Painful metaphors: enactivism and art in qualitative research

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ABSTRACT

Enactivism is an emerging theory for sense-making (cognition) with increasing applications to research and medicine. Enactivists reject the idea that sense-making is simply in the head or can be reduced to neural processes. Instead, enactivists argue that cognisers (people) are embodied and action-oriented, and that sense-making emerges from relational processes distributed across the brain-body-environment. We start this paper with an overview of a recently proposed enactive approach to pain. With rich theoretical and empirical roots in phenomenology and cognitive science, conceptualising pain as an enactive process is appealing as it overcomes the problematic dualist and reductionist nature of current pain theories and healthcare practices. Second, we discuss metaphor in the context of pain and enactivism, including a pain-related metaphor classification system. Third, we present and discuss five paintings created alongside an enactive study of clinical communication and the co-construction of pain-related meanings. Each painting represents pain-related metaphors delivered by clinicians during audio-recorded clinical appointments or discussed by clinicians and patients during interviews. We classify these metaphors, connecting them to enactive theory and relevant literature. The art, metaphors and associated narratives draw attention to the intertwined nature of language, meaning and pain. Of clinical relevance to primary and allied healthcare, we explore how clinicians' taken-for-granted pain-related metaphors can act as scaffolding for patients' pain and agency, for better or worse. We visually depict and give examples of clinical situations where metaphors became enactive, in that they were clinically reinforced and embodied through assessment and treatment. We conclude with research and clinical considerations, suggesting that *enactive metaphor* is a widely overlooked learning mechanism that clinicians could consider employing and intentionally shape.

INTRODUCTION

Current leaders in back pain research assert that our greatest priority is to address the question that patients ask clinicians daily: 'What is causing my low back pain?'[1 p.743] This is difficult for clinicians to answer because most low back pain is 'non-specific', in that there is no definitive, identifiable underlying pathology, such as a fracture, tumour, infection or significant structural change to explain the pain experience.[2] The resulting dilemma is that although patients want an answer, pointing to a single, specific cause of pain is not consistent with our current understanding of the complexities of pain, especially when pain has become persistent. So, what is a clinician to do?

Clinicians navigate this diagnostic uncertainty by employing a variety of strategies to get patients 'on board' or 'sell' pain concepts,[3 p.9] often using metaphor. Further, there is evidence that clinicians provide ambiguous or simple explanations in an attempt to give patients answers to their diagnostic questions and something to 'hang their hat on'.[4 p.562] Surprisingly, some clinicians believe ambiguous explanations somehow enhance patient engagement and trust in the clinician's expertise.[5] Recently it has been argued that these types of approaches can be problematic as they are often reductionist or dualist, and may make things worse (ie, create confusion, stigmatise or promote beliefs of fragility), rather than better (ie, empower patients and enhance control over their situations).[6] Using an alternative, enactive approach can replace dualistic or reductionistic pain explanations with a narrative that more fully explains patients' experiences of pain. Enactivism is a promising avenue to reconceptualise pain and mitigate the potential negative impact of approaches currently found in clinical practice and research programmes.

We start this paper by summarising an enactive conceptualisation of pain,[7] which considers pain as a 5E process (Enacted, Embodied, Embedded, Emotive and Extended). We then connect this theory to the use of metaphor in healthcare, with a focus on pain and the classification of pain-related metaphors. Next, we unravel and express these ideas using painted renditions of a sample of metaphors identified in a novel qualitative study informed by enactivism. Each painting represents a pain-related explanation delivered by a clinician (in some cases, multiple clinicians) during an audio-recorded clinical appointment or discussed by a clinician or patient during a semistructured interview. We classify these metaphors, connecting them to enactive theory and relevant literature. We conclude with research and practice considerations. The overarching aim of this paper is to expand the understanding of metaphor in the context of pain by applying enactive theory and exploring taken-for-granted metaphors used in everyday clinical practice involving patients with low back pain. We encourage clinicians to closely attend to different types of metaphor and their potential implications, and consider using metaphors with the *intention* to help positively shape patients' experiences of pain and pain-related outcomes.

ENACTIVE APPROACH TO PAIN

The formal introduction of enactivism (the enactive approach) is typically attributed to the

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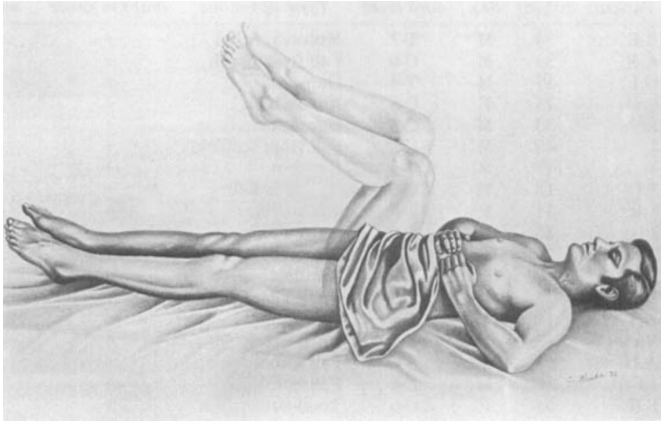

Figure 1 Reprint of an image depicting a person's experience after a spinal cord injury. The perception of their flexed phantom legs (lived body, lightly drawn) are dissociated from their extended physical legs (living body) (adapted from Conomy[126]).

interdisciplinary work of Varela, Thompson and Rosch.[8] With a foundation in phenomenology and cognitive science, they theorised that cognition is a relational process that is *enacted* (brought forth) through an individual's embodied interaction with the world. Enactivists consider *sense-making* as a mode of cognition whereby meaning is enacted by living systems with a concerned point of view. The enactive approach challenges reductionist approaches to cognition that attempt to diminish experience to mechanisms or representations in the brain. It also provides an alternative to Cartesian dualism that abstracts the mind from bodily dynamics and engagement in the world. For enactivists, the appropriate unit of analysis for understanding cognition/sense-making is not the neuron, the brain or other bodily tissues; it is the dynamic interplay of the brain-body-environment.[9] Informed by the enactive approach, pain and meaning belong to the relational domain; they are not located in a single part, just as the speed of a car is not located in the engine.[10]

