

## REVIEW ARTICLE

# What is pain: Are cognitive and social features core components?

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**Abstract**

Pain is a universal experience, but it has been challenging to adequately define. The revised definition of pain recently published by the International Association for the Study of Pain addressed important shortcomings of the previous version; however, it remains narrow in its focus on sensory and emotional features of pain, failing to capture the substantial roles of cognitive and social core components of the experience and their importance to advances in pain management. This paper reviews evidence and theoretical models for the significant role social and cognitive factors play in pain experience and we argue that without explicit recognition of these core components in the definition, significant nuances are lost at a cost to understanding and clinical management of pain. A focus on sensory and emotional features perpetuates biomedical interventions and research, whereas recognition of cognitive and social features supports a multidimensional model of pain, advances in interdisciplinary care, and the benefits of cognitive behavioral therapy and self-management interventions. We also explore the six Key Notes that accompany the new definition of pain, discuss their application to the understanding of pain in childhood, and, in doing so, further explore social and cognitive implications. Considerations are also described for assessment and treatment of pain in pediatric populations.

**KEYWORDS**

assessment, biopsychosocial model, definition, pain, pediatric pain, social communication

## 1 | INTRODUCTION

Virtually everyone knows pain through personal experience. Unfortunately, there is a long history of disagreement as to the essence of the experience in a definition of pain.<sup>1-4</sup> This is not surprising as the term covers a substantial range of experiences arising from diverse conditions of injury and disease,<sup>5</sup> to say little of the remarkable differences in how people experience similar injuries or painful diseases.<sup>6</sup> Nevertheless, definitions have an important bearing on

how we study pain and on the delivery of health care. Given the ubiquitous use of the word pain, common core features would be expected.

In the following, we examine the revised definition of pain recently adopted by the International Association for the Study of Pain (IASP), noting admirable features as well as inadequacies and lost opportunities, and discuss them in the context of the rationale presented to justify decisions leading to the revision.<sup>4,7</sup> We do so in the spirit of continuing productive development of our understanding

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of the nature of pain and in improvements of care for humans and nonhuman animals.

## 2 | WHY IS A CONCISE DEFINITION OF PAIN NEEDED?

Well-crafted definitions reduce ambiguity and clarify concepts, particularly when the topic being discussed is somewhat subjective.<sup>8</sup> They add precision in understanding by characterizing essential features of the construct of interest and they provide for communications that focus upon the important characteristics of the concept being addressed. Of the several types of definitions that can be identified,<sup>9</sup> the IASP revision would be considered an *explicative* definition, one where the intention was to take an existing word with a meaning and impose a new meaning within the spirit of the original meaning. Swartz<sup>8</sup> proposes that the process of explication draws upon analysis and theory to provide a richer explanation of a concept. Explicative definitions must aim to be as fruitful, exact, and simple as possible, while also being similar to the original term itself. Caution is usually recommended in revising definitions. Gupta<sup>10</sup> argues: (a) that the definition must not facilitate the establishment of new claims about that which is referred to (ie, the definition itself shouldn't trivialize what is already known about a concept) and (b) definitions should fix the use of the term used, in terms of its meaning (ie, it should be specific and clear).

### 2.1 | The IASP definitions

The revised definition reads: "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage."<sup>7</sup> This was expanded upon by the addition of six Key Notes and an account of the etymology of the word pain, to provide additional context. It replaced a 1979 definition which read, "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".<sup>5</sup> The IASP website<sup>11</sup> observes that "a central change in the new definition, compared to the 1979 version, replaces terminology that emphasized a person's ability to describe the experience to qualify as pain." The phrase "described in terms of such damage" was interpreted as excluding humans with communication limitations (eg, infants, people with cognitive impairment, and nonhuman animals, who could not articulate their pain). This revision is advantageous as are other features of the definition, such as the emphasis on the experience of the individual in pain, appreciation of its aversive nature, and keying the phenomenology of the experience to actual or potential tissue damage or stress. Demonstration of actual or potential tissue damage is not required, only the requirement that the experience should be as if there were actual or potential tissue damage. Use of the phrase, "or resembling that associated with, actual or potential tissue damage" makes this explicit, however, some ambiguity is introduced by the phrase "or resembling that associated

with...". One wonders how "resembling" is to be interpreted and how judgments concerning what constitutes resemblance will be addressed.

