Exploring Pain Science Education in the Context of a Healthcare Dyad: What Supports or Hinders Pain Reconceptualisation?

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I, Stian le Roux, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Abstract

Background. Pain Science Education (PSE) has emerged as a useful treatment strategy for a wide range of painful conditions, including persistent musculoskeletal pain (PMP). The interaction between the two members of a healthcare dyad is subject to various contextual elements. It remains unclear which contextual elements within the PSE dyadic interaction help or hinder the recipient's reconceptualisation of pain.

Purpose of the Study. The purpose of the study was to explore and understand participants' experiences of a PSE intervention and elicit perspectives of a PSE dyad relating to elements of their interaction that supported or hindered the reconceptualisation of pain.

Methodology. This study employed a phenomenological research design. Semi-structured interviews were conducted with eight PSE dyads – healthcare providers and people under their care (*n* = 17). An interpretive phenomenological analysis framework was used to analyse and interpret the data. **Summary of Qualitative Findings.** Dyad members had mostly congruent perspectives on elements that supported reconceptualisation, especially a strong therapeutic alliance. Some intra-dyadic incongruencies included recipient pain beliefs, which some PSE recipients believed supported reconceptualisation, while their providers perceived them as a barrier. A common thread that influenced multiple contextual elements, was pain intensity. Pain relief was often identified as a helpful element as it increased trust in the provider and the PSE. Increased pain was an unhelpful element for some PSE recipients, but their PSE providers found that it helped reconceptualisation, considering it a learning opportunity. This was another area where intra-dyadic perspectives were incongruent. A novel insight included the value of experiential PSE, where providers facilitated reflection and discussion of painful sensations and experiences, with the explicit goal of deepening the learning by exploring pain as a sensory-affective experience. Observing other painful conditions was another learning avenue that dyads valued, where observation of other pain presentations could be compared with their own experience to gain a deeper understanding of pain.

Conclusion. Exploring the perspectives of both members of a PSE dyad triangulated the meaning that each member made of the contextual elements that influenced reconceptualisation, drawing out the similarities and differences in their perspectives. PSE dyads valued a range of contextual elements, and dyadic perspectives mostly converged on the theme that PSE is built on a strong therapeutic alliance and a skilled PSE provider. A limitation of this study was that the selection bias was oriented toward participants with positive PSE experiences. This new perspective of elements that influence reconceptualisation may inform PSE implementation and increase its effectiveness.

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List of key terms

Central sensitisation	An increased responsiveness of nociceptive neurons in the central nervous system to their normal or sub-threshold afferent input (den Boer et al., 2019)
CLBP	Chronic Low Back Pain
COPI-A	Concept of Pain Inventory for Adults
IPA	Interpretative Phenomenological Analysis
LMIC	Low- and Middle-Income Country
Nociceptive pain	Pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors (Baliki and Apkarian, 2015)
Nociplastic pain	Pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain (Kosek et al., 2016)
OT	Occupational Therapist
PMP	Persistent Musculoskeletal Pain
PSE	Pain Science Education
PT	Physiotherapist
RCT	Randomised Controlled Trial
SA	South Africa
YLD	Years Lived with Disability

Chapter 1

Introduction

The impact of persistent pain

Pain is one of the most disabling health conditions in the world (Rice et al., 2016) and persistent pain has a major impact on South Africans. Recent evidence suggests that nearly one in five South Africans are living with pain that has lasted longer than three months, i.e. persistent pain (Kamerman et al., 2020). People living with persistent pain often limit their participation in various activities, leading to work and social expectations going unmet and putting strain on their work and family structures (Hartvigsen et al., 2018). There are limited empirical data quantifying the financial burden of persistent pain in South Africa, but in other countries, the direct cost of persistent pain is estimated to resemble that of other prevalent, high-cost diseases like cancer, mental health disorders and cardiovascular disease (Maniadakis and Gray, 2000). The financial burden of pain is therefore not only direct through medical costs to the individual and the healthcare system, but also in indirect cost of loss of work opportunity. Furthermore, the indirect costs of persistent pain are often significantly higher than the direct costs, reportedly up to eight times greater. (Maher et al., 2017, Walker et al., 2003).

The increasing impact of persistent pain in low- and middle-income countries (LMICs) tells a tale of a significant treatment challenge (Rice et al., 2016). The Global Burden of Disease Study (Vos et al., 2015) lists persistent low back pain as the leading cause for years lived with disability (YLD) worldwide, with persistent neck pain placed as the fourth cause of YLD. A large portion of persistent pain is the result of a sensitised nervous system, rather than tissue damage or pathology (Cohen et al., 2021). This understanding of persistent pain necessitates that healthcare systems adapt and broaden their pain management protocols. Current management of low back pain in South African primary healthcare, however, puts most people with persistent pain on care pathways consisting only of medication (Major-Helsloot et al., 2014) which is contrary to current South African clinical guidelines that recommend interdisciplinary management, including psychological and rehabilitation care (Ernstzen et al., 2023).

Pain education and conceptual change

Education serves to empower individuals who seek care for pain, and Pain Science Education (PSE) is a well-established and continually evolving intervention. Various pain management guidelines recommend education as a first-line treatment for pain (Lin et al., 2020, Ernstzen et al., 2023). Previously, education programmes for persistent back pain (“Back School”) focused on biomedical principles like anatomy and pathology, but this had little to no effect on pain and disability (Parreira et al., 2017). The notion that anatomical abnormalities underlie persistent pain has been comprehensively refuted, with the pain phenotype “nociplastic pain” introduced to describe pain that arises due to changes in the nociceptive nervous system, which is believed to be the predominant mechanism that underlies persistent pain (Nijs et al., 2019, Fitzcharles et al., 2021). Pain is a biopsychosocial phenomenon, and PSE is rooted firmly in a biopsychosocial framework and aims to bring about conceptual change in pain beliefs among those experiencing pain (Moseley and Butler, 2015). Pain beliefs have a significant influence on a person’s pain experience and their management outcomes. Pain prompts an individual to behave in a protective manner (toward self-preservation), and the meaning that the person makes of their pain (e.g. cause and perception of pathology) predicts the extent to which they adapt their behaviour (Vlaeyen and Linton, 2012). People who suffer from pain who do not have a clear and comprehensive understanding of the cause of their pain may demonstrate overprotective pain behaviour that can be considered a barrier to recovery. In the long term, this leads to unhealthy behaviour such as avoidance of valued activities like work and life roles, and in turn can make pain persist (Vlaeyen and Linton, 2012). An aim of PSE is, therefore, to facilitate conceptual change in a person’s pain beliefs that breaks this cycle.

Facilitating conceptual change is an intricate process. One commonly held misconception that negatively impacts pain behaviour is that pain equates to tissue damage (Caneiro et al., 2021, Darlow, 2016). In PSE, this misconception is addressed by the clinician explaining how pain can be felt in the absence of tissue damage – typically by referring to the physiology of pain and that it is influenced by psychosocial factors (Moseley and Butler, 2015). Achieving reconceptualisation can influence pain in two ways: first, perceiving pain as less threatening can decrease the sensitivity of the central nervous system which can result in decreased pain (Goffaux et al., 2007, Moseley, 2007, Boothby et al., 1999); second, reconceptualising pain can lead to a change in behaviour that promotes health (Vlaeyen and Linton, 2012, Lepri et al., 2023). In this way, effective PSE guides a person to a concept of pain that is aligned with its biopsychosocial nature and facilitates a return to their valued activities and activities that promote health.

The Efficacy of PSE

PSE has been found to be an effective tool for pain management. Various systematic reviews and meta-analyses have shown that PSE is effective in changing psychological variables that influence pain, like kinesiophobia (the fear of engaging in painful activity or movement), pain catastrophising, and fear avoidance (Romm et al., 2021, Watson et al., 2019, Louw et al., 2016). When combined with active treatments like exercise or physiotherapy, PSE can positively affect outcomes on pain and function (Lepri et al., 2023, Watson et al., 2019).

Although the evidence for PSE is promising, the effect size of PSE varies across studies, raising questions about the depth and nature of reconceptualisation achieved in these participants. Watson et al. (2019) analysed the effect of PSE and found it had low clinical effect on pain in the short-term, with a mean decrease of 3.2 on a 100-point scale (-3.20/100; 95%CI -6.66 to 0.27). PSE decreased pain in the medium-term by a mean of 4.2 points (- 4.22/100; 95%CI -16.44 to 8.01), and disability by a mean of 8.2 points (-8.23/100; 95%CI -15.61 to -0.84). Wood and Hendrick (2019) had similar findings but added that the effect of PSE on disability was greatest when combined with physiotherapy treatment, with a Weighted Mean Difference of 3.94/10 on a 10-point scale (95% CI 3.37; 4.52) when compared to physiotherapy only. Qualitative work by King and colleagues (King et al., 2018, King et al., 2016) explored reconceptualisation, which they measured by comparing participants' language use before and after PSE. They regarded language progression toward an awareness that pain is not proportionate to the degree of tissue damage as evidence of reconceptualisation. Levels of reconceptualisation ranged from 'no reconceptualisation' to 'clear evidence of reconceptualisation', with most participants achieving a moderate degree of reconceptualisation. Varying degrees of reconceptualisation could explain the differences in treatment effects among participants and lead to decreased group-level effect sizes. Ram et al. (2023) found that an increase in pain knowledge alone did not lead to better outcomes and concluded that more research is needed to find out what the ‘active ingredients’ in PSE are. These enquiries into PSE leave us with questions about the true effect size of PSE, and the factors that influence the level of reconceptualisation.

What does PSE involve?

PSE is an educational process that takes place within a dyad consisting of a healthcare provider (i.e., PSE provider) and a person seeking pain care (i.e., PSE recipient). Facilitating the reconceptualisation of pain includes a reflective discussion that relates to pain symptoms, pain beliefs, emotions, behaviour and how the physiology of pain is influenced by these factors (Nijs et al., 2020). This can be done verbally or by using additional material like booklets or videos (Moseley and Butler, 2017). Building on the new understanding of pain, the dyad can revisit the recipient’s treatment, activities, or behaviours that can be approached differently and then collaboratively devise a plan to apply this new pain concept (this can be considered PSE-informed care). Achieving optimal PSE outcomes (changing the person’s concept of pain, their behaviour, and their pain) depends on the success of this dyadic interaction with all its contextual elements.

Contextual elements influence the PSE process and may facilitate or hinder the person seeking pain care’s reconceptualisation of pain and, ultimately, their outcomes. Contextual elements that influence healthcare interactions, pain management, and PSE can be examined within the following domains: (1) Beliefs and characteristics of the PSE recipient, such as pain beliefs and cultural background; (2) Beliefs and characteristics of the PSE provider, including pain beliefs and experiences; (3) The therapeutic relationship between these two members of the dyad e.g. open communication and trust; and (4) External context, such as availability of time and privacy. (Di Blasi et al., 2001, Rossettini et al., 2018, Caneiro et al., 2021).

Rationale of the current research project

The available evidence indicates that PSE serves as a valuable tool for pain management; however, successful implementation of PSE relies on a myriad of factors like the therapeutic alliance, provider competence, and recipient openness (Wijma et al., 2018). The degree of pain reconceptualisation as a result of PSE can vary greatly between individuals (King et al., 2018) and little is known about the underlying reasons for inter-individual differences (Watson et al., 2021). Qualitative data highlight the role of contextual factors in the PSE interaction, with recipients and providers reporting that elements such as open communication and a trusting therapeutic relationship facilitate the PSE process and support reconceptualisation (Wijma et al., 2018, Louw et al., 2017). Yet, it remains unclear whether recipients and providers have congruent perspectives of the influence of contextual elements, and how these elements influence pain reconceptualisation. This thesis, therefore, explores and makes meaning of perceptions of both members of the PSE dyad to gain a deeper understanding of the PSE interaction in the context of real-world implementation and offers a triangulated perspective on the value of specific contextual elements that influence pain reconceptualisation. These findings may be valuable in promoting the effectiveness of PSE as a pain intervention.

Aims and objectives

Aim

The overall aim of this study is to explore and understand participants' experiences of a PSE intervention and elicit perspectives of a PSE dyad on elements of their interaction that supported or hindered the reconceptualisation of pain.

Objectives

1. Using a semi-structured in-depth interview, to explore elements of the PSE that providers perceive to support or hinder pain reconceptualisation. This will include providers' perceptions of their own beliefs and characteristics, the recipient's beliefs and characteristics, therapeutic alliance, and external contexts like setting.

2. Using a semi-structured in-depth interview, to explore elements of the PSE that recipients perceive to support or hinder pain reconceptualisation. This will include their perceptions of their own beliefs and characteristics, the provider's characteristics, therapeutic alliance, and external contexts like setting.

Structure of the thesis

Chapter two reviews the literature on the nature of persistent pain and its impact on individuals and society. It discusses education as a cornerstone of pain management and supports PSE as a preferred educational method for individuals experiencing pain. The chapter then explores PSE as a pain treatment modality, justifying it with a summary of systematic reviews regarding PSE's efficacy in pain management. Furthermore, the review examines various contextual factors influencing pain management and PSE, concluding with an emphasis on the literature gap that this study seeks to address.

Chapter three covers the methodology used to gather and process data on participants' experiences. This includes the reasoning behind the methodological approach, the study design, setting, participants and sampling methods, measures and procedures, data collection, data analysis and ethical considerations.

Chapter four presents the study's results, detailing the participants' demographic information, aspects of the PSE intervention, and themes that illustrate contextual elements considered helpful or hindrances to pain reconceptualisation. These themes are discussed in the order they appeared in the PSE intervention, starting with indirect themes, followed by direct themes that built upon them.

Chapter five provides concluding remarks that illustrate the connection between these findings and existing literature, highlighting themes that provide new insights into the dyadic perspectives of PSE and pain reconceptualisation. Finally, it discusses how these findings could influence PSE implementation.

Chapter 2

Literature review

This literature review will introduce the reader to the literature that supports the rationale for this study. A roadmap for this literature review is as follows: First, the review will discuss the concept of pain and the impact of persistent musculoskeletal pain. The focus will then shift to management options for persistent pain, followed by a discussion of the emergence of PSE as educational and pain management intervention. The evidence base for PSE's efficacy is reviewed, and shortcomings in the research are discussed. The review concludes by exploring the contextual factors that influence PSE and highlight the rationale for this study.

This literature review searched PubMed and Google Scholar for articles relating to Patient education, Pain Education, Pain Science Education (PSE), Pain Neuroscience Education, Therapeutic Neuroscience Education, impact of chronic/persistent pain, treatment of persistent/chronic musculoskeletal pain, the influence of contextual factors in healthcare, contextual effects on pain and analgesia, chronic/persistent pain management in South Africa, and patient experiences in PSE. A screening process of perusing titles and abstracts was initiated and followed by in-depth reading and annotating on full text articles. From there, in-text citations were followed to find other papers in relevant fields of research. This review prioritised the inclusion of papers that focused on psychological, social, or educational aspects of pain management. Papers that had a biomedical or interventional focus were excluded, as well as papers that were not peer reviewed. Although an emphasis was put on recent evidence, older articles were included where relevant. The term "chronic pain" typically refers to pain that persists for three months or longer, often associated with a specific medical condition. In contrast, "persistent pain" is a broader term encompassing any ongoing pain that lasts beyond the usual course of healing, which may not necessarily fit the criteria for chronic pain (Raffaeli et al., 2021). For this thesis, participants will be sourced from populations who report musculoskeletal pain. Persistent musculoskeletal pain can be divided into two categories, namely persistent primary musculoskeletal pain (ongoing pain in joints, muscles, tendons, and bones that is not a consequence of tissue damage and causes significant distress and functional limitation) and persistent secondary musculoskeletal pain (ongoing pain originating from nociception from bone, joint, muscle, tendon, or deep somatic lesions) (Perrot et al., 2019). This review will, therefore, use the term “persistent musculoskeletal pain” (PMP) for musculoskeletal pain lasting beyond three months, regardless of the underlying cause.

Persistent pain

Pain is a biopsychosocial phenomenon. In contrast, the Cartesian model of pain (Descartes, 1972) assumed that the body operates in a machine-like fashion and that pain is a sensation caused by a disturbance in nerve fibres that “pulls a thread” (relays an impulse) to the brain. This was the dominant theory in pain science until Engel (1977) and Loeser (1982), among others, proposed that pain is not a direct measure of tissue damage but that it has contributions from biological, psychological, and social domains. These contributions act to protect the organism from harm by producing an unpleasant sensory and emotional experience (i.e., pain) that motivates protective behaviour. Pain is “*An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage*…” (Raja et al., 2020, p. 17) This sensory and emotional experience is, in other words, a response to an organism’s perception of threat. The perception of threat can be conscious or subconscious, and is informed by biological processes like activation of nociceptors in the peripheral and central nervous system in response to a noxious stimulus (Baliki and Apkarian, 2015). Psychological processes like attention (e.g. vigilance, distraction), cognition (e.g. expectations) and emotion also arise from an assessment of threat and can influence pain by adjusting the sensitivity of the nociceptive nervous system (Goffaux et al., 2007, Moseley and Butler, 2015, Linton and Shaw, 2011). Social learning and observational modelling influence the appraisal of threat and so have been observed to modulate pain by modulating nociceptive activity (Schenk et al., 2017). Pain plays an important and useful role in human function and safety.

Pain that extends beyond the typical time frame of tissue healing, usually 12 weeks, is referred to as chronic or persistent pain (Treede et al., 2015). According to the International Classification of Diseases, 11th edition, persistent pain can be considered a disease in its own right, as it does not necessarily relate to underlying tissue damage or inflammation but is sustained by changes in the peripheral and central nervous systems (Cohen et al., 2021, Treede et al., 2015). In contrast to acute pain, persistent pain usually offers little benefit and can profoundly affect those who experience it.

The Impact of Persistent Musculoskeletal Pain

Persistent musculoskeletal pain (PMP) has a significant impact globally. For instance, in the global burden of disease study (Vos et al., 2015), musculoskeletal pain conditions were three of the top ten leading causes of years lived with disability (YLDs) worldwide, and chronic low back pain (CLBP) and chronic neck pain featured in the top 10 of every country examined. The disability arising from CLBP has increased by 61% since 1990, with the largest increase occurring in low- and middle-income countries (LMICs), possibly due to ageing populations (Hartvigsen et al., 2018, Rice et al., 2016). The financial burden of persistent pain is substantial – it is estimated to be comparable with high-cost diseases like heart disease, cancer, and mental illness (Hartvigsen et al., 2018). The socioeconomic burden of persistent pain is represented mainly (80%) through indirect costs like the cost of work absence, while direct costs (20%) are related to healthcare use and medication (Stubhaug et al., 2024).

In contrast to other countries, the impact of persistent pain in South Africa (SA) has not been reliably measured but is likely to be significant. Available data estimate that one in five South Africans has persistent pain, with a higher prevalence in women and the elderly (Kamerman et al., 2020). One study found that the direct annual cost of *low back pain alone* at five public hospitals in the KwaZulu-Natal province (5 of 38 primary public hospitals in 1 of 9 provinces) was estimated at 5.4 million US$ (approximately R100m). Indirect costs have not been measured in SA, but data from other countries suggest they could be up to eight times the direct cost (Kahere et al., 2022b). In the South African public healthcare system, which services approximately 80% of the population (Mash et al., 2012), low back pain is often not managed according to international evidence-based guidelines, which could contribute to the prevalence (and impact) of persistent pain (Major-Helsloot et al., 2014). The significant impact of PMP highlights a need to develop, implement and refine interventions to prevent and treat it. As such, improving pain management remains a high priority in research and practice.

Managing PMP

Due to the multidimensional nature of PMP, management guidelines recommend that people seeking pain care receive interdisciplinary assessment and management to address all the factors that contribute to pain and disability (Ernstzen et al., 2023). This means that various modalities like pharmacological and psychological approaches should be considered, along with therapeutic interventions that limit the impact of PMP.

Pharmacological Treatment of PMP

PainSA, the South African chapter of the International Association for the Study of Pain, advises that chronic pain be managed in accordance with the recommendations of the American Society of Anaesthesiologists Task Force on Chronic Pain Management and the American Society of Regional Anaesthesia and Pain Medicine (2010) – referred to as the "Task Force" in this chapter. The Task Force recommendation is based on data that includes a wide range of pain types, which have various underlying pain mechanisms. It has a heavy emphasis on conditions like diabetic neuropathy which is classified as neuropathic pain but fails to use a mechanistic framework to separate treatment recommendations in accordance with pain mechanisms. This is important because the effect of medication varies depending on the underlying pain phenotype. This thesis will compare the Task Force recommendation with the review of Nijs (2019) which discusses the efficacy of medication in conditions that feature central sensitisation (a main feature of nociplastic pain, which is the pain type most relevant to this thesis' study population).