Despite long-standing evidence of the contrary,[11] there is a prevailing belief that pain is simply an indicator of tissue damage. In fact, the relationship between tissue damage and pain is highly variable, and pain is shaped by many factors that can make it better or worse.[12] The enactive approach to pain[13] considers how relations between the whole person and their environment bring forth pain when a person's bodily integrity is threatened. Further, pain is considered an *adaptive* process of sense-making that changes the way a person navigates the world. The adaptive nature of pain makes it protective and critical to survival; those who cannot feel pain, due to rare genetic disorders, often die in childhood due to unnoticed injuries and ailments.[14] To promote survival, the threshold to experience pain is low; even *potentially* damaging stimuli and situations can elicit the experience of pain.[15] The enactive approach to pain embraces this, appreciating the dynamics between the person and their changing environmental context that can threaten the integrity of the body. There is increasing theoretical work and empirical evidence demonstrating how context can change the way pain is experienced.[16 17] For example, compelling experimental research has demonstrated that positive expectancy (through verbal instruction and conditioning-like procedures) can substantially enhance the analgesic effect of remifentanil (opioid analgesic drug), while negative expectancy can completely abolish remifentanil analgesia.[18] Many modifiable sources of threat or safety[19] can act as scaffolding for pain and its relief, this includes clinicians' words; yet, this is commonly overlooked in clinical practice.

Enactivism builds on embodied cognition and is commonly tethered to other 'E' approaches to cognition. The term '4E' has been attributed to Gallagher who considered cognition as Enacted, Embodied, Embedded and Extended.[20] With application to pain, we have suggested adding another E (Emotive), and argued that pain is a 5E process.[21] Because enactivism (as it relates to pain) incorporates the 5Es, it is simply referred to as the *enactive approach to pain*. Next, we briefly discuss the Es within the enactive approach to pain to further emphasise that pain is a process of sense-making, and that the perception and meanings of pain can be shaped by clinical interactions and context, including the use of pain-related metaphors. For a more complete and detailed discussion of the enactive approach to pain and the Es, please refer to Stilwell and Harman.[22]

Pain as a 5E process

The enactive approach builds on *embodied* approaches to cognition. While there are many versions of embodiment, embodied approaches to cognition generally consider how the body shapes how we experience the world. Phenomenologists, such as Merleau-Ponty,[23] outlined how embodiment includes the *living body* (body as an object) as well as the *lived body* (body as a subject). Although different authors use the terms *living* and *lived* in different ways, philosophers currently working in the areas of phenomenology and enactivism (eg, Fuchs[24] and Thompson[25]) continue to use this terminology to make sense of embodiment and experience. As depicted in figure 1, the experience of phantom limbs provides a clear distinction between the living body and the lived body, while appreciating their interconnectedness precipitated by bodily injury. Thompson[26] has noted that when we think in terms of a lived body and living body, there is no longer reference to two radically different ontologies (ie, mental and physical). Instead, we are considering two types of bodies within one typology of embodiment. With this, there is no longer an absolute Cartesian mind/body separation. With application to pain, the living body includes factors such as anatomical changes, nociception, sensitisation, neuroplasticity, and bodily movement and orientation. All these factors affect and set limits to the different ways we are able to have lived (subjective) experiences, such as pain.[27] When taking an enactive approach to pain, the living and lived body must be simultaneously considered when exploring the experience of pain. Further, the enactive approach to pain appreciates that lived experiences of pain can occur without pathoanatomical dysfunction/disease; therefore, pain cannot be reduced to objective bodily processes that can be observed.[28]

For organisms (eg, people) to be embodied, they must also be *embedded* or situated in an environment. Embedded approaches to cognition build on the work of Heidegger, Merleau-Ponty and Gibson.[29–32] With an embedded approach to cognition, perception is shaped by potential for action, based on environmental affordances.[33] Affordances are relational; they are possibilities for action based on an organism's past experiences, the types of bodies they have, and their current relation or fit to their environment. Pain-related placebo and nocebo effects nicely demonstrate how the environment and context can shape agency and the perception of pain.[34–36] Consider trials reporting no difference in outcomes when comparing real versus sham musculoskeletal surgeries (eg, arthroscopic surgery for meniscal tear[37] or knee osteoarthritis[38]). This may be explained by the patient being embedded in the surgical environment with credible evidence of

the surgical preparation, verbal instructions, postoperative scar (cut made over the knee without introducing the arthroscope)[39] and medical equipment. The effect was that the patient believed they would be 'fixed' and that they would be able to resume physical activities with less pain and disability. While context cannot cure conditions such as cancer, it can significantly modulate perception, including pain. Therefore, the embodied and embedded nature of pain must be considered to optimise the care of those experiencing pain.

Overlapping with embodied-embedded approaches to cognition, enactivists have built on the thesis of the *extended mind*[40] that challenged commonly accepted boundaries of cognition such as the skull and skin. Many enactivists consider how material items as well as engagement with large-scale institutions (eg, academic, scientific, cultural) allow for certain types of cognitive accomplishments.[41] However, application to pain remains underdeveloped. Some work has been done on the embodiment of assistive devices, with pain and rehabilitation implications.[42] We can also consider how patients engage with external elements such as clinics and society, providing potential scaffolding (eg, unhelpful messages of danger and fragility) for their pain experience. Only recently has there been widespread recognition that low back pain is partly iatrogenic, reflecting the shift from simple low back pain being a benign part of life, to a problem requiring investigation (eg, imaging) and healthcare.[43] Therefore, we need to consider how objects from the environment (eg, X-ray images, skeleton models, etc) and clinicians may act as scaffolding for a person's sense-making, for better or worse.

Lastly, sense-making is also *emotive*. Enactivists consider how sense-makers are action-oriented and create meaning for themselves through recurrent interactions (couplings)[44] with the environment, including others. Throughout this process, our attention is directed towards things we care about (eg, bodily threat). Many enactivists have considered the connection between emotion/affect and perception, and how affective phenomena are integrated into perceptual experience.[45] As a result, pain is considered a mode of sense-making that comprises emotion; cognition and emotion are not separate.[46] Although we presented the Es individually, they are all interdependent and collectively shape the enactive (5E) process of sense-making. Next, we discuss metaphor use in healthcare and make a connection to enactive theory.