The major problem with the revised definition is continuing narrow reference to sensory and emotional attributes of the experience, failing to explicitly acknowledge fundamental cognitive and social features. The opportunity to further revise the definition to reflect rich developments in theory, research, and clinical practice that have disclosed the importance of these attributes in recent decades has been missed. Williams and Craig<sup>12</sup> challenged restricting characterizations of pain to sensory and emotional features on the basis of 50 years of advances in understanding and management of pain since the earlier attempt. They proposed a revised definition, "a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components." Broad realms of science argue in favor of recognizing the complexity of pain experience, which could be captured with the inclusion of these additional core components and advances in multidisciplinary care typically rely upon cognitive and social interventions. Acknowledging that cognitive and social features are important would endorse patient thoughts and social dimensions of the experience, thereby facilitating patient communications.

## 3 | PHYLOGENETIC AND ONTOGENETIC PERSPECTIVES ON PAIN COMPLEXITY

Substantial evidence indicates increased complexity in the nature of pain experience as species evolved and as humans mature from infancy to adulthood. The necessity of protecting themselves from physical harm provided even unicellular organisms with tropisms before the capacity for rudimentary experience emerged.<sup>13</sup> Behavior, manifest or implicit, relating to tissue damage or stress would be subject to strong natural selection pressures. One would expect, early in phylogenesis, simpler organisms to have acquired a capacity to experience sensory and emotional components of pain motivating reflexive and automated survival behaviors supporting escape and avoidance.<sup>14</sup> Cross species continuities in pain behaviors are expected, as successful survival strategies are conserved over evolutionary time, but species-specific adaptations appropriate to unique ecological niches would have emerged in more complex organisms.<sup>15,16</sup> A capacity for inhibition and flexible controls of response to environmental demands would be expected in more sophisticated organisms supporting cognitive processing and social adaptation. Social adaptations appeared in animals millions of years ago, with humans ultimately becoming the quintessential social animal, our evolved brains have permitted adaptation to social environments characterized by cooperation and competition. Human pain behavior often occurs in social contexts characterized by altruism, empathy, care-eliciting, and caregiving,<sup>17,18</sup> but it is presumptive to believe this is always the case. Pain also occurs in contexts of loss of status and stigma,<sup>19</sup> cruelty and exploitation,<sup>20</sup> disbelieving, withholding care, social traumatization, and

violence.<sup>21,22</sup> Complex institutions have emerged, many centering around protection from pain, with the healthcare system effectively illustrating the demands and solutions to health challenges emerging in human society.

The definition of pain should reflect this increasingly sophisticated understanding of evolutionary transformations in pain in both human and nonhuman species. A more inclusive set of descriptors would be applicable to nonhuman and human species. Cognitive and social features of pain are recognized in mammalian species, including investigations in rodents<sup>23,24</sup> and other domesticated species<sup>25</sup>. The capacity to communicate pain to conspecifics and others is well-demonstrated with development of measures of facial grimaces during pain in nonhuman animals, with social parameters important as these expressions vary with the social context.<sup>26-28</sup> And there is interest in the complexities of pain in fish, amphibians, birds, and nonavian reptiles. The argument for inclusion of consideration of cognitive and social features of pain applies to all species, nonhuman and human, that demonstrate these capabilities.

