

A Novel Proposal for the Definition of Pain

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A Novel Proposal for the Definition of Pain

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“Pain is a conscious experience, evolved to elicit corrective behavior in response to actual or imminent damage to an organism’s survival and/or reproduction. Still, some manifestations, such as neuropathic pain, can be maladaptive. It is affectively and cognitively processed as an adverse and dynamic sensation that can vary in intensity, duration, texture, spatial specificity, and anatomical location. Pain is characterized as ‘physical’ when primarily triggered by pain receptors and as ‘psychological’ when triggered by memory and primary emotional systems. Depending on its intensity and duration, pain can override other adaptive instincts and motivational drives and lead to severe suffering.”

Introduction

Defining pain has long been a subject of debate. Recently, a new and substantially modified definition was published by the *International Association for the Study of Pain* (IASP) (Raja et al., 2020). In this more recent version, pain is defined as “**An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.**”

This definition is expanded by the addition of six key notes:

1. Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors.
2. Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.
3. Through their life experiences, individuals learn the concept of pain.
4. A person’s report of an experience as pain should be respected.
5. Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.
6. Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain

We argue that the IASP’s definition of pain fails to fully encompass its evolutionary, cognitive, and affective dimensions. It overlooks key aspects of this sensory phenomenon, such as its inherent consciousness, its independence from learning, and its evolutionary role extending beyond mere avoidance of tissue damage – when what should be considered is fitness damage. The definition is also overly human-centric. For example, the note that a person’s report of an experience as pain should be respected ignores the weak association between pain indicators and self-reports (Labus et al., 2003). Assuming greater validity of self-reports relative to objective indicators of pain is also detrimental to the advancement of pain assessment in non-verbal subjects.

We further argue that the definition should acknowledge the multidimensional and dynamic (temporally varying) nature of pain, and allow for both physical and psychological categorizations. While there is often a reluctance to extend the term ‘pain’ beyond the realm of tissue damage or sensations processed by pain receptors, it is important to recognize that the experience of pain originates in the brain and can emerge independently of these receptors. The sensation of pain, likely evolved originally to process information from these receptors, has been co-opted evolutionarily to signal

other threats to the organism beyond physical tissue damage. Accordingly, evidence indicates the similar processing of emotional and physical pain in the brain (Kross et al., 2011), and the commonalities of their neural pathways (Sturgeon & Zautra, 2016), with psychological and physical pain engaging similar brain regions (Figure 1) and involving similar neurochemicals, such as opioids. Jaak Panksepp, the father of affective neuroscience, indeed used the term ‘psychological pain’ to describe emotional states associated with two primary systems, ‘PANIC/GRIEF’ and ‘FEAR’. This sub-classification of pain as “physical” and “psychological” recognizes these evolutionary and neuroanatomical commonalities.

