient affiliation calms down the storyteller. *Social psychology quarterly*, 78(4), 301-323.
- Poitras, S., Blais, R., Swaine, B., & Rossignol, M. (2005). Management of work-related low back pain: a population-based survey of physical therapists. *Physical therapy*, 85(11), 1168-1181.
- Pomerantz, A. (1986). Extreme case formulations: A way of legitimizing claims. *Human studies*, 9(2), 219-229.
- Qaseem, A., Wilt, T. J., McLean, R. M., Forcica, M. A., & Physicians*, C. G. C. o. t. A. C. o. (2017). Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Annals of internal medicine*, 166(7), 514-530.
- Roter, D. L. (1991). The Roter interaction analysis system (RIAS) coding manual. *Baltimore, Md: School of Hygiene and Public Health, Johns Hopkins University*.
- Roter, D. L., Hall, J. A., Kern, D. E., Barker, R. L., Cole, K. A., & Roca, R. P. (1995). Improving physicians' interviewing skills and reducing patients' emotional distress: a randomized clinical trial. *Archives of internal medicine*, 155(17), 1877-1884.
- Ruusuvuori, J. (2005). "Empathy" and "sympathy" in action: Attending to patients' troubles in Finnish homeopathic and general practice consultations. *Social psychology quarterly*, 68(3), 204-222.
- Ruusuvuori, J. (2007). Managing affect: Integration of empathy and problem-solving in health care encounters. *Discourse Studies*, 9(5), 597-622.
- Sacks, H. (1992). Lectures on conversation. Ed. G. Jefferson. 2 vols. In: Oxford: Blackwell.
- Sahrmann, S. A. (2014). The human movement system: our professional identity. *Physical therapy*, 94(7), 1034-1042.
- 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(1), 1-10.
- Schoeb, V., Staffoni, L., Parry, R., & Pilnick, A. (2014). "What do you expect from physiotherapy?": a detailed analysis of goal setting in physiotherapy. *Disability and rehabilitation*, 36(20), 1679-1686.

- Selting, M. (1996). Prosody as an activity-type distinctive cue in conversation: The case of so-called 'astonished'. *Prosody in conversation: Interactional studies*, 12, 231.
- Stivers, T., & Heritage, J. (2001). Breaking the sequential mold: Answering 'more than the question'during comprehensive history taking. *Text & Talk*, 21(1-2), 151-185.
- Street, R. L., Krupat, E., Bell, R. A., & Haidet, R. L. K. P. (2003). Beliefs about control in the physician-patient relationship: Effect on communication in medical encounters. *Journal of General Internal Medicine*, 18, 609-616.
- Suchman, A. L., Markakis, K., Beckman, H. B., & Frankel, R. (1997). A model of empathic communication in the medical interview. *Jama*, 277(8), 678-682.
- Svanberg, M., Stålnacke, B.-M., Enthoven, P., Brodda-Jansen, G., Gerdle, B., & Boersma, K. (2017). Impact of emotional distress and pain-related fear on patients with chronic pain: subgroup analysis of patients referred to multimodal rehabilitation. *Journal of rehabilitation medicine*, 49(4), 354-361.
- Turk, D. C., & Okifuji, A. (1998). Treatment of chronic pain patients: clinical outcomes, cost-effectiveness, and cost-benefits of multidisciplinary pain centers. *Critical Reviews™ in Physical and Rehabilitation Medicine*, 10(2).
- Wang, M. T., Bolland, M. J., & Grey, A. (2015). Reporting of limitations of observational research. *JAMA internal medicine*, 175(9), 1571-1572.
- Wijma, A. J., Bletterman, A. N., Clark, J. R., Vervoort, S. C., Beetsma, A., Keizer, D., . . . Van Wilgen, C. P. (2017). Patient-centeredness in physiotherapy: What does it entail? A systematic review of qualitative studies. *Physiotherapy theory and practice*, 33(11), 825-840.
- Wilkinson, S., & Kitzinger, C. (2006). Surprise as an interactional achievement: Reaction tokens in conversation. *Social psychology quarterly*, 69(2), 150-182.
- Wu, Y. (2021). Empathy in nurse-patient interaction: a conversation analysis. *BMC nursing*, 20(1), 1-6.
- Zolnierok, K. B. H., & DiMatteo, M. R. (2009). Physician communication and patient adherence to treatment: a meta-analysis. *Medical care*, 47(8), 826.

**CHAPTER 4: ECOLOGICALLY ASSESSED EMPATHIC COMMUNICATION IS ASSOCIATED WITH
PATIENT-REPORTED OUTCOMES OF PAIN REHABILITATION**

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ABSTRACT

Questions: How frequently do physical therapists respond empathically to patient expressed emotions across 6 weeks of routine care for chronic musculoskeletal pain? Is more frequent empathic communication by physical therapists associated with greater improvements in patient-reported pain intensity and interference?

Design: A longitudinal observational study of up to 4 audio recorded physical therapy visits over 6 weeks of routine care in an outpatient private practice.

Participants: Thirty-one physical therapist-patient dyads. Patient participants presented with persistent or recurring pain in the back, neck, upper, or lower extremities for 3 or more months.

Outcome measures: Empathic communication was coded from audio recordings and quantified as a ratio of the frequency of empathic responses by physical therapists normalized to the frequency of empathic opportunities expressed by patients. Pain intensity and interference were assessed with the Brief Pain Inventory after each recorded visit. Primary analyses used repeated-measures, conditional linear mixed-effects models to determine if physical therapist empathic communication was associated with changes in pain intensity and interference across time.

Results: Across 99 recorded visits, physical therapists responded empathically 67.1% of the time. More frequent physical therapist empathic communication was associated with an overall lower pain intensity ($B = -1.29$ [95%CI=0.39, 4.91], $p = 0.007$) and less pain interference ($B = -1.07$ [95%CI=-2.11, -0.03], $p = 0.044$) across all time points. A significant interaction between empathic communication and time ($B = -0.78$ [95%CI=-1.45, -0.12], $p = 0.022$) indicated that more frequent empathic communication was associated with a greater reduction in pain intensity across time.

Conclusion: Physical therapists are empathic when managing patients with chronic pain. More frequent empathic communication by physical therapists is associated with lower ratings of pain intensity and interference by patients. Higher empathy is also associated with larger and more rapid decreases in pain intensity over time. These findings provide rationale and direction for future clinical trials to investigate

the efficacy of empathic communication skills training for physical therapists who manage patients with chronic pain, an innovative approach to improving conservative pain management.

Introduction

In the United States, 20% of adults have chronic pain and 8% have high impact disabling chronic pain.¹ Chronic pain is taxing on individuals and society: it reduces quality of life², is linked to opioid dependence³, and is one of the most common reasons for seeking medical care in the United States (U.S.).⁴ The total economic burden of pain care in the U.S. ranges from \$560 to \$635 billion, which exceeds the annual costs of heart disease, cancer, and diabetes.⁵ In addition to direct medical costs, chronic pain is a primary cause of both temporary and permanent work disability contributing \$299 to \$335 billion in lost productivity in the workplace.⁵ Globally, musculoskeletal disorders are the primary cause of chronic pain and disability.⁶ Physical therapists are a primary source of care for individuals with chronic pain, particularly musculoskeletal pain.⁷

Emotions and pain

In healthy adults, negative emotions have been shown to directly influence pain perception. For example, experimental trials using hypnosis to induce negative emotions, including anger and sadness, produced robust increases in pain intensity and unpleasantness ratings following exposure to noxious stimuli as compared to controls using attention-matched hypnotic relaxation.⁸ In clinical populations, pain correlates with sustained negative emotions such as fear, anxiety, sadness, depression, and anger.⁹⁻¹² For example, pain catastrophizing and fear are associated with increased pain severity, distress, and disability,^{13,14} even after controlling for level of physical impairment.¹⁵

Comorbid affective disorders such as depression and anxiety are common among individuals with chronic pain. The prevalence of depression, anxiety, and other mood disorders follows a linear pattern with the lowest rates found among individuals with no pain, higher rates among those with a single pain condition, and the highest rates among those with multi-site pain.¹⁶ Additionally, adults whose pain is more strongly associated with affect report higher levels of depression and anxiety.¹⁷ Anxiety disorders are higher among those with chronic pain compared to the general population (35% versus 17%).¹⁸ In a large international study of adults from 17 countries, individuals with back or neck pain were 2 to 3 times more likely to have had a past panic disorder, social anxiety disorder, or generalized anxiety disorder.^{19,20} Pain and depression may develop secondarily to each other, as chronic pain is a risk factor for developing depression²¹ and depression is a risk factor for developing chronic pain.^{22,23} A European study of 320

million adults found that those with major depressive disorder were more than 5 times more likely to report back pain and of those with major depressive disorder, 28.9% reported having a chronic pain condition.²⁴

Empathic communication in pain management

Primary care physicians cite poor communication as the most important barrier to effective pain management.²⁵ Despite the perception that poor communication can impede pain care, research is sparse regarding the influence of patient-provider communication on treatment outcomes in chronic pain. Although physical therapists have recognized the benefit of psychologically informed interventions that feature strong patient-provider communication as a foundational component of chronic pain management,²⁶ some have expressed feeling insufficiently trained in communication practices required to implement these approaches.^{27,28} Physical therapists have also reported difficulty responding to sad emotions expressed by patients despite preferring them to express their feelings rather than remaining stoic.²⁹ Collectively, these observations suggest a need for research, education, and skills training on best communication practices for chronic pain management in physical therapy.