A developmental perspective on lifespan transformations in the nature of the experience of pain in humans from birth through adulthood into later stages of life also argues for recognition of developmental changes in the complexity of pain experience, intersecting life events with transformations in the biological capacity to experience pain.<sup>29</sup> Newborns, preterm and term, enter life with an evolved capacity to experience distress and to signal pain and distress to mothers and other caregivers.<sup>30,31</sup> Growth, including cognitive and affective maturation, leads to increasing cognitive, linguistic, and social capabilities. Emotions become differentiated,<sup>32</sup> language becomes increasingly sophisticated,<sup>33</sup> and social skills needed to elicit protection and caregiving emerge.<sup>34</sup> There are major differences between infants and mature adults, perhaps summarized in the simplest terms as reflecting greater cognitive and linguistic competency, personal agency, and social complexity in the latter.<sup>29</sup> Cognitive impairment is also associated with declines in these competencies and shifting changes in pain experience and expression.<sup>35</sup> A definition of pain that explicitly includes cognition and sociality as core features would accommodate the phylogenetic and ontogenetic differences associated with different patterns of pain processing in complex organisms and typically developing humans.

#### 4 | AFFIRMING THE IMPORTANCE OF SENSORY AND EMOTIONAL FEATURES OF PAIN EXPERIENCE

Early efforts to define pain shifted between whether pain is an emotional or sensory experience.<sup>36</sup> Concepts of pain as emotion date back to the ancient Greeks who considered pain a passion rather than a sensation like touch or smell. The sensory model of pain reflecting the magnitude of underlying tissue damage began to gain more authority in the 19th century as biomedical science advanced with Von Frey in 1894 (see Pearce<sup>37</sup>) and Goldschneider,<sup>38</sup> generating a vigorous debate as to whether pain was primarily a sensory or an

emotional experience.<sup>39,40</sup> But there were concerns as to whether pain and sensation could even be grouped together,<sup>41</sup> and others pondered the link between sensation and emotion, positing that pain was a sensation that brought about displeasure.<sup>40,42</sup> At present, emotional processes are recognized as integral to the phenomenology of pain,<sup>43</sup> potentially serving as antecedents, intrinsic features, and consequences of pain.<sup>36</sup> Sensory features are inherently neutral in valence, the evolutionary adaptive role of pain in signaling imminent harm or threats to the self directs attention to noxious, aversive, or emotional qualities. In sum, there is general affirmation of sensory and emotional features of pain, but contemporary scientific models of pain would consider exclusive attention to these components as an oversimplification and insufficient in both nonhuman animals and humans. Pain is better described as a perception rather than as a sensation.

#### 5 | SHOULD COGNITION AND SOCIAL FEATURES BE ACKNOWLEDGED AS CORE, UNIVERSAL FEATURES?

People compress or integrate the complexities of their experiences when they describe themselves as in pain so as to communicate their distress in a simple, straight forward manner. To some extent, they must do this because clinical and research queries about the experience typically constrain them to using unidimensional reports, ignoring their complexity. But, people are able to interrogate their experiences and isolate concurrent multiple dimensions, for example, on the McGill Pain Questionnaire<sup>44</sup> or on discrete psychophysical scales.<sup>45</sup> Since initial formulations by Harold Merskey in his 1964<sup>46</sup> Oxford University doctoral thesis examining what became the IASP definition, and the deliberations of the IASP Committee on Taxonomy and Definitions he chaired over 40 years ago,<sup>3</sup> theoretical and research advances have led to a more complex and multidimensional understanding of the nature of pain. An evidence-based definition would reflect these advances. Melzack and Wall's<sup>47</sup> integration of research evidence and formulation of the Gate Control Theory of pain provided an early basis for expecting substantial changes. They rejected sensory-specific models of pain, advanced basic science understanding of the neurophysiological modulation of pain,<sup>48</sup> and inspired numerous clinical advances by demonstrating the potential for peripheral and central inhibitory control of afferent input. Central control pathways are able to bias sensory inputs. Melzack and Casey<sup>49</sup> observed, "that neocortical or higher central nervous system processes, such as evaluation of the input in terms of past experience, exert control over activity in both the discriminative and motivational systems." (p. 427). Recognition of these feedforward mechanisms descending through the spinal cord contradicts and should dispel misguided beliefs in temporal priority for the sensory and emotional features with cognitive appraisal subsequently triggered and modulating sensory processes retrospectively. Melzack and Casey<sup>49</sup> recognized the complexity and multidimensional nature of the experience, characterizing the

pain experience as comprising sensory/discriminative, affective/motivational, and cognitive/appraisal dimensions, an approach that prevails today.<sup>50</sup> They had no difficulty including cognitive mechanisms when observing, "Pain must be defined in terms of its sensory, motivational, and central control determinants." (p. 434).