METAPHOR IN HEALTHCARE

Metaphor, simile and analogy

Metaphor is understanding one kind of thing (often abstract or unfamiliar) in terms of another (more concrete and familiar).[47] For example, *pain is war*. Pain (the target domain) is more abstract and difficult to describe, so it is compared with war (the source/base domain), which is something more concrete and tangible. Similes are a type of metaphor; however, they make a comparison using words such as *like* or *as*, instead of making a direct comparison. For example, *pain is like war* is a simile. Analogies are similar, but they are more complex, typically using metaphors and similes to explain a comparison or make a point. For example, the following is an analogy; *pain is like a war in that it is a constant battle, devastating, and full of loss and despair*. Often metaphors are described as analogies—which further complicates things. For the purposes of this paper, we only refer to metaphors, although we appreciate that sometimes we are technically referring to similes or analogies. We do this because all similes are metaphors, and the analogies we discuss are built from metaphors. We are also cognizant of nuanced debates on the relationship between metaphor and metonymy (name of one thing is substituted for another);[48 49] however, we do not delve into these details in this paper.

The use of metaphor in healthcare has been debated and discussed for decades, including the use of war in metaphors. Sontag is well known for their disdain of metaphor in medicine, advocating that we need to remove metaphor from healthcare as it harms patients.[50] While they are correct that metaphors can harm (eg, blaming, shaming and stigmatising patients), authors such as Loftus[51] have pointed out that Sontag failed to appreciate that metaphor is pervasive in life and cannot simply be removed. The ubiquitous nature of metaphor is a key message put forward by Lakoff and Johnson.[52] They argued that metaphor is not just common in language, it is found in our everyday actions and thoughts. This contemporary understanding of metaphor is nicely summarised by Loftus:[53 p.216]

> … the ways in which we think, act, and interpret our experience are profoundly metaphorical. Metaphor is therefore a major means for constituting reality. The implication of this view is that we do not perceive reality and then separately interpret it and give it meaning. Once we acquire language, we perceive reality immediately through the lens of language.

We align with this current understanding, considering the pervasiveness of metaphor and how it shapes experience. Language allows us to communicate thoughts, while also playing a role in shaping them.[54 55] We constantly, unconsciously create categories through metaphor; this helps us compare prior experiences to the present, allowing us to '… spot similarities and to exploit these similarities in order to deal with the new and strange'.[56 p.20] Alternatively, metaphors may be used to highlight differences to provoke new ways of thinking and experiencing the world. This all has massive implications for clinical practice and pain.

Metaphor and pain

Historically, authors such as Scarry[57] have argued that pain is inexpressible and unsharable. As technology has progressed, many in the scientific community began (and continue) searching for objective measures of pain. However, we suggest they are making the mistake of subsuming the subjective under the objective. Therefore, similar to Scarry, we have suggested that pain cannot be observed or measured, and qualitative pain narratives remain the best available proxy for inferring pain in others.[58] Language is important for pain communication, and this includes the use of metaphor. Metaphor provides a bidirectional service; it can help patients express their pain and can aid clinicians to help a patient understand their diagnosis, prognosis and treatment. For this reason, Moseley and Butler have described clinical appointments as a metaphorical fountain, gushing from the patient, as well as the clinician and clinical environment.[59]

Moseley and Butler have done extensive work in this area, concluding that clinicians and patients *must* use metaphors to communicate and explain pain.[60] Metaphors give pain meaning and help transform it into something tangible and communicable. Moseley and Butler recently put together a pain-related classification of metaphors that builds on the work of Lakoff and Johnson[47] and Kövecses.[61] In box 1 we present an adapted version of this classification system, with the added 'multidimensional' classification. It is important to appreciate, as Moseley and Butler have done, that this system is artificial as metaphors often fit into multiple categories and the boundaries are blurred. However, we believe the system in box 1 is of value as it can help

Box 1 Pain-related metaphor classification system adapted from Moseley and Butler.[127]

- *Structural*: Provides a comparison and understanding that is often concrete and anatomical.
- *Orientational*: Seeks to objectify a problem by relating to space, direction and movement.
- *Invasive*: Involves physical and/or psychological invasion.
- *Disembodiment*: Suggests separation of the body and self.
- *Ontological*: Objectifies abstract concepts such as thoughts and feelings.
- *Diagnostic*: Labels an injury, disease or condition.
- *Prognostic*: Suggests the trajectory of an injury, disease or condition.
- *Multidimensional*: Conveys complex experiences as multidimensional and/or emergent.

unravel the purpose and reason behind the use of metaphors, as well as their (un)intended implications. Although metaphors are fluid and their use and interpretations vary, using a classification system can act as a starting point to think about the nature of metaphors and how they can afford a range of pain-related meanings. We will use this system later in the paper to discuss metaphors from our study, including those represented in our paintings.

Consider a person reporting that their pain feels like *lightning bolts* down the back of their right leg. This could be classified as both an *ontological* and *orientational* metaphor. This metaphor helps the clinician better understand the patient's situation and is a pathway to diagnosis. Specifically, this description provides insight regarding the pain location/distribution (down the back of their right leg) and pain quality/character (shooting, electric-like), indicating there may be a neuropathic mechanism[62] which may guide subsequent clinical testing (eg, reflexes and sensory examination) and imaging in the presence of red flags. Therefore, a simple metaphor, such as the example above, can have much clinical value. Researchers have recognised this and developed questionnaires to quantify and subgroup patients' subjective pain descriptions to aid diagnosis and treatment (eg, McGill Pain Questionnaire[63] and pain*DETECT*).[64] Metaphor can aid diagnosis/treatment or help to empower a patient; on the other hand, metaphor has potential to become problematic.[65]