Pain states, both acute and chronic, produce a strong desire for relief. Sontag³⁰ asserts that all people belong in two kingdoms—that of the sick and that of the well—when in the kingdom of sickness we desire a “passport” back to wellness. Seeking medical treatment is a tangible effort to achieve relief from pain, and secondarily the negative emotions surrounding pain. Unfortunately, disregarding patient feelings and emotions expressed during healthcare visits is not uncommon in medicine^{31,32} Empathic communication is defined as choosing to recognize or explore an emotion either indirectly or directly expressed.³³ Therefore, empathic communication seems uniquely suited for alleviating the emotional burden of chronic pain and contributing to positive health outcomes. A qualitative meta-synthesis found empathic communication, described as identifying and attending to patients’ emotional matters, to be one of eight preferred communication behaviors used by physical therapists in pain management.³⁴ Important aspects of empathic communication identified by studies in the meta-synthesis were listening without judgement coupled with encouragement,³⁵ touch³⁵, and providing support soon after patients’ emotional expression rather than delayed offerings of support.³⁶ This study also identified limited operationalization

of communication behaviors preferred by physical therapists in prior work, highlighting a need for future studies to clearly operationalize preferred communication behaviors.³⁴

Empathic communication is an understudied phenomena in pain management despite evidence supporting its potential to alleviate the psychological and affective burdens associated with chronic pain. This investigation presents the first longitudinal, ecological assessment of the relationship between physical therapists' empathic communication and patient-reported outcomes of physical therapy for the management of chronic musculoskeletal pain. This is one of the few existing studies^{37,38} to longitudinally examine patient-centered communication practices over an episode of physical therapy care for chronic pain. The transactional model of communication asserts that communication is dynamic and co-constructed.³⁹ Therefore, longitudinal research is particularly important for characterizing how communication behaviors may contribute to clinical outcomes of pain rehabilitation as therapeutic relationships evolve over time.

Our primary purpose was to determine if more frequent empathic communication by physical therapists is associated with greater improvements in patient-reported pain intensity and interference across 6 weeks of routine care for chronic musculoskeletal pain. Secondary analyses sought to explore the association of empathic communication with other factors that may facilitate improved clinical outcomes, including physical therapy attendance, exercise adherence, therapeutic alliance, and patient emotional affect.

Methods

Overview of Study Design

A longitudinal observational study of empathic communication was conducted on 31 physical therapist-patient dyads across six weeks of routine physical therapy in an outpatient orthopedic clinic. Participants completed standardized patient-reported outcome measures within 48 hours of attending each of four audio-recorded encounters with their physical therapist approximately every two weeks during six weeks of care for chronic musculoskeletal pain. Empathic responses to emotions raised by patients during

each encounter were manually coded from transcripts. Primary clinical outcomes were pain intensity and pain interference.

Clinical Setting and Participants

Physical therapists and their adult patients with chronic musculoskeletal pain participated in this study. All physical therapists employed at a single physical therapy private practice clinic in Southern California from March 2020 to July 2022 were eligible and invited to participate. This clinic receives an average of 100 new referrals each month for the evaluation of a broad range of musculoskeletal conditions, with over 50% of the case load comprising cervical or lumbar spine diagnoses (spine arthropathies, scoliosis, post op/prehab, sports and occupational injuries). This clinic was selected by convenience as generally representative of private practice outpatient orthopedic clinics providing physical therapy services in the local community. Enrolled physical therapists did not have specialized training in chronic pain management beyond that provided in their professional education program.

Consecutive patients referred to participating physical therapists for a musculoskeletal pain diagnosis during the same study period were screened for eligibility. Patients who met the following inclusion criteria were considered eligible for enrollment: (1) complaint of musculoskeletal pain located in the back, neck, upper, or lower extremities, (2) duration of persistent or recurring pain for 3 months or longer (i.e., chronic pain), (3) new referral to the clinic for the presenting pain condition, and (4) planning to attend 6 or more weeks of physical therapy at the same clinical site. Patients were excluded if the first visit occurred within 3 months of surgery or other injury (i.e., acute or subacute pain), or if the patient reported any of the following: (1) pregnant or lactating, (2) unable to speak or read English, (3) current or previous spine fracture, tumor, infection, or any other major medical conditions affecting the spine or extremities, (4) major medical conditions affecting sensation (e.g., diabetes, cancer, spinal cord injury), (5) major uncontrolled psychiatric disorder (e.g., psychosis, substance use disorder), (6) current litigation or legal claims related to an injury, (7) plans to start or modify treatments other than physical therapy (e.g., medication) during the study enrollment period. This study was approved by the San Diego State University Institutional Review Board, and all participants provided written informed consent prior to enrollment.

Audio Data Collection

Audio recordings were collected at the initial physical therapy examination (Time 1) and subsequent treatment visits approximately once every 2 weeks for up to 6 weeks (Times 2, 3, and 4). Exact time points for data collection varied to accommodate personalized scheduling of physical therapy visits based on staff and patient availability. Physical therapists donned a small unobtrusive audio recording device (Recjoy; 2.63 x 0.83 x 0.33 inch, 1.76oz, 16 GB, 16KHZ Mini Voice Recorder, EVida, San Francisco) to record conversations that occurred during routine clinical care in the absence of a researcher. To minimize observer bias, patients and physical therapists were blinded to the type of communication analyzed in the study—participants were told that communication was being studied, but not specifically emotional expression and empathic communication. Additionally, the longitudinal design is one of the most effective techniques for mitigating the Hawthorne effect as participants habituate to being observed over time.⁴⁰ Prior to each recorded visit, devices were time stamped by study staff and then handed to physical therapists who wore them on a shirt collar. Physical therapists were instructed to turn on the device at the start of each visit and turn off the device during any time spent away from the patient and at the conclusion of the visit. Following recorded visits, devices were returned to a locked box where study staff collected the devices and performed data transfers to a secure server for offline analysis at the end of each week. All audio recordings were processed into verbatim transcribed files through automated transcription using NVivo ("NVivo," 2020, QSR International, Burlington).

Coding Empathic Opportunities and Responses

Seven coders were trained to listen to audio files and independently code the transcripts using Suchman, Markakis, Beckman, Frankel³³ definitions of *empathic opportunities* and *empathic responses*. Patient statements or questions were coded as *empathic opportunities* if they referenced an emotion directly (e.g., "I was feeling hopeless") or indirectly (e.g., "I was just so lost"). Physical therapist statements or questions following *empathic opportunities* were coded as *empathic responses* if they recognized, validated, or explored the emotion raised. Empathic communication was quantified as a ratio of the frequency of *empathic responses* by physical therapists normalized to the frequency of *empathic opportunities* expressed by patients during a given encounter. Scores ranged from 0% (no empathic responses) to 100% (all empathic responses). Sixty-seven percent of audio recordings were independently

coded by at least two raters. Interrater reliability of empathic response coding was excellent (Cohen's kappa = 0.76).⁴¹ Discrepancies between coders were discussed and resolved through consensus in weekly team meetings. Coders were blind to patient-reported outcomes when analyzing transcripts.

Patient-Reported Outcome Measures

Upon enrollment, physical therapists were asked to complete a custom survey containing questions about their sociodemographic characteristics, professional education, clinical experience, preferred treatment approaches, and sources of information for clinical decision-making. Upon enrollment and prior to the initial physical therapy examination, patients were asked to complete a custom survey containing questions about their sociodemographic and clinical characteristics including location of pain and previous experience with physical therapy. Trait anxiety and depressive symptoms were also assessed at baseline using standardized PROMIS-Anxiety and PROMIS-Depression Short Forms 4a version 1.0. These scales measure trait anxiety and depressive symptoms with four items each rated on a 1 (never) to 5 (always) point Likert scale with scores on both scales ranging from 4-20 points; Higher scores indicate higher anxiety or depressive symptoms.⁴² Results were converted into T-scores, a standardized score with a mean of 50 and SD of 10 in the general population. These norm-referenced values allow for accessible interpretation. For example, a PROMIS-Depression score of 60 is one standard deviation worse than the reference population (general U.S. adult population).⁴² PROMIS surveys were administered by phone at the completion of the study for 3 participants who failed to complete these assessments at study enrollment.

Within 48 hours of completing the initial physical therapy examination (Time 1) and each recorded treatment visit (Times 2, 3, and 4), patients were asked to complete a battery of standardized patient-reported outcome measures as described below. Questionnaires were deployed based on patient preference either through REDCap Cloud (Research Electronic Data Capture, nPhase, Inc., Encinitas), or hardcopy paper surveys. Data from paper surveys were administered and entered into REDCap Cloud by research assistants not involved in the coding of audio data.

Primary Outcomes

Brief Pain Inventory (BPI)⁴³ subscale scores for pain intensity and pain interference served as the primary clinical outcomes for this study. The BPI measures least, worst, current, and average pain intensity with 4 items each rated on a 0 (no pain) to 10 (pain as bad as you can imagine) point visual analog scale. Pain interference is assessed on a 0 (does not interfere) to 10 (interferes completely) point scale for items in 7 domains: general activity, mood, walking ability, work, relations with others, sleep, and enjoyment of life. Composite scores for both subscales ranged from 0-10 points with higher scores indicating greater pain intensity or interference. The BPI is a valid and reliable measure for assessing pain intensity and interference in populations with chronic noncancer pain.^{44,45} The minimal clinically important difference (MCID) for patients with chronic pain is 2.1 points for pain intensity and 1.0 point for pain interference.⁴⁶

Secondary Outcomes

Hypothesized mediators of the relationship between empathic communication and clinical outcomes were assessed as secondary outcomes using the following standardized questionnaires:

Exercise adherence was assessed using the Exercise Adherence Rating Scale (EARS)⁴⁷, a valid and reliable 16-item self-report measure to assess patients' adherence to the exercises and activities prescribed to them by their physical therapist. Scores range from 0-64 points where higher scores indicate greater adherence to assigned exercises.