The Task Force recommends using a multimodal strategy to manage PMP. The Task Force recommends that anticonvulsants should form part of treatment for patients with neuropathic pain, and that tricyclic antidepressants and serotonin-norepinephrine reuptake inhibitors be used for various chronic pain conditions (but does not specify which conditions). As part of the Task Force's multimodal pain management strategy, they recommend non-steroidal anti-inflammatory medication as well as muscle relaxants, benzodiazepines, and NMDA receptor agonists for chronic pain. Furthermore, they suggest that oral opioids may be utilised for patients with neuropathic or back pain – once more they do not offer a mechanistic guideline for different pain types that may underlie back pain. Even though opioids are suggested by the Task Force, it is widely considered a low-value option because they show small benefits for pain and function in the short to medium term, and these effects become clinically insignificant in the long term (Cohen et al., 2021). The harmful effects of opioids are well documented – they can lead to addiction, overdose, and death (Busse et al., 2018). Another risk to consider is opioid hyperalgesia, where overuse or long-term use of opioids sensitises the nociceptive system, leading to increased pain (Guichard et al., 2022). The Task Force recommendations are vague and do not consider the different mechanisms that underlie PMP.

In contrast to the Task Force, Nijs et al. (2019) recommend an approach that targets specific pain phenotypes, keeping in mind that focusing on long-term outcomes means that some medications, like opioids, are a suboptimal choice. Their recommendation for pharmacological management of persistent pain conditions includes tricyclic compounds, serotonin-norepinephrine reuptake inhibitors, and α2δ ligands that are prescribed on the basis that they may be useful in the presence of central sensitisation, which is a common mechanism underlying persistent pain conditions. In line with this mechanistic approach, recent South African guidelines for chronic pain management advocate for the classification of pain to inform management decisions (Ernstzen et al., 2023), but also acknowledge that mechanism-based classification of pain has limited pragmatism due to the uncertainty relating to pain phenotype identification.

Although pharmacological approaches are a stalwart of PMP management, they have small effects on pain and function and adverse events like opioid hyperalgesia and addiction are important to consider (Nijs et al., 2019). The recommendations above emphasise that to reach optimal outcomes, a multimodal approach to pain management must be implemented and optimised. In the pursuit of refining pain management, this thesis also explores management options in the broader biopsychosocial context.

Psychological and Behavioural Treatment of PMP

Pain is a psychological experience, so it stands to reason that psychological processes play a role in the entire experience, including pain intensity and duration (Caneiro et al., 2021). Psychological processes also mediate a person's behaviour in response to pain, influencing pain persistence and recovery (Linton and Shaw, 2011, Vlaeyen and Linton, 2012). Psychological treatments for pain have been implemented in many contexts and are an important component of pain management. Of the many psychological treatments suggested for chronic pain, Cognitive Behavioural Therapy arguably has the strongest evidence base.

Cognitive Behavioural Therapy (CBT) is a form of psychological therapy that centres on the interplay between thoughts, feelings, and behaviours. It seeks to assist individuals in recognising and confronting negative thought patterns and beliefs, resulting in emotional and behavioural changes (Hanscom et al., 2015). In this way, CBT promotes healthier coping strategies and improves mental well-being. Since its origins in the 1950s, there have been three waves of CBT. First-wave behavioural therapy approaches had no specific protocol but are considered a set of techniques implemented at the therapist's discretion. These techniques focused on operant behavioural approaches that aim to modify maladaptive behaviours through learning principles (McCracken et al., 2022). The second wave introduced a cognitive element, exploring how thoughts influence emotions and behaviours. Approaches here focus on identifying and challenging cognitive distortions, by implementing cognitive restructuring and problem-solving therapy. Third-wave CBT is an eclectic approach, where traditional CBT is combined with techniques that calm the nervous system to help the participant apply cognitive appraisal to their thoughts and focuses on strategies of emotional regulation and behavioural activation toward engagement with meaningful activities. This wave has led to mindfulness and acceptance-based approaches to therapy. Approaches like Acceptance and Commitment Therapy (ACT) emphasise the importance of psychological flexibility, present-moment awareness, and accepting rather than avoiding difficult thoughts and feelings (Williams et al., 2020, McCracken et al., 2022)

Traditional CBT offers benefits for a range of conditions. CBT has positive effects on pain, disability, fear, and distress in the short to medium term, but effect sizes are small compared to active controls that aim to change pain-related behaviour, such as physical therapy or education (Williams et al., 2020). Reducing fear and distress is a focus for a variety of treatments targeting chronic pain, and CBT uses exposure-based protocols that target feared movements and activities in conditions such as PMP (Meulders, 2020). Even though these treatments primarily aim to reduce functional disability, they may play a role in pain reduction if one considers that the brain modulates pain depending on the brain's perception of threat, i.e., fear (Butler and Moseley, 2003). In the context of exposure therapy for pain, expectancy violation is key because it leads to decreased exposure-related fear (Craske et al., 2018). Challenges in exposure-related treatments are high drop-out rates, likely due to the fact the treatment rationale is hard for people in pain to accept (Vlaeyen and Morley, 2005). This difficulty for participants to accept the treatment rationale may be an indicator that the educational component of these interventions was ineffective in facilitating a conceptual shift in the understanding of the problem and how it can be addressed.

Cognitive Functional Therapy (CFT) is a promising offshoot of CBT that integrates educational and graded exposure principles. The CFT intervention consists of three components, starting with "making sense of pain" (pain science education). Implementing the education component first is important, as it addresses the rationale for the intervention. The second component that is introduced, is "Exposure with control", which is based on the principles of graded exposure therapy and exposes the participant to feared activities in a step-wise manner. Graded exposure breaks the exposure process down into manageable steps, allowing patients to gradually increase their engagement with feared activities or movements and is often guided by the individual's readiness to confront an activity (O'Sullivan et al., 2018). The third component of CFT is lifestyle change, addressing, among other things, physical activity levels, sleep, and stress management. A recent large randomised controlled trial of CFT in people with chronic low back pain (CLBP) showed significant decreases in pain and activity limitations that were maintained at 1-year follow-up (Kent et al., 2023).

Implementing psychological strategies for pain care in SA has many challenges, namely identifying distress, appropriate referral, and access to resources. As mentioned previously, it has been reported that the majority of people with CLBP presenting to clinics in the greater Cape Town area received medication alone and that the presence of psychological distress did not prompt their healthcare providers to include other interventions (like physiotherapy or psychology) as part of their care (Major-Helsloot et al., 2014). More recently, a psychologically informed approach has been integrated into specific long-term programmes for the management of PMP and painful osteoarthritis (Kruger-Jakins et al., 2016, Saw et al., 2016). Implementing psychologically informed pain care on a broader scale has, however, not been successful as pain management is predominantly still managed with pharmacological approaches with little or no input from rehabilitation disciplines (Prempeh et al., 2020, Ahenkorah et al., 2019). Access to mental healthcare in SA is sparse, with fewer than 10% of people with mental conditions receiving the care they need. This is due to a scarcity of mental health and allied health professionals (especially in primary healthcare) (Sorsdahl et al., 2023, Narain and Mathye, 2023). Resource allocation in primary care is another challenge, with only 14% of mental health resources allocated to outpatient care, where people suffering from PMP are most likely to present.

A sufficient understanding of one's condition, treatment, and prognosis is critical to managing any health condition, and pain is no different. A biomedical model of pain prompted healthcare providers to educate individuals with pain about anatomy, pathology, and lifestyle adaptations that address these. A shift to a new pain paradigm, which states that pain is multifactorial and fits within a different, biopsychosocial framework, requires introducing and implementing a new model for pain education.

Pain Science Education

Education has been a mainstay of pain management for many years and has taken many different forms. It is widely recommended that first-line pain management includes patient education (Lin et al., 2020). Traditional education focuses on diagnosis, prognosis and treatment, and most guidelines recommend that clinicians offer information according to the needs of the people seeking pain care (Lin et al., 2020). Educating people with PMP about their condition, prognosis, and treatment may improve various outcomes, including self-efficacy, quality of life, and self-management (Joypaul et al., 2019).

As the implementation of the biopsychosocial model of pain has evolved, so has patient education. In the early 2000s, Moseley and Butler (2015) noticed that CBT management of persistent pain aimed to help the person seeking pain care cope better despite their pain and made no overt attempt to improve their pain. This approach was implicitly rooted in the Cartesian model of pain (also called the biomedical model) and assumed that a psychological intervention cannot directly influence pain. The biopsychosocial model of pain, however, takes the position that pain is affected by thoughts, beliefs and emotions and can be influenced by a change in one or more of these domains. Moseley et al. (2004) – amongst others – started to explore pain education as an intervention that influences pain. To do this, they developed an educational strategy aimed at facilitating reconceptualisation of pain in those who had pain beliefs that were considered unhelpful (Fordyce, 1995).

Pain beliefs influence pain in various ways. Surveys of the general population show that most people believe that back pain is due to underlying tissue damage (Darlow, 2016). This may explain why a survey in New Zealand reported that 59% of respondents believed that painful movements should be avoided in the future and a significant number believed that bedrest is necessary if someone has back pain. These beliefs, rooted in the biomedical model of pain, are common in those with PMP (Caneiro et al., 2021). Unhelpful pain beliefs predict incidences of future pain and predict the severity of disability over time (Alyousef et al., 2018, Martinez-Calderon et al., 2018, Jay et al., 2018, Elfering et al., 2015). Beliefs are modifiable and are therefore a logical treatment target.

Changing pain beliefs can change the physiology of pain. Pain is a protective response to threat (Moseley and Butler, 2017). A person’s belief that pain is a sign of damage or pathology can increase the threat value attributed to pain, which in turn may exacerbate the pain. This is at least partly mediated by descending pathways in the central nervous system that are responsive to psychological processes like fear and anxiety (Van Oosterwijck et al., 2013, Goffaux et al., 2007) and can modulate ascending neural signals. Pain education that facilitates conceptual change about the meaning of pain (that pain is not a sign of tissue damage) may, therefore, be effective in decreasing pain in those with unhelpful beliefs (who tend to attribute a high threat value to pain, leading to rumination, magnification, or a fear of painful movement). Van Oosterwijck et al. (2013) found that people with fibromyalgia (a painful condition typified by altered descending inhibitory control leading to hypersensitivity of the nociceptive system) showed greater inhibition of nociception after PSE intervention than a control group. The PSE group also had significantly greater improvements in pain, vitality, mental health, general health perception, and physical functioning. These outcomes support the notion that PSE changes pain in the short term.

In addition to its potential to produce short-term changes in pain, PSE can facilitate behaviour change that has lasting benefits. Short-term avoidance of selected movements may be helpful if the pain is due to tissue damage (nociceptive pain), as rest allows injured tissue to heal. The Fear Avoidance Belief Model (Vlaeyen and Linton, 2012) suggests that avoidance is not helpful if a person has pain in the absence of tissue damage (nociplastic pain). People with PMP and high levels of fear report an underlying uncertainty about the nature of the pain (intensity, controllability) as well as the diagnostic uncertainty arising from a failed search for a structural cause of their pain (Bunzli et al., 2015). Pain-related fear (including kinesiophobia and pain-related catastrophising) can lead to long-term avoidance behaviour and has a strong association with poor functional and pain outcomes (Hanscom et al., 2015, Zale et al., 2013). Long-term avoidance of physical activities can lead to deconditioning of the affected body part. Avoidance of functional tasks decreases participation in valued activities like social interaction and work-related tasks and has been associated with depression, anxiety and disability (Rogers and Farris, 2022), which in turn can influence pain (Linton and Shaw, 2011). PSE aims to break the cycle of unhelpful beliefs underlying pain-related fear and so decreases avoidance and the negative consequences it has on a person’s physical health, psychological well-being, pain, and function.

A review of PSE literature

The following section details a review of PSE literature, consists of systematic reviews of the efficacy of PSE for PMP and is organised according to each of the common variables that have been studied. These include pain reduction, disability improvement, effect on fear-avoidance and kinesiophobia, pain catastrophising, healthcare utilisation, and knowledge change.

Pain Reduction

PSE has been shown to significantly reduce pain in various populations. Louw et al. (2016) conducted a systematic review of randomised controlled trials (RCTs) focusing on PSE for PMP and found strong evidence supporting its effectiveness in pain reduction for a wide range of painful conditions. Although many of the studies they analysed had limitations, such as varied delivery methods and the combination of PSE with other interventions, the authors reported significant pain reduction outcomes, especially when PSE was integrated with physical interventions. Similarly, Tegner et al. (2018) identified small to moderate effects on pain intensity in patients with chronic low back pain (CLBP), with sustained improvements observed three months post-intervention. Wood and Hendrick (2019) confirmed these findings, demonstrating that PSE, especially when combined with physiotherapy, resulted in statistically significant reductions in pain intensity.

Disability Improvement

Watson et al. (2019) reported that PSE effectively reduced disability in the short to medium term, although the effects were small and did not meet the minimum clinically important difference threshold. PSE is effective in improving disability associated with pain conditions. Louw et al. (2016) noted that PSE significantly reduced disability alongside pain when combined with other modalities. Wood and Hendrick (2019) also highlighted that, while PSE alone had small positive effects on disability, combining it with physiotherapy led to more substantial improvements in both the short and medium term.

Fear-Avoidance and Kinesiophobia

Another outcome for which PSE demonstrates efficacy is in reducing fear-avoidance behaviours and kinesiophobia. Watson et al. (2019) found that PSE produced clinically significant improvements in kinesiophobia in the short term, while Romm et al. (2021) reported that PSE contributed to a decrease in kinesiophobia when it was part of a pain management programme. The studies suggest that PSE may help patients manage fear associated with movement and pain, thereby improving their overall function and well-being.

Pain Catastrophising

PSE has been shown to lower levels of pain catastrophising. Watson et al. (2019) reported that pain catastrophising scores decreased in the medium-term following PSE interventions, indicating that individuals might need time to apply their learned skills to their daily experiences. This aligns with Moseley and Butler’s perspective that PSE should not only involve learning about pain science, but also applying this knowledge to life circumstances (Moseley and Butler, 2017). Romm et al. (2021) also confirmed the effectiveness of PSE in reducing pain catastrophising in the short term, highlighting its potential role in altering negative pain perceptions.

Healthcare Utilisation

PSE appears to decrease healthcare utilisation, contributing to decreased healthcare costs. Louw et al. (2016) observed that studies with long-term follow-up demonstrated favourable outcomes in health utilization after PSE interventions. This suggests that effective PSE may lead to a reduction in the demand for healthcare services, thereby alleviating the burden on healthcare systems.

Knowledge Change

While PSE aims to increase pain knowledge, its direct impact on knowledge change has rarely been assessed. Louw et al. (2016) noted that only a few studies measured changes in pain knowledge post-intervention. In their review, Watson et al. (2019) also highlighted the scarcity of research on reconceptualisation of pain, indicating that while knowledge may change, the translation of this knowledge into meaningful behaviour change is crucial to optimise pain outcomes.

Active Ingredients in PSE

The identification of the "active ingredients" in PSE is essential if we wish to increase its efficacy. Ram et al. (2023) concluded that merely acquiring new knowledge does not guarantee improvements in pain or function, emphasising the need to pinpoint what truly drives positive outcomes in PSE. This highlights a critical gap in research, suggesting that further exploration is needed to understand the mechanisms through which PSE exerts its effects on patients.

Conclusion of reviews

PSE demonstrates usefulness in managing PMP because it decreases kinesiophobia, pain catastrophising, fear-avoidance and healthcare utilisation. It is also effective in increasing function and decreasing pain when combined with other active treatments. The reported effects are mostly small, but this may be due to methodological challenges, especially heterogeneity of PSE delivery and patient populations. Where patient populations were most homogenous, PSE had more significant effects (Wood and Hendrick, 2019, Tegner et al., 2018). This implies that some populations benefit more from PSE than others and underscores a need to understand the details around which populations may benefit most. This need was identified by PSE providers when reflecting on the practicalities of PSE implementation and they agree that tailoring PSE to the individual must be a key focus in translating PSE research into clinical practice (Louw et al., 2017). Uncertainty remains about the interpretation of review findings, because reconceptualisation was rarely measured. PSE has an initial goal of achieving the reconceptualisation of pain from a sign of tissue damage to a protective mechanism influenced by many factors. This knowledge can decrease the threat value of pain and provide reassurance, leading to changes in pain and function, amongst other variables. The first goal of PSE is to achieve reconceptualisation. One cannot determine efficacy in relation to the secondary goals (e.g. pain relief, disability) if one is not certain that the primary goal – reconceptualisation – has been achieved.

Qualitative investigation of PSE

The inclusion of papers that were qualitative in nature provided rich insights into the experiences of especially PSE recipients and highlighted a lack of literature exploring PSE deliverer perspectives. The work of King et al. (2016) highlights the incomplete nature of pain reconceptualisation after two hours of in-depth PSE, noting that prior beliefs were still present even when participants understood new concepts. King et al. (2018) had similar findings but also added that beliefs about personal relevance, and perceptions of perceived benefit of PNE influenced the reconceptualisation process. In a survey study, (Louw et al., 2017)explored PSE implementation from a provider perspective, finding contradictory perspectives on patient characteristics associated with the failure or success of PSE. Clinical factors predicting success had more agreement among providers, with time availability, effective communication, and trust noted as aiding success. Prior beliefs and the influence of other healthcare providers were, among others, noted as predictors of failure. Oosterhof et al. (2014) Interviewed people who received pain care and providers after completing a pain rehabilitation programme and noted that reaching a shared understanding of pain was associated with better outcomes. They stress the importance of the interaction that takes place in the rehabilitation setting and note that better interactions that include a patient-centred attitude and open communication, are factors that may facilitate better outcomes. These qualitative studies offer insight into different perspectives, but only give superficial insight into the implementation of PSE. The lack of insight into providers' perspectives hinders one from drawing conclusions about the similarities and differences between provider and recipient perspectives of PSE.

How PSE is conducted

PSE is an educational process between a provider and recipient. This thesis acknowledges and shares the important concern that this terminology (‘provider’; ‘recipient’) obscures the interactive, mutually contributory nature of a PSE interaction and asks the reader to bear that in mind when reading this discussion.

The *content* of PSE can is the information provided to the recipient to facilitate their reconceptualisation of pain. This content typically involves a description of neurophysiological concepts like nociception, synapses, action potentials, spinal neurons, peripheral sensitisation, central sensitisation, plasticity of the nervous system and psychosocial factors that contribute to pain (Louw et al., 2016). Although the concepts are technical, people seeking pain care often retain more information than clinicians anticipate (Moseley, 2003), especially when providers simplify terminology e.g. Moseley and Butler (2017) call nociceptors “danger sensors” or use metaphors (Moseley, 2007). There is no specific curriculum that must be provided to all recipients. PSE literature encourages clinicians to deliver specific content according to each recipient’s needs (Moseley and Butler, 2017). Tailoring content to the individual seems to be important because some recipients of PSE in group settings have reported feeling that the PSE content was not relevant to them – making them less willing to engage in the PSE (King et al., 2016). Leake et al. (2021) asked people who had positive experiences with PSE what information about pain they had found most useful, and three themes emerged: 1. Pain does not correlate with tissue damage; 2. Psychosocial experiences affect pain; and 3. The nervous system (and therefore pain) can change. This could be the minimum amount of information needed to facilitate conceptual change, and so to simplify the PSE process. Mardon et al. (2024) interviewed participants who had derived benefit from PSE to understand the concepts they had found most useful and why they valued them. The most valued concepts lined up with those identified by Leake et al. (2021) as participants regarded them to be validating, reassuring, and empowering.

The method of PSE is the method used by the provider to facilitate conceptual change in the recipient. PSE has been delivered in various ways including one-on-one consultations, group sessions, video recordings, and booklets (Louw et al., 2016). Recognising that conceptual change is a dynamic process, PSE is most often conducted on a one-to-one basis, which facilitates discussion and questions that enable the provider to customise the information to suit the recipient’s needs (Moseley and Butler, 2017). In successful conceptual change, a learner receives and considers a message, engages with the message, and finally understands and commits to a new concept – this engagement with the message is influenced by many other factors like affective behaviour, emotion, extant knowledge and social/cultural beliefs (Nadelson et al., 2018).

The proof that reconceptualisation has occurred is when lasting behavioural change is observed, which may require a provider to include practical application of pain science into the PSE curriculum. Rehearsing new behaviour that is coherent with the new concepts reinforces the new conceptual model of pain and increases the likelihood of attaining long-lasting benefits. The process of reconceptualising pain requires the recipient to receive and consider information about pain that may conflict with their current understanding and/ or beliefs. They need to engage with this message to discern whether it is applicable to them and, when they understand it, they must commit to this new paradigm by changing their behaviour i.e. be willing to do activities that they avoided in the past. This is a delicate process that can be a challenge to fully put into practice. Figure 1 illustrates dynamic engagement with a new concept (in this case the PSE recipient's engagement with new pain concepts) and details the critical role of the provider in each step. This figure is based on the Dynamic Model of Conceptual Change (Nadelson et al., 2018), which describes the process of conceptual stage as first receiving a message, then considering and engaging with the message, understanding the new concept, and committing to the concept. This thesis aims to translate this process to the PSE and reconceptualisation and adds 'lasting behavioural change' as the ideal endpoint of conceptual change.