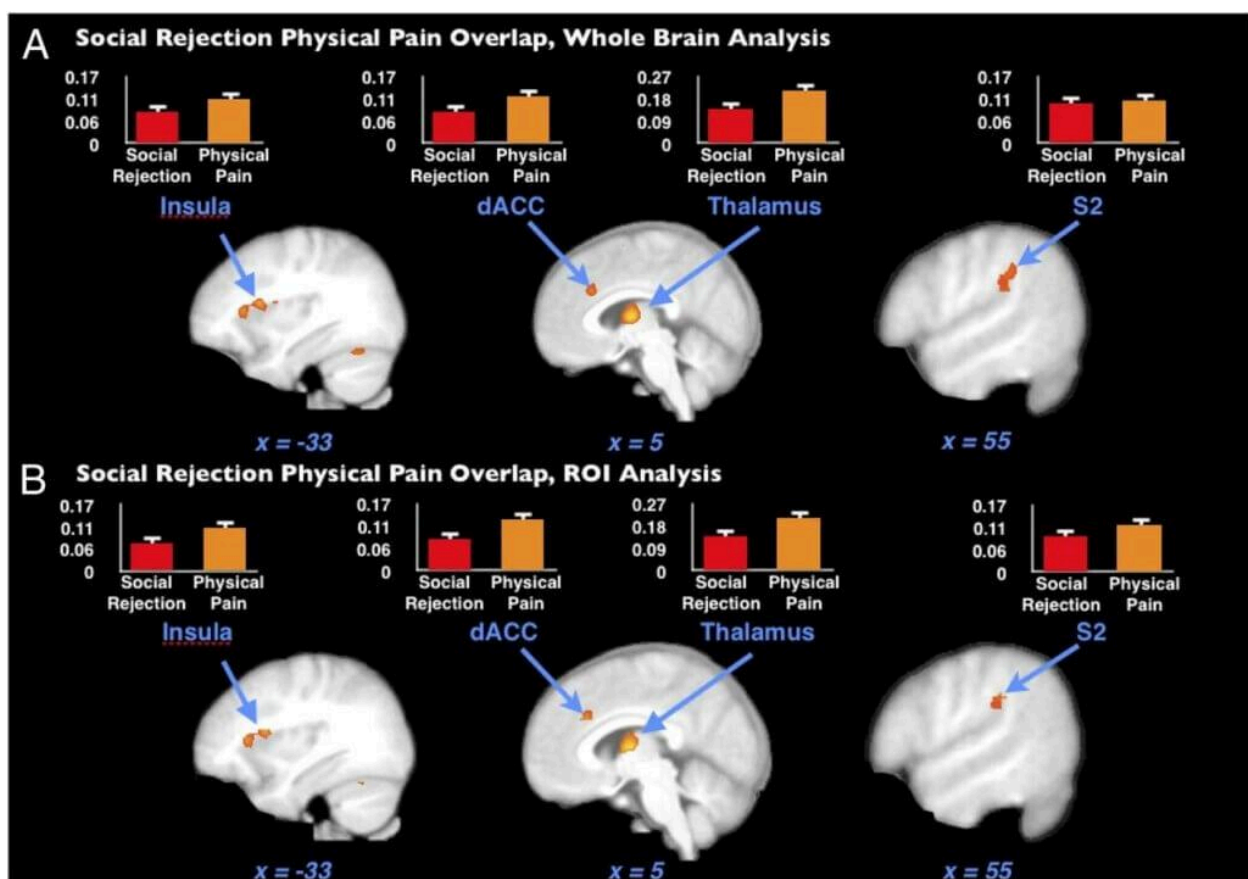


Figure 1. Emotional and physical pain activate very similar brain regions (from: Kross, E. et al. 2011, Social rejection shares somatosensory representations with physical pain, PNAS, 108, 6270–6275).

To address these shortcomings, we propose the following alternative definition:

“Pain is a conscious experience, evolved to elicit corrective behavior in response to actual or imminent damage to an organism’s survival and/or reproduction. Still, some manifestations, such as neuropathic pain, can be maladaptive. It is affectively and cognitively processed as an adverse and dynamic sensation that can vary in intensity, duration, texture, spatial specificity, and anatomical location. Pain is characterized as ‘physical’ when primarily triggered by pain receptors and as ‘psychological’ when triggered by memory and primary emotional systems. Depending on its intensity and duration, pain can override other adaptive instincts and motivational drives and lead to severe suffering.”

The proposed definition addresses the following points:

1. Asserts that pain requires conscious awareness, agreeing with authors who argue that “feelings need to be felt.” While pain’s precursors are unconscious (e.g., sensory receptors eliciting reflexive retracting behaviors), pain itself necessitates consciousness for its existence.
2. Calls for consciousness (or sentience) but not learning, therefore disagreeing with the IASP’s third keynote. Pain is not a ‘concept’ requiring learning; rather, it is a feeling or affective state that can be fully experienced by young and inexperienced individuals. This does not deny that pain can be influenced or modulated by experience.
3. Describes pain’s evolutionary role as an adaptation to prevent not only tissue injury but also threats to an organism’s survival (e.g. the pain of suffocation) and reproduction (e.g. the pain of a parent facing the separation or death of a child). Like other biological features, pain can malfunction and present non-adaptive manifestations (e.g., chronic and neuropathic forms).
4. Acknowledges the multidimensional nature of pain (McDowell, 2006), outlining key attributes for describing pain (intensity, duration, texture, spatial specificity and anatomical location). The term “dynamic” encourages consideration of the variability of pain attributes over time (Alonso and Schuck-Paim, 2021).
5. Supports categorizing pain as physical or psychological (Alonso and Schuck-Paim, 2021) based on the primary origin of neuronal triggers (note that the term ‘pain receptors’ is used instead of the more technical ‘nociceptors’ for easier understanding by the broader public).

6. It is not human-centric, allowing for the recognition and comparison of pain and its evolutionary antecedents across species (Walters and Williams, 2019)
7. Acknowledges the profound impact pain can have on organisms experiencing it in its most extreme forms (Cervero, 2012).

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