Unlike Sontag, we take the perspective that metaphors are not inherently good or bad; their valence ultimately depends on the corresponding meaning that is co-constructed between the patient and clinician. In the same manner, Loftus articulated that metaphors cannot be true or false, just more or less useful to patients.[66] Similarly, Gallagher and Lindgren suggested that a '… good metaphor will lead us somewhere, open up an insight, show us something that we could not see before …'[67 p.391] which can positively impact clinician-patient communication. Conversely, clinicians' words can also have an enduring negative impact on patients,[68] with certain metaphors apparently more prone to mislead patients, create uncertainty or result in confusion.[69] Unfortunately, when it comes to words and context in healthcare where patients are looking for explanations for their pain and suffering, messages and meanings that are perceived as negative may persist, more so than messages and meanings of positivity.[70] Along these lines, Neilson summarised problematic mechanistic, body-as-machine and neurological metaphors in medicine, arguing that the context of pain does not need to be '… a clinicoapocalyptical one of damage, weaponry, or live wires'.[71 p.10]

Similar to Sontag, Neilson argued that neurological metaphors are littered with reference to war and bodily damage, negatively impacting the thoughts and beliefs of patients. However, instead of suggesting that we do away with metaphor, Neilson recommended the need to *change* both our verbal and visual metaphors (ie, models, medical schematics in textbooks, etc). Neilson's discussion regarding the simplicity of pain schematics masquerading as truth, aligns with Wall and McMahon's frustrations in 1986 when they stated:

> The labelling of nociceptors as pain fibres was not an admirable simplification but an unfortunate trivialization. The writers of textbooks will continue to purvey trivialization under the guise of simplification.[72 p. 255]

Images with clear 'pain pathways' reinforces the Cartesian impression that pain is something that simply travels from the periphery to the brain. These types of images conflate nociception and pain, and endorse a linear and mechanical conceptualisation of pain, rather than a more accurate understanding where pain is considered a multidimensional, integrated package involving meaning.[73] Current textbooks still take these stances, endorsing the structural metaphor that the *body is a machine* rather than a multidimensional experience that is shaped by many factors (ie, 5Es). Unfortunately, structural metaphor is clearly embedded in clinical practice. A recent study reported that people experiencing back pain considered their bodies to be like a 'broken machine' and their pain as permanent/immutable, complex and very negative.[74 p.1] Of relevance to this discussion on metaphor, most (89% of the 116 surveyed participants) indicated that they learnt these beliefs from health professionals.[75] While verbal and visual metaphors have received attention in the pain literature, enactive metaphor[76] in relation to clinician-patient interactions and pain is yet to be explored.

ENACTIVE METAPHOR

Building on the work of Winner *et al*,[77] Gallagher and Lindgren[78] examined *enactive metaphor* and studied it using technologically supported learning. They considered how enactive metaphor is not really a different kind of metaphor; rather, it is a way of engaging with metaphor. Enactive metaphor is one that we enact; it is put into action or brought into existence through action. Gallagher and Lindgren[79] summarised the literature and posited that enactive metaphor can reinforce and enhance learning through embodied action (ie, act out understanding) with feedback to revise/reinforce understanding. They gave examples of technologies that allowed learners to engage with enactive metaphors, including mixed reality to support the study of physics and astronomy. In their research, students learnt about principles of gravity by metaphorically identifying with an asteroid, acting out its movement and learning through kinesthetic feedback. They concluded that enactive metaphor clearly supports learning as it fosters more comprehensive and flexible understandings.

Other recent work has also started to connect enactive theory and metaphor. This includes the developing concept of *metaphordances*,[80] which can be combined with the idea of *landscapes* and *fields* of affordances,[81] as well as *affordance space*.[82] The idea of metaphordances connects enactivism to a dynamic view of metaphor, with a focus on affordances (described above). *Landscape of affordances* refers to all possibilities for action, while *field of affordances* is the *relevant* possibilities for action

Figure 2 Painting representing structural and diagnostic metaphors relating to *muscle knots* and *tight/ropey muscles* delivered and discussed by participants in our study.

specific to the individual.[83] *Affordance space* is the abstract range of possibilities provided by change in body or environment; this includes evolution, development (life-stage) and sociocultural practices.[84] Collectively, this enactive theory offers new ways to consider clinician-patient interaction and pain. People with persistent pain frequently report a loss of agency,[85] and the healthcare system and society create a *landscape of affordances* that can constrain a patient's *field of affordances* depending on the types of bodies they have and their first-person perspectives.[86] Metaphor in healthcare is built on sociocultural practices, which can alter the *affordance space*. In the following section we use art as a point of departure for continued discussion on how metaphor use in clinical practice can shape the affordance space, with the potential to make things worse (reducing a patient's field of affordances, shaping perception) or better (increasing a patient's field of affordances). We further demonstrate how enactivism, affordances and metaphor are intertwined. This art also acts as a mirror for clinicians and other readers to see what their metaphors might 'look' like, so that they might more easily reflect on their impact.

THE ART OF PAINFUL METAPHORS

Here we present and discuss five paintings that were created from the results of an enactive study of clinical communication and the co-construction of pain and its meanings.[87] We apply enactive theory and explore various types of metaphors and their implications. We use art as a vehicle for clinicians and other readers to see how words might be received and as a way to facilitate a deeper level of reflection on the fluid and interpretive nature of pain-related metaphors. One of the themes from the study was that metaphor was frequently used when explaining pain, but without apparent purpose. Here we use art as a point of departure, extending and elaborating on this theme. We apply the adapted pain-related metaphor classification system (box 1) and explore the unfolding of enactive metaphor through clinician-patient interaction. We connect and integrate relevant literature throughout. Details regarding the paradigm (postpositivism), methodology (enactivism, with strong influence from interpretive phenomenology) and methods (observation and interviews, hybrid deductive-inductive coding) of the study that inspired the creation of artwork and further exploration of metaphor are reported elsewhere.[88] For context, we briefly provide some details here. We recruited seven dyads in Nova Scotia, Canada: licensed physiotherapists and chiropractors, and adult patients with low back pain under their care. We audio-recorded clinical appointments, followed by individual semi-structured interviews guided by enactive/5E theory with both the clinician and patient. Using semistructured interviews, in addition to exploring the current pain explanations the patients were receiving from their physiotherapist or chiropractor, we also explored past and concurrent explanations from other clinicians, which included general practitioners, specialists (eg, rheumatologist and sports physician) and massage therapists. Considering the population size of Nova Scotia and the sensitive nature of some of the discussed content, to maintain confidentiality we do not attribute content to specific health professions or provide clinician/patient demographics such as age and gender.