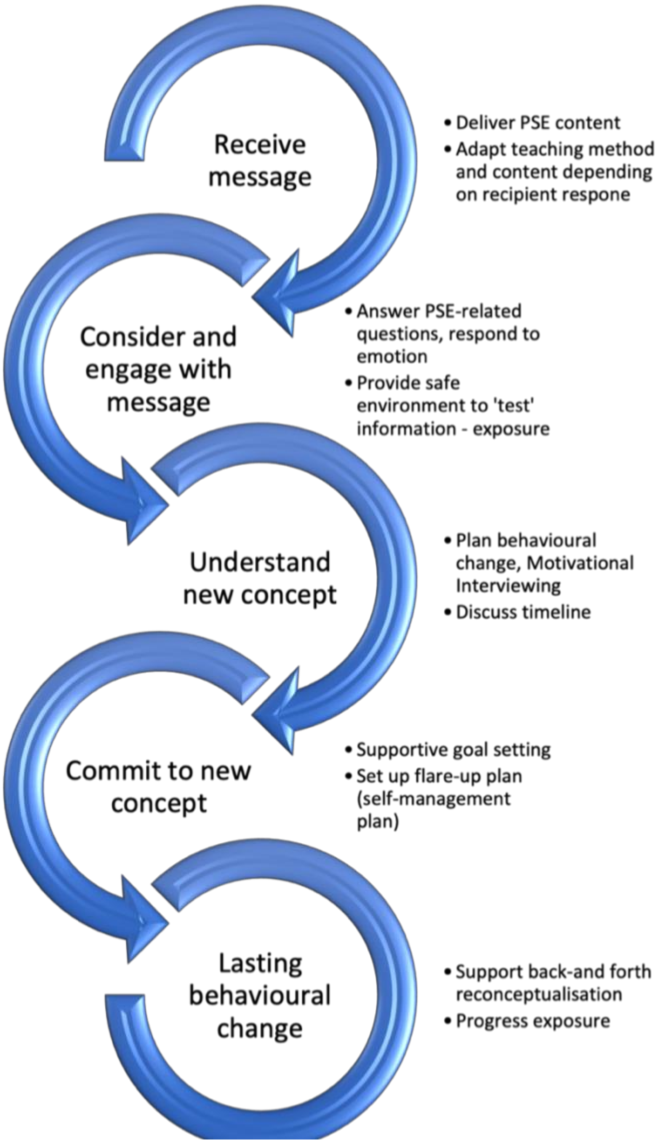


Figure 1 *The role of the PSE provider in PSE conceptual change, based on The Dynamic Model of Conceptual Change*

(Figure adapted from NADELSON, L. S., HEDDY, B. C., JONES, S., TAASOOBSHIRAZI, G. & JOHNSON, M. 2018. Conceptual change in science teaching and learning: Introducing the dynamic model of conceptual change. *International Journal of Educational Psychology,* 7**,** 151-195)

Facilitating reconceptualisation requires a skilled provider who can combine PSE content and process in a flexible manner. In order to achieve this, Moseley and Butler (2017) describe eleven competencies for PSE providers. These include having a deep knowledge of the biopsychosocial model of pain, being able to apply that knowledge in assessment and educational contexts and being able to teach others how to put this biopsychosocial model into action. The in-person nature of PSE requires the provider to skilfully elicit the recipient's pain beliefs and address them appropriately. People seeking pain care may or may not be open to new information about pain depending on their readiness to change (DiClemente and Velasquez, 2002). Motivational interviewing, a communication style used to facilitate behaviour change, has been suggested (but not yet tested) as complementary to PSE (Nijs et al., 2020) and could facilitate conversations that confront a person's pain beliefs and facilitate behavioural change. Included in the core competencies needed to facilitate effective reconceptualisation is that the provider should distinguish between declarative and functional knowledge (Moseley and Butler, 2017). This discerning between a patient 'knowing' and a patient 'doing' may be critical in the PSE process and a key element in assessing reconceptualisation. In this light, it is no surprise that combining PSE with active treatments improves its efficacy (Wood and Hendrick, 2019).

These active treatments vary in the literature but may be seen as a continuation of learning in a practical sense. They support a coming together of content and process, where education extends into action. This exposure can take many forms and depends on the needs of the recipient as well as the skill set of the provider. The chosen exposure-related activity should ideally bring the recipient closer to the goals they most value and prioritise (Kent et al., 2023). Reinforcement of PSE concepts within social domains may also be beneficial – especially in healthcare systems and family (Nijs and Meeus, 2016, Chalmers and Madden, 2019). A skilled healthcare provider may choose to facilitate this social engagement in pain reconceptualisation by including family members or carers in the PSE process. Effective delivery of the information is critical to facilitate the challenging process of considering and accepting new concepts that conflict with pre-existing beliefs.

In South Africa, PSE has been implemented successfully in certain contexts. Even though PSE was developed and studied mostly in Australia, The United States of America, and Europe (Watson et al., 2019), it has been implemented successfully in SA as one part of biopsychosocial intervention programmes for chronic pain and osteoarthritis (Kruger-Jakins et al., 2016, Saw et al., 2016, Ernstzen et al., 2022). Although it is not possible to single out the effect PSE had on the success of these programmes, participants with OA had significantly greater improvements in pain and function scores than participants in usual care. Participants in a comparable online intervention for chronic pain reported that they were satisfied with the intervention they received (Ernstzen et al., 2022). Implementing PSE is an attractive option for a healthcare system with limited resources because it is cost-effective and may lead to lower long-term healthcare utilisation when compared to control groups (Louw et al., 2016).

Implementing PSE in South Africa faces several challenges, especially concerning communication. In SA, people with persistent pain report various obstacles to accessing optimal healthcare, including communication barriers and misconceptions about causality (Kahere et al., 2022a). South African clinicians also face communication barriers that hinder establishing rapport, gathering accurate medical histories, and interpreting cues (Van den Berg, 2016). In the midst of these communication challenges, the PSE provider must communicate information in a way that the recipient understands and connects with their own pain experience. Effective communication is one of many contextual elements to consider if PSE is to become a useful tool in pain management in SA.

Contextual elements in pain management and PSE

The therapeutic effect of contextual elements in pain management is significant. The magnitude of pain relief attributed to contextual elements has been reported to be as high as 75% in osteoarthritis (Zou et al., 2016), 45% in fibromyalgia (Häuser et al., 2011) and up to 81% when people receive manual therapy (Menke, 2014). Identifying specific contextual elements that influence pain management is challenging, but they typically belong to five key domains (Di Blasi et al., 2001): Patient beliefs and characteristics (prior experiences, expectations, beliefs), practitioner beliefs and characteristics (empathy, pain beliefs), patient-practitioner relationship (trust, therapeutic alliance, communication), therapeutic setting (physical environment) and treatment characteristics (continuity of care, labelling of modality, physical touch). Of these, the strongest predictor of pain relief is the recipient's expectations about the treatment's efficacy (Vase et al., 2015, Rossettini et al., 2018).

An individual's beliefs and characteristics affect how they engage with and respond to PSE. Beliefs about pain are formed at a young age and strongly influenced by social circumstances like the beliefs and behaviour of parents and culture (Caneiro et al., 2021, Pate et al., 2018)**,** as different cultures attribute different meanings to pain (Davidhizar and Giger, 2004, Van den Berg, 2016). As discussed before, pain beliefs and subsequent expectations can decrease or increase pain by modulating nociceptive transmission (Goffaux et al., 2007, Schenk et al., 2017). Beliefs determine people's behaviour in response to pain, and maladaptive behaviour also influences pain (Caneiro et al., 2021). Beliefs (and the expectations they create) formed by past healthcare experiences play a significant role in pain management. Some researchers have identified beliefs as the most significant contextual factors in healthcare, whether positive or negative (Sherriff et al., 2022). People with persistent knee pain have reported low treatment credibility and acceptability for PSE, indicating that PSE was not in line with their treatment expectations (Stanton et al., 2020). They did not expect education to be a viable treatment option, reporting that the educational content was not applicable to them, which also diminished the perceived degree of benefit of PSE (King et al., 2018). This expectation mismatch could decrease PSE recipients' motivation to engage with PSE, negatively influencing the conceptual change process (Nadelson et al., 2018). An unwillingness to change pain beliefs can impede pain reconceptualisation, given that a change in beliefs is the goal of PSE. Openness may be an element that facilitates reconceptualisation in people seeking pain care. Openness is a broad personality domain that proposes that 'open' individuals are more likely to examine an experience due to intellectual curiosity (Williams et al., 2009). Thus, an 'open' person may be more inclined to engage with PSE and achieve reconceptualisation.

Preliminary evidence suggests that health literacy is a characteristic to consider in PSE. Low health literacy is associated with inaccurate beliefs about pain control (Mackey et al., 2019) and people with low health literacy also display significantly higher pain levels and worse physical function than those with higher health literacy (Lacey et al., 2018). People with low health literacy are reported to retain limited information, appraise PSE negatively, and have significant difficulty applying PSE to their own lives (Oosterhaven et al., 2023).

Emotions are central to how people process and understand their world and it is important to recognise their role in pain reconceptualisation. Persistent pain can dramatically impact quality of life and lead to mental health issues such as depression, which is a common comorbidity (Hartvigsen et al., 2018). People with persistent pain are likely to have negative emotions regarding their health that may threaten emotional well-being and even health outcomes (Street et al., 2009). Furthermore, being presented with information that conflicts with their understanding can elicit strong emotions in PSE recipients (Wijma et al., 2018), challenge the therapeutic relationship, and compromise engagement with the PSE (Nadelson et al., 2018). PSE recipients sometimes disagree with their diagnosis and some have reported that the confronting nature of having their beliefs challenged was an unhelpful aspect in their PSE experience (Wijma et al., 2018). Understanding the role of emotion in reconceptualisation is important if providers aim to facilitate reconceptualisation successfully.

Clinician beliefs and characteristics influence healthcare interactions, pain management, and PSE. The care that a clinician provides is informed by their own beliefs about pain. For example, clinicians who hold fear-avoidant beliefs make clinical judgments and offer advice based on those – often unhelpful – beliefs (Linton et al., 2002). Clinicians transfer their beliefs to people under their care, and transference of fear-avoidance beliefs to people seeking pain care has been observed (Darlow et al., 2012). Clinicians' beliefs are influenced by various factors including their training (speciality) and past experiences, which may influence their PSE delivery content, style and their attitude toward a recipient's behaviour. A clinician's gender can influence the therapeutic interaction. Surgeons, for example, are perceived to be more competent if they are male, and warmer if they are female (Ashton-James et al., 2019). Perceptions of warmth and competence impact pain-related outcomes largely because they shape the expectations of people seeking pain care (Ashton-James et al., 2019). During PSE, both members of the healthcare dyad interact through the lenses of their own emotions, beliefs, and characteristics. This interaction brings about its own contextual elements that also influence the recipient's process of reconceptualisation.

Person-centred PSE is built on a healthy therapeutic alliance between provider and recipient. The value of the therapeutic alliance was first emphasised in the seminal work by Bordin (1979, p. 252): *"I propose that the working alliance between the person who seeks change and the one who offers to be a change agent is one of the keys, if not the key, to the change process..."*. Forming a therapeutic alliance is an interdependent phenomenon that happens within the clinician-patient dyad. Building this alliance is less dependent on immutable characteristics than previously thought; rather, it depends heavily on skilled communication (Petrocchi et al., 2019). Patient-centred communication includes healthcare providers' clear explanations, healthcare provider compassion, active patient participation and shared decision-making (Street et al., 2009). These communication strategies establish a strong therapeutic alliance, encompassing consensus on treatment goals, alignment on tasks (interventions), and the development of a personal bond, ultimately resulting in enhanced clinical outcomes (Street et al., 2009, Rossettini et al., 2018, Wampold and Flückiger, 2023). In pain management, agreement between clinicians and people seeking pain care about the origin of pain and treatment plans (which are critical discussion points in PSE) are associated with long-term behavioural change and better outcomes (Oosterhof et al., 2014). Indeed, the therapeutic alliance has been found to predict outcomes in CLBP (Ferreira et al., 2013). Receiving information from a trusted source also creates a positive expectancy that can have an analgesic effect (Wampold, 2021). In PSE, recipients valued various interpersonal contextual elements of their intervention like the PSE provider taking time to listen to and validate their symptom story (Wijma et al., 2018), which makes them more likely to perceive the information as relevant to them. PSE recipients also report appreciating the effort the providers put in to make complex concepts comprehensible (Wijma et al., 2018). Making complex pain concepts comprehensible is a process influenced by interpersonal elements that may hinder PSE in a South African context.

Cultural differences and language discordance are other interpersonal elements to consider in a South African healthcare context. Some cultural groups may participate less in healthcare interactions e.g. isiXhosa speakers report pretending to understand information shared by their clinician because follow-up questions are framed as attempts to 'challenge' the clinician and are therefore considered disrespectful (Schlemmer and Mash, 2006).

Language discordance is common in South Africa, with the vast majority of consultations taking place in the patient's second or third language (Van den Berg, 2016). During PSE, expression of an abstract concept like pain may fall victim to linguo-cultural barriers that could create uncertainty for both provider and recipient. Metaphors are often used in PSE and may not translate accurately across languages and cultures, as various cultures attribute different meanings to pain (Orhan et al., 2018), different cultures describe pain in different ways (Van den Berg, 2016), and different living circumstances or life experiences render certain pain metaphors obscure.

External contexts like healthcare settings and treatment characteristics influence pain management and PSE. Privacy and confidentiality are well-known contextual factors that influence healthcare interactions and dyadic relationships. Clinicians do not always recognise what people seeking pain care identify as external barriers to their care e.g. when clinicians reschedule or are late for appointments (Oosterhof et al., 2014). Treatments that are invasive and overt have greater contextual effects on pain (Rossettini et al., 2018). This may be an unhelpful element in PSE because recipients may attribute less value to 'low tech' treatments like education and might be less motivated to engage with the PSE process.

Qualitative inquiry into healthcare dyads enables us to examine a healthcare interaction from two distinct perspectives, which can clarify the convergence and divergence of perspectives. Together, the healthcare dyad co-constructs a symptom narrative and seeks to achieve a shared understanding of the treatment plan for the person seeking care (Street et al., 2009). When successful, a person-centred interaction supports clinical outcomes by aiding information retention, adherence to advice and increased self-efficacy. Both members of the dyad influence one another's behaviour, emotions, thoughts and attitudes, which makes this a dynamic process (Schoenthaler et al., 2018). Indeed, incongruent perspectives (or mismatches) often occur in these complex, dynamic interactions. Allegretti et al. (2010) reported a mismatch between people with CLBP and their doctors regarding the explanatory model for CLBP. Other incongruencies include patients rating doctors' communication skills as weaker than the doctors' own assessment of their abilities (Kenny et al., 2010), patients and doctors disagreeing on which presenting problems require follow-up (Starfield et al., 1981), some patient complaints going unrecognised as a problem by the clinician (Burack and Carpenter, 1983), and physiotherapists underestimating their patients' pain and functional limitations (Perreault and Dionne, 2005). This incongruence of perspectives can also occur within the PSE dyad because the underlying model of pain, which PSE aims to address, contrasts with the PSE recipient's beliefs. Exploring both perspectives within a PSE dyad can uncover points of agreement and disagreement about the factors that helped shape the recipient's reconceptualisation process. A better understanding of these elements can lead to the discovery of previously unknown or undervalued helpful elements and the identification of unhelpful elements in PSE from both perspectives.

Although dyadic studies in pain management are scarce, this thesis opted to focus on dyads because it has been noted that members of chronic pain healthcare dyads harbour different perspectives about the explanatory model of the disease (Allegretti et al., 2010), which is the very phenomenon that PSE aims to address. Gogovor et al. (2025) applied a phenomenological approach to explore patients' experiences of interdisciplinary care for low back pain. They explored patient perceptions of their treatment in a collaborative care environment (i.e. with various healthcare providers) and shared detailed accounts of their experiences. Some insights were that people seeking pain care valued gaining a better understanding of their condition, receiving individualised care, and that those receiving care had a broad view of recovery, i.e., not only pain mitigation but that a measure of pain relief and/ or better functional capacity would constitute a successful outcome. The authors concluded that the non-dyadic relationship in interdisciplinary care (with each patient receiving care from four providers) was not seen as a barrier. However, only interviewing participants who completed the programme may miss the perspectives of those who dropped out, as they may have pointed to a lack of therapeutic alliance or other obstacles as reasons. Phenomenological exploration of patient narratives provides a nuanced account of the evolution of participants' perspectives on their pain during participation in a pain management intervention, highlighting the dynamic and complex nature of pain that is intertwined with people's identity and lifeworld (Nizza et al., 2022). This highlights the usefulness of using a phenomenological framework to explore the nuances in healthcare and PSE.

More research is needed to better understand the active ingredients in clinical encounters like PSE. Optimising these contextual factors in clinical practice may lead to better pain management outcomes (Rossettini et al., 2018). Therefore, this study will investigate and compare the elements of a PSE intervention that healthcare dyads perceived as being helpful and unhelpful in facilitating pain reconceptualisation.

Chapter 3

Methods

This chapter outlines the methodology used in conducting a qualitative descriptive enquiry**.** It includes a description of the research design, setting, participants, sampling methods, measurements used, procedures and data collection, data analysis, and ethical considerations. The methods described were employed to explore and understand participants' experiences of their PSE intervention.

Design

To understand the lived experience of individuals with persistent pain, this thesis was informed by phenomenology. Phenomenology is a research approach aimed at understanding human experiences and is rooted in the work of the German philosopher Edmund Husserl, who proposed that understanding can be achieved by exploring how phenomena appear in consciousness (Groenewald, 2004, Liamputtong, 2019). This approach seeks to reduce the external world to the substance of personal consciousness and emphasises that viewing realities as mere phenomena highlights the concrete nature of the human experience of the external world (Smith and Fieldsend, 2021).

This thesis aimed to understand participants' experience of PSE and how various factors influenced pain reconceptualisation. Phenomenological research starts with the belief that shared experiences possess an essence or multiple essences. These essences represent the fundamental meanings that participants mutually comprehend through a commonly experienced phenomenon (Patton, 1980). PSE uses various educational methods to build understanding and facilitate pain reconceptualisation. These educational interactions rely heavily on the intrapersonal and interpersonal contexts of the two individuals of the dyad, as well as external contextual elements. PSE took place in the context of a dyad, and so the common experience of the interaction, as well as the separate experiences of recipients and providers, hold common essences that are meaningful and can be interpreted to gain deep insight into the elements that influenced pain reconceptualisation from the perspectives of both members of a PSE dyad.

Hermeneutics is the theory and practice of interpretation, focusing on uncovering meaning within specific contexts (Liamputtong, 2019). In this study, hermeneutics guides the analysis of how participants—patients and providers—construct and negotiate meaning during PSE interactions, particularly in relation to pain reconceptualisation. The subjective meaning made of participant experiences are co-constructed within the healthcare dyad, with insight extended to the researcher. Interpreting the meaning that participants made of their PSE experience would constitute a double hermeneutic approach that recognises the researcher's perspective as integral to interpreting participants' experiences and accounts (Smith and Fieldsend, 2021). As an experienced PSE deliverer, the researcher possesses in-depth, practical knowledge of the PSE interaction, which may enrich the interpretation of participant accounts.

Ontologically, this thesis assumes that reality is co-constructed through interpretive acts, embedded in various contexts. Epistemologically, it views knowledge as interpretive, requiring reflexive engagement with participants' narratives to reveal deeper insights. This interpretive process is particularly relevant to the dyadic nature of PSE, where meaning emerges from the interplay of two individuals' perspectives, mediated by trust, communication, and external factors such as clinical settings or societal attitudes toward pain. This thesis adopts an ideographical perspective, emphasising that knowledge is acquired through comprehensive, individual case studies situated in a dyad, and it appreciates the detail and nuance that arise from contextual depth (Smith, 2017). Within this thesis, ideography facilitates an in-depth examination of the distinct experiences of each patient and provider in the PSE dyad, highlighting their unique perceptions and interactions with pain education and its results.

This approach is well-suited to studying PSE dyads, as it allows for a nuanced examination of how individual patients and providers experience their educational interaction differently yet share common themes or essences.

Setting

Due to the significant burden of PMP on South Africans, this thesis focused on a participant population consisting of South Africans with PMP as well as physiotherapists (PTs), and occupational therapists (OTs). PTs and OTs are well suited to manage pain, and form a part of recommended pain management guidelines in SA (Ernstzen et al., 2023). These guidelines also recommend PSE as a pain management tool, but little is known about the implementation of psychologically informed pain care in SA. For this reason, insight into PSE as implemented in South African healthcare settings may add valuable context to the state of PSE and its contextual elements that are relevant in SA. The PSE interventions took place in a private healthcare setting and were ongoing or had concluded within one month prior to the data collection.

Participants and sampling

This study used non-probability, purposive sampling to recruit PTs and OTs (PSE providers) and snowball sampling to recruit people who received PSE under their care (i.e., PSE recipients). Purposive sampling is appropriate for exploring information-rich experiences from a small sample of individuals, as is often the case in qualitative research (Eatough and Smith, 2017). PSE providers were recruited based on the inclusion and exclusion criteria set out below, as well as based on their experience in implementation of PSE. Snowball sampling is useful to reach populations that the researcher could not access directly, in this case the PSE recipients (Liamputtong, 2019). Informed consent was obtained from all participants before partaking in this study. Recruitment was done during or shortly after receiving pain management, which included PSE. The researcher contacted the PSE providers who were willing to participate first and asked them to identify a suitable PSE recipient. The provider then gave them the ‘consent for contact’ form (Appendix 1) to give to their PSE recipients so that the researcher had consent and details to contact them and arrange a time and place for the interview. They were asked to complete the demographic questionnaire and COPI-Adult questionnaire, and then took part in interviews as scheduled.