Emotional affect was assessed using the Positive Affect Negative Affect Schedule (PANAS-SF)^{48,49}, a valid and reliable 20-item scale with separate dimensions for positive and negative affect. Scores for each dimension range from 10-50 points where higher scores indicate greater positive and negative emotional affect, respectively.

Therapeutic alliance was assessed using the Kim Alliance Scale (KAS-R)^{50,51}, a valid and reliable 16-item scale with four dimensions (integration, communication, collaboration, and empowerment) to quantify the shared partnership and trust between patients and their providers. The KAS-R assesses patients' perception of their relationship with their provider. Scores range from 16-64 points where higher scores indicate greater therapeutic alliance.

In addition to self-report surveys, physical therapy attendance was measured through review of electronic health records. Attendance was calculated as the number of visits attended divided by the total number of scheduled visits which included visits that were rescheduled or missed by the patient.

Covariates

Female sex and older age are both known risk factors for poorer outcomes of pain management.⁵²⁻⁵⁴ Depression is prevalent among individuals with chronic pain and is also an established predictor of poor clinical outcomes^{21,55}. Therefore, models assessing the relationship between empathic communication and primary clinical outcomes were adjusted for sex, age, and depressive symptoms.

Statistical Analyses

Descriptive statistics were used to characterize the study sample and to describe changes in patient-reported outcomes across a 6-week episode of pain rehabilitation. Independent samples t-tests were conducted to explore sex differences in the frequency of patient-initiated empathic opportunities and physical therapist empathic responses. Primary analyses used repeated-measures, conditional linear mixed-effects models⁵⁶ to determine if physical therapist empathic communication was associated with changes in pain intensity and interference across time. Covariate-adjusted mixed-effects models were created in R using the “lme4”⁵⁷ and “lmerTest”⁵⁸ packages with estimated marginal means computed using the “effects”⁵⁹ package. For all models, the primary independent variable was physical therapist empathic communication, operationalized as the normalized frequency of empathic responses to patient raised emotions. Covariates included age, sex, and depressive symptoms. To determine if the association between physical therapist empathic communication and pain outcomes evolved over time, an empathic communication × time interaction term was added to each model in a subsequent step. Likelihood ratio testing was used to compare two level (patient participant nesting) and three level (patient participants nested within physical therapists crossed with time) nesting as random effects. The models with patient participant nesting performed better, therefore physical therapist assignment was included as a covariate in the models and was found to be non-significant. Lmer models are robust to missing data which are handled by dropping observations for time varying variables in the model (empathic communication, pain intensity, pain interference).

Secondary analyses were conducted to explore associations between physical therapist empathic communication and hypothesized mediators of the primary relationship with pain outcomes, including patient (1) exercise adherence, (2) positive affect, (3) negative affect, (4) therapeutic alliance, and (5) physical therapy attendance. The available sample size was insufficient for planned mediation analyses, therefore, exploratory repeated measures bivariate correlations were conducted in R using the “rmcorr” package.⁶⁰ Correlations were computed for each of these variables paired with empathic communication from all collected time points.

Statistical analyses were performed using R (version 4.2.1; R Foundation for Statistical Computing, Vienna, Austria). All tests were 2-tailed with significance set to $\alpha=0.05$.

Results

Sample Demographics

A total of 45 patient participants enrolled in the study. Participants completing fewer than two assessment time points (N=14) were dropped from the analytic sample. Reasons for drop out were not provided. Demographic and clinical characteristics did not differ for study completers and non-completers ($p>0.05$ for all variables in **Table 2.1**). Patient participants (N=31) were predominantly middle-aged, White, well educated, and married (**Table 2.1**). More than half had previous experience with physical therapy, and 60% of those with previous physical therapy experience had been treated for the same condition they were seeking treatment for upon study enrollment. The majority of the sample presented with chronic lower extremity pain, with fewer patients reporting back, neck, or upper extremity pain. The severity of anxiety and depressive symptoms was low in this cohort. All eight physical therapists who practiced at the clinical site volunteered for study enrollment (**Table 2.2**). Physical therapists ranged in age from 26 to 59 years, with 0 to 35 years of clinical experience. The majority had completed a terminal Doctor of Physical Therapy (DPT) degree. When surveyed about preferred treatment approaches, half reported using manual therapy most often and the majority used physical modalities least often.

Change in Patient-Reported Outcomes during Pain Rehabilitation

Patient-reported outcomes are reported from initial evaluation through all follow up time points (**Table 2.3**). Participants reported low pain intensity and interference at Time 1, with small improvements over time that did not meet established thresholds for clinically meaningful change⁴⁶ on average for the cohort. Participants reported high positive relative to negative affect, with gradual increases in positive mood over time. Therapeutic alliance started and remained high throughout the course of treatment. Patients were moderately adherent to prescribed exercises throughout treatment.

Empathic Opportunities and Responses

Provider-patient encounters examined in this study were drawn from a total collection of 99 audio recorded physical therapy visits (31 initial examination and 68 follow-up visits). Recorded visits averaged 41.1 minutes (SD=18.1 minutes; range 11 to 98 minutes) in duration. Across all recorded visits, a total of 899 empathic opportunities and 603 empathic responses were identified. When a patient initiated an empathic opportunity, physical therapists responded empathically 67.1% of the time (range 0 to 100%). No sex differences were observed in the number of emotions raised (men=27 vs. women=31, $p=0.50$) nor the frequency of empathic responses received (men=61% vs. women=73%, $p=0.09$) by patients. There was also no sex difference in the frequency of empathic responses provided by physical therapists (men=56% vs. women=76%, $p=0.15$).

Association between Empathic Communication and Pain Outcomes

Linear mixed effects models for pain intensity are summarized in **Table 2.4**. Significant main effects were found for patient sex, physical therapist empathic communication, and time. Overall, women reported higher pain intensity (3.6 [95%CI= 2.9, 4.4]) as compared to men (2.3 [95%CI= 1.5, 3.0]; $B = 1.37$ [95%CI=0.30, 2.45], $p = 0.013$). After the initial physical therapy examination (Time 1), participants reported an average pain intensity of 3.3 points (95%CI=2.8, 3.9), which fell to 2.5 points after approximately 6 weeks of pain rehabilitation (Time 4) (95%CI=1.9, 3.10; $B = -0.28$ [95%CI=-0.45, -0.12], $p = 0.001$). More frequent physical therapist empathic communication was associated with an overall lower pain intensity across all time points ($B = -1.29$ [95%CI=0.39, 4.91], $p = 0.007$).

We also observed a significant interaction between empathic communication and time ($B = -0.78$ [95%CI=-1.45, -0.12], $p = 0.022$) indicating that level of empathy produced differential decreases in pain intensity over time. To visualize differences in the reduction of pain intensity ratings across time for different levels of empathic communication, physical therapist empathic communication was divided into quintiles and lower ($\leq 51\%$ empathy) and upper ($\geq 91\%$ empathy) quintiles were plotted as a function of time (**Figure 2.1**). Over a 6-week episode of rehabilitation, pain intensity ratings decreased 0.5 points for patients exposed to relatively low levels of empathic communication compared to a decrease of 1.4 points for those with highly empathic physical therapists.

Linear mixed effects models for pain interference are summarized in **Table 2.5**. Results for pain interference were similar to those for pain intensity, with significant main effects of time and physical therapist empathic communication and a non-significant trend ($p = 0.059$) for the interaction of these variables. In contrast, there was no effect of sex on pain interference ($p = 0.279$). Average pain interference scores were 2.6 points at Time 1 and fell to 1.8 points at Time 4 ($B = -0.25$ [95%CI=-0.43, -0.07], $p = 0.008$). Across the study period, more frequent empathic communication by physical therapists was associated with less pain interference ($B = -1.07$ [95%CI=-2.11, -0.03], $p = 0.044$).

Associations between Empathic Communication and Secondary Outcomes

Significant bivariate correlations between physical therapist empathic communication and other variables hypothesized to impact clinical outcomes are illustrated in **Figure 2.2**. Empathic communication was moderately associated with positive affect ($r_{rm}(46) = 0.48$, 95% CI [0.22, 0.67], $p < .001$) and weakly associated with therapeutic alliance ($r_{rm}(86) = 0.26$, 95% CI [0.054, 0.45], $p = 0.013$). There were no significant associations between empathic communication and exercise adherence, negative affect, or physical therapy attendance.

Discussion

We present the first ecological longitudinal analysis of the relationship between physical therapists' empathic communication and pain rehabilitation outcomes. Our primary findings revealed frequent use of empathic communication by physical therapists when managing patients with chronic musculoskeletal pain.

We found that more frequent empathic communication by physical therapists during a 6-week episode of care was associated with lower patient-reported pain intensity and interference. Additionally, higher levels of empathic communication were associated with a greater rate of decrease in pain intensity over time, even after adjusting for known prognostic factors including age, sex, and depressive symptoms. Finally, empathic communication was associated with higher reports of positive affect and therapeutic alliance among patients with chronic pain.

Prevalence of Empathic Communication Among Physical Therapists

When presented with empathic opportunities by patients, physical therapists responded empathically 67% of the time overall, and all but one physical therapist communicated empathically more than half of the time. Compared to empathic response rates of 22% among oncologists observed using the same coding system⁶¹ as the present study, physical therapists were found to be over three times more empathic in clinical interactions with their patients. While these findings suggest that physical therapists are generally empathic in their responses to patient expressed emotions during pain rehabilitation, there is a need for future studies to investigate environmental and personal factors contributing to differences in the use of empathic communication, both among different health care professions and among individual providers within the same profession. Such studies will aid in developing more effective institutional systems and training programs to facilitate compassionate care by physical therapists and other healthcare professionals.