Patient involvement

Patients were not directly involved in the design of this paper.

Knotted muscles, weak cores and bones out of place

Figure 2 represents the 'muscle knots' and 'tight' or 'ropey' muscles that were discussed during several of our recorded appointments and individual interviews. These pain explanations can be considered structural and diagnostic metaphors. These metaphors became enactive through clinician-patient interaction; we observed dynamic sense-making unfold between clinicians and patients when clinicians touched patients in the areas of their back where they were experiencing pain, as well as the surrounding areas. As the clinicians applied manual pressure to tissues, it was brought to patients' attention when muscles were perceived by the clinician to be knotted, tight or ropey. In turn, patients identified when they experienced tenderness or pain. Through this interactive process of touch and feedback, the patient and clinician linked the living body to the lived body—connecting the experience of pain to problematic muscles. Several clinicians described to us that this clinical assessment sequence of assessment-response-education was a way to 'show' patients the 'pain generator' and help them make sense of their bodies and pain (ie, diagnostic enactive metaphor). Although it may be viewed as positive, as clinicians validated patients' pain by showing them why they hurt, this type of enactive metaphor can also be problematic. The issue is that although offered as a metaphor (understanding one kind of thing in terms of another) they can be misinterpreted as a literal answer to the question 'what is causing my low back pain?'.

Patients in our study were looking for explanations and solutions for their pain (eg, their muscle knots to be released), and clinicians offered help (eg, manual therapy). The challenge here is translating a credible and relatable metaphor to patients, while also considering the patients' assigned meanings. Muscles do not literally get tied in knots and this can result in confusion or the desire for solutions to remove or treat the so-called knots. This may include continually seeking care from clinicians (as we saw in our study) and/or self-management including stretching or the use of poking, prodding and vibrating devices (which can be expensive and have not been shown to untie muscle knots). The confusion lies in that physiotherapists and chiropractors have advanced anatomical knowledge but used anatomically impossible metaphors. Here we must consider how this may impact a patient's sense-making and agency. For example, advising patients to stretch to relieve a muscle knot makes little sense as stretching a knot would only make it tighter.[89] Another example of confusion that arose in our study was when one clinician explained to a patient that their muscles were chronically tight (their injury was 7 years ago) because they were 'slow to heal'. The issue is that the clinician's structural metaphor unintentionally conflated injury and pain, suggesting that ongoing pain/muscle tightness was due to tissues still healing rather than a complex experience

produced by many interwoven factors. Unfortunately, the literal interpretation of metaphor can be taken up by patients as they seek to understand their pain through clinicians' anatomical focus and expertise. Moseley and Butler have indicated that this type of metaphor ('you must be a bad/poor/slow healer') belongs in the 'dustbin' as it has potential to harm.[90 p.166] As well, the use of linear structural metaphors may be the limit of a person's ability to understand their condition/pain (ie, the cause of persistent pain is simply a muscle knot, rather than a complex experience).

The potential for structural metaphors to be problematic aligns with the concept of *naïve analogy*[91] in that they are often overly simplistic with incorrect assumptions that carry 'baggage'. Metaphors/analogies in this realm, as described by Hofstadter and Sander,[92] are essentially invisible and manipulating as they shape experience without us even realising it. Further, they can lead to conclusions without consideration of other options (limit affordances), and without any uncertainties or doubts arising[93] (eg, those with non-specific low back pain who have self-narratives that their *body is like a machine* and that their pain is due to a single anatomical structure that can only be fixed mechanically are not challenged by these metaphors; rather, the structural interpretation is reinforced). Unless an overly simplistic metaphor is identified as metaphorical and reconceptualised, it may act as a barrier to an individual's ability to learn more about the complexities of pain and available evidence-based treatment strategies. This appeared to be the case in some of the dyads in our study, especially when structural rather than multidimensional metaphors were used.

Some clinicians in our study also informed their patients that their joints 'were out', 'not aligned' or 'fused' (all determined through active/passive movement and palpation), and that they had a weak 'core'. What is also troubling is that some clinicians indicated that they knew they were not always being helpful when they used these explanations. Like the muscle metaphors above, these structural/diagnostic metaphors were used to explain why their patients were experiencing pain. For example, one clinician commented that a patient's core muscles may not be 'firing on all cylinders' as an explanation for why they had a flare-up. This was followed by advice to never bend forward and twist their back while at work, as it was too risky, even for those without previous back injury. Not surprisingly, the patient blamed themselves for their recent flare-up, because they 'did something even more stupid'. Following this, when their range of motion was assessed by the clinician and nothing 'major' was found, they were advised that they 'dodged a bullet'. This type of intersubjective-enactive sense-making has the potential to elicit hypervigilance on movement, unnecessary bracing and worry. Similar to the muscle metaphors, this core stability explanation is an overly simplistic way of explaining the cause of pain. Further, the associated education is kinematically impossible to follow (ie, one should not flex and rotate their spine at work. Yet, the patient's work requires flexion and rotation). These types of self-contradictory statements created confusion, impacting the affordance spaces shaped between dyads.