PSE providers were included if they met the following criteria:

1. PTs or OTs, who deliver PSE on a weekly basis
2. Have more than two years’ experience in delivering PSE
3. Could communicate comfortably in English and/or Afrikaans.

PSE providers were excluded if they suffered from mental conditions that affected memory such as Dementia, Alzheimer's disease, and Parkinson's disease because conditions like these would negatively affect recall of events.

PSE recipients were included in the study if they met the following criteria:

1. 18 years old or older,
2. Had pain on most days for at least three months prior to starting PSE,
3. Completed the PSE intervention and concluded their treatments within one month before the interview,
4. Could communicate comfortably in English and/ or Afrikaans.

PSE recipients were excluded according to the following criteria:

1. If they were diagnosed with ongoing pathology (i.e. Rheumatoid arthritis, cancer, immune disorders)
2. If they had mental conditions that affected learning and memory such as Dementia, Alzheimer's disease, and Parkinson's disease.

PSE providers were recruited from various institutions across South Africa: PainSA, Train Pain Academy, the Pain Management Physiotherapy Group, and the Occupational Therapy Pain Management Group. The researcher asked these institutions to circulate a link to a 'request for participation' letter (Appendix 2) to their members via email. These institutions and independent professional groups also have text-message groups (e.g. "SA physios together" on the WhatsApp application) and social media groups that were used to recruit participants, with permission of the relevant administrators. The outgoing messages on email and WhatsApp platforms invited OTs and PTs who were interested in participation and met the eligibility criteria to respond with their contact details. They were then provided with more information about the study including the title, aims and objectives, and consent forms. Consent forms were sent electronically to all but one participant, and participants were encouraged to ask questions pertaining to consent at any stage, before or during the interview.

Once willing PSE providers were identified, and consented to take part in the study, the researcher provided them with a ‘permission to contact’ form (see Appendix 1) to hand to eligible PSE recipients (people who were under their care). By signing the ‘permission to contact’ form, PSE recipients consented to be contacted by the researcher. The providers relayed these forms to the researcher by phone, by email, or in person so that the researcher could now contact the PSE recipients to explain the details of the study and answer any questions. Recruitment and participant interviews continued until saturation of the data occurred. In total, the researcher recruited a total of nine PSE providers (*n* = 9), eight of which recruited one PSE recipient each (*n* = 8). One recipient was unable to attend the interview due to scheduling difficulties. The sample size in total was 17 participants (*n* = 17).

To ensure consistency in PSE interventions, the inclusion criteria for these interventions were based on inclusion criteria for a literature review on PSE by Ryan et al. (2022), where PSE includes at least one of the following concepts (See Appendix 3 for a PSE checklist):

1. The relationship between nociception and pain (OR between tissue state and pain) varies.
2. Pain is influenced by biological, psychological, and social factors.
3. We are bioplastic and (neural) sensitivity can change.
4. Pain motivates protective behaviour OR fulfils a protective role.

Measures

Pain knowledge among participants was assessed using the Concept of Pain Inventory for Adults questionnaire (COPI-Adult) – see Appendix 4. The COPI-A is a short questionnaire that assesses pain concepts in adults, which includes assessing current pain beliefs and pain knowledge (Pate et al., 2022). It also has various response options which provide insight into the depth of understanding of specific pain concepts (Pate et al., 2022). Each item in the questionnaire is scored on a five-point Likert scale from “strongly disagree” (0 points) to “strongly agree” (4 points). Scores are interpreted on a continuum, with higher scores indicating better alignment with current scientific pain knowledge. Questionnaire responses were used in the interviews as discussion points if participants (specifically PSE recipients) were unsure about pain-related concepts that the interviewer referred to. The interviewer could also gauge the recipient's pain concept based on this data, which informed the interviewer regarding prompting and follow-up questions. Understanding the pain concept of providers was also pertinent to the interviewer, as healthcare providers convey their pain beliefs to recipients (Darlow et al., 2012). Participants were asked to complete the COPI-Adult questionnaire. The questionnaire's psychometric properties have only been validated in a limited scope, so its results may not correlate with other, better-validated questionnaires. It has, however, been correlated with the Revised Neurophysiology of Pain Questionnaire (Pate et al., 2022).

Procedures

Data were collected by means of semi-structured interviews conducted with PSE providers and recipients separately. These data represent the main unit of analysis in this study. Additional data in the form of demographic questionnaires and the COPI-A, were gathered to better describe and understand the participants' experiences. Adherence to the Consolidated Criteria for Reporting Qualitative Studies (COREQ), a 32-item checklist detailing the reporting of qualitative research, can be seen in Appendix 9 (Tong et al., 2007).

To describe the sample and help interpret findings within the sample, the demographic questionnaire included questions about the following (see Appendix 5). For PSE providers - Age, cultural identity, gender, first language, highest level of education, profession, languages able to deliver PSE, years conducting PSE, PSE training, conditions for which they implement PSE, and work setting. The demographic questionnaire for PSE providers also includes questions about the language of PSE instruction, amount of time spent on PSE, the provider's PSE objectives and total number of sessions completed, and whether they achieved their PSE goal in those sessions. For PSE recipients, the demographic questionnaire included items relating to age, gender, first language, proficiency in other languages, cultural identity, highest level of education, diagnosis, time living with a painful condition prior to PSE, number of clinicians seen for current health condition, other chronic health conditions. A better understanding of this background information informed the researcher about the participant's beliefs and characteristics that may have played a role in the reconceptualisation of pain during PSE. Finally, PSE providers were provided with PSE criteria as set out by Ryan et al. (2022) and requested to ensure that their PSE intervention was in line with these guidelines – see Appendix 3.

Interviews with the PSE dyads were conducted, where the researcher and followed a semi-structured interview guide which was developed following guidelines specified by Kallio et al. (2016) and is included in this document (see Appendices 6 and 7). The use of open-ended questions facilitated unbiased responses and allowed unanticipated themes to emerge. The terms “helped” and “hindered” were used in initial open questions that related to pain reconceptualisation (i.e. *“what helped or hindered the process of learning about pain”)*. Key elements that the interviewer followed up on included 1) Recipient beliefs and characteristics (i.e., beliefs, concerns, expectations, emotions, past experiences, nature of condition); 2) Provider beliefs and characteristics (pain beliefs, competence); 3) Interpersonal context (therapeutic alliance, language of instruction, communication style); and 4) External context (method of PSE delivery, educational resources, privacy, time availability, nature of condition, physical environment, and other medical influences like imaging reports).

The researcher conducted two pilot interviews to ensure that the questions in the interview guide were clear, facilitated detailed responses, and flowed in a logical sequence. This also aided in checking interview duration and testing recording devices. The interview guide was then refined according to the findings of the pilot interviews. One challenge noted in the pilot interview was that participants often referred to elements that hindered or helped the therapeutic process, not specifically the PSE. The researcher then set out to solve this problem by ‘setting the scene’ more overtly so participants were orientated towards the PSE reconceptualisation (referred to as the “pain mind-shift”). The researcher also made sure to clarify during the interview whether the helpful or hindering elements discussed related to the “pain mind shift”, or general therapeutic process. The data from the pilot interviews were not included in the analysis.

Data collection

In total, 17 participants were interviewed. Of these, 14 interviews took place via an online platform (Zoom), and three in person in Gqeberha, South Africa. Although the aim was to interview 18 participants, i.e., 9 dyads, one participant was unable to attend the interview despite multiple attempts to reschedule. To facilitate ease of access to the interviews, 1.5 GB of data was made available to participants who were interviewed online, and travel costs were reimbursed up to R60 for participants who wished to travel to a designated private office where interviews took place in person. Interviews were conducted in either English or Afrikaans (the option to have an isiXhosa interpreter was made available for a participant whose first language was isiXhosa, but she declined as she could speak English fluently). Language preference and need for interpretation were clarified before the interviews.

During the interviews, which were all done one-on-one (i.e. there were no other persons present during the interview), participants were encouraged to answer questions in as much detail as possible. The interviewer remained flexible and sensitive to emergent themes and follow-up questions were used to attain more depth relating to the meaning behind each participant's experience. The interviews were recorded and transcribed verbatim with participant names anonymised in the transcript. The recordings were stored on a password-protected computer and backed up within a password-protected file on a cloud storage application. Participants were anonymised on all documentation by allocating participant numbers that were only known to the researcher. The order of the interviews was alternated i.e. in the first dyad, the PSE recipient was interviewed first and in the second dyad the PSE provider was interviewed first, and so on. This ensured that the interviews flowed in both directions within dyads (i.e. the interviewer used data emerging from one member of the dyad when interviewing the second member of the dyad. This 'flow' would have been one-directional if the first interviewee were always the provider, for example). Where a PSE provider formed part of more than one dyad, (i.e. they recruited more than one PSE recipient) they were interviewed on separate occasions to keep the focus on the dyadic interaction and prevent confusion between cases. Interviews took place with as many dyads as needed for conceptual depth to be achieved (Nelson, 2017). Conceptual depth was considered as 'achieved' at the point where no new themes arose, and no new insights were gained in terms of richness or depth of previously identified themes. Observational notes supplemented the primary data. The themes that emerged from analysis of the digital recordings of the interviews served as the primary data for this study.

Data analysis

This study used an interpretive phenomenological analysis (IPA) framework to interpret the data gathered in the interviews. IPA is an appropriate method to deeply analyse the experience of an individual, as it allows a researcher to better understand an event, process, or relationship by considering the meaning behind participants' experiences (Eatough and Smith, 2017). It is therefore ideal to elicit the meaning that members of a PSE dyad made of the various elements of their interaction.

For the first four participant interviews, the researcher translated, transcribed, and made exploratory comments relating to both the semantic and latent meanings of the data. Once each interview was completed, the recording was translated where applicable and then transcribed by using transcription software (Microsoft Word and Otter.ai). To eliminate any errors the researcher then revised the transcription by comparing it to the audio recording. From the outset, the researcher immersed himself in the first four transcriptions, annotating interesting or significant findings from the experiential statements. These annotations were of a descriptive and conceptual nature, labelling the texts and ascribing meaning to the statements while keeping in mind the participant's context. The researcher then set out to make exploratory comments with the assistance of one senior researcher, while discussing the finer nuances and contexts of the experiential statements to ensure validity of these interpretations. While considering these exploratory comments, the researcher started looking for patterns like recurring codes, then connecting codes and abstracting them to more generalised experiences. After applying open coding and developing preliminary codes, the codes were refined and clustered to form the codebook, which was reviewed by a second coder before being finalised. After transcribing the audio recordings, the codebook was developed so that two coders could use it to apply this coding to the remaining 13 transcripts using qualitative analysis software (Nvivo). Once all the exploratory codes were completed, an inductive approach ensured that the data guided the analysis and allowed for themes to occur organically, so allowing for a depth and richness of data (Liamputtong, 2019). In order to understand the meaning that participants made of their experience, the researcher's interpretations of codes examined underlying ideas and conceptualisations that underpinned the semantic content of the data (Eatough and Smith, 2017). As interviews progressed, certain codes recurred, and the researcher probed for these in the interviews that followed. This meant that deductive coding occurred simultaneously with the inductive coding process. After all the interviews were coded and experiential statements were completed for all the individual cases, two researchers looked for cross-case patterns and so identified emergent themes. When themes were identified as meaningful in the reconceptualisation process, other codes that supported or facilitated these themes were identified as subthemes.

Reflexivity

To achieve a satisfactory level of rigour, the thesis aimed to fulfil the criteria set forth by Korstjens and Moser (2018). The researcher, a physiotherapist with 10 years' experience in delivering PSE, conducted all the interviews. Credibility was sought by establishing rapport with participants, thereby ensuring an open and honest interview environment that facilitated honesty and authenticity in participant responses. Interviews were scheduled for time slots where participants were not rushed and were in a relaxed, private environment. This ensured that interviews were in depth and the interviewer and participant engagement was optimal, allowing open conversation, reflection, and information checking. The interviewer also checked the meaning of participants' statements within the interview with regular summaries and an invitation to correct or elaborate on any misunderstandings. Considering the dyadic context, the interviewer kept the interview with the other member of the dyad in mind when asking and probing topics relevant to the other member, while keeping the details of the first interview confidential. Investigator triangulation was achieved by using multiple coders, and analysis was done by two investigators collaboratively. Although no repeat interviews were done, member checking was conducted, where participants were contacted (with prior consent) to confirm any uncertainties relating to their responses to questions. Interviews and analyses continued until themes became stagnant, when no new depth or richness was added as interviews progressed (Braun and Clarke, 2021). Dependability was pursued by clearly describing the setting, recruitment strategy, interview guides and study limitations (Korstjens and Moser, 2018). Furthermore, consistency was achieved by creating a codebook after initial interviews, briefing all coders, and conducting follow-up briefings as coding progressed. The investigator engaged reflexively and extensively with the data, and re-checked participants' words to ensure accurate interpretation of the data (Smith and Fieldsend, 2021). A thorough description of themes (as reviewed by two coders) was linked to experiential statements to ensure confirmability, and the trail of reasoning and methods was described in detail. Purposive sampling ensured that participants reflected on "real world" experiences where PSE formed part of their routine care. In-depth description of each participant's context gave the data depth and richness that made underlying phenomena transferable to other settings (Liamputtong, 2019, Tobin and Begley, 2004).

The researcher kept a reflexive journal to keep a record of their own internal processing of events, and how their bias may have influenced the interviews, analysis, and interpretation of themes. They identified the need to tailor questions to the individual's perception of the PSE – this was necessary as some Providers did PSE in ways that were not obvious to the recipient. For instance, when participants were unsure about the concept of pain reconceptualisation, the researcher called it the "pain mindshift" and at times referred to the participants' responses on the COPI-A questionnaire if they were unsure about the meaning of reconceptualisation, or the pain concepts that their providers introduced. The researcher also normalised the idea that barriers to PSE exist and gave examples if participants did not respond to the initial open question about whether barriers prevented reconceptualisation. Understanding the challenges faced by PSE providers, the investigator resonated with their situation. By sharing some of his own experiences, with the aim of creating an inviting atmosphere that encouraged participants to express themselves more openly, this may have led them to share about topics they would otherwise not have considered significant. The same can be said about interviews with PSE recipients, where the investigator may have given examples of stories from their own experience to contextualise a question. Again, this was useful to prompt them to share of their own experience but may be seen as leading questioning. To manage and limit biases in the interview process, the investigator remained open-minded to participants' responses by allowing ample time to speak and conduct the interview. Facilitating their responses included not interrupting their train of thought and using summaries with invitations for participants to correct any inconsistencies. Debriefing with peers who were familiar with PSE as well as with qualitative research, assisted the investigator in elucidating and addressing any biases.

The themes that arose were in line with the researcher's own experience and they reflected on whether this was objectively the case, or whether this was just his interpretation through their own lens. As a PSE deliverer, the researcher believes that PSE is influenced by many factors like provider-recipient relationships, communication strategies, and the context in which the PSE takes place. This may have influenced their interpretation of participant responses. To promote objectivity, the researcher conversed with peers and other coders on a regular basis by sharing quotations from the interviews and aligning them with emerging themes.

Ethical considerations

Ethical approval for this study was obtained from the Human Research Ethics Committee (HREC REF 026/2024). Prior to data collection, participants were asked to read, understand, and sign an informed consent form which included assurance that participation was voluntary and that they could withdraw at any time without consequence (the care they received from their clinician would not be affected in any way). They were also informed about the aims of the study, along with the procedures that were to be followed. They were assured that their identity and information would be protected and would only be shared with their written consent. All participant names and identities were de-identified and anonymised during the data analysis by assigning unique participant numbers. See Appendix 8 for the informed consent form. Additional consent was obtained from participants to allow the researcher to contact them after the interview to gather any additional information that may have been required – demographic information or information to clarify interview statements. Online interviews were end-to-end encrypted. The participants were again oriented toward the goals of the study, the length of the interview and the value of insight into their experiences. They were reminded that the recording may be deleted at their request, should they require it at any stage. They were assured that their names would be redacted from the transcripts. The study was conducted according to the 1964 International Declaration of Helsinki (revised 2013), the South African Guidelines for Good Clinical Practice (2006), the Medical Research Council (MRC) Ethical Guidelines for Research (2002), and the Department of Health Ethics in Health Research: Principles, Processes and Studies (2015).

Potential benefit to participants lay in the exploration of the PSE experience and the process of reconceptualisation. For PSE recipients, exploring their PSE interaction clarified the purpose of the PSE intervention and shed light on the reasons for the specific pain concepts covered by their clinician. PSE providers found value in reflecting on their experience. Many of them mentioned during or after interviews that the conversation about contextual elements in PSE gave them a deeper insight into their interaction, which they could consider in future interactions. PSE providers will be provided with anonymised study findings. This will give them insight into helpful and unhelpful elements in PSE and they can use or avoid appropriately in PSE delivery in the future. The only cost to participants was the time spent on the interview (approximately 1 hour). For online interviews, participants were given 1.5GB of mobile data if needed. Participants who were interviewed in person, were interviewed at the physiotherapy practice where the treatment took place. In the only in-person recipient interview (Recipient H), the interview took place directly after their last physiotherapy treatment session. Data (patient details, consent forms, audio recordings and field notes) were digitised and stored on an encrypted cloud facility. The hard copies were stored in a locked cupboard in a private office in Gqeberha, South Africa.

Chapter 4

Results and Findings

In total, 17 participants were interviewed. This included eight PSE dyads (provider and recipient) and one provider whose recipient was ultimately unavailable to be interviewed due to scheduling difficulties. The PSE providers included three OTs and six PTs, eight were female and one male. Providers' mean age was 45.6 (SD = 7.4) years and the range of their PSE experience was four to eleven years (median 6.1 years). The PSE recipients included seven females and one male, with ages ranging from 38 to 56 years, with a mean age of 49 years. They reported having persistent pain for a mean of 5.8 years (range six months to 27 years, median = 2.5 years). The mean number of PSE (plus usual care) sessions completed was six per dyad. Regarding the PSE, providers estimated a mean time of 101 minutes spent on PSE per dyad, but many noted this was difficult to estimate accurately as PSE was done in conjunction with other treatment and sometimes implicitly throughout activities like exercise. All providers reported that they achieved their PSE goals.

All providers had received training from the Train Pain Academy (not-for-profit organisation) and some had completed a Postgraduate Diploma in Interdisciplinary Pain Management (University of Cape Town), which included PSE training. Others had received training with renowned PSE researchers and educators Adriaan Louw, David Butler, or Peter O'Sullivan. One participant (Recipient I) mentioned that pain was not the main focus of the rehabilitation, but rather fatigue. She did, however, report having persistent pain. Provider I reported that she focused education on the health systems relevant to pain as well as fatigue. The demographic characteristics of the sample are presented in Tables 1 and 2, respectively.

Table 1. *Demographic information of PSE providers*

Provider	Age	Gender	Profession	Work setting
A	45	Female	PT	Hospital rehab, outpatient musculoskeletal
B	47	Female	PT	Outpatient musculoskeletal , chronic pain
C	30	Female	PT	Acute hospital, outpatient musculoskeletal
D	37	Female	OT	Outpatient musculoskeletal , Vocational rehab, chronic pain, mental health
E	45	Female	OT	Pain management/ Vocational rehab
F	51	Female	PT	Outpatient musculoskeletal
G	50	Male	PT	Outpatient musculoskeletal
H	49	Female	PT	Outpatient musculoskeletal
I	56	Female	OT	Adult neurology, outpatient musculoskeletal , chronic pain

Table 2. *Demographic information of PSE recipients*

Recipient	Age	Gender	Cultural identity	Pain (years)
A	51	Female	White South African	0.5
B	56	Female	European	0.5
C	47	Female	Coloured*	0.5
D	51	Female	Christian	3
E	-	-	-	-
F	45	Male	-	5
G	39	Female	Christ centred (Christian)	8
H	49	f	African	2
I	55	f	South African English	27

Note 1. Recipient E was not interviewed due to scheduling difficulties.

Note 2. Recipient F declined to disclose their cultural identity

Note 3. Recipient C referred to herself as ‘coloured’ in the interview, and in the demographic questionnaire filled in cultural identity as “rich in history”

Table 3 presents data gathered from the demographic questionnaire concerning the PSE interaction, such as the provider's experience, language use, total sessions, time spent on PSE, and whether the provider believed they had achieved their PSE goals.

Table 3. *Dyadic PSE information*

Dyad	**Provider PSE Experience (years)**	**PSE language**	**Sessions total**	**PSE time spent (min)**	**PSE goal achieved?**
A	5	Afr	10	30	Yes
B	11	Eng	5	150	Yes
C	8	Afr	10	125	Yes
D	6	Afr and Eng	1	35	Yes
E	6	Eng	4	80	Yes
F	4	Afr	8	80	Yes
G	7	Afr	4	60	Yes
H	5	Eng	10	150	Yes
I	6	Eng	3	200	Yes
Mean	**6.4**		**6.1**	**101.1**	

Note 1. Afr = Afrikaans, Eng = English.