Empathic Communication and Pain Outcomes

Physical therapist empathic communication is a social behavior with the potential to alleviate emotional distress. Findings from this study confirmed our hypothesis that empathic communication is significantly associated with overall lower pain intensity and interference ratings, supporting a potential role for empathy in managing chronic pain. Importantly, our findings also revealed differential effects of empathic communication on the rate and magnitude of reductions in pain intensity over time. Patients who were engaged in more frequent empathic communication with their physical therapists experienced a larger and more rapid decrease in pain intensity across the study period than those receiving fewer empathic responses. A similar pattern of recovery was observed for pain interference, although this interaction did

not reach significance in the present sample. These findings suggest that although the severity of chronic pain generally decreases over time with rehabilitation, empathic communication may help facilitate recovery for some pain outcomes.

Unexpectedly, the magnitude of improvement in pain intensity and interference observed over 6-weeks of pain rehabilitation in this study failed to meet established thresholds for clinically meaningful change⁴⁶. It is important to note that the study sample was atypical of adults who generally seek clinical intervention for chronic musculoskeletal pain. Risk factors previously associated with chronic musculoskeletal pain include affective and socioeconomic characteristics such as mood disorders, less education, manual occupations, minority race/ethnicity, lower income, and single living status.⁶² Patients in our sample were minimally impaired with low reported pain intensity and interference at the time of their initial physical therapy evaluation. This restricted the range of clinical improvements that could be achieved despite an unusually high prevalence of positive prognostic indicators for recovery in this sample (e.g., positive affect and lack of comorbid mood disorders; educational, marital, and non-minority status).⁶³⁻⁶⁶ Although effect sizes were small, it is notable that our study was able to detect significant main and interaction effects of empathic communication on pain intensity in a nominally impaired sample. It seems plausible that these effects may be even larger in populations more typical of those with chronic pain who are often challenged with high levels of pain severity, mood disorders, and socioeconomic barriers that may benefit from empathic support.

Sex Differences in Empathic Communication

Patients' sex was predictably associated with pain intensity, with women reporting lower overall pain intensity scores than men. Prior studies have shown that chronic musculoskeletal pain conditions are more prevalent in women than men.^{52,54} Additionally, women have reported increased pain sensitivity and greater severity of pain both for chronic pain conditions and during exposure to experimental noxious stimuli as compared to men.^{53,67,68} Interestingly, we found no interactions between sex and empathic communication for pain outcomes in the present study. There were also no sex differences in the number of emotions raised nor the frequency of empathic responses received by patients. Physical therapists of both sexes were equally empathic in their responses to patients despite prior evidence that patients may

perceive female providers to be more empathic than males.⁶⁹ Together these observations suggest that empathic communication is neither more often solicited nor more protective against increased pain intensity for women than men. Importantly, both sexes express their emotions and both may benefit from empathic communication.

Empathic Communication, Positive Affect, and Therapeutic Alliance

We performed an exploratory analysis of variables hypothesized to be potential mediators of the relationship between empathic communication and improved pain outcomes. Strong therapeutic alliance has previously been shown to improve pain outcomes⁷⁰. We hypothesized that therapeutic alliance would be strengthened by physical therapist empathic communication by helping to build trust between patients and their physical therapist. Studies have also shown that better physical therapy attendance is associated with longer treatment duration⁷¹ and greater exercise adherence^{72,73}. Similarly, greater exercise adherence is associated with improved perceptions of rehabilitation effectiveness⁷², improved functional outcomes^{73,74}, and improved pain intensity.⁷⁴ We hypothesized that having emotions heard and validated by physical therapists may make patients more likely to attend their physical therapy visits and adhere to prescribed exercises. Finally, prior research suggests that positive and negative affect are also associated with pain outcomes. For example, higher positive affect was predictive of improved function whereas negative affect was predictive of higher pain interference in a study of postoperative spine pain.⁷⁵

Results from our exploratory analysis indicate that more frequent empathic communication is associated with higher patient-reported positive affect and therapeutic alliance, but not physical therapy attendance, exercise adherence, or negative affect. Patients may have reported higher positive affect and greater therapeutic alliance for treatment sessions in which physical therapists were more empathic because having one's expressed emotions explored and acknowledged is a validating and positive experience that may improve mood and foster the patient-provider relationship. Contrary to expectation, empathic communication was not associated with greater physical therapy attendance. This result may have been confounded by the collection of data during the COVID-19 pandemic when attendance was often influenced more by external factors related to the pandemic (e.g., fear of infection or infecting others, safety concerns with public / high exposure settings, debilitating illness) and less by factors within patients' control

(e.g., forgetting appointment, loss of motivation, prioritizing other commitments). Empathic communication was also unrelated to exercise adherence, suggesting that exercise adherence may be more strongly influenced by internal motivation⁷⁶ than relational influences. Finally, the lack of association between empathic communication and negative affect could have been influenced by relatively low and somewhat homogenous ratings of negative affect in our sample. Although our study was not adequately powered to perform a formal mediation analysis, preliminary findings for positive affect and therapeutic alliance suggest that these variables should be further explored as potential mediators of the relationship between empathic communication and clinical outcomes in future studies.

Limitations and Future Directions

To our knowledge, this is the largest longitudinal investigation of empirically observed communication behaviors in physical therapy practice. However, the manual coding methods used to quantify empathic communication were resource intensive and we therefore limited our analysis to a single physical therapy clinic selected by convenience. This limits the generalizability of our study findings, as the available sample was relatively small and had poor representation from minority groups including non-English speakers and those from lower socio-economic backgrounds who are differentially impacted by pain.⁷⁷⁻⁷⁹ For example, Hispanics/Latinos, many of whom are primarily Spanish-speaking, experience more frequent and severe musculoskeletal pain from work activities⁸⁰⁻⁸² and often receive less treatment for pain from healthcare providers, in part due to communication barriers.⁸³ In studies of pain management, medical students were more empathic when treating white patients compared with black patients.⁸⁴ Clinicians were also less capable of recognizing pain in racially and ethnically diverse patients than their white counterparts.⁸⁵ Future studies should include a greater representation of minority and socioeconomically disadvantaged patients, including non-English speakers to determine (1) if these populations are more or less expressive with their emotions, (2) whether physical therapists are equitably empathic, and (3) whether empathic communication is similarly well received and associated with improved clinical outcomes. Studies should also investigate to what extent findings observed in a single physical therapy practice generalize to other physical therapy and medical settings that may afford less time for providers to interact with patients.

Second, the typical duration for an episode of care for musculoskeletal pain in outpatient physical therapy ranges from 3 to 11 weeks.⁸⁶ While our study explored pain outcomes over 6 weeks of care, many adults with chronic musculoskeletal pain experience persistent, recurrent, or worsening symptoms up to 12 months following an acute episode of pain.^{87,88} Longer duration studies are necessary to determine if and when the relationship between empathic communication and pain severity reaches a plateau. Future research should also investigate the quality, dose, and timing of empathic communication to help optimize recovery. For example, the present study quantified the frequency of empathic communication immediately following a patient's expressed emotion but delayed empathy, repeatedly addressing a concern with empathy, and the quality of those empathic responses could provide valuable information to assist providers when implementing empathic communication as a therapeutic tool.

Finally, it is important to recognize that this was an observational study and the observed associations cannot be interpreted as causal. In our covariate adjusted model, the interaction of physical therapist empathic communication with time together with patient sex explained 27% of the variance in pain intensity ratings, leaving nearly three-quarters of the variance explained by factors not measured in our study. Future studies should evaluate additional factors that could mediate, moderate, or confound the relationship between empathic communication and pain outcomes. Additional variables to consider are cognitive-emotional factors found to influence pain outcomes such as pain beliefs, coping, and self-efficacy.^{68,89,90} Variations in physical therapy treatment approaches are likely to have influenced pain outcomes and may covary with communication styles. Ultimately, to determine causality between empathic communication and pain outcomes, future studies should develop empathic communication interventions for providers and test the efficacy of these interventions in randomized controlled trials.

In conclusion, our findings reveal that physical therapists are empathic when managing patients with chronic pain, more so than previously documented in other healthcare settings where empathy has been investigated. More frequent empathic communication by physical therapists is associated with lower ratings of pain intensity and interference by patients. Higher empathy is also associated with larger and more rapid decreases in pain intensity over time. These findings provide rationale and direction for future

clinical trials to investigate the efficacy of empathic communication skills training for physical therapists who manage patients with chronic pain, an innovative approach to improving conservative pain management.