What seems to be missing in the revised IASP definition is recognition of the substantial processing of somatic experience by the brain, with the nociceptive system prepared in advance by prior experiences to inhibit or facilitate afferent input.<sup>51,52</sup> Processes, usually described as cognitive, modulate sensory signals<sup>53</sup> and emotional states with information derived from beliefs and memories of prior experiences (personal and vicarious) and perception of the immediate context (physical and social) and generate meaning, expectations, appraisals, attitudes, or judgments. This understanding includes directing attention to the importance of interpersonal histories and the immediate social context. We note that Key Notes were added in explanations of the definition to bring attention to cognition and social processes, but ignoring them in the text of the definition diminishes their importance in favor of emphasizing sensory and emotional processes.

The role of personal and social cognitions in conscious perception of pain has long been recognized. The same covariance and experimental research designs demonstrating the roles of biological factors, sensation, and emotion in pain apply to the study of cognition and social processes. Indeed, it is findings to the effect that pathophysiological status only accounts for modest to moderate proportions of variations in pain experience, expression, and functional capacity that directs attention to additional or complementary determinants.<sup>6,54,55</sup> We are advised by Raja et al<sup>7</sup> that the role of cognition in pain was discussed in development of the revised definition, but, as this was implied in the Key Notes to the effect that pain is subjective and modified by life experiences, cognition was not included as a characteristic in main definition. Unfortunately, description of the subjective experience focuses upon sensory and emotional features, diminishing the importance of cognition. Cognition needs to be recognized as a dynamic, ongoing process that determines the pain experience.

There is extensive research demonstrating greater pain, qualitative variation in the nature of the experience, differences in emotional distress and disability, and greater reliance on medication when pain is appraised as particularly threatening or beyond the person's capacity to cope.<sup>56-58</sup> When this occurs, the individual becomes preoccupied with their pain experience, they magnify severity of distress and perceive themselves as helpless in efforts to control pain (ie, catastrophizing tendencies,<sup>59-63</sup>). When the individual's sense of self-efficacy to cope with specific pain challenges is diminished the nature of painful experience changes,<sup>64</sup> reoccupation with health,<sup>66</sup> changes in expectations for recovery,<sup>67-69</sup> and perceptions of injustice are enhanced.<sup>70</sup> Patients capable of using coping self-statements and remaining active in order to divert attention from pain display better psychological functioning.<sup>71</sup> The roles of cognition and social processes are well-illustrated by placebo and nocebo effects.<sup>72</sup> There would be no placebo effect

without expectancy, memory, appraisal and other cognitive processes and the effect relies upon life experience with pain and analgesics, both personal and social.<sup>73</sup> This represents only a sample of studies demonstrating the importance of cognitive mechanisms in controlling painful experience. But, to quibble with this focus on intrapersonal states, it ignores common origins of these patterns of thinking in social experiences.