Note 2. Participants found it very challenging to give an accurate estimate of time spent on PSE as it was often done implicitly

The participants' concept of pain was evaluated using the COPI-A questionnaire, where higher scores indicated a more accurate understanding of pain. The providers' mean COPI-A score was 49.9, while the recipients had a mean score of 38.4 points (range 30-49). These data are summarised and presented in Table 4.

Table 4. *COPI-A scores*

COPI-A score

Dyad	Provider	Recipient
A	52	37
B	51	49
C	52	37
D	42	38
E	45	-
F	52	30
G	51	38
H	52	42
I	52	36
Mean	49.9	38.4

Qualitative Findings

In total, five themes and five subthemes emerged from the data. In the tables and discussion below, these themes are organised in the order that they emerged in the PSE intervention. Themes like therapeutic alliance and engaging with PSE-informed care features first, because they were pertinent in the early stages of PSE and seemed to influence reconceptualisation indirectly. These initial interactions established a therapeutic environment in which other themes influenced reconceptualisation directly.

Table 5 presents the themes that emerged after the interviews were coded and clustered. These themes are supported by quotations from participant interviews, as well as exploratory comments that emerged as the data was processed. The specific influence of these themes on reconceptualisation is nuanced and is discussed later in this chapter.

Table 5. *Themes, illustrative quotes, and exploratory comments.*

Indirect influence on reconceptualisation

Theme	Subtheme	Illustrative quote	Exploratory comment
Therapeutic Alliance		*"… it was a reciprocal situation. It was an easy-going relationship which helped a mind shift"* (Provider F, PT).	The therapeutic alliance, defined by trust, rapport, and respect facilitated reconceptualisation
	Skilled provider communication	*"… being able to summarise and reflect her entire history in two sentences, really caught her attention and then she realised that she has my full undivided attention"* (Provider D, OT)	Skilled communication of the provider supported the therapeutic alliance
	Change in pain intensity	*"[the pain relief] is telling me that there is real value in the things that [Provider G] is telling me. You know, I believe what he's telling me".* Recipient G (39 y/o female)	Pain relief increased trust in the provider and their messaging about PSE

	Recipient expectations	*“[Recipient D’s] preconceived idea around what OT was, was definitely a barrier that I had to dismantle and […] rebuild into what it actually can be” (*Provider D, OT)	PSE recipients have expectations of care that are formed by prior knowledge, beliefs and experiences. These may influence the therapeutic alliance
Engaging in PSE-informed care		*“when we start to be able to put it [valued activities] into daily tasks and changing things in our context, um, that starts to bring fulfilment and a sense of joy. That's where it kind of really hits home.” (Provider I, OT)*	Engaging in care that is focused on biopsychosocial domains was a foundation for the pain education, supporting reconceptualisation
	Social support	*“[my wife] understands how important mental wellness is. […] she actually laid on the floor and did some exercise with me”* Recipient F (45 y/o male)	Social support influenced how recipients engaged in PSE-informed care at home
	Having adequate access to care	*“if the doctor said to me, ‘Go see a physio, it's going to cost you a*	Recipients identified that a lack of funding would have

	thousand rand a session,’ I would have said, ‘Thanks, but no thanks.’ I would rather hang in there with the pain, because I don't have a thousand rand per session. But because it was free, […] I said, ‘Well, bargain. I've got nothing to lose.’" (Recipient F, 45 y/o male)	prevented them from participating

Direct influence on reconceptualisation

Theme	Illustrative quote	Exploratory comment
Change in pain	*“It [the pain relief] is telling me that there is real value in the things that he's telling me. You know, I believe what he's telling me” (Recipient G, 39 y/o female).*	Decreased pain made the PSE seem more valid, while increased pain challenged new pain concepts
Recipient internal processing	“[I] *already had some prior knowledge and experience of pain. And [therefore] what [Provider A]*	Recipients engage with PSE to the extent of their internal processing capabilities. These

	said made sense to me" (Recipient A, 51 y/o female)	are influenced by situational and inherent contexts.
Tailoring PSE	*"So if I used [in-depth verbal PSE] in the first, second or third session it would not have been effective" (Provider A, PT)*	The timing, content, and method of PSE was helpful when adapted to recipient needs

Table 6. *Themes and subthemes*

Indirect influence on reconceptualisation

Theme	**Subtheme**
Therapeutic Alliance	Skilled provider communication Pain relief Recipient expectations
Engaging in PSE-informed care	Access to care Social support

Direct influence on reconceptualisation

Theme	**Subtheme**
Change in pain intensity	

Recipient internal processing

Tailoring PSE

Themes that influenced reconceptualisation indirectly

Several themes emerged from the data that highlighted contextual elements that influenced reconceptualisation indirectly. These contextual factors impacted recipients' willingness to engage with PSE, although they did not affect the recipients' internal processing of specific pain concepts during the PSE itself. This chapter discusses indirect themes first because these themes materialised first during the PSE process and formed a foundation without which the direct themes would have been less impactful. Below, each of the indirect themes and subthemes is discussed and supported by illustrative quotations.

Therapeutic alliance

The therapeutic alliance between providers and participants was a crucial theme that facilitated pain reconceptualisation. In this thesis, this theme relates to the relationship between the two members of the healthcare dyad, and how this created a conducive environment to deliver care, and PSE specifically. For instance, Dyad F described their engagement as *"a very comfortable relationship. And it was a reciprocal situation. It was an easy-going relationship which helped a mind shift"* (Provider F, PT). Recipients described a strong therapeutic alliance in various ways, often referring to trust, common ground, and a provider that is person-centred.

Common ground. Several participants emphasised how finding common ground facilitated a healthy therapeutic alliance. Common ground refers to having a common point of reference (interests, attitudes, beliefs, or worldview) through which members of a dyad viewed experiences, health, and meaning. Participants asserted that common ground in terms of cultural background and language "*makes [the relationship] easier. Because immediately, without having any concrete evidence, you already have an audience that has respect for you, because you've got that common ground*" (Provider G, PT) and that "*any relationship where there's more common ground it makes it easier* [*to connect*]" (Provider F, OT). In Dyad G, religion and social structure were important elements that strengthened the therapeutic alliance:

> *"Our kids were in the same school, which is a Christian school, and she and her husband are Christians, and she knows I and my family are Christians, so I think there was a lot of trust she had when she walked in the room because of that. That was a big thing for her."* (Provider G, PT).

This sentiment was echoed by Recipient G (38 y/o female), noting that "*I think the culture is the same. We're both Christians, and I think that helped. It was nice. I think it's nice to have a physio who has the same culture as you, because you've got the same mindset."* When common ground was less forthcoming, providers could still strengthen the therapeutic alliance by searching for common ground. This was evident in Dyad C, as Provider C (PT) noted that *"We have different backgrounds, but we had enough common ground that culture could be shifted to the back burner so that we can focus on the content".* Recipient C spoke about cultural aspects significant to her that were adversely affected by the pain, noting that "*standing at the sink and […] washing dishes is like, culturally for me as a coloured person, that's like the moment when you pray, or you just have your moments. So, to disturb that activity it's disturbing my peace of mind and me not being able to do that, it's literally culturally, it breaks me also there"*. Even though the provider had a different cultural identity, common ground in terms of gender roles established the perspective needed to strengthen the therapeutic alliance. Provider C (PT) noted that *"I think the fact that I'm a woman made a positive difference in terms of approachability. A man probably wouldn't understand why washing the dishes is such an important thing".*

Recipient H was the only first-language isiXhosa speaker yet was fluent in English. Provider H (PT) reported that language was a barrier to reconceptualisation because *"… at one point I felt like, […] my patient is not on the same […] wavelength. She's not understanding what I'm saying.' So then I tried to give her examples, […] just [to] clarify it…".* She also simplified her language and used a video clip to support the PSE. Recipient H reported finding value in the video clip and noted regarding the PSE, *"It [went] well, it wasn't difficult"* Recipient H (49 y/o female). Although common ground in language and culture were reported to be helpful elements, Provider H ultimately navigated this lack of common ground successfully, as illustrated by the Recipient's response: *"No, it [culture] didn't influence because the mind shifting, it was all about me, […] the pain and me, not* *about my culture or my background"* Recipient H (49 y/o female), and regarding their therapeutic alliance, Recipient H noted they had a good relationship, *"as much as she is my physio, she is, she was helping me about what to do, about my pain, when I feel the pain, what to do. But also, she also listened to me."* These excerpts illustrate that, although recipients value common ground and it may indirectly facilitate reconceptualisation, a supportive provider who is responsive to recipient needs can establish new common ground by fostering mutual respect and forming a mutual understanding of the treatment plan and goals.

Trust. A dominant element that supported a successful and strong therapeutic alliance, was trust in the provider and their expertise, experience, and choice of treatment modality. This was demonstrated by Recipient F (45 y/o male) who valued trust above other contextual elements: "*The main thing was about trust, to build trust and then maintain trust".* Interestingly, Provider F (PT) noted that Recipient F was uncertain about physiotherapy initially and decided that she *"needed to really understand where he was coming from".* She adapted that session by spending more time on gathering information about the recipient's perspective on their illness experience. This adaptation and time investment was worth it, Recipient F asserted that "*I can trust [her] and I can believe what [she is] telling me is actually the truth*." Provider E (OT) noted that trust relied on the perception of competence, noting, "*What I said* [will happen], *did happen, which once again increased her trust in me and our relationship, our relationship grew".* In Dyad G, the recipient (39 y/o female) had some doubts about Provider G (PT)'s perspective because *"…a physio that's never had chronic pain or had health issues, will never be able to understand 100% what the patient is going through".* However, Recipient G (39 y/o female) also reported that she felt supported by her provider, which established trust and mitigated her sense of fear:

> *"I think it's the fear of being alone. You don't have anyone to talk to about this, […] so you hold everything back in just within yourself. I think that can hold you back as well, if you don't have anyone you can share it with. So if you actually have someone that you can share it with, it brings a more positive light to your pain management."*

The importance of trust was also illustrated by interactions during treatment sessions that decreased trust in the Provider. "*Sometimes her focus was not 100% on me. Because she was busy [on her phone] and I did not feel that was appropriate*", noted Recipient A (51 y/o female). She also felt that hygiene was not up to the standard that she had expected. Interestingly, when the interviewer followed up on the influence of these negative elements, she reported that they were outweighed by *"the pain relief, [which] was worth more than the negative things*" (Recipient A, 51 y/o female). Their alliance then grew and became stronger with subsequent sessions, even to the point where another negative element emerged from the perspective of the provider. At one point, she was concerned that a very strong and trusting relationship might hinder the PSE process, *"almost like I'm going to become a crutch"* (Provider A, PT). In other words, the recipient's self-efficacy may be negatively affected if she becomes too reliant on this therapeutic alliance.

Person-centredness. A person-centred approach**,** specifically relating to the adaptations of the provider, contributed to establishing a therapeutic alliance as treatment progressed. For instance, in Dyad C the Provider (PT) recognised that prior to their intervention, the recipient had received physiotherapy elsewhere, which was a negative experience. She had felt that the previous provider was unresponsive to her needs, ultimately leading to a poor outcome (no pain improvement). In response to this, the provider approached the sessions with a more flexible mindset, noting *"… in our sessions, I gave her options, and she could tell me what works better, and she could say no when she wasn't ready to do something"* (Provider C, PT). This worked well to ensure a healthy relationship, with Recipient C (47 y/o female) noting, *"…information was key and the communication with [Provider C] was for me, a lot better"* and "*… for somebody to really listen, that's what she did, she really listened and walked with me through this thing. That was actually the mindset change that yes, I can do this thing".* Another common occurrence was that recipients primarily wanted pain relief and were not aware of PSE as a pain management option. To navigate this, the provider needed to be observant and responsive to the recipient's needs. This was highlighted by Provider B (PT): *"we spoke about this pain versus danger [in the first session], but she said what she really feels like she might need is just something to help with her pain there and then, and I said OK…"* and Provider A (PT*) "so if I used that method [verbal PSE] in the first second or third session it would not have been* *effective I think the fact that we had walked a road together and she really trusted my opinion".*

As discussed above, therapeutic alliance emerged as a theme as it was reported by recipients referring to common ground, trust, and a person-centred approach. Several foundational elements were also identified as subthemes that influenced the process of forming of a strong therapeutic alliance. These were skilled communication, pain relief, and recipient expectations, and are supported by illustrative quotations below.

Skilled communication. This subtheme describes communication skills deployed by providers that aided in forming a strong therapeutic alliance. Various communication skills and rapport-building interactions were highlighted as important aspects that contributed to an effective therapeutic alliance and many of those were intentionally implemented by the provider. This is illustrated by Provider D (OT), who asserted that *"… being able to summarise and reflect her entire history in two sentences, really caught her attention and then she realised that she has my full undivided attention"*, which played a key role in establishing therapeutic alliance. Similarly, Provider E (OT) shared: *"We just connected, but I intentionally, within the first few minutes, made a bit of small talk, added a bit of humour, just to put her at ease".* Recipients were also sensitive to the therapeutic alliance that formed and that it was a positive influence on their interactions, stating *"…[Provider D] has got a lovely nature about her. I think you can just feel people's energy, you know." (Recipient D, 50 y/o female) and "it's just that we had a good connection*" (Recipient A, 51 y/o female). Their providers, however, were intentionally establishing a strong connection, implementing strategies that further facilitated communication. For instance, Provider A (PT) asserted *"it's nice when the patient lies face down because they speak with the floor basically and they tend to open up a lot more than would if you were face to face".* Another sign of a strong alliance was when a recipient is comfortable to communicate openly, as demonstrated by Recipient I (55 y/o female)'s opinion:

> *"[T]he way we've connected that if it was something I felt I didn't agree with or that I didn't want to implement, or I didn't feel it would work for me in my own situation, I*

> *feel that our relationship is good enough that I would be able to tell [Provider I] that".*
> Recipient I (55 y/o female)

For participants with negative previous healthcare interactions, establishing a therapeutic alliance appeared to be particularly useful to facilitate reconceptualisation. Recipient B (56 y/o female) had seen many healthcare professionals before consulting Provider B (PT). She was distressed and in severe pain, and upon reflecting on the therapeutic alliance that had formed, she expressed her experience as follows:

> *"She hears you, she sees you and she's interested in you as a person, not just as a patient. So I think that definitely established a connection between us. I've never felt as cherished – I know that's an odd word to use – by any medical professional as I have by [Provider B]. I mean, I think she really cares"*

Pain relief. This subtheme describes the influence of PSE recipients' decreased pain played in the therapeutic alliance. Pain relief increased trust in the provider and the PSE message. One strategy used by Provider D (OT) was overtly using pain relief to build trust: *"The moment that I show them something and they can feel the physical change and they go 'oh' and then I still joke then I say, 'so you trust me now?'".* She also added that these changes add trust to the PSE, *"the very significant changes you can bring in a person's body with them sitting right here and that they can feel better after having years of pain and just feel a slight reprieve and then they […] buy in" (Provider D, OT)*. Pain relief that increased trust in the provider and the PSE process was echoed by Recipient G (39 y/o female): *"[the pain relief] is telling me that there is real value in the things that [Provider G] is telling me. You know, I believe what he's telling me".* Increased pain was not reported to diminish trust in the provider. Increased pain did, however, decrease trust in the PSE message, with Recipient A (51 y/o female) reporting that it raised self-doubt and self-blaming thoughts rooted in the biomedical model that hindered the reconceptualisation process: "At *that moment, you don't think that it's the nervous system that's overwhelmed. You think that the pain you feel is due to something that happened, or something that you did…"*

Recipient expectations. This subtheme pertains to the influence that pre-existing expectations had on the therapeutic alliance. These expectations were concerning their healthcare provider and the care the recipients expected. Participants indicated that these prior expectations impacted reconceptualisation by affecting the therapeutic alliance (i.e. indirectly), either by increasing or decreasing trust in the provider. Provider F (PT) noted that Recipient F (45 y/o male) *"was really sceptical about physio initially…"* and suspected that this was based on prior physiotherapy treatment that had failed to relieve their pain. Recipient F (45 y/o male) added more context:

> *"So, what [Provider F] did physically in terms of the exercises, was nothing new to me. I knew about it. I didn't know all the names of the exercises, but nothing was new to me. […] I've seen every professional, and have tried everything, […] it's not so much the exercise, even though the exercise worked […] But the thing that was different was the chats that we had, the conversations."*

Upon follow-up, both dyad members reported that these conversations covered many topics, starting with an in-depth interview and progressing to PSE and implementing behavioural change. Recipient F (45 y/o male) noted that in these conversations, *"she explained to me where pain comes from, and how your attitude and your brain plays a role. How life at home, life at work, your diet, how everything plays a role in pain, and how you experience pain, and how your body deals with pain. So that was very, very interesting".* He also noted how the conversations flowed into various behavioural changes, which in turn became potent pain-relieving habits which were combined with in-session pain-relieving modalities. Provider D (OT) also felt that the recipient's *"preconceived idea around what OT was, was definitely a barrier that I had to dismantle and kind of rebuild into what it actually can be".* Recipient D (50 y/o female) corroborated this, saying that she "*didn't understand why the occupational therapist, [and] what is occupational therapy actually [was]. I was being very ignorant …"*. This quickly changed, however, as the Recipient valued the provider's skilled communication early in the first session, reflecting that "*It's not about what you say but how you also say it and how she allowed me to speak*" and that this made the Provider more "*approachable*". In that session, Recipient D observed that the primary aspect that captured her attention was that osteoarthritis can be pain-free. This concept of pain education related to information the Provider gathered earlier: "*the doctor initially told me about that I have osteoarthritis. I was like oh my god don't tell me that my hands are gonna look like my mom's and I won't be able to play sports and I won't be able to […] go for walks" (Recipient D, 50 y/o female).* The pain education reassured her, and this reassurance facilitated a productive session. Recipient C (47 y/o female) had had previous physiotherapy treatment which influenced her mindset: *"So, with physios, so I have a history now. […] So, already I was in that prejudiced mind, like just do what you must do and get it over and done with. […] You're not doing actually anything to uplift my life. So, there already, I came in like that to her".* In contrast, some previous healthcare interactions were reported to also have positive influence on engagement in PSE. For example, Provider E stated: "*I think the OT that referred her primed her very well, because from the first moment, she was willing [and] the building of the therapeutic relationship happened very quickly".* Provider G (PT) noted that Recipient G arrived with a positive attitude and she *"was ready to engage for an extended period"* because her funding was pre-approved by her medical aid. Interestingly though, her engagement was directed not toward PSE but rather core strengthening exercise as this had been discussed by the referring doctor. These beliefs about treatment, provider competence and being informed about the provider were, therefore, perceived to be helpful or unhelpful in supporting the therapeutic alliance, which in turn influenced the pain reconceptualisation process.

Engaging in PSE-informed care

This theme pertains to the positive impact that implementing the PSE principles had on reconceptualisation. PSE communicates the concept that pain is a biopsychosocial phenomenon and that addressing these domains (biology, psychology, and social elements) can improve pain. Participants reported that implementing behaviour change based on PSE principles helped reconceptualisation. Pain can limit one's participation in valued activities, which in turn can have an adverse impact on psychological aspects such as mood. Returning to valued activities that had been negatively impacted by pain was identified as an element that supported reconceptualisation in various dyads. For instance, Provider F (PT) noted that a walking programme addressed stress levels and mood: *"[Recipient F] did that a few times,* *and [when] he experienced that, then he was hooked, and he felt better as he drove to work, and he felt better throughout the day, and that's actually what got him walking*". Provider I (OT) had a similar perspective, stating that "*when we start to be able to put it [valued activities] into daily tasks and changing things in our context, um, that start to bring fulfilment and a sense of joy. That's where it kind of really hits home."* Provider G (PT) reported that behaviour change, specifically exposure to exercises that Recipient G (38 y/o female) had been avoiding, and pain reconceptualisation were part of a broader shift:

> "*I think her mobility and the function that improved and the pain that decreased was a building block in terms of function. So, she gained more confidence as the experiential knowledge […] evolved. […] it seemed like one concept of function and mobility and everything was sort of building on each other".*

Another functional domain where PSE-informed care made a positive impact, was in a work context. In Dyad C, a change in the Recipient's work environment supported reconceptualisation. Recipient C (47 y/o female)'s persistent pain made her less productive at work, and she was under pressure to reach her targets due to an upcoming performance evaluation. This affected her perspective on her health, as she felt compelled to accelerate the healing process by means of surgery, as demonstrated by her comment: *"Am I going to do the operation? Am I not going to do it? So, those things were there in my brain already"* Recipient C (47 y/o female). This back-and-forth related to her prior experience with having failed rehabilitation and successful surgery for another injury that negatively impacted her work performance. Provider C (PT) addressed the work-related stress by contacting the employer and arranging accommodations, including changing the Recipient's work schedule to exclude night shifts. After that, Provider C noted that "*the pain was better in general, she could function better with everyday things. And in my opinion, the fact that her sleep cycle stabilised, also made a difference in her pain"*. Recipient C (47 y/o female) also noted a change in pain and increased productivity when she worked only day shifts: *"So, for her even to take me off night shift and place me day shift was also big, it was like a huge impact"*

Two subthemes were identified as being influential in implementing PSE-informed care, namely having social support and adequate access to care.