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REFERENCES

1. Dahlhamer J, Lucas J, Zelaya C, et al. Prevalence of chronic pain and high-impact chronic pain among adults—United States, 2016. *Morbidity and Mortality Weekly Report*. 2018;67(36):1001.
2. Tüzün EH. Quality of life in chronic musculoskeletal pain. *Best practice & research clinical rheumatology*. 2007;21(3):567-579.
3. Crofford LJ. Adverse effects of chronic opioid therapy for chronic musculoskeletal pain. *Nature Reviews Rheumatology*. 2010;6(4):191-197.
4. Simon LS. Relieving pain in America: A blueprint for transforming prevention, care, education, and research. *Journal of pain & palliative care pharmacotherapy*. 2012;26(2):197-198.
5. Gaskin DJ, Richard PJTJoP. The economic costs of pain in the United States. 2012;13(8):715-724.
6. Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. *Bulletin of the world health organization*. 2003;81(9):646-656.
7. Haetzman M, Elliott AM, Smith BH, Hannaford P, Chambers W. Chronic pain and the use of conventional and alternative therapy. *Family practice*. 2003;20(2):147-154.
8. Rainville P, Bao QVH, Chrétien P. Pain-related emotions modulate experimental pain perception and autonomic responses. *Pain*. 2005;118(3):306-318.
9. Fernandez E, Milburn TW. Sensory and affective predictors of overall pain and emotions associated with affective pain. *The Clinical Journal of Pain*. 1994.
10. Fernandez E, Turk DC. The scope and significance of anger in the experience of chronic pain. *Pain*. 1995;61(2):165-175.
11. Okifuji A, Turk DC, Curran SL. Anger in chronic pain: Investigations of anger targets and intensity. *Journal of psychosomatic research*. 1999;47(1):1-12.
12. Keefe FJ, Lumley M, Anderson T, Lynch T, Carson KL. Pain and emotion: new research directions. *Journal of clinical psychology*. 2001;57(4):587-607.
13. Crombez G, Vlaeyen JW, Heuts PH, Lysens R. Pain-related fear is more disabling than pain itself: evidence on the role of pain-related fear in chronic back pain disability. *Pain*. 1999;80(1-2):329-339.
14. Varallo G, Giusti EM, Scarpina F, Cattivelli R, Capodaglio P, Castelnuovo G. The association of kinesiophobia and pain catastrophizing with pain-related disability and pain intensity in obesity and chronic lower-back pain. *Brain Sciences*. 2020;11(1):11.
15. Severeijns R, Vlaeyen JW, van den Hout MA, Weber WE. Pain catastrophizing predicts pain intensity, disability, and psychological distress independent of the level of physical impairment. *The Clinical journal of pain*. 2001;17(2):165-172.
16. Gureje O, Von Korff M, Kola L, et al. The relation between multiple pains and mental disorders: results from the World Mental Health Surveys. *PAIN®*. 2008;135(1-2):82-91.
17. Mak HW, Schneider S. Individual differences in momentary pain-affect coupling and their associations with mental health in patients with chronic pain. *Journal of psychosomatic research*. 2020;138:110227.

18. McWilliams LA, Cox BJ, Enns MW. Mood and anxiety disorders associated with chronic pain: an examination in a nationally representative sample. *Pain*. 2003;106(1-2):127-133.
19. Asmundson GJ, Katz J. Understanding the co-occurrence of anxiety disorders and chronic pain: state-of-the-art. *Depression and anxiety*. 2009;26(10):888-901.
20. Demyttenaere K, Bruffaerts R, Lee S, et al. Mental disorders among persons with chronic back or neck pain: results from the World Mental Health Surveys. *Pain*. 2007;129(3):332-342.
21. Surah A, Baranidharan G, Morley S. Chronic pain and depression. *Continuing Education in Anaesthesia, Critical Care and Pain*. 2014;14(2):85-89.
22. Currie SR, Wang J. More data on major depression as an antecedent risk factor for first onset of chronic back pain. *Psychological medicine*. 2005;35(9):1275-1282.
23. Pinheiro MB, Ferreira ML, Refshauge K, et al. Symptoms of depression and risk of new episodes of low back pain: a systematic review and meta-analysis. *Arthritis care & research*. 2015;67(11):1591-1603.
24. Ohayon MM, Schatzberg AF. Using chronic pain to predict depressive morbidity in the general population. *Archives of general psychiatry*. 2003;60(1):39-47.
25. King BJ, Gilmore-Bykovskiy AL, Roiland RA, Polnaszek BE, Bowers BJ, Kind AJ. The consequences of poor communication during transitions from hospital to skilled nursing facility: a qualitative study. *Journal of the American Geriatrics Society*. 2013;61(7):1095-1102.
26. Keefe FJ, Main CJ, George SZ. Advancing psychologically informed practice for patients with persistent musculoskeletal pain: promise, pitfalls, and solutions. *Physical therapy*. 2018;98(5):398-407.
27. Nielsen M, Keefe FJ, Bennell K, Jull GA. Physical therapist-delivered cognitive-behavioral therapy: a qualitative study of physical therapists' perceptions and experiences. *Physical therapy*. 2014;94(2):197-209.
28. Hall A, Richmond H, Copsey B, et al. Physiotherapist-delivered cognitive-behavioural interventions are effective for low back pain, but can they be replicated in clinical practice? A systematic review. *Disability and rehabilitation*. 2018;40(1):1-9.
29. Afrell M, Rudebeck CE. 'We got the whole story all at once': physiotherapists' use of key questions when meeting patients with long-standing pain. *Scandinavian journal of caring sciences*. 2010;24(2):281-289.
30. Sontag S. *Illness as Metaphor*. New York, NY: Farrar, Straus, Giroux; 1977.
31. Agledahl KM, Gulbrandsen P, Førde R, Wifstad Å. Courteous but not curious: how doctors' politeness masks their existential neglect. A qualitative study of video-recorded patient consultations. *Journal of Medical Ethics*. 2011;37(11):650-654.
32. Levinson W, Gorawara-Bhat R, Lamb J. A study of patient clues and physician responses in primary care and surgical settings. *Jama*. 2000;284(8):1021-1027.
33. Suchman AL, Markakis K, Beckman HB, Frankel R. A model of empathic communication in the medical interview. *Jama*. 1997;277(8):678-682.

34. Chapman CR, Woo NT, Maluf KS. Preferred Communication Strategies Used by Physical Therapists in Chronic Pain Rehabilitation: a Qualitative Systematic Review and Meta-Synthesis. *Physical Therapy*. 2022.
35. Askew R, Kibelstis C, Overbaugh S, Walker S, Nixon-Cave K, Shepard KF. Physical therapists' perception of patients' pain and its affect on management. *Physiotherapy Research International*. 1998;3(1):37-57.
36. Cowell I, O'Sullivan P, O'Sullivan K, Poyton R, McGregor A, Murtagh G. Perceptions of physiotherapists towards the management of non-specific chronic low back pain from a biopsychosocial perspective: a qualitative study. *Musculoskeletal Science and Practice*. 2018;38:113-119.
37. Øien AM, Steihaug S, Iversen S, Råheim M. Communication as negotiation processes in long-term physiotherapy: a qualitative study. *Scandinavian journal of caring sciences*. 2011;25(1):53-61.
38. Schoeb V, Staffoni L, Parry R, Pilnick A. "What do you expect from physiotherapy?": a detailed analysis of goal setting in physiotherapy. *Disability and rehabilitation*. 2014;36(20):1679-1686.
39. Barnlund DC. A transactional model of communication. In: *Communication theory*. Routledge; 2017:47-57.
40. Goodwin MA, Stange KC, Zyzanski SJ, Crabtree BF, Borawski EA, Flocke SA. The Hawthorne effect in direct observation research with physicians and patients. *Journal of evaluation in clinical practice*. 2017;23(6):1322-1328.
41. Cicchetti DV. Methodological commentary the precision of reliability and validity estimates revisited: distinguishing between clinical and statistical significance of sample size requirements. *Journal of Clinical and Experimental Neuropsychology*. 2001;23(5):695-700.
42. Kroenke K, Yu Z, Wu J, Kean J, Monahan PO. Operating characteristics of PROMIS four-item depression and anxiety scales in primary care patients with chronic pain. *Pain Medicine*. 2014;15(11):1892-1901.
43. Cleeland CS, Ryan K. The brief pain inventory. *Pain Research Group*. 1991;20:143-147.
44. de Andrés Ares J, Cruces Prado LM, Canos Verdecho MA, et al. Validation of the short form of the brief pain inventory (BPI-SF) in Spanish patients with non-cancer-related pain. *Pain Practice*. 2015;15(7):643-653.
45. Keller S, Bann CM, Dodd SL, Schein J, Mendoza TR, Cleeland CS. Validity of the brief pain inventory for use in documenting the outcomes of patients with noncancer pain. *The Clinical journal of pain*. 2004;20(5):309-318.
46. Mease PJ, Spaeth M, Clauw DJ, et al. Estimation of minimum clinically important difference for pain in fibromyalgia. *Arthritis care & research*. 2011;63(6):821-826.
47. Newman-Beinart NA, Norton S, Dowling D, et al. The development and initial psychometric evaluation of a measure assessing adherence to prescribed exercise: the Exercise Adherence Rating Scale (EARS). *Physiotherapy*. 2017;103(2):180-185.
48. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*. 1988;54(6):1063.

49. Thompson ER. Development and validation of an internationally reliable short-form of the positive and negative affect schedule (PANAS). *Journal of cross-cultural psychology*. 2007;38(2):227-242.
50. Kim SC, Boren D, Solem SL. The Kim Alliance Scale: development and preliminary testing. *Clinical nursing research*. 2001;10(3):314-331.
51. Kim SC, Kim S, Boren D. The quality of therapeutic alliance between patient and provider predicts general satisfaction. *Military medicine*. 2008;173(1):85-90.
52. Wijnhoven HA, de Vet HC, Picavet HSJ. Explaining sex differences in chronic musculoskeletal pain in a general population. *Pain*. 2006;124(1-2):158-166.
53. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. *British journal of anaesthesia*. 2013;111(1):52-58.
54. Meucci RD, Fassa AG, Faria NMX. Prevalence of chronic low back pain: systematic review. *Revista de saude publica* 2015;49:73.
55. Lerman SF, Rudich Z, Brill S, Shalev H, Shahar G. Longitudinal associations between depression, anxiety, pain, and pain-related disability in chronic pain patients. *Psychosomatic medicine*. 2015;77(3):333-341.
56. McCulloch CE, Searle SR. *Generalized, linear, and mixed models*. John Wiley & Sons; 2004.
57. Bates D, Mächler M, Bolker B, Walker S. Fitting linear mixed-effects models using lme4. *arXiv preprint arXiv:1406.5823*. 2014.
58. Kunzetsova A, Brockhoff P, Christensen R. lmerTest package: tests in linear mixed effect models. *J Stat Softw*. 2017;82:1-26.
59. Fox J, Weisberg S. An {R} companion to applied regression 3rd ed Sage Thousand Oaks. In: CA; 2019.
60. Bakdash JZ, Marusich LR. Repeated measures correlation. *Frontiers in psychology*. 2017;8:456.
61. Pollak KI, Arnold RM, Jeffreys AS, et al. Oncologist communication about emotion during visits with patients with advanced cancer. *Journal of Clinical Oncology*. 2007;25(36):5748-5752.
62. Cimmino MA, Ferrone C, Cutolo M. Epidemiology of chronic musculoskeletal pain. *Best practice & research Clinical rheumatology*. 2011;25(2):173-183.
63. Pincus T, Burton AK, Vogel S, Field AP. A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine*. 2002;27(5):E109-E120.
64. Linton SJ. A review of psychological risk factors in back and neck pain. *Spine*. 2000;25(9):1148-1156.
65. Bair MJ, Robinson RL, Katon W, Kroenke KJAoim. Depression and pain comorbidity: a literature review. 2003;163(20):2433-2445.
66. Abásolo L, Lajas C, León L, et al. Prognostic factors for long-term work disability due to musculoskeletal disorders. *Rheumatology international*. 2012;32(12):3831-3839.