The social nature of the pain experience is less well appreciated and often ignored by those working within the confines of the biomedical model, but an extensive literature on social features of pain has emerged,<sup>74</sup> and slowly, there has been recognition that sensory, affective, and cognitive features of the experience and expression of pain are shaped in the course of development by familial/cultural influences and the social contexts of people's lives.<sup>75-78</sup> Critics of proposals to revise the initial definition of pain engaged in minimal analysis of cognitive and social features and perhaps have not seriously considered the rationale for their inclusion. Social features were described by Raja et al<sup>7</sup> as only worthy of highlighting in the Key Notes, but not an essential component of the definition. We would hope that greater familiarity with the powerful impact of the social environment on pain experience and expression would lead to a different conclusion. It was observed that "the influence of the social context was not unique to pain, but was shared by other sensory experiences, including vision and hearing." Raja and colleagues are inconsistent. Surely they recognize that sensory and emotional features are not confined to pain either and yet they feature in the definition. We also note that Raja et al<sup>7</sup> quoted Treede et al<sup>79</sup> in asking the question, "Can a person alone on a desert island not experience pain?" The question is posed rhetorically, without an answer, but, to provide at least some response, there would be no person to experience pain if they were not nurtured by others following birth, and the accumulation of life experiences, both personal and social, shapes sensations, emotions, and thoughts to painful events thereafter, even when people are alone. It is difficult to imagine that suffering from pain on a desert island alone would not differ from pain with others present, whether friendly and able to provide succor, or antagonists able to exacerbate distress. Audience effects on pain experience and expression are well known<sup>80,81</sup> and widely appreciated in family, work, and clinical settings.

There is an increasingly voluminous literature on social determinants of pain.<sup>82</sup> It covaries with social features of people's earlier histories and current circumstances and studies using experimental designs demonstrate a causal role for social variables. Being identified as belonging to a socially marginalized group<sup>21,22</sup> or involved in a disability compensation claim<sup>83,84</sup> are associated with more pain and challenges in accessing pain management. Well-controlled laboratory studies demonstrate potent effects on research participants of social models who represent themselves as tolerant or intolerant of pain, not only on self-report and nonverbal expressions of pain of observers, but on measures of the physiological response, and psychophysical measures of pain sensitivity.<sup>85</sup> The presence of people of the same ethnicity leads to more intense pain expressions,<sup>86</sup> while being around someone of high status diminishes distress from

pain.<sup>87,88</sup> Culture influences whether individuals share or conceal their pain from their families and healthcare providers.<sup>89</sup> The illness narratives we use are shaped by past and present social contexts.<sup>90-92</sup> These studies highlight the relevance of the social context on pain experience and expression. There also are elements of reciprocal influence, with pain representing a threat to the social self<sup>93</sup> and social information providing a context for threat or safety in the situation and, in turn, influencing the perceived salience of the painful event.<sup>94</sup> Law<sup>95</sup> provides a basis for this in the observation that “in some contexts and with certain cultural groups, pain is often dismissed, ignored,<sup>96,97</sup> or regarded as natural and acceptable.<sup>98</sup>” (p. 45).

Are cognition and social attributes universal features of pain? Perhaps not so in simple organisms, but, as noted above, cognition and social factors become increasingly important early in phylogenetic development. Lack of recognition would seem to reflect lack of interest in examining these features and sometimes there is an incredulous reaction that “it could not possibly be so.” Unfortunately, typical measurement strategies for assessing pain rarely address social features. Unidimensional pain scales, for example, numerical rating scales, the visual analogue scale, faces pain scales<sup>99</sup> typically yield a measure of pain intensity, obscuring the complexity of the underlying experience.<sup>100</sup> Biological measures of nociception and measures of sensory processing during pain, for example, those using quantitative sensory testing, and those focusing upon intrapersonal psychological features such as depression and anxiety, are likely to exclude social processes, but if one searches for social dimensions they will become evident. A demonstration of the nociceptive reflex seems independent of the potential for downward inhibition, the reaction can be too fast for afferent and efferent neurological messages to have an impact, but advanced preparation through instruction, a social intervention, can inhibit or facilitate the nociceptive reflex through feed forward processes.<sup>101</sup> We are likely to appreciate increasingly the roles of cognition and social determinants as the social neuroscience of pain advances.<sup>102,103</sup>