Moseley and Butler have suggested that the narrative of the *bone-out-of-place* and the practice of telling patients that they do not have *core stability* also belong in the metaphorical dustbin, as they promote meanings of danger and fragility.[94] This aligns with our work that challenged common core stability recommendations, emphasising that words and meaning matter.[95] The idea that there are problematic phrases and metaphors tied to clinical practice is not simply opinion. A systematic review with meta-analysis of stabilisation exercises for low back pain by Smith *et al* found that there is strong evidence that core stability exercises are in fact not more effective (on pain or disability) than any other form of exercise in the long term and may increase fear-avoidance compared with other exercises.[96] When patients are told that they have 'weakness' or 'instability', this may create and reinforce hypervigilance and the enduring belief/fear that the spine is fragile. This is reflected in research reporting that people are unfamiliar with medical terminology, including 'muscle weakness' and 'instability', and this leads to misunderstandings.[97] This includes believing that their problem is permanent, it will progress, and that their spine can 'go' at any time.[98] An extreme example of potential to harm is found in a study by Darlow *et al*.[99]

> All I've kind of been told to do by physios is to work on my core … I've been tested by various different physios, and Pilates, and I'm apparently ridiculously weak … I had an abortion because I didn't think I could have a baby. I didn't think I could handle it … carrying it, and having extra weight on my stomach.[100 p.532]

While many metaphors identified in our study have been criticised in the literature, we also saw efforts to reconceptualise metaphor, and expressions of frustration with clinicians' pain explanations. This is reflected in the following quote regarding commonly used disembodied metaphors; specifically, the bone-out-of-place concept that is easy to 'sell':

> I don't as much avoid it (bone-out-of-place message) as I actually try and deprogramme people from it … It leads them down the wrong path, and it leads them into potentially dangerous ideas that these are not fixable things, their bones are going to come out … starts leading them down to "let's get surgically fused" … (I) try and guide them away from this idea that the bone's gone out of place … The problem is (other clinicians) start to pander to what the patient wants to hear because you're more interested in making the sale than you are in educating. But you undermine yourself.

During a recorded appointment, this same clinician was asked by their patient for more information as they tried to make sense of their constantly tight-feeling muscles. The clinician stated that we do not really know why muscles get tight, but it is likely a 'protective response'. When asked about this later in their individual interview, they described their approach to these situations with intention, considering the patient's level of understanding and if they desire to know more. They described how they try to normalise the concept of muscle tightness, rather than pathologise it as others in our study have done:

> Why are my muscles so tight? Why do they hurt? Well, because they should. You're supposed to tense up. This is normal … It's okay. You're not diseased.

The clinician moved beyond simple structural metaphors, discussing pain as being protective and multidimensional. This is further discussed with the fifth painting, in the section *Moving towards emergence*.

Diminishing hope for recovery

One patient in our study described their past experience with a clinician, indicating that they sought help because they had persistent disabling low back pain and numbness associated with their sciatic nerve. The patient was expecting to receive an MRI requisition to identify the source of their pain. However, as reflected in figure 3, the explanation they were given was that everybody will experience back pain because we walk on two feet. This left the patient with diminished agency and no solutions

Figure 3 Painting representing patient-clinician sense-making involving multiple layers of metaphor (orientational, diagnostic, prognostic, disembodiment and structural). A patient reported their pain as *shooting up their spine* and a clinician advised them that *everybody gets pain because they walk on two feet*. What is the solution, to walk on all fours to prevent intervertebral disks from *compressing, sliding* and *slipping*? These literal interpretations of disk-related directional and disembodied metaphors were heard and embodied by several patients in our study.

moving forward (ie, reduced field of affordances), they were so frustrated, they reported: 'It's like the one of three people I've yelled at in my life'. This situation is consistent with the literature reporting that people seeking pain care often feel that healthcare providers dismiss their pain/symptoms and indicate that medical care is not warranted.[101] Further, it aligns with literature reporting that patients often view pain as immutable or that they are a broken machine, and that they learn these concepts from clinicians.[102] This may come down to clinicians not knowing what to do and feeling underprepared to address the complexities of low back pain. The need for additional clinical training in this area has been identified in the medical,[103] physiotherapy[104] and chiropractic[105] literature. While the patient discussed above was frustrated with the lack of diagnostic imaging and ultimately sought out other clinicians for more reasonable explanations and guidance, others in our study received imaging which created its own problems as it afforded a range of diagnostic, prognostic and structural metaphors—shaping the meaning of pain.

Several patients (and clinicians) grasped structural metaphor related to X-ray and advanced imaging (MRI/CT) as a way to point to the cause of pain (validating and better understanding the experience) and as a tool to select appropriate treatment. This attachment to structural metaphor is interesting, as the literature suggests that diagnostic tests do little to reassure.[106] But this fact is working against a powerful, patient desire: 'I would like to know exactly what's wrong, and I would like to see it' as one of our patients declared when asked what they wanted. Further, the potential harms and limited utility of non-indicated imaging is consistently reflected in the literature and clinical practice guidelines around the world (see recent *The Lancet* low back pain series).[107 108] For example, patients who obtained early MRI for back pain are reported to be more likely to have greater disability, increased medical costs and surgery, unrelated to severity.[109] Overlapping with the extended and emotive aspects of cognition, in our study we found that the metaphors used to relay imaging findings were highly salient and memorable, especially when turned into an enactive metaphor through the use of educational spinal models and correlation to pain with movement/spinal loading. Several patients easily named the specific spinal levels where they had 'disk bulges' and similar findings—even years after being told. Some had the belief that imaging findings were permanent and directly related to pain, and that they could never achieve full recovery (or that recovery would take years of treatment). Of concern, the emotive nature of imaging findings was sustained, even when patients' current clinicians relayed contradicting diagnostic and prognostic messages. This was of little surprise when we explored patients' past histories and their interactions with clinicians. They were embedded in a culture and context promoting fixes or cures that depended on a structure at fault to be targeted. Demonstrating the unfolding of enactive metaphor involving emotive-extended features, one patient told us the following occurred after receiving a CT scan of her low back:

> (The clinician advised that) … is important to get fixed. If not, it's just going to get worse and you're just going to have more problems … I remember the L4 and 5 because she pointed it out and she showed me on like a little model … I didn't quite get what she was talking about at first because I'm like, okay, mild bulging, bulging of what? Like I know it's your spine and like I know there's like little vertebras, and there's like little stuff in the middle just to keep it all safe where it's not cracking against each other. I was like but what's bulging exactly? And then that's when she pulled out the model and she's like, 'So these little things, they're not supposed to be *sliding out*. They're supposed to *stay straight*'. So, it was easier when she showed me. I was like okay; it corresponds to how I'm feeling and why it hurts so much.