67. Barnabe C, Bessette L, Flanagan C, et al. Sex differences in pain scores and localization in inflammatory arthritis: a systematic review and metaanalysis. *The Journal of Rheumatology*. 2012;39(6):1221-1230.
68. Keefe FJ, Affleck G, France CR, et al. Gender differences in pain, coping, and mood in individuals having osteoarthritic knee pain: a within-day analysis. *Pain*. 2004;110(3):571-577.
69. Howick J, Steinkopf L, Ulyte A, Roberts N, Meissner K. How empathic is your healthcare practitioner? A systematic review and meta-analysis of patient surveys. *BMC Medical Education*. 2017;17(1):1-9.
70. Kinney M, Seider J, Beaty AF, Coughlin K, Dyal M, Clewley D. The impact of therapeutic alliance in physical therapy for chronic musculoskeletal pain: a systematic review of the literature. *Physiotherapy theory and practice*. 2020;36(8):886-898.
71. Alexandre NMC, Nordin M, Hiebert R, Campello M. Predictors of compliance with short-term treatment among patients with back pain. *Revista Panamericana De Salud Pública*. 2002;12(2):86-95.
72. Kolt GS, McEvoy JF. Adherence to rehabilitation in patients with low back pain. *Manual therapy*. 2003;8(2):110-116.
73. Deutscher D, Horn SD, Dickstein R, et al. Associations between treatment processes, patient characteristics, and outcomes in outpatient physical therapy practice. *Arch Phys Med Rehabil*. 90:1349-1363.
74. Hayden JA, Van Tulder MW, Tomlinson G. Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Annals of internal medicine*. 2005;142(9):776-785.
75. Seebach CL, Kirkhart M, Lating JM, et al. Examining the role of positive and negative affect in recovery from spine surgery. *Pain*. 2012;153(3):518-525.
76. McAuley E, Mullen SP, Szabo AN, et al. Self-regulatory processes and exercise adherence in older adults: executive function and self-efficacy effects. *American journal of preventive medicine*. 2011;41(3):284-290.
77. Eze B, Kumar S, Yang Y, Kilcoyne J, Starkweather A, Perry MA. Bias in Musculoskeletal Pain Management and Bias-Targeted Interventions to Improve Pain Outcomes: A Scoping Review. *Orthopaedic Nursing*. 2022;41(2):137-145.
78. Davies KA, Silman AJ, Macfarlane GJ, et al. The association between neighbourhood socio-economic status and the onset of chronic widespread pain: results from the EPIFUND study. *European Journal of Pain*. 2009;13(6):635-640.
79. Dorner TE, Muckenhuber J, Stronegger WJ, Ràsky É, Gustorff B, Freidl W. The impact of socio-economic status on pain and the perception of disability due to pain. *European journal of pain*. 2011;15(1):103-109.
80. Anderson JT, Hunting KL, Welch LS. Injury and employment patterns among Hispanic construction workers. *Journal of Occupational and Environmental Medicine*. 2000:176-186.
81. Hamilton ER, Hale JM, Savinar R. Immigrant legal status and health: legal status disparities in chronic conditions and musculoskeletal pain among Mexican-born farm workers in the United States. *Demography*. 2019;56(1):1-24.

82. Davis KG, Kotowski SE. Understanding the ergonomic risk for musculoskeletal disorders in the United States agricultural sector. *American journal of industrial medicine*. 2007;50(7):501-511.
83. Green CR, Anderson KO, Baker TA, et al. The unequal burden of pain: confronting racial and ethnic disparities in pain. *Pain medicine*. 2003;4(3):277-294.
84. Kaseweter KA, Drwecki BB, Prkachin KM. Racial differences in pain treatment and empathy in a Canadian sample. *Pain Research and Management*. 2012;17(6):381-384.
85. Mende-Siedlecki P, Qu-Lee J, Backer R, Van Bavel JJ. Perceptual contributions to racial bias in pain recognition. *Journal of Experimental Psychology: General*. 2019;148(5):863.
86. Childs JD, Cleland JA, Elliott JM, et al. Neck pain: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *Journal of Orthopaedic & Sports Physical Therapy*. 2008;38(9):A1-A34.
87. Côté P, Cassidy JD, Carroll LJ, Kristman V. The annual incidence and course of neck pain in the general population: a population-based cohort study. *Pain*. 2004;112(3):267-273.
88. Costa LdCM, Maher CG, Hancock MJ, McAuley JH, Herbert RD, Costa LO. The prognosis of acute and persistent low-back pain: a meta-analysis. *Cmaj*. 2012;184(11):E613-E624.
89. Unruh AM. Gender variations in clinical pain experience. *Pain*. 1996;65(2-3):123-167.
90. Keogh E, Herdenfeldt M. Gender, coping and the perception of pain. *Pain*. 2002;97(3):195-201.

Table 2.1 Demographic and Clinical Characteristics of Participants with Chronic Pain stratified by Sex

	Total (N = 31)	Male (n = 16)	Female (n = 15)
Age (years)	51.3 (18.3)	47.0 (19.0)	56.0 (17.0)
Race/Ethnicity			
White	21 (67.7%)	10 (62.5%)	11 (73.3%)
Hispanic/ Latino	4 (12.9%)	2 (12.5%)	2 (13.3%)
Black/ African American	2 (6.5%)	1 (6.2%)	1 (6.7%)
Asian/ Pacific Islander	1 (3.2%)	0 (0.0%)	1 (6.7%)
Not Reported	3 (9.7%)	3 (18.8%)	0 (0.0%)
Education			
Graduate or Professional Degree	10 (32.2%)	3 (18.8%)	7 (46.7%)
Bachelor's Degree	2 (6.5%)	0 (0.0%)	2 (13.3%)
Some College, No Degree	4 (12.9%)	2 (12.4%)	2 (13.3%)
High School Graduate or GED	1 (3.2%)	0 (0.0%)	1 (6.7%)
Not Reported	14 (45.2%)	11 (68.8%)	3 (20.0%)
Marital Status			
Married, Domestic Partnership, or Cohabiting	16 (51.6%)	8 (50.0%)	8 (53.3%)
Single	8 (25.8%)	4 (25.0%)	4 (26.7%)
Divorced or Widowed	4 (12.9%)	1 (6.3%)	3 (20.0%)
Not Reported	3 (9.7%)	3 (18.8%)	0 (0.0%)
Pain Location			
Lower Extremity	12 (38.7%)	8 (50.0%)	4 (26.7%)
Back	7 (22.5%)	1 (6.2%)	6 (40.0%)
Neck	6 (19.4%)	3 (18.8%)	3 (20.0%)
Upper Extremity	6 (19.4%)	4 (25.0%)	2 (13.3%)
Previous Experience with Physical Therapy for any condition			
Yes	10 (32.3%)	6 (37.5%)	4 (26.7%)
No	8 (25.8%)	2 (12.5%)	6 (40.0%)
Not Reported	13 (41.9%)	8 (50.0%)	5 (33.3%)
Previous Experience with Physical Therapy for this condition			
Yes	6 (19.5%)	5 (31.3%)	1 (6.7%)
No	12 (38.6%)	3 (18.8%)	9 (60.0%)
Not Reported	13 (41.9%)	8 (50.0%)	5 (33.3%)
Trait Anxiety (T-score)	49.0 (8.0)	49.0 (8.0)	48.0 (7.4)
Trait Depression (T-score)	47.0 (6.5)	48.1 (7.4)	45.9 (5.3)

Values reported as number (%) or Mean (SD)

Abbreviations: GED=General Education Development test for high school equivalency

Table 2.2 Demographic and Clinical Characteristics of Physical Therapists stratified by Sex

Characteristics	Total (N = 8)	Male (n = 4)	Female (n = 4)
Age (years)	32 (11)	35 (16)	29 (1)
Ethnicity			
White	7 (88%)	3 (75%)	4 (100%)
Hispanic/ Latino	0 (0%)	0 (0%)	0 (0%)
Black/ African American	0 (0.0%)	0 (0%)	0 (0%)
Asian/ Pacific Islander	1 (12%)	1 (25%)	0 (0%)
Highest Professional Degree			
DPT	7 (88%)	3 (75%)	4 (100%)
MOMT	1 (12%)	1 (25%)	0 (0%)
Clinical Experience (years)	6 (12)	10 (17)	2 (1)
MOST informs decisions about treatment			
Clinical experience	3 (38%)	2 (50%)	1 (25%)
Journal articles, research evidence	2 (25%)	1 (25%)	1 (25%)
Professional education	2 (25%)	1 (25%)	1 (25%)
Patient preferences	1 (12%)	0 (0%)	1 (25%)
LEAST informs decisions about treatment			
Patient preferences	2 (25%)	1 (25%)	1 (25%)
Social media or non-peer reviewed internet sources	2 (25%)	0 (0%)	2 (50%)
Undergraduate education	2 (25%)	1 (25%)	1 (25%)
Journal Articles	1 (13%)	1 (25%)	0 (0%)
Seminars/ Conferences	1 (12%)	1 (25%)	0 (0%)
Treatment approaches used MOST often			
Manual therapy	4 (50%)	2 (50%)	2 (50%)
Patient education	3 (38%)	1 (25%)	2 (50%)
Therapeutic exercise	1 (12%)	1 (25%)	0 (0%)
Treatment approaches used LEAST often			
Physical modalities	5 (62%)	2 (50%)	3 (75%)
Motivational interviewing	1 (12%)	1 (25%)	0 (0%)
Patient education	1 (12%)	0 (0%)	1 (25%)
Not reported	1 (12%)	1 (25%)	0 (0%)