Social support. Participants reported that receiving social support in the application of PSE principles aided reconceptualisation. Recipient F (45 y/o male) said *"[my wife] understands how important mental wellness is. […] she actually laid on the floor and did some exercise with me. And she started walking with me, so we really put an effort in to start walking together".* When asked whether the support from his wife helped reconceptualisation, he replied *"Yes, it definitely helped. My wife, for instance, is very much interested in how the brain works […] and she supported this mind shift".* Social elements were also found to be a hindrance to reconceptualisation, as experienced by Dyad I. Recipient I (55 y/o female)'s spouse also had persistent pain, but had a different (biomedically based) understanding of pain. He also believed that persevering (his coping mechanism) was the best way to deal with persistent pain. This perspective was contrary to what Provider I was trying to teach in the PSE, and the social influence was perceived by Provider I (OT) to hinder reconceptualisation: *"[Recipient I] felt totally judged. She didn't feel like [her spouse] really understood where she was coming from, […] because he's also got pain, but I don't think he really appreciates […] how much pain she's got…"*. To address this barrier to reconceptualisation, Provider I did a combined session with the Recipient and her spouse which navigated the negative social influence:

> *"We explored some of the psychosocial stuff around [the spouse's] pain, which was quite insightful for both of them, and I think especially for him even. And then we explored some of the things around her, her experience of her pain, and he also seemed quite shocked. And towards the end, I think she felt quite validated that her husband was actually understanding"*

Recognising the evolution that can take place in contextual elements relevant to pain is useful. These cases illustrate that social elements can help or hinder reconceptualisation in the initial stages, but with the right approach, unhelpful elements can be addressed and even become helpful.

Access to adequate care. This subtheme emerged as participants noted that spending a sufficient amount of time on PSE was beneficial to reconceptualisation. This subtheme can, therefore, be defined as having access to multiple sessions of care. As discussed, participants reported that building a therapeutic alliance and receiving other pain-relieving modalities alongside PSE supported reconceptualisation. Other helpful (and time-intensive) elements were revisiting pain concepts and giving feedback about between-session experiences (e.g. exercise). Recipient C (47 y/o female) valued having multiple sessions, to reflect on exercise and adapt accordingly: "*I think for the third meeting, it started elevating for me because then she asked 'Did this work?', so that was nice. When she started asking, 'Did this work for you? How did you feel with this exercise?', that there started to be a game changer for me".* Provider B (PT)'s statement relating to the necessity of progressing at a pace that supported the patient best - she "*gently kept reinforcing the contextual nature of pain*" by slowing down the PSE process. To accommodate this, they completed multiple sessions where the provider did minimal in-person PSE and then communicated asynchronously between sessions, with Recipient B (56 y/o female) noting that "*I think what really helped me and made me kind of, not believe her more but trust her more, was that she stays in touch all the time*". The main barrier to adequate PSE voiced by recipients was about funding. This was illustrated by Provider H, who said that *"[Recipient H] told me is that if [the therapy sessions weren't covered by medical aid], she wouldn't have been able to attend something like that, and definitely not the full set".* Recipient F (45 y/o male) shared the same opinion, noting that

> "*if the doctor said to me, 'Go see a physio, it's going to cost you a thousand rand a session,' I would have said, 'Thanks, but no thanks.' I would rather hang in there with the pain, because I don't have a thousand rand per session. But because it was free, […] I said, 'Well, bargain. I've got nothing to lose.'*" (Recipient F, 45 y/o male)

Themes that influenced reconceptualisation directly

Several themes emerged that directly influenced the process of reconceptualising pain. These were a change in pain intensity, elements relating to the recipient's beliefs and internal processing, and providers that tailored PSE delivery methods in ways that were conducive to learning.

Change in pain intensity

This theme relates to a change in pain intensity that influenced the recipient's understanding of their pain's causation, features, or phenotype. Pain intensity changes were both helpful and a hindrance to reconceptualisation**,** highlighting an incongruence in dyadic perspectives**.** Decreased pain intensity helped reconceptualisation overall. Some participants reported that it made them trust the PSE content more: *"If I hadn't improved, I wouldn't have thought it was valid, you know?"* (Recipient B, 56 y/o female), "*It's telling me that there is real value in the things that he's telling me. You know, I believe what he's telling me" (Recipient G, 39 y/o female).* Dyad F were in agreement that increased pain was a useful part of the reconceptualisation process, as reported by Recipient F (45 y/o male) *"on day one, I went to walk really far with my wife, and I had so much pain afterwards, and then [Provider F] actually explained to me, like you actually overdid it a bit".* Increased pain intensity was an area where dyadic perspectives were incongruent at times, as illustrated by Dyad A. Provider A (PT) felt that *"[Recipient A] realised these stressors are aggravating everything and […] contributing to her pain, and once you realise that she realised that her pain can be managed better in this new mindset*". In other words, the provider felt that it supported the notion that stress can increase pain. Recipient A (51 y/o female), however, returned to her "*automatic way of thinking [when I had] more pain*" and that some doubt arose as "*you still feel due to the fact that the intensity is different, maybe the pain [cause] is different.*" In dyad G, the provider (PT) reported that increased pain "[helped] *the patient to make sense of what they were experiencing*". The recipient, however, responded to the flare-up by requesting further imaging, looking for structural pathology. In explaining her request for the MRI, she stated that it is "*so we can specifically look at the nerves, the* *ligaments and the muscles, so we can see why they're responding the way that they are*" suggesting that she was not fully on board with her provider's explanation.

Dyads A and G illustrate the emergence of incongruent perspectives in response to increased pain intensity. This dyadic perspective emphasises the importance of understanding a PSE recipient's beliefs about the reasons that contribute to a pain flare-up.

Recipient internal processing

This theme emerged as participants identified internal factors in the recipient that they perceived to influence the reconceptualisation of pain. This theme, therefore, relates to the internal reasoning that a PSE recipient undergoes when engaging with a new concept and includes the elements that mediate this engagement. Elements in this domain that emerged from the data include extant beliefs, recipient openness, recipient emotional state and desperation, and observing pain in parallel situations.

Extant pain beliefs. Pain beliefs formed by pre-existing knowledge influenced the recipients' internal processing and engagement with PSE concepts, and had a mixed influence on reconceptualisation, resulting in another incongruence in dyadic perspectives. From Recipient A (51 y/o female)'s perspective, experiences with other healthcare providers supported the concepts that Provider A introduced during the PSE. She reported that she "*already had some prior knowledge and experience of pain. And [therefore] what [Provider A] said made sense to me*". Provider A (PT), however, had a different perspective, "*[Recipient A] had been to a few healthcare practitioners and had the attitude eventually was that no one can help her*" – thus noting hopelessness and perceiving it as a barrier to engaging in PSE. A similar incongruence is observed in dyad G, where Recipient G (39 y/o female) stated that prior reading about her condition *"…definitely supported this mind shift*". In contrast, Provider G (PT) believed that the influence of other healthcare providers and personal research hindered reconceptualisation as it referred to a different explanatory model for her pain, noting: "*She definitely came to me with this anatomical understanding. She even mentioned to me, okay, so there is spondylosis, right? Or there is a narrowing of* *the spine. So those seeds were sowed in some way into her mind"*. As a result, facilitating the reconceptualisation was challenging:

> *"It was difficult to facilitate the mind shift to tell her, don't […] investigate the structures, that's not in line with the goal we are working towards. So that made it difficult. […] it made me have to explain everything again, and without making her feel like, you know, I'm ignoring all of her hard work that she had actually put in".*
> Provider G (PT)

This provider recognised the necessity of facilitating change while preserving trust. The quotation above illustrates the complexity of navigating recipient beliefs, and the degree of awareness required of the provider to facilitate this process.

Dyads A and G once again exhibit incongruent perspectives, this time regarding the usefulness of existing knowledge and beliefs. This valuable insight reiterates the significance of triangulating experiences and the meaning that different members of the dyad derive from these phenomena.

Recipient openness. The challenge of engaging with and changing old beliefs highlighted another element: Recipient openness . Openness is a personality trait that refers to a broad domain of personality that includes intellectual curiosity and independence of judgment. This element relates to openness that can be considered a combination of trait and situation**,** that influences the recipient's engagement with PSE concepts. Participants identified openness as a helpful element in the process of reconceptualisation, as illustrated by Recipient B (56 y/o female)'s statement when asked what about 'who she is' helped reconceptualisation: "*I would say, it is being, being intellectually open because some people just don't want to know, they want the doctor to fix them".* Recipient D (50 y/o female) reported openness as an inherent trait "*I think I am receptive up to different things. And I, I'd like to believe that I have a sort of growth mindset. So I'm not closed off to new things you know I like to learn new things*." Provider C (PT) had a similar observation when reflecting on her recipient: "*She was actually an easy patient because she was open to the education and curious about what's going on inside of her body and how to improve that* *situation. So […] she was open to what was being taught*". Recipient C (47 y/o female), however, highlighted how openness can present differently depending on the situation: "*I just think the transition of this whole journey with her was me coming in there with my own perceptions, and then the change came after the third meeting with her…"*. This change occurred after two sessions of building a strong therapeutic alliance and the provider responding to the recipient's needs and treatment preferences. She also addressed the recipient's emotional barriers that influenced her openness, as described by Recipient C (47 y/o female):

> "*I was rude. And I'm not normally a rude person, but that was, I knew I was rude that day. I was like, 'no man, don't play around with me, just write out and tell the doctor I'm done. I'm done here, and that's it.' So, she was just looking at me and smiling and said, 'Okay, can you try to speak about it?' […] So, that's the space she allowed it to be in…"*

Emotional state. For this study, emotional state is defined as the condition of the recipient's emotions, especially in relation to its effect on cognitive processing. Emotional state is an ever-present part of the human experience, and it influences how individuals engage with new information. People with PMP may have overwhelming negative emotions, as was evident in Dyad B, with Recipient B (56 y/o female) noting *"the first time I saw [Provider B], I was practically in tears…" and* Provider B (PT) noticed that the recipient had "*so much physical pain [and distress] that she couldn't engage in anything, in any process*". The provider validated the recipient's experience by spending more time listening - making sure the Recipient is "being listened to, being heard, [and] not being dismissed" and adjusted the implementation method of PSE, *"I had to go very gently and very softly because she was very angry and very frustrated" (Provider B, PT).* An interesting adaptation was not only in the PSE delivery ("going very gently and softly") but also in her reasoning behind the pain management strategies she implemented: *"if you're completely in fight or flight you're not going to engage in something higher level like [PSE] so yes, I had to do dry needling and massage [pain management] first before I start bombarding her with a whole lot of pain neuroscience*". In other words, the Provider opted to do pain management and emotion handling before PSE. This approach from the Provider established a deep level of trust, which was an effective foundation for PSE. In Dyad G, both members noted that underlying fear had to be negotiated to deepen reconceptualisation, with Recipient G (39 y/o female) mentioning that *"I think fear holds you back and makes you believe things are worse than they are. So, if you can overcome the fear, you'll definitely look at pain in a different light".* PSE can be reassuring – one of the goals of PSE is to communicate that pain is not an accurate measure of tissue damage, which can have a significant reassuring effect. However, managing fear might be necessary before the PSE to allow the recipient to engage more thoroughly – Recipient C reported that prior treatment failure influenced her emotional state while engaging with her Provider: *"I also went frantic in my brain, because now the first physio's not getting results, I'm not getting results there. So, why is [the doctor] sending me to a different physio also altogether?" Recipient C (47 y/o female).* Once more, Provider C (PT) appropriately navigated this challenging situation by adapting to the recipient's preferences, telling the Recipient that *"You had hands-on treatment and it didn't work for you"* so she *"…focused a lot more on pain science education [and] gave her exercises to get her moving. We adapted her work situation so that she didn't have to walk so much or lift heavy things".* Upon reflection, Recipient C noted the value in Provider C being responsive to her needs:

> *"So, the information that she [gave] me, that was for me crucial. That was like understanding the one-on-ones was crucial. Understanding me, where I am. Seeing, 'Okay, she's pulling her face for this. Okay. She's taking a little bit long to do this.' So, while she was speaking she was observing too."*

Desperation can act as a catalyst for change, as shown by Recipient B:

> *"I think the turning point came when I went to the ER and they did all those tests, […] and they said there's nothing wrong. We can't find anything wrong with you. And then I realized it's not my body, it must be my mind, and I think that is probably when I thought, I have to find out what it is. I was so bad that I couldn't not pursue it. I had to pursue every avenue. I mean, that's why I'm doing meditation, I'm doing yoga, I'm doing all sorts of things that I never considered a year ago"* (Recipient B, 56 y/o female).

This quote illuminates a common contextual element that emerged from the data: Desperation can help reconceptualisation because it motivates recipients to engage with the PSE. Desperation may serve as a catalyst that propels progress from pre-contemplation towards change and supports the individual's engagement with the PSE content. Various providers mentioned desperation as a helpful element. Provider A (PT) noted that *"[Recipient A] was looking for answers - she'd been struggling for a long time with the stiffness and pain, and she was at a point where she was actually desperate".* This emotional response to failed treatment can be contrasted with another element that was perceived by Provider A as hindering, which was the Participant's lack of willingness to engage because of failed treatment, leading to low self-efficacy. This highlights the depth and complexity of the PSE interaction – 'failed' treatment can be a helpful or hindering influence on reconceptualisation. The utility of failed treatment and its resulting emotional state was also emphasised by Recipient B (56 y/o female), noting, *"I was so desperate […], that I started looking into that stuff"* and *"It [failed treatment] helped because [Provider B] gave me a solution… nobody else has come up with a […] solution, so let me just listen to this".* Provider C (PT) noted that desperation helped the recipient to engage even though she had low expectations: *"… she came with a bit of an apprehensive attitude [...], but I think she was desperate enough to be looking for a change in her pain that she wanted to come and try this".* Even though one might consider desperation an undesirable emotion, it could be a force for change and facilitate reconceptualisation.

Observing pain in parallel situations. Observing pain in parallel situations emerged as a contextual element that can impact how one engages with one's own pain experience. This occurred in two dyads and was deemed helpful to reconceptualisation. Both participants in dyad A noted that comparing Recipient A (51 y/o female)'s pain to her daughter's chronic pain was helpful because she saw a similar pain presentation *"…my daughter who has fibro, she always has pain. You realise that this is [also] my brain doing this to me, it's not my body"* (Recipient A, 51 y/o female) and *"comparing things to her daughter, that's when the light bulb went on and she realised that's what's going on in both of them"* (Provider A, PT). Recipient F (45 y/o male) had a similar opinion, even though he had developed a painful condition that was a very different presentation from that of his persistent pain. He noted that *“when I was doing rehab with her, I actually developed shingles. I had all sorts of pain […] and […] she explained to me where pain comes from, and how your attitude and your brain plays a role.” (*Recipient F, 45 y/o male).

Observing and comparing one’s pain to that of others can be beneficial for learning. The usefulness of observation as a form of learning leads one to consider other delivery methods that a provider may utilise when delivering PSE.

Tailoring PSE

This theme relates to the adaptations that providers made in delivering the PSE to accommodate a recipient’s preference or situation. Most PSE was done verbally, and the sequence of delivering PSE after establishing a strong therapeutic alliance was a common element that providers found helpful in facilitating reconceptualisation. This required an observant and adaptable provider as illustrated by Provider A (PT) “*So if I used [in-depth verbal PSE] in the first, second or third session it would not have been effective*” and held back the PSE until *“[Recipient A] really trusted my opinion”*. Provider A also delivered verbal PSE while doing other treatments, which facilitated the PSE conversation – Recipient A (51 y/o female) confirmed this upon follow-up with the interviewer, stating that *“It is definitely easier to talk about pain when one is laying down”*. Providing the appropriate amount of information was also considered helpful. This varied significantly from person to person, as illustrated by Recipient B (56 y/o female), who was initially hesitant about PSE. Provider B (PT) adapted accordingly, noting *“[I] didn't go on and on and [the pain education] wasn't a very long thing it was just […] a statement of fact”.* After the first session, which included establishing rapport and pain management, Recipient B was eager to consume more information and Provider B recommended a mobile application as a source of information. The recipient found it extremely useful, to the point where she “*spent the whole week just listening to this app for about six hours a day”* (Recipient B, 56 y/o female). Another observant provider (Provider E, OT) reported that the recipient’s prior reading *“told me more about who [Recipient E] was as a learner, and the educational approach I needed to follow.”* She observed that the Recipient had done a lot of prior reading and was knowledgeable on the topic, so she opted to give explanations and resources that were more technical than she would normally give. When Provider H (PT) noted that she was struggling to get the PSE message across while sitting face-to-face, she adapted and found *"…it was much easier to talk about these things while we were outside [in the exercise area], exercising, doing things and maybe trying to get the key concepts [across]".* Dyad B used asynchronous methods to transfer and discuss PSE concepts. In retrospect, Recipient B realised that she *"needed this barrage of persuasion [and that] one person telling me one thing for half an hour or an hour wasn't going to do it".* Provider B (PT) echoed these sentiments by noting

> *"…that's […] where the pain neuroscience is being kind of reinforced with these extra resources and then I'm just checking OK what are they coming up against in terms of their own concept in their own paradigm …"*

Dyad G also noted that the home exercises were a useful asynchronous element that was discussed in each follow-up session. Provider G (PT) oriented the recipient at the end of the session that their "*homework is to come back […] with more questions*", and follow-up questions were then often linked to the PSE. This was a bridge that transformed the theory of pain education into something more practical and experiential. Some providers went deeper into practical, experiential PSE**,** linking in-session pain modification and sensory-affective awareness to pain education targets, as described by Provider B (PT):

> *"I use the hands-on or the needling [to] reinforce the idea that it's the nervous system that's generating pain. In other words, I will use the opportunity of maybe working with pain through massage as an example later […] like 'let's see if you can stay with that experience and notice what's happening in your heart' or 'let's see what's happening in your mind […] when you feel the pain coming on' […] this is actually through experience…"* (Provider B, PT)

In Dyad F, both participants reported that when the recipient developed an unrelated painful condition, it presented an opportunity to explore and experience a different pain mechanism and compare it to their persistent pain condition:

> *"I think it was good for him to see that you've got different types of pain, and pain has got different origins, and we could discuss how shingles works. You know, and that this peripheral nerve, this, this was a neuropathy, and that was a different type of input from what he's getting from his back, which is the chronic pain. So we could say these two are different things"* Provider F (PT)

Provider G (PT) noted that experiential knowledge was helpful in their context, because *"[Recipient G] gained more confidence as the experiential knowledge […] evolved"* and overall treatment could progress. The wide range of delivery methods emphasises the depth and breadth of the challenge and opportunity that a provider has to deliver PSE in a manner that helps reconceptualisation.

The abundance of themes gives insight into the elements that helped or hindered these participants' reconceptualisation of pain. Reconceptualisation challenges are common but can be overcome if the provider navigates these situations skilfully. These findings can be interpreted and extrapolated to better understand the state of the art of PSE and may inform future PSE training and implementation.

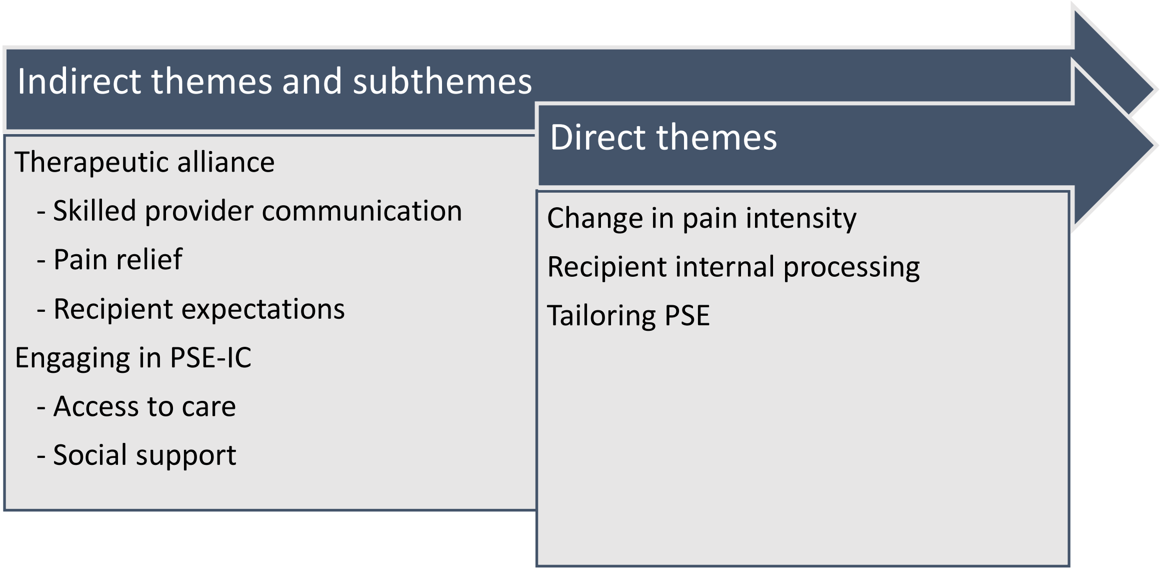
Chapter 5

Discussion

This thesis set out to explore and understand the elements that influenced the reconceptualisation of pain during a PSE intervention. To enhance this understanding, the thesis interviewed members of PSE dyads and specifically examined contextual elements that either helped or hindered the reconceptualisation of the concept of pain. The experiences of PSE dyad members provide valuable insights into the essence of the PSE process and the reconceptualisation of pain as perceived by these participants.