In our study, there were many other examples where clinicians and patients discussed different types of metaphors related to imaging, affording emotive and danger-laden meanings. Moseley and Butler speculated that patients may seek and anchor themselves in ontological metaphors, such as spine *degeneration*, because it is a way to objectify their pain experience—providing a clear operational diagnosis.[110] We also observed this in our study; for example, after having X-rays, a patient in their 30s reported that they were told that they had 'the spine of an 80-year-old'. As a result, this is an enduring part of who they are. They described the state of their spine: 'It's *pushing* … that *pressure* … slowly *crushing* that last disk'.

In contrast to the somewhat negative narratives we have covered so far, the following section provides an example of the use of more optimistic metaphor.

Building tolerance and control

Figure 4 represents a prognostic metaphor delivered by a clinician in our study; how pain flare-ups are like a hangover from drinking alcohol. This was presented by a clinician to a patient with persistent pain. During the appointment, the patient expressed how they felt they were not in control of their pain, as it would flare up for no apparent reason. The clinician described how treatment and education on self-management may give the patient control and agency over their pain:

> **Clinician:** It's like getting a hangover if you go drinking … if you want to go partying tonight and you're going to drink tequila, tomorrow morning's not going to feel good … But if you know that walking in the door and you're like, you know what, I'm prepared for that, okay. But if it's like wow, I didn't do anything and now I'm dealing with this, and it's this random thing that happens, you're like I don't even know what to do with myself. Because it's now this fear that is tonight going to be the night that I'm going to get up tomorrow morning with a hangover after not having a single drink?
> **Patient:** That's me.

Figure 4 Painting representing the prognostic metaphor of *pain being like a tequila hangover* delivered by a clinician in our study.

> **Clinician:** But if you start to gain control, and you're like, you know what, I want to go for a run, I really want to go for a run. I know I'm going to be a bit sore tomorrow but screw it. You've made, you know, an informed decision in the process.

The clinician went on to discuss the environments that afford the patient action, specifically sitting for prolonged periods of time. Helping broaden the width of their field of affordances, the clinician suggested that instead of simply sitting (which was bothersome to the patient) they could periodically stand or use strategies (demonstrated in the clinic) to 'decompress' the spine. The clinician advocated that the patient be aware of their environment and actions—giving them better agency and control over how they may facilitate or reduce their pain. The clinician and patient discussed these ideas mostly in structural terms (ie, offloading tissues); this is consistent with evidence indicating that clinicians who see patients with back pain (ie, physicians, physiotherapists, chiropractors) tend to be biomechanically oriented.[111 112] As indicated in the enactive approach to pain[113] and our previous work on contextual factors,[114] non-mechanical factors may also be at play, such as self-efficacy and giving the patient a sense of control over their pain. Combining prognostic and multidimensional metaphors may be a way to help a patient understand that both mechanical and non-mechanical factors shape pain.

Figure 5 Painting representing an ontological, invasive and prognostic metaphor of *pain as being like a fire* delivered by a clinician in our study.

Finding balance

Figure 5 reflects an ontological, invasive and prognostic metaphor delivered by a clinician, suggesting low back pain is like a fire, buckets of water help put the fire out and gasoline worsens the fire. The clinician explained that buckets of water represent treatment (mentioning manual therapy, cryotherapy, medications) and exercise/movement modifications, and gasoline represents things like prolonged sitting—which makes the fire (pain) worse. The patient was advised to move towards situations where more water than gasoline was added. This included being cognizant of how they were moving (or not) daily and the impact this had on pain. Having determined that the patient was grasping the metaphor, they used it again during the consult. The metaphor was also reinforced through the clinician's words as they talked about the pain *flare-up* they were experiencing. The metaphor became enactive when manual therapy was used during the recorded appointment, followed by post-treatment movement to reinforce how the patient could move with less pain.

Moseley and Butler[115] argue that invasive metaphors usually promote meanings of danger. They suggest reframing invasive metaphors such as 'its burning inside when I move', instead using water-associated imagery or hydrotherapy.[116 p.155] Although very speculative, they suggest that conceptualising pain as a fire may even have neuroimmunological consequences—potentially shifting thermal heat pain thresholds; something that is testable. The fire metaphor in our study created a complex and somewhat paradoxical affordance space for meaning. The description of using 'water' to counteract the 'gasoline' seemed to give this particular patient a sense of control and empowerment. In the patient's individual interview, they repeated this metaphor, very clearly indicating how they appreciated the clinician's explanation and how they felt that they were heading in the right direction (increased field of affordances). The use of fire and water metaphor warrants further exploration and investigation.

Moving towards emergence

During an individual interview with a clinician, they described how patients can have many 'bricks' in their life that ultimately weigh them down, resulting in pain or worsening pain (figure 6). Pain was conceptualised as a multidimensional puzzle—representing the clinician's understanding that pain is unique for each patient. Stressors (pathoanatomical and psychological) were expressed as bricks; once a threshold is reached, pain occurs:

> It's hard to define for somebody … mom got sick, and my episode's since gotten worse … adds another brick on the pile and you're dealing with a pile that's overweighing you … That's sort of the explanation I give people … throws more on top of it … when you build up enough of them, something gives. So, if we want to undo this, we need to unwind a bunch of these things. Maybe some better posture at work. Maybe stretch and do a little bit of exercise during the week. Maybe get rid of some of that stress. Maybe sort of think about where it's coming from. Because this is all part of your puzzle.

The clinician went on, hinting at many concepts under the enactive umbrella, such as systems theory, emergence, and how we cannot typically point to a single structural cause of a person's pain and simply fix it. A metaphor such as this one would open the door for exploration of a patient's complex experiences and a discussion about the impact of different 'bricks' on the patient's

Figure 6 Painting representing a multidimensional metaphor of having too many 'bricks' added in one's life, resulting in pain or the worsening of pain. Each brick (stressor) was described as part of an individualised pain 'puzzle'.

experience of pain. This included the important differentiation between pain and injury:

> It's not very often that we get somebody that we can say you have one piece, right. You fell down a flight of stairs. You were perfect at the top of the stairs. You fell down the flight of stairs, you broke it, we put you back together again. Humpty Dumpty, right, you're back on your wall. It's rarely like that. Most people have some puzzle that fits together in there. But that I guess, to a certain extent, sort of leads (to the) psychosocial aspect of, you know, giving people the frame that pain's not just an injury.