Values reported as number (%) or Mean (SD)

DPT, Doctor of Physical Therapy

MOMT, Master of Orthopedic Manual Therapy

Table 2.3 Change in Patient-Reported Outcomes Across a 6-week Episode of Pain Rehabilitation

Patient-Reported Outcome Measure†	Mean*	Time 1	Time 2	Time 3	Time 4
Pain Intensity (BPI; 0-10 points) N	3.0 (1.8)	3.4 (1.7) 31	3.0 (1.6) 30	3.0 (1.8) 24	2.6 (2.2) 20
Pain Interference (BPI; 0-10 points) N	2.2 (1.8)	2.6 (1.8) 31	2.1 (1.5) 30	2.1 (1.8) 24	2.0 (2.1) 20
Exercise Adherence (EARS; 0-64 points) N	43.0 (12.0)	42.0 (14.0) 18	44.0 (10.0) 17	48.0 (12.0) 9	45.0 (12.0) 9
Positive Emotional Affect (PANAS-SF Positive; 10-50 points) N	38.0 (7.0)	36.0 (7.0) 18	38.0 (6.0) 17	39.0 (6.0) 9	40.0 (7.0) 9
Negative Emotional Affect (PANAS-SF Negative; 10-50 points) N	11.1 (2.0)	11.2 (1.8) 18	10.9 (1.4) 17	10.8 (2.0) 9	11.4 (3.3) 9
Therapeutic Alliance (KAS-R; 16-64 points) N	62.0 (2.9)	61.6 (2.7) 28	61.7 (3.5) 28	62.4 (2.6) 19	62.5 (2.3) 19

*Mean score averaged across all timepoints

Values are reported as Mean (SD)

N is reported for the number of participants who completed each outcome at each measurement time point

Time 1 = Initial Physical Therapy examination, Time 2 = 2.1 (SD 1.6) weeks post; Time 3 = 3.9 (SD 1.5) weeks post; Time 4 = 6.5 (SD 2.9) weeks post

†Abbreviations: Brief Pain Inventory (BPI), Positive Affect Negative Affect Schedule (PANAS-SF), Kim Alliance Scale Revised (KAS-R), Exercise Adherence Rating Scale (EARS)

Table 2.4 Linear Mixed Effects Model for Pain Intensity

<i>Independent Variables</i>	Pain Intensity			
	Main Effects Model (N=31)		Interaction Effects Model (N=31)	
	β (95% CI)	<i>p</i>	β (95% CI)	<i>p</i>
Main Effects				
Patient Female Sex	1.37 (0.30, 2.45)	0.013	1.26 (0.21, 2.32)	0.020
Physical Therapist Empathic Communication	-1.29 (-2.23, -0.36)	0.007	1.01 (-1.15, 3.17)	0.354
Time	-0.28 (-0.45, -0.12)	0.001	0.24 (-0.23, 0.71)	0.315
Patient Age	0.02 (-0.01, 0.05)	0.139	0.02 (-0.01, 0.05)	0.108
Patient Depressive Symptoms (Intercept)	-0.00 (-1.10, 1.10)	0.994	-0.02 (-1.09, 1.06)	0.974
Interaction				
Physical Therapist Empathic Communication x Time	--		-0.78 (-1.45, -0.12)	0.022

Main Effects Model Marginal R²: 0.26

Interaction Effects Model Marginal R²: 0.27

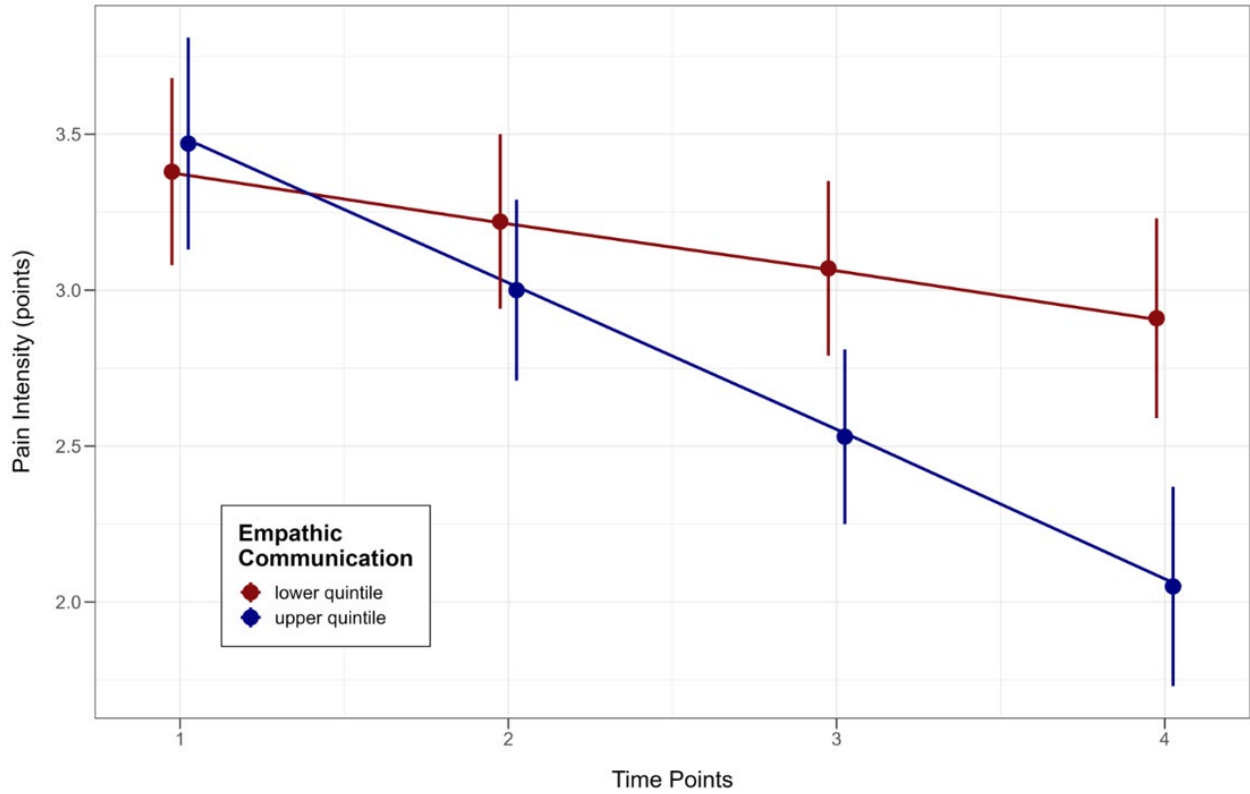


Figure 2.1 Pain Intensity Scores by Physical Therapist Empathic Communication Level Across Time

Pain Intensity is measured using the pain intensity subscale of the Brief Pain Inventory (BPI) within 24 hours of each recorded visit. Higher scores indicate higher pain intensity. Empathic communication is expressed as a percentage of Physical Therapist empathic responses for patient verbally raised emotions in recorded visits. Empathic communication was divided into quintiles with the 25% quintile and 75% quintile expressed in this graph. Standard error (SE) bars are provided for each line of empathic communication.