Sequence of themes

Five themes and five subthemes emerged from the data, representing elements that participants perceived as influencing reconceptualisation. During the data analysis, it became clear that these themes emerged in a distinct sequence during the PSE intervention: When asked which elements facilitated the reconceptualisation of pain, participants frequently cited aspects such as therapeutic alliance (a supportive provider, clear communication, trust), decreased pain, and revisiting pain education concepts as beneficial. When the interviewer followed up on these elements’ role in reconceptualisation, participants remarked that these did not directly influence their pain reconceptualisation (or “mind shift"), but it made them more receptive to the PSE. These themes formed the foundational elements that had to be established to make direct approaches more effective. Consequently, the themes and subthemes will be discussed in the same order, starting with the indirect themes, followed by those that have a direct influence on reconceptualisation.



Note 1. This figure illustrates the sequence in which themes arose during the PSE, and how the direct themes flowed from the indirect themes which occurred first during PSE sessions.
Note 2. PSE-IC = PSE-infored care

Figure 2. *Sequence of themes*

The bidirectional relationship between the contextual factors that influence reconceptualisation

Reconceptualising pain entails a complex interplay of various factors, and notably, the identified themes have a bidirectional influence on each other. Some themes were collectively regarded as supportive of reconceptualisation (e.g., pain relief), whereas others presented areas of incongruence (e.g., extant pain knowledge). There was also no element that was universally considered a hindrance to reconceptualisation. Considering this, a provider who wishes to facilitate reconceptualisation effectively must understand, observe, and respond to a multitude of contextual elements. This 'tailored approach' is in line with the recommendations for optimal PSE delivery (Moseley and Butler, 2017, Nijs et al., 2020). The interdependent nature of these elements emphasises how the two members of the dyad collaboratively navigate the PSE interaction.

Therapeutic Alliance as a foundation for PSE

Therapeutic alliance flows into every element of PSE. This theme was common; in fact, all dyads had a positive outlook on their relationship. PSE providers highlighted how they used skilled communication to establish rapport and build a collaborative relationship. They either found or established new common ground. These are in line with the key elements of therapeutic alliance described by Wampold and Flückiger (2023). Providers were also responsive to the recipient's needs, which made the recipients more willing to engage with PSE later on. Tvalue of a strong therapeutic alliance was evident in various other contextual elements. A trusting relationship between PSE provider and recipient can have an analgesic effect in its own right (Rossettini et al., 2018), and participants reported that experiencing pain relief increased their trust in the provider as well as the new concept of pain. Furthermore, evidence suggests that a supportive therapeutic alliance positively influences emotional state (Wampold and Flückiger, 2023), which in turn is a key element in how a recipient will engage with a new concept like PSE (Nadelson et al., 2018). Trust in a provider, their modalities, and advice also influences a recipient’s adherence and motivation to engage in care (Ward, 2018), and this engagement offers opportunities for PSE-informed care that facilitates behavioural change and other pain-relieving practices.

Subthemes were identified that influenced therapeutic alliance, namely pain relief and the recipient’s expectations of treatment. Pain relief emerged as another common theme linked to reconceptualisation. Experiencing less pain fostered greater trust in the provider and the modalities they utilised, including PSE. Participants noted that pain relief enhanced the credibility of the PSE, even though it conflicted with some existing beliefs they had held. Although there is ample evidence that a strong therapeutic alliance can facilitate pain relief, existing knowledge about the influence of pain relief on therapeutic alliance is scarce, but pain relief does increase patient satisfaction (Lee et al., 2020). Evidence suggests that pre-conceived ideas of healthcare providers can affect trust and treatment expectations positively (Peerdeman et al., 2021). Low expectations, described as scepticism, emerged as an element that hindered reconceptualisation. Two OTs (Providers D and I) reported that recipients presented with low expectations, mainly because they had limited knowledge about OT and perceived benefits were minimal. PTs (Providers C and F) also indicated that initial trust levels were low due to recipients' previous experiences with physiotherapy. Providers perceived that low levels of trust had a negative impact on reconceptualisation, as recipients were less likely to engage in the PSE and PSE-informed care. Recipients with a history of failed treatment also displayed a negative emotional state in initial sessions, which Providers needed to mitigate before they could effectively deliver PSE (e.g., Dyads B and C). The pre-conceived ideas about the provider were also helpful when they were positively formed by the referring clinician (as was the case with Provider E) and when the Recipient read positive comments online (as reported by Provider G).

Engaging in care

Another significant benefit of exploring PSE in a real-world context, was to explore participants' reflections on reconceptualisation as it occurred in conjunction with other treatment and life events. In practice, PSE forms a part of a greater pain care process and may take place over a period of multiple weeks to months, as illustrated by this population who averaged six sessions of care per dyad. Themes that arose from these practicalities of PSE implementation included engagement in PSE-informed care and having adequate resources to attend multiple sessions.

Participants found that implementing strategies based on PSE supported the reconceptualisation process. This included returning to valued activities like (exercise, hobbies) (Dyads C, F and I), and is supported by evidence that suggests that returning to valued activities improves emotional state (Kirsh et al., 2019). The impact of decreased work productivity can be severe, and a return to working at full capacity improves stress and emotional state, which in turn can influence how a recipient engages with PSE (Hill and Macartney, 2019). Provider C facilitated this by contacting Recipient C's employer and arranging short-term accommodated duties, agreeing to exclude painful movements like heavy lifting from their daily routine. This was reported by the recipient as an event that significantly improved her stress levels. Provider C also arranged a change in the shift schedule. They opted for this change because the recipient reported having increased pain during night shifts and struggles to sleep during the day due to family responsibilities. Decreased sleep quality is associated with poorer functioning, increased emotional distress, higher levels of catastrophising, and greater pain intensity (Burgess et al., 2019). This change in work schedule, therefore, facilitated another key ingredient of PSE-informed care, namely improving sleep quality. Implementing these strategies may have had a direct influence on pain, but also may have been an extension of PSE principles into behaviour which allowed recipients to engage with the PSE message and pain concepts more frequently and on a deeper level. Implementing PSE-informed care was also facilitated by supportive spouses who joined in with behavioural change. In Recipient F, that included diet adaptations that their spouse initiated, and for Recipients D and I that included discussions about PSE and PSE-informed care strategies at home.

All but one dyad (D) completed multiple treatment sessions and many reported that having multiple sessions supported reconceptualisation. Providers reported that developing a strong therapeutic alliance before conducting PSE was critical, as recipients often were not receptive to it in the initial sessions. This was illustrated in Dyads A and B, especially, where providers provided minimal PSE initially, but later could impart more educational content. Revisiting pain concepts proved valuable for various dyads, with additional resources, home exercises, exposure activities, and a return to valued activities between sessions serving as helpful educational talking points in follow-up sessions – this particularly featured in Dyad G. One significant aspect that emerged from this extended engagement process was funding, with some participants (Recipient F and Provider H) clearly stating that PSE and general care would not have been feasible without the provision of funding.

The members of the dyad

The therapeutic alliance is formed between two individuals, each with their own contribution to the interaction. Between them, they form a mutual understanding that ultimately supports or hinders the process of pain reconceptualisation.

In the PSE recipient, reconceptualisation is influenced by a multitude of factors that mediate their engagement with PSE. The way a recipient engages with new pain-related information depends on their motivation and ability to observe and gather information about the new conceptual model (Nadelson et al., 2018). Contextual elements that influenced this engagement emerged in the data as recipient openness and emotional state, extant knowledge, and observational engagement. Knowledge and beliefs about pain are formed and modified by life experiences and are present in (practically) all people who seek pain care (Ahenkorah et al., 2019, Caneiro et al., 2021). In this study, a recipient's openness to new information was often linked to desperation, with Dyads A, B, and C reporting desperation due to high pain intensity and failed treatment. Interestingly, Providers B and C explicitly noted that their recipients were desperate but not open to PSE initially, their recipients (B and C) reported the Providers' skilled communication (attentive listening, validation) and responsiveness to their needs (pain relief) facilitated their openness to PSE as their sessions progressed. Recipient D considered openness to be an inherent trait, but also that there was a strong connection with their provider. The decreased quality of life and an increased mental health load that accompanies persistent pain may bring forth unhelpful emotional states (Maher et al., 2017), and this was the case for Dyads A, B, C, and E. These may hamper the recipient's ability to engage with the PSE, but skilled provider communication (attentive listening, adapting treatment and PSE to the recipient's emotional state and ability to engage) navigated these challenges successfully. The recipient elements that influence reconceptualisation are malleable, and these data suggest that they often evolve throughout the PSE process, mainly facilitated by the therapeutic alliance. This progression of contextual elements relies greatly on the provider's ability to manage the interaction in an appropriate manner (Linton et al., 2024). In a more direct sense, observing pain in parallel situations is a theme that has not commonly been explored in the literature. Dyad A reported on the usefulness of comparing the similarities of the recipient's pain features to those of a family member with fibromyalgia. Both members of the dyad felt like that was the most influential direct influence on reconceptualisation. Similarly, Dyad F valued observing and discussing another painful condition (shingles), which could then be contrasted with the recipient's pain features. Although evidence on this phenomenon is limited, Ashar et al. (2022) included 'gathering evidence' about the pain features in their intervention and used this as a self-learning and reflective exercise to support the new concept of pain to great effect.

To create an atmosphere where PSE and reconceptualisation can flourish, a provider must be able to establish a strong therapeutic alliance, notice and facilitate the recipient's internal processing, and deliver PSE tactfully – all in conjunction with applying other pain-relieving modalities (Linton et al., 2024). The PSE providers in this thesis were experienced and capable, which led to deeper insight into skilled PSE. Skilled communication like early attentive listening to understand the recipient's perspective, using humour to establish rapport, simplifying key terms and using metaphors were all useful in establishing therapeutic alliance and conveying pain concepts. These can be considered person-centred communication strategies and have a strong evidence base supporting their utility (Street et al., 2009, Ward, 2018). The data suggests that being responsive to recipient needs supports reconceptualisation. Deliverers A, B, C had to adapt the sequence of care, often to provide pain management first while slowly drip-feeding PSE until a more opportune moment for further education. This responsive and collaborative process may fit well into a motivational interviewing communication style, which is a patient-centred approach that aims to increase cognitive and behavioural awareness about behaviour change (DiClemente and Velasquez, 2002). Motivational interviewing has been put forward as a communication strategy that compliments PSE and can potentially increase adherence and long-term outcomes (Nijs et al., 2020). Providers delivered PSE through various methods, including verbally (face-to-face, during exercises, and while the recipient received other treatment), drawing pictures, and watching videos. One key helpful aspect was the flexibility that providers demonstrated in choosing the appropriate delivery method for the recipient at the right time. This timing – delaying the PSE until after a strong therapeutic alliance had been established – was a particularly common approach that providers identified as being helpful. Another was recognising when a recipient was not responding as intended and subsequently altering the delivery method. Provider A combined PSE with massage, reporting that altering the recipient's positioning facilitated more openness and engagement. Provider H moved to a different area (the exercise area) and found that PSE flowed more effectively while exercises were being performed. Others chose to do PSE mostly asynchronously, providing resources for recipients to follow up on in between sessions while still scaffolding the basic educational concepts in-person and in conjunction with other treatment. In their interviews, Providers B and H mentioned that their confidence in their own skills facilitated reconceptualisation because it created a perception of competence, which in turn made their recipients more open toward the PSE. They attributed this confidence to having trust in the PSE content, and their clinical experience (referencing adequate communication skills, pain assessment skills, and treatment skills). Managing pain through other modalities was also identified as a helpful theme, without which the chain of events that lead to reconceptualisation could be permanently altered. This is illustrated clearly in Dyads A, B, C, and G. Recipient B even reported that if they had no pain relief, they would not have been receptive to the PSE.

Extant knowledge of pain relief as a facilitator of reconceptualisation is scarce – this thesis could not find any such literature. This may speak to a strength of this study, which explored PSE qualitatively in a real-world context where PSE is implemented alongside (and influenced by) other interventions.

Pain Fluctuation, an Ever-Present Influence on Reconceptualisation

A change in pain intensity strengthens the therapeutic alliance, and directly facilitates reconceptualisation by lending credibility to the PSE message as well as extending the theoretical knowledge into the experiential realm. One cannot blame a person seeking pain care for seeking one thing out above the rest – pain relief. This theme emerged in the data in two ways – indirectly pain relief increased trust in the provider and gave the PSE perceived validity. In a direct sense, pain relief helped the recipients make sense of pain, experiencing the physical nature of the theory they had been taught. The delivery of PSE differed greatly between dyads, and the experiential nature of PSE was an element that supported reconceptualisation in a novel manner. Although PSE is intended to be accompanied by PSE-informed care (Moseley and Butler, 2017), the transition to PSE-informed care may indeed involve “experiencing the PSE”. Just like a chemistry student needs theory and practical sessions under guidance before they can become a chemist, it seems like PSE recipients value theory and practical (experiential) pain education before taking on the task of self-management. The value of experiential PSE became evident in this data set, and once again this theme hinges on the ability of skilled providers.

Incongruent perspectives

The interconnectedness of the PSE interaction highlights how vital it is to nurture shared perspectives. By doing so, we can enhance pain management for the best possible outcomes. Exploring the perspectives of PSE dyads illuminates the similarities and differences within these views. Understanding the meanings that each member attributes to various phenomena – in this case, elements influencing pain reconceptualisation – triangulates areas where perspectives are congruent and where they are incongruent. Hidden incongruencies may lead to failed reconceptualisation, but understanding the potential areas of incongruence allows skilled providers to overcome this challenge.

For these participants, the dyadic perspectives were mostly congruent, but two main areas of incongruence emerged: existing pain knowledge and beliefs and experiencing increased pain. Pre-existing pain beliefs are present in all PSE recipients, these data suggest that a provider may not know the details of these beliefs. Understanding a recipient’s beliefs about the explanatory model they believe is causing their pain, what other healthcare providers recommended for treatment, and what the recipient believes regarding their prognosis may be critical factors to address to achieve reconceptualisation. Increased pain led recipients to doubt the diagnosis and the cause of their pain, despite providers believing they had effectively managed the flare-up (i.e., in accordance with PSE principles). Interestingly, these elements were also present in other dyads, yet the members of those dyads successfully navigated these challenges. This perspective may inform the current state of the art in PSE and guide providers to fully explore these elements to ensure that congruent perspectives are maintained.

These findings suggest that successful pain reconceptualisation relies on the implementation of two key sequential factors: Firstly, a strong therapeutic alliance, then flexible and accurate PSE delivery. This is in line with Linton et al. (2024)’s recommendation on core competencies that clinicians must possess to successfully implement psychologically informed care. These include person-centred communication, the ability to form and maintain a therapeutic alliance, and having the knowledge and ability to adapt care according to recipient feedback.

Methodological Reflections

IPA was particularly apt for this study as it allowed for an in-depth exploration of personal experiences, capturing the subjective nature of pain reconceptualisation. Implementing an IPA framework also lent itself to exploring phenomena in depth, using both perspectives of the PSE dyad to interpret participants' experiences. The small sample size typical of IPA limits the generalisability of the findings. Future studies might benefit from larger samples or mixed methods to validate these insights. Improving PSE may rest on communication strategies, and comparing different communication strategies in observational studies may add value to this field.

Study limitations

A significant study limitation was that selection bias was likely toward dyads that favourable PSE outcomes, as illustrated by all providers noting that they achieved their PSE goals. This may have decreased the depth and quantity of hindering elements that could have been identified if unfavourable outcomes were also explored. Nonetheless, the value of exploring elements that hindered reconceptualisation became clear as the thesis elicited perspectives of how these elements could be overcome. Two professions (PT and OT) were represented in this population, giving it a bias toward the experiences of therapists and their PSE recipients. These professions were selected as they were the most prevalent professions delivering PSE in the literature reviewed for this thesis (Louw et al., 2017, Louw et al., 2016). There was no standardised training of PSE for providers, so the content and process of PSE varied significantly. This variation is, however, in line with current best practice and exploring participant experiences may give insight into the 'real world' elements that influence the reconceptualisation of pain. As with all interviews, recall of events that happened weeks or months before the interview may not be fully accurate. Nonetheless, exploring the meaning participants made of their experience shed light on various contextual elements on PSE and pain reconceptualisation. Providers' perceptions of elements that influenced reconceptualisation were subjective and could have been inaccurate. It was, however, still valuable to explore providers' perceptions because providers tailor educational content according to their perception of the recipient's motivation and cognitive engagement (Nadelson et al., 2018). The order of the interviews within the dyad (i.e., recipient first vs. provider first) was not alternated as planned, but overall, the interviews with provider first vs. the recipient first were equal (n=8). Recipient E was not interviewed due to scheduling difficulties. This thesis acknowledges that, as with all qualitative research, the interviewer's biases played a role in the interview and interpretation of data (Korstjens and Moser, 2018).

The investigator is a physiotherapist who views PSE as a valuable treatment strategy and had been delivering PSE for five years prior to this thesis being conducted. This may have been evident in their communication and interpretation of the interviews. A reflexive journal was kept to assess how their bias influenced the approach to this study, including the interviewing and data analysis processes.

Implications and Future Directions

These findings support the notion that pain education programmes ought to be highly individualised, considering not only the content but also the context of delivery. Findings also suggest that cultivating a strong alliance can significantly enhance the depth of pain reconceptualisation, as well as treatment outcomes. This study contributes to understanding PSE as a dynamic process that is strongly influenced by contextual factors, potentially influencing how PSE is conceptualised in medical literature. Unexplored factors that emerged from this data include the influence of pain relief and increases on reconceptualisation, the indirect effect of the availability of care as a facilitator of reconceptualisation, and the elements which are perceived to hinder reconceptualisation can be navigated successfully. This thesis offers valuable insights into the intricate and nuanced process of PSE, particularly by examining dyadic perspectives that reveal where viewpoints align and differ.

Further research could explore how different PSE delivery methods impact the depth of pain reconceptualisation. This could also be extended to diverse demographics. Longitudinal studies could examine the longevity of reconceptualisation effects, especially as it related to pain-related behaviour.

Sourcing participants (providers and recipients) who have had negative experiences with PSE may also give insight into more areas where dyadic perspectives are incongruent, identifying areas that can be addressed to ensure greater benefit from PSE intervention. Future studies should investigate the experiences of dyads with weaker therapeutic alliances or where participants fail to achieve pain reconceptualisation or symptom improvement. These cases could clarify barriers to successful PSE implementation. Such research can enhance the current findings by highlighting factors that affect the application of PSE-informed care across various patient-clinician interactions”

Conclusion

The intricacies of the PSE process highlighted in this thesis give deeper insight into the challenge of implementing PSE successfully. The thesis underscores the necessity of considering not only the informational aspect but also the emotional, relational, and situational contexts in which pain education occurs. This insight was enhanced by exploring two perspectives of the same interaction, allowing the thesis to find areas where dyadic perspectives were incongruent. Highlighting the importance and novelty of these contextual elements may inform PSE providers about elements to consider when delivering PSE. Moreover, by integrating these findings into clinical practice, there is potential to significantly improve the reconceptualisation of pain in people seeking pain care, and so improve their quality of life.

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APPENDICES

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APPENDIX 1

Consent for contact

I, ____, hereby give consent for Stian le Roux to contact me regarding participation in a research project.

My preferred mode of communication is
(please tick the preferred box and then add your contact details in the next column)

	Phone call	Tel nr:
	E-mail	Email address:
	WhatsApp message	Cell nr:
	Other	Details:

___________________ ______________________

Signature Date

APPENDIX 2

Request for participation letter

Good day

I am a researcher from the University of Cape Town, who is conducting interviews for my M. Phil. Behavioural Medicine degree.

If you are a physiotherapist or occupational therapist, who is passionate about pain management and understanding the complexity of the healthcare interactions, please consider taking part in my study.

The title of my research is:
Exploring helpful and unhelpful elements of Pain Science Education (PSE) in dyads of people seeking pain care and their clinicians.

My research pertains to the experiences of patient-clinician pairs (dyads) – that is – the experience of a clinician and their patient with regards to their PSE interaction. I aim to recruit physiotherapists and occupational therapists, and 1-2 of their patients, and interview both parties after they completed their PSE as a part of routine care.

<u>What will be expected of you when you sign up?</u>
Participants (clinicians and 1-2 of their patients) will be interviewed separately about their PSE experience. These interviews can be done online (or in person if you live in Gqeberha, South Africa) and will last for approximately one hour.

If you are willing to participate or would like more information, please click on this link __________________ and fill in your contact details so that I can get in touch with you. Alternatively, you can send me an email or text message and I will happily give you more details about the study.

You will be eligible to take part in the study if:

- You are a physiotherapist or occupational therapist
- You deliver PSE on a weekly basis
- You have been delivering PSE for more than two years
- You can communicate fluently in English or Afrikaans

Your patient will be eligible to take part if:

- They are 18 years of age or older
- They have had persistent pain for more than three months before consulting you
- They can communicate fluently in English or Afrikaans
- They have no disease or illness affecting their memory

I look forward to hearing from you!