While the clinician clearly appreciated the multidimensional nature of pain and relayed this to their patient, the explanation of treatment (exercise and manual therapy) remained somewhat mechanically oriented. The use of multidimensional metaphor may not have been used to its fullest, as research continues to suggest that the benefits of exercise[117] and manual therapy[118] are not simply due to anatomical or biomechanical changes. By making patients aware of this through multidimensional metaphor, they may move towards a more enactive conceptualisation of pain and its treatment. This includes appreciation of the interplay among bodily systems and the environment.

All of the examples in the previous sections provide insight into how clinician-patient interactions, pain and metaphor blend with the 5E, enactive approach to pain. It is clear that clinicians' pain explanations, use of models and imaging findings can be embodied by patients, shaping meanings of pain and the experience itself. The final section summarises this work and points to research and clinical applications.

RESEARCH AND CLINICAL CONSIDERATIONS

Clinicians struggle to provide understandable and accurate explanations of pain to their patients, often defaulting to simplistic metaphors (eg, structural metaphors) that can convey linear understandings of pain, and meanings of danger, weakness, slow healing and fragility. However, as indicated in this paper, some clinicians work to construct understandable multidimensional metaphors that better reflect the contemporary (and enactive) understanding of pain. All these metaphors (positive and negative) can be reinforced when they become enactive. In this paper, we gave examples of how enactive metaphor ensues when a verbal metaphor is combined with non-verbal communication (ie, clinical assessment/touch), models and imaging reports, and the way treatment is delivered and outcomes assessed (eg, post-treatment range of motion with verbal pain assessment, attributing a reduction in movement-evoked pain to specific aspects of treatment). While much work has been done in the area of metaphor, few studies have used empirical methods to explore the use of pain-related metaphor and clinician-patient dynamics in clinical practice. No studies (that we are aware of) have explicitly explored pain-related enactive metaphor and how this may enable learning, for better or worse.

Given that metaphor is pervasive in clinical settings, more research is needed to explore clinicians' taken-for-granted use of metaphor, and how metaphor may be used with intention to increase the landscape of affordances enabled in healthcare settings. Intentional use of metaphor may facilitate patient empowerment and improve pain-related outcomes. Enactive metaphor is particularly relevant in the rehabilitation of those with persistent pain as movement and exercise are core elements of treatment. We posit that patient learning and outcomes may be enhanced with thoughtful (optimistic, yet realistic) active engagement and interaction (ie, enactive metaphor brought forth through embodied clinician-patient interaction), rather than passive patient education (ie, verbal metaphor alone) or the unintentional (often unhelpful) generation or shaping of enactive metaphor. Also, more research is needed to better understand the negative impact of enactive metaphor, as our work suggests that clinicians and patients are not fully aware that they are talking in metaphor and prompting patients to act out metaphorical understandings. The issue is that metaphor can be taken literally by patients (eg, disks actually slip, or one can have no core stability). This also applies to other body areas. For example, consider the common saying that a joint (eg, knee) is 'rusty' and how this is reinforced (becomes enactive) through excessive attention to joint noises (crepitus), reduced range of motion and feelings of stiffness. In this scenario, we must also consider extended cognition and the types of metaphors that are relayed, including the use of X-ray images or models to show how the knee is 'bone-on-bone' resulting from 'wear and tear'.[119] All of this may act as scaffolding for patients' enduring negative views and experiences of their bodies.

Of particular concern, there is evidence that negative beliefs stemming from linear and overly simplistic metaphors may impede patients' engagement with evidence-based treatment such as exercise—instead favouring alternative or experimental 'fixes' for the issue that they conceptualised and embodied through emotive structural and prognostic metaphors (see Bunzli *et al*[120] and Darlow *et al*[121] for studies demonstrating the negative impact of literal interpretations of *bone-on-bone* and *wear*

and tear 'diagnoses'). We speculate that the use of understandable, multidimensional metaphors may help reduce the unintended consequences of suboptimal structural metaphors, and may empower patients by expanding their field of affordances. This includes the potential to increase acceptance of first-line treatment options that are *not* focused solely on anatomy (eg, cognitive behavioural therapy for persistent low back pain[122]) while maintaining openness to first-line and second-line treatments that are typically perceived to be more mechanical in nature (eg, exercise and manual therapy for persistent low back pain[123]). Further, the use of multidimensional metaphor may help patients better understand current evidence indicating that treatments such as exercise impact a variety of bodily systems and the way one engages in the world. It is not simply about flexibility, strength or endurance—other factors like self-efficacy and affordances come into play as they shape perception.

While this paper is exploratory and more research is needed, the use of art in our discussion may provide a vehicle for clinicians to see how their words might be received. We have taken seriously the calls[124 125] to integrate embodied approaches, such as art, into qualitative research to enhance analysis, interpretation and to enrich findings. We hope the use of art in this paper offers readers opportunity for interpretation and reflective thinking that could not be achieved with text alone. Awareness and intention are key elements to continual self-improvement; intentional use of metaphor may facilitate a shift from taken-for-granted utterances, including self-contradicting and potentially harmful pain explanations—towards patient education and clinician-patient engagement that empowers, promoting adaptability and an improved sense of control. Clinicians and the clinical environment are a part of patients' sense-making. We encourage clinicians to reflect on the types of metaphors they use in clinical practice (see box 1) and the meanings they co-construct with patients, for better or worse. Although pain is protective and adaptive, unnecessary or excessive threat triggered by clinicians may result in overprotection (ie, increased pain and disability). Therefore, all clinicians treating patients with pain have a responsibility to be sensitive to how pain-related metaphors are used, reinforced and reconceptualised. In other words, clinicians need to (re)consider their *painful metaphors* and how they may (dis)empower patients and shape their experience of pain.

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