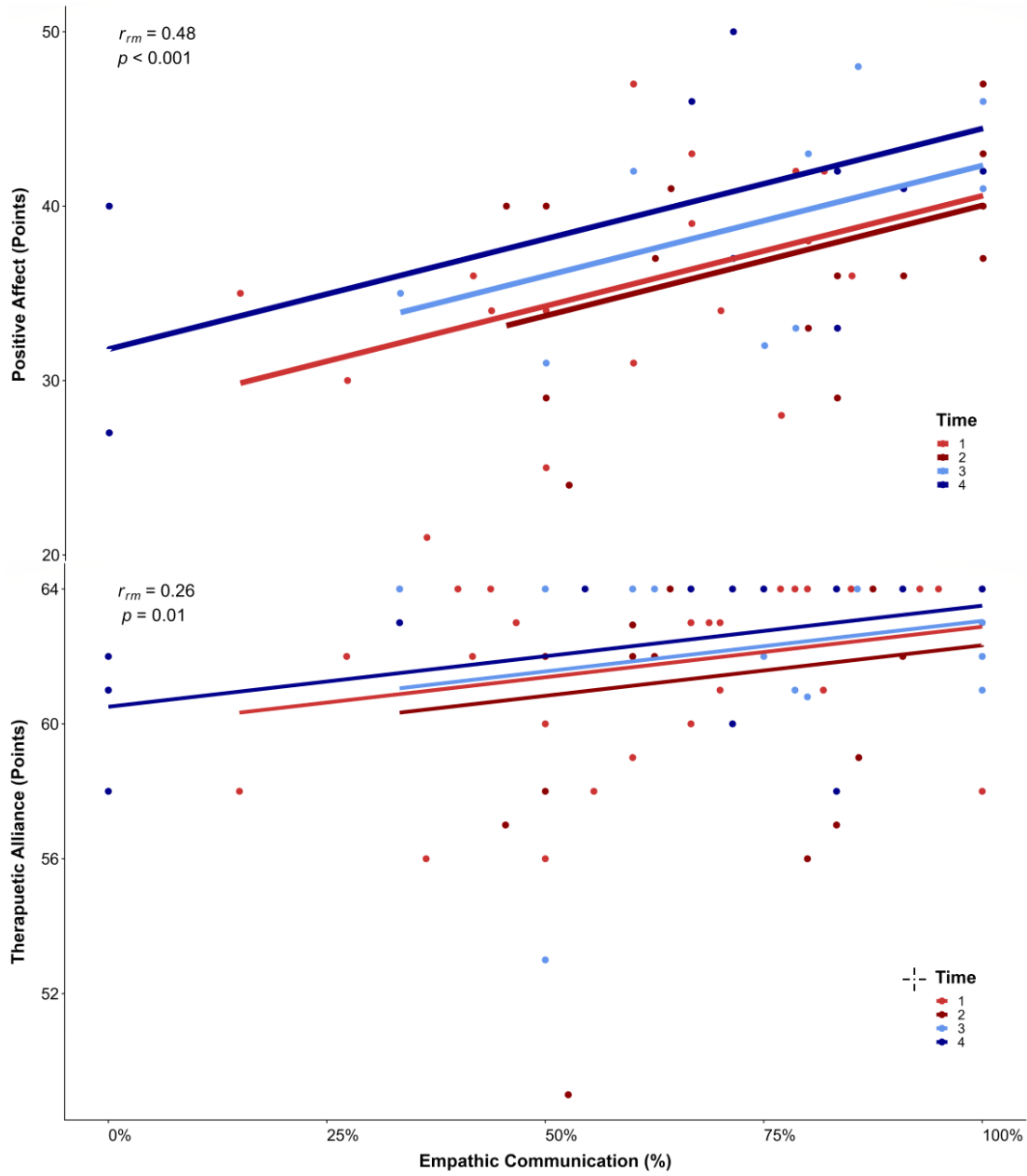
Table 2.5 Linear Mixed Effects Model for Pain Interference

<i>Independent Variables</i>	Pain Interference			
	<i>Main Effects Model (N=31)</i>		<i>Interaction Effects Model (N=31)</i>	
	β (95% CI)	<i>p</i>	β (95% CI)	<i>p</i>
Main Effects				
Physical Therapist Empathic Communication	-1.07 (-2.11, -0.03)	0.044	1.07 (-1.37, 3.51)	0.386
Patient Female Sex	0.67 (-0.55, 1.88)	0.279	0.56 (-0.63, 1.75)	0.350
Time	-0.25 (-0.43, -0.07)	0.008	0.23 (-0.30, 0.76)	0.387
Patient Depressive Symptoms	-0.17 (-1.42, 1.07)	0.782	-0.19 (-1.40, 1.02)	0.761
Patient Age (Intercept)	0.02 (-0.02, 0.05)	0.331	0.02 (-0.02, 0.05)	0.280
	2.55 (-0.01, 5.10)		1.15 (-1.73, 4.02)	0.430
Interaction				
Physical Therapist Empathic Communication x Time	--		-0.72 (-1.48, 0.03)	0.059
Main Effects Model Marginal R ² : 0.10				
Interaction Effects Model Marginal R ² : 0.11				

Figure 2.2 Relationship between Physical Therapist Empathic Communication and Positive Affect (upper panel) and Therapeutic Alliance (lower panel)

The upper panel illustrates the relationship between physical therapist empathic communication and patient positive affect. Empathic communication is expressed as a percentage of Physical Therapist empathic responses for patient verbally raised emotions in recorded visits. Patient positive affect is expressed as a score from 10-50 with higher scores indicating higher positive affect. Participants self-reported their affect over the past week. Affect was measured using the Positive Affect Negative Affect Schedule (PANAS-SF).

The lower panel illustrates the relationship between physical therapist empathic communication and patient-reported therapeutic alliance. Empathic communication is expressed as a percentage of Physical Therapist empathic responses for patient verbally raised emotions in recorded visits. Patient therapeutic alliance is expressed as a score from 16-64 with higher scores indicating higher therapeutic alliance. Participants self-reported their therapeutic alliance from their past encounter with their physical therapist. Therapeutic alliance was measured using the Kim Alliance Scale (KAS-R).



CHAPTER 5: CONCLUSION

Pain is a public health burden that costs the U.S. between \$560-635 billion each year and impacts one-third of Americans.¹ Multiple federal agencies have joined efforts to develop novel and effective solutions for pain management that cross traditional disciplinary boundaries. For the military and veteran population alone, the U.S. Department of Health and Human Services, U.S. Department of Defense (DoD), and the U.S. Department of Veterans Affairs (VA) have developed 12 projects dedicating \$81 million in funding to investigate non-pharmacological approaches to pain management for military personnel.² Amidst the opioid crisis, the NIH has launched initiatives such as the HEAL initiative (Helping to End Addiction Long Term) to investigate and promote behavioral interventions for pain management as an alternative to opioids.³ Physical therapist-delivered empathic communication is a unique non-pharmacological approach to improving quality of care and pain outcomes in adults on with chronic musculoskeletal pain. Empathic communication is an under-researched behavioral intervention that can be utilized across health care disciplines, and as an intervention for pain outcomes, aligns with NIH and other federal initiatives for multimodal and non-pharmacological approaches to pain management.

This dissertation is one of the only interactional studies⁴ to longitudinally examine communication practices over an episode of care for chronic pain. Longitudinal research is particularly important in physical therapy which is characterized by frequent, repeated interactions between patients and providers. The transactional model of communication posits that everyday communication is dynamic and co-constructed, communication can and does change over time and based on relationships.⁵ A physical therapist's communication with their patients will change over time based on cues provided by the patient, treatment progress, and other known and unknown influences. Patient disclosures of emotion that would provide opportunities for physical therapists to respond empathically are also influenced by trust which takes time to build and is associated with improvements in pain outcomes.⁶ Therefore, the longitudinal component of this research is integral and improves accuracy in measuring empathic communication during physical therapy.

In chapter 2, Chapman, Woo, Maluf ⁷ (2022) reveal that preferred communication behaviors for physical therapists, including empathic communication, are poorly operationalized in the extant literature.

In chapter 3, Chapman, Beach, Monroe ⁸ (2023, manuscript in preparation) provide a framework for understanding the social context of empathy and the unique social actions that comprise physical therapist enacted empathy in pain rehabilitation. The three themes identified in this study, which are unique to physical therapy pain management encounters, can be developed into an empathic communication training program or as a communication arm of an existing, effective psychosocial intervention. Audio recorded clinical examples of the language used to convey empathy in response to varying expressions of patient emotion provide a strong evidence base for clinicians to understand *how* to apply empathic communication in practice. Finally, in chapter 4, Chapman, Stone, Monroe ⁹(2023, manuscript in preparation) establish a significant association between empathic communication and pain intensity over time. Our findings reveal that physical therapists responded empathically a majority of the time, more so than previously documented in other healthcare settings where empathy has been investigated. More frequent empathic communication by physical therapists is associated with lower ratings of pain intensity and interference by patients. Higher empathy is also associated with larger and more rapid decreases in pain intensity over time. These findings establish confidence and direction for conducting an RCT to investigate causal relationship of empathic communication on pain intensity.

This dissertation develops the first evidence-based conceptual framework for preferred communication behaviors used by physical therapists in pain rehabilitation through a qualitative systematic review and meta-synthesis. This investigation is also the first to integrate conversation analysis with repeated-measures, conditional linear mixed-effects models to determine if physical therapist empathic communication was associated with changes in pain intensity and interference across time. These two approaches complemented one another's limitations and benefits. This dissertation not only provided the granular detail of *how* empathic communication is enacted but also *measured* empathic communication's frequency and association with pain outcomes and other outcomes consequential to physical therapy and pain rehabilitation. Conversation analysis provided rich, descriptive information about the ways physical therapists provide empathic support in response to patient expressed emotions. The details of *how* to communicate empathically in this setting can equip physical therapists with the knowledge to better address patients displaying emotions like fear, shame, worry, and uncertainty during clinical interactions. Taken

together, these findings reveal that physical therapists frequently and skillfully use empathic communication as an approach to address patient emotions in pain care.

REFERENCES

1. Porter L, Sankar C, Schwentz T. *The IPRCC and the Federal Pain Research Portfolio Analysis*. 2011.
2. Federal agencies partner for military and veteran pain management research [press release]. September 20, 2017 2017.
3. Health. Nlo. HEAL Initiative: What is the NIH HEAL Initiative? <https://www.nih.gov/research-training/medical-research-initiatives/heal-initiative>. Published 2017. Accessed.
4. Schoeb V, Staffoni L, Parry R, Pilnick A. "What do you expect from physiotherapy?": a detailed analysis of goal setting in physiotherapy. *Disability and rehabilitation*. 2014;36(20):1679-1686.
5. Barnlund DC. A transactional model of communication. In: *Communication theory*. Routledge; 2017:47-57.
6. Zimney KJ, Puentedura E, Kolber MJ, Louw A. The relationship between trust and outcomes during physical therapy care for chronic low back pain. *Physiotherapy Theory and Practice*. 2022:1-8.
7. Chapman CR, Woo NT, Maluf KS. Preferred Communication Strategies Used by Physical Therapists in Chronic Pain Rehabilitation: a Qualitative Systematic Review and Meta-Synthesis. *Physical Therapy*. 2022.
8. Chapman CR, Beach WA, Monroe KS. Providing and Withholding Empathic Support during Physical Therapy Management of Chronic Pain. 2023.
9. Chapman CR, Stone MD, Monroe KS. Ecologically Assessed Empathic Communication is Associated with Patient-Reported Outcomes of Pain Rehabilitation. *Manuscript in preparation*. 2023.