Stian le Roux
Email: stianleroux131@gmail.com
Cell: 0832601984

APPENDIX 3

PSE checklist for providers

Pain Science Education Checklist Participant number ____________________

Please tick the box next to the Pain Science Education content that you communicated during your intervention with ______________________

☐	The relationship between nociception and pain (OR between tissue state and pain) varies
☐	Pain is influenced by biological, psychological, and social factors
☐	We are bioplastic and (neural) sensitivity can change/update
☐	Pain motivates protective behaviour OR fulfils a protective role

Did you implement one or more of the above 'concepts' in a practical / experiential manner (e.g. exercise or exposure to feared activities) ?

☐	Yes
☐	No

If yes, how did you implement the above in a practical / experiential manner?

PSE criteria compiled by Ryan et al. (2022)

APPENDIX 4

Concept of Pain Inventory for Adults (COPI-Adult)

Instructions: These sentences are about what you think pain is, why you feel pain, and how you feel pain. Please read each sentence carefully. Indicate how much you agree or disagree with each sentence by marking the appropriate box.

Item	**Strongly disagree**	**Disagree**	**Unsure**	**Agree**	**Strongly agree**
1. Feeling sad can make you feel more pain					
2. Doing something you enjoy can make you feel less pain					
3. Feeling pain for a long time can make the brain more sensitive to warning messages					
4. You can feel a lot of pain even when an injury is small					
5. Learning about pain can help you to feel less pain					
6. You can have an injury and feel no pain					

7. The brain can make pain better or worse					
8. You can feel a little bit of pain even when an injury is big					
9. Pain usually feels better if you move your body a little bit more each day					
10.The brain processes lots of details before you feel pain					
11.Resting for a long time can make pain worse					
12.Pain is a feeling that is made by the brain					
13.Pain can be too protective if it stops you getting moving again					

Pate, J. W., Simons, L. E., Rush, G., Heathcote, J., Hancock, M. J., Hush, J. M., Verhagen, A., Pacey, V. (2020)

APPENDIX 5

Demographic questionnaire (PSE recipient)

Participant number _________________

Age	
Gender	
Home language	
What language(s) can you speak fluently?	
Cultural identity (how would you describe your own culture)	
Highest education level	
Concerning your latest pain complaint for which you received treatment:	
For how long have you had pain prior to starting treatment with your therapist?	
What diagnoses have you been given? (you may write down more than one)	

How many healthcare providers have you seen for your pain?	
What other ongoing (chronic) health problems or concerns do you currently have?	

Demographic questionnaire – PSE provider

Participant number ________________

Age	
Gender	
Home language	
What language(s) you can speak fluently?	
In what language(s) can you effectively conduct Pain Science Education?	
Cultural identity (how would you describe your own culture)	
Highest education level	
Profession	
Work setting (e.g. neuro rehab)	

Concerning your general PSE experience:

For how long have you regularly been using PSE as an intervention?

For which patient profile / pain presentation would you generally use PSE?

What training have you received in PSE and how to implement it?

Concerning the PSE intervention with your patient:

How many sessions did you do in total? _________________________

How much time did you spend on PSE, approximately? _________________________

In what language did you deliver PSE? _________________________

How did you deliver the PSE? (One-on-one, group setting, verbally, PowerPoint presentation, booklet, informational video, other?)

What was your goal in implementing PSE, what did you hope to achieve?

Do you think the PSE was effective, and why?

APPENDIX 6

Interview guide: PSE recipient

PARTICIPANT NUMBER:	DATE: (DD/MM/YYYY)	START TIME:	END TIME:	INTERVIEWER INITIALS:

QUALITATIVE INTERVIEW GUIDE:

Thank you very much for allowing me to interview you. I am Stian le Roux, and I am a researcher from the University of Cape Town. I am conducting a study that focuses on your experience of Pain Science Education, which was a part of your pain management with _________________ (your therapist). I would also like to know your thoughts and feelings about the Pain Science Education process.

You can choose whether you prefer to do the interview in English, in Afrikaans, or in a mix of both. Please tell me if the words I use in the interview are confusing – I will rephrase questions if you would like me to.

The questions I will ask are about your experience. There are no wrong answers, as I am interested in your story. Because of your experiences, you are one of the few people who can help me better understand how pain education is received. Your opinions are very valuable, and I thank you for taking the time to meet with me today.

We have just reviewed the consent form, which describes this part of the study in detail and gives us permission to ask you these questions. Some of the things we talk about today may be difficult. As a reminder, you are not required to answer my questions, and you may skip any questions that make you uncomfortable. As we discussed before, we will record our conversation on this recorder. This is necessary for analysing the data to see if there are any themes from people's stories. Everything you will say will be treated confidentially and will remain anonymous, and I will not be saying your name while we are recording. To better protect your confidentiality, I also ask you not to use your own name, but if you do, we will delete it from the written transcript of this recording.

What questions do you have before we begin the interview?

Interview: (begin recording, do not use the participant's name)

<table>
<tr><td colspan="2">Domain: General experience of PSE
*Note: probe for meaning ("why") to gain insight into reconceptualisation process</td></tr>
<tr><td>Question</td><td>Probe</td></tr>
<tr><td>1. Please give me a short summary of the sessions you did with your therapist</td><td>Identify significant moments in the process</td></tr>
<tr><td>2. I understand you and your PT/OT spoke about pain and how it works. Can you tell me your story with respect to your understanding of your own pain?</td><td>Clarify "your pain" vs "pain in general"
What was your understanding of your pain when you started therapy for your pain?
What is your understanding of your pain now, after treatment has concluded?</td></tr>
<tr><td>3. How did your PT/ OT teach you about pain?</td><td>Did you do education sessions, little bits of info, group sessions, presentations, video clips, practical learning?</td></tr>
<tr><td>4. What stands out to you as something that helped the process of learning about pain along?</td><td>Your own beliefs/ characteristics</td></tr>
</table>

	Your PT/OT's beliefs and characteristics Your relationship with the PT/ OT External context
5. What about the process about learning about pain did you NOT find helpful?	
Domain: Own beliefs and characteristics	
Question	Probe
6. What thoughts and feelings went through your head when you were learning about pain – If any?	Clarify/ elaborate on helpful vs unhelpful Follow up on beliefs Learning pain and applying new pain concepts
7. How did the type of person you are influence the process of learning about pain and applying that to your life?	
Domain: Perception of clinician characteristics	
Question	Probe
8. What about your therapist played a role in the process of learning about pain?	Characteristics
Domain: Therapeutic alliance/ relationship	
Question	Probe
9. How did the relationship you formed with the therapist influence the learning process?	
Domain: External context	
Question	Probe

10. What else influenced your thinking about pain?	Other healthcare interactions Environment Social influence
Domain: Future recommendations	
Question	Probe
11. How can pain education improve in the future?	

Thank you for participating in this interview. The recording will now end. I appreciate all the information and feedback you have given me.

1. Answer any outstanding questions.
2. Turn off voice recorder.

APPENDIX 7

Interview guide: PSE provider

PARTICIPANT NUMBER:	DATE: (DD/MM/YYYY)	START TIME:	END TIME:	INTERVIEWER INITIALS:

QUALITATIVE INTERVIEW GUIDE:

Thank you very much for allowing me to interview you. I am Stian le Roux and I am a researcher from the University of Cape Town. I am conducting a study that focuses on your experience of delivering Pain Science Education, which was a part of your treatment of _____________ (your patient). I would like to know your thoughts and feelings about the Pain Science Education process.

You can choose whether you prefer to do the interview in English, in Afrikaans, or in a mix of both. Please tell me if the words I use in the interview are confusing – I will rephrase questions if you would like me to.

The questions I will ask are about your experience. There are no wrong answers, as I am interested in your story. Because of your experiences, you are one of the few people who can help me better understand how PSE feels to a person who is delivering it. Your opinions are very valuable, and I thank you for taking the time to meet with me today.

We have just reviewed the consent form, which describes this part of the study in detail and gives us permission to ask you these questions. Some of the things we talk about today may be difficult. As a reminder, you are not required to answer my questions, and you may skip any questions that make you uncomfortable. As we discussed before, we will record our conversation on this recorder. This is necessary for analysing the data to see if there are any themes from people's stories. Everything you will say will be treated confidentially and will remain anonymous, and I will not be saying your name while we are recording. To better protect your confidentiality, I also ask you not to use your own name, but if you do, we will delete it from the written transcript of this recording.

This interview relates to your PSE intervention with your patient,

__________________________.

What questions do you have before we begin the interview?

Interview: (begin recording, do not use the participant's name)

<table>
<tr><td colspan="2">Domain: General experience of PSE
Note 1: Interviewer to clarify whether the elements were helpful/ unhelpful to themselves or the recipients
Note 2: Probe for meaning "why"</td></tr>
<tr><th>Question</th><th>Probe</th></tr>
<tr><td>1. Could you tell me your patient's pain story, and how their relationship with pain evolved during your treatment?</td><td></td></tr>
<tr><td>2. How did you go about delivering the PSE?</td><td>Experiential, theory, resources/ teaching aids?
Follow-up question: How did you or your patient find value in that particular form of delivery?</td></tr>
<tr><td>3. What did you aim to achieve with the PSE and can you think of any factors that helped or hindered achieving this goal?</td><td></td></tr>
</table>

Domain: Own beliefs and characteristics	
Question	Probe
4. How did the type of person you are influence the PSE?	Beliefs Characteristics
Domain: Perception of patient beliefs and characteristics	
Question	Probe
5. How did the type of person your patient is influence the PSE?	Beliefs Characteristics
Domain: Therapeutic alliance/ relationship	
Question	Probe
6. How did the relationship you formed with the patient influence the PSE?	
Domain: External context	
Question	Probe
7. What else influenced the PSE – positively or negatively?	External influence (outside the individuals and the relationship)
Domain: Future recommendations	
Question	Probe
How can pain education improve in the future?	

Thank you for participating in this interview. The recording will now end. I appreciate all the information and feedback you have given me.

1. Answer any outstanding questions.
2. Turn off voice recorder.

APPENDIX 8

Informed consent form for PSE recipients

TITLE OF RESEARCH

What makes Pain Science Education helpful or unhelpful?

WHAT IS THE PURPOSE OF THE STUDY?

I am a researcher from the University of Cape Town. I am asking you to take part in a voluntary study that is being conducted. I am doing this research study to find out what your thoughts are about Pain Science Education, which formed part of your pain treatment. This document will help you decide if you would like to participate.

If you agree to take part in this study, a researcher will contact you to make an appointment to ask some questions about your experience. This conversation will take about one hour to complete and will be accompanied by some forms that you will be asked to fill in. Your participation will be anonymous.

It is important to know that you may choose not to participate in this study. Choosing not to participate will not affect your medical care in any way.

WHAT DO I HAVE TO DO IF I AGREE TO TAKE PART?

If you agree to take part, you will be asked to participate in a one-hour (one-on-one) interview with the researcher. This can take place on the online platform “Zoom” or in person if you live in Gqeberha. We will provide you with 1.5GB data to load onto your device for the interview. If you need to travel for the interview, your transport will be reimbursed up to R60. You will also be asked to fill in some forms relating to your understanding of pain as well as some anonymous personal information. This will take about 5 minutes to complete.

WHAT ARE THE POTENTIAL RISKS?

There are no inherent risks to taking part in this interview. Your personal information will be confidential and will not be shared with anyone.

WHAT ARE THE POTENTIAL BENEFITS?

If you are a recipient of Pain Science Education, it may be beneficial to reflect on the experience as reflection often assists people in seeing the value of a treatment and implementing that knowledge in the future.

If you are a PSE provider, reflection on your experience may help you gain insight of the process by identifying elements that were helpful or unhelpful. You can also be notified of the findings of this study if you are interested.

WHAT ARE THE ALTERNATIVES TO TAKING PART?

You may opt out of participating at any stage, for any reason. You may also postpone your interview at any stage, for any reason. This will have no impact on your ongoing pain treatment or healthcare.

WHAT ABOUT CONFIDENTIALITY?

Your personal information will be protected as far as possible. The researcher doing the interview will know your identity but will not use your name or other details in the transcripts of the recording.

WHAT HAPPENS IF I GET HURT TAKING PART IN THIS STUDY?

This research study is covered by an insurance policy taken out by the University of Cape Town if you suffer a bodily injury because you are taking part in the study.

The insurer will pay for all reasonable medical costs required to treat your bodily injury, according to the SA Good Clinical Practice Guidelines 2006. The insurer will pay without you having to prove that the research was responsible for your bodily injury. You may ask the study staff for a copy of these guidelines.

The insurer will not pay for harm if, during the study, you:

- Do not follow the researcher’s instructions

- Do not take reasonable care of yourself

If you are harmed and the insurer pays for the necessary medical costs, usually you will be asked to accept that insurance payment as full settlement of the claim for medical costs. However, accepting this offer of insurance cover does not mean you give up your right to make a separate claim for other losses based on negligence, in a South African court.

It is important to follow the researcher's instructions and to report straightaway if you suspect study related bodily harm.

WILL I BE GIVEN ANYTHING FOR TAKING PART?

Unfortunately, you will not be given anything in return for your participation. You are, however, entitled to keep any data or travel expense money allocated to you that you did not use.

ARE THERE ANY COSTS?

You will be given data in advance and/or travel costs up to R60 will be reimbursed if you choose to do the interview in person. If transport is a problem, please ask the researcher to help you find a transport solution – perhaps an alternative venue can be arranged for the interview.

CAN I LEAVE THE STUDY?

You may opt out of participating at any stage, for any reason. You may also postpone your interview at any stage, for any reason. This will have no impact on your ongoing pain treatment or healthcare.

DO YOU HAVE ANY QUESTIONS?

If there is anything that is unclear or if you need further information, please ask us and we will provide it. Do you have any questions?

FOR ADDITIONAL INFORMATION:

If you have any questions or have any problems while taking part in this research study, you should contact:

Stian le Roux
Tel: 0832601984
Email: stianleroux131@gmail.com

CONSENT STATEMENT:

I have read this form, or someone has read it to me. I have been offered a copy of this consent form. I was encouraged and given time to ask questions. I agree to be in this study. I give my permission for the following activities:

1. One interview that is audio recorded
2. Future contact (by phone) by the researcher for additional information or research opportunities

I know that after choosing to be in this study, I may withdraw at any time. My being in the study is voluntary. I understand that whether or not I participate will not affect my healthcare services received today, or at any time in the future.

Please indicate your consent to participate in this study with your signature.

Volunteer's name _______________________________________

________________________________ ________________________________

Signature or Thumb Print of Volunteer Date

Please indicate your consent to be audio-recorded with your signature.

Volunteer's signature _______________________________________

Please indicate (with your signature) your consent to be contacted after the interview if the researcher requires any other information from you.

Volunteer's signature ______________________________________

________________________________ ________________________________

Signature or Thumb Print of Volunteer Date

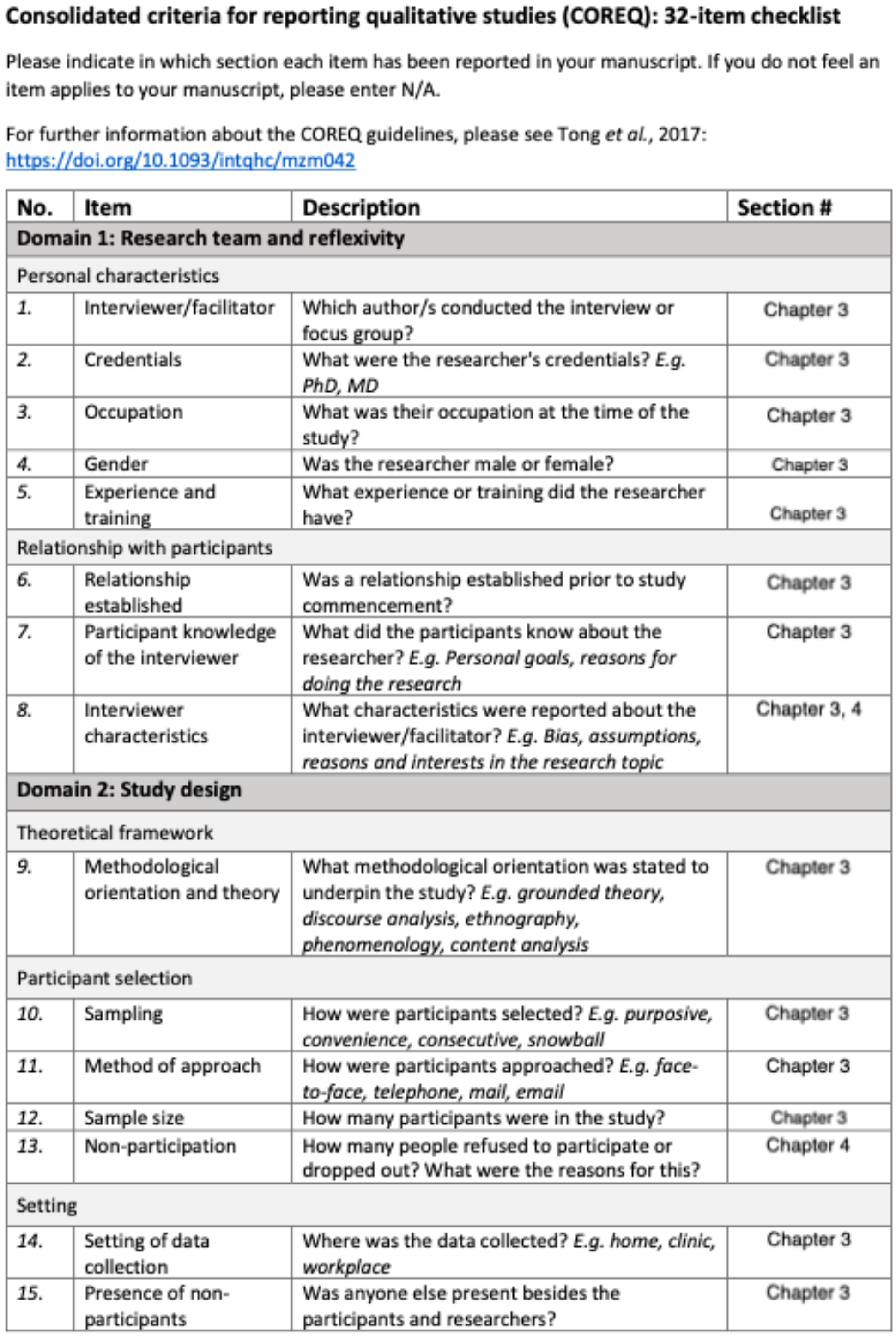
Researcher's name____________________________________

_________________________________ ___________________________

Signature of researcher Date

Thank you.

APPENDIX 9



Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Please indicate in which section each item has been reported in your manuscript. If you do not feel an item applies to your manuscript, please enter N/A.

For further information about the COREQ guidelines, please see Tong *et al.*, 2017: https://doi.org/10.1093/intqhc/mzm042

No.	Item	Description	Section #
Domain 1: Research team and reflexivity			
Personal characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	Chapter 3
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD*	Chapter 3
3.	Occupation	What was their occupation at the time of the study?	Chapter 3
4.	Gender	Was the researcher male or female?	Chapter 3
5.	Experience and training	What experience or training did the researcher have?	Chapter 3
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Chapter 3
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? *E.g. Personal goals, reasons for doing the research*	Chapter 3
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? *E.g. Bias, assumptions, reasons and interests in the research topic*	Chapter 3, 4
Domain 2: Study design			
Theoretical framework			
9.	Methodological orientation and theory	What methodological orientation was stated to underpin the study? *E.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	Chapter 3
Participant selection			
10.	Sampling	How were participants selected? *E.g. purposive, convenience, consecutive, snowball*	Chapter 3
11.	Method of approach	How were participants approached? *E.g. face-to-face, telephone, mail, email*	Chapter 3
12.	Sample size	How many participants were in the study?	Chapter 3
13.	Non-participation	How many people refused to participate or dropped out? What were the reasons for this?	Chapter 4
Setting			
14.	Setting of data collection	Where was the data collected? *E.g. home, clinic, workplace*	Chapter 3
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Chapter 3

16.	Description of sample	What are the important characteristics of the sample? *E.g. demographic data, date*	Chapter 4
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Appendix 6,7
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Chapter 3
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	Chapter 3
20.	Field notes	Were field notes made during and/or after the interview or focus group?	Chapter 3
21.	Duration	What was the duration of the interviews or focus group?	Chapter 3
22.	Data saturation	Was data saturation discussed?	Chapter 3
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Chapter 3
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	Chapter 4
25.	Description of the coding tree	Did authors provide a description of the coding tree?	Chapter 4
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Chapter 4
27.	Software	What software, if applicable, was used to manage the data?	Chapter 3
28.	Participant checking	Did participants provide feedback on the findings?	Chapter 4
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? *E.g. Participant number*	Chapter 4
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	Chapter 4
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Chapter 4
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Chapter 4

Developed from: Allison Tong, Peter Sainsbury, Jonathan Craig, Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups, International Journal for Quality in Health Care, Volume 19, Issue 6, December 2007, Pages 349–357, https://doi.org/10.1093/intqhc/mzm042