Social factors become particularly salient in people suffering from chronic pain, as, with time, the pain can become increasingly distressing due to the development and worsening of interpersonal problems, such as lack of social support, employment stress, and intrapersonal difficulties.<sup>104,105</sup> The relationship between psychological well-being and pain outcomes is well established, with numerous psychosocial predictors of pain-related outcomes identified in the literature.<sup>69,95,106-110</sup> These represent risk factors for disability from pain conditions.<sup>95,111</sup> For example, in the context of the impact of pain on the capacity to work, Law<sup>95</sup> observed that “a worker’s ability to make a timely return to work despite musculoskeletal pain is influenced by the quality of their family support,<sup>108</sup> sense of belongingness in society,<sup>112</sup> job satisfaction,<sup>66</sup> perceived workplace fairness, and level of managerial involvement.<sup>113</sup>” It is evident through this example, and countless others that exist in the literature, that there is an undeniable and impactful effect of psychosocial factors on the biologically related outcomes of pain.

To further highlight the interplay between these pain-related domains, the social communication model of pain<sup>114-116</sup> was formulated

to integrate biological, psychological, and social features of pain, with an emphasis on the latter as they typically have received minimal attention. This is in contrast to most formulations of pain which focus on intrapersonal (biological and psychological) dimensions of pain. This has had the benefit of attracting communication scientists to the field of pain, with Hintz<sup>117</sup> arguing for consideration of pain as a social and communicative phenomenon within the subfield of health communication and application of their analytic tools.

It is noteworthy that social factors achieve recognition in the now widely accepted theoretical framework of the biopsychosocial model of pain, but in research and practice they are not prominent. Biomedical interests prevail in research, education, and formulations of practice, although the interpersonal domain looms larger when interactions between patients and practitioners are examined.<sup>118-125</sup> The biopsychosocial model of illness became salient when Engel<sup>126</sup> recognized health and illness are a consequence of the interplay among biological, psychological, and social determinants.<sup>126,127</sup> Use of the model contributes to the most effective and cost-effective interdisciplinary pain management programs.<sup>128</sup> The biopsychosocial model is increasingly embedded in treatment strategies and guidelines for people suffering from chronic pain. For example, the World Health Organization’s International Classification of Functioning, Disability, and Health to understand musculoskeletal disability (WHO-ICF,<sup>129</sup>) considers social context when determining disability.

## 6 | ADVANCING PAIN ASSESSMENT AND MANAGEMENT

The recent revision is described as intending “to better convey the nuances and the complexity of pain in the interest of improved assessment and management of pain”.<sup>7</sup> As well, Dr Raja has observed, “IASP and the Task Force wrote the revised definition and related Notes with the hope that a better understanding of the multiple factors that contribute to an individual’s experience of pain may lead to better communication between the patient and the provider and result in improved assessment and management of their pain.” The more inclusive definition proposed should “encourage the person in pain to convey a more complete picture of the adverse effects of their pain to their care providers.”<sup>7</sup> Surely explicit recognition of the roles of cognitive and social features of pain would have greatly assisted in achieving these objectives. As well, the inclusive definition would be more compatible with the interests of basic scientists and care providers, perhaps building better bridges between these communities. The failure to recognize cognitive and social features of pain in the definition was a missed opportunity. Studies of patient/clinician dialogue demonstrate that talk does not focus on pain as a sensation or emotion, but rapidly comes to focus upon the realities of the patient’s life and the social challenges they confront. Clinical assessment rapidly moves beyond asking patients for pain intensity ratings, often treated with scorn by patients, to include the broad complexities of their personal, family, and work lives.<sup>130</sup> Carr and Bradshaw<sup>131</sup> observed that the social complexities of peoples’ lives

are far more important to both patients and clinicians than injuries, diseases, or their pharmacological care. When patients receive supportive health care, including being listened to, believed in and experiencing mutual trust, they do far better than when they find it difficult to express needs, leading to loss of hope in recovery.<sup>132</sup> Practically speaking, this should translate to the clinician not only listening to the patients' complaints of pain, but also to inquiring as to how the individual's pain interferes with their daily activities, quality of life, relationships, and social interactions.

While there remains heavy emphasis in pain education on biomedical pain management (eg, pharmacological, neurophysiology<sup>133</sup>), an approach that focuses upon sensory and emotional features of pain, there is increasing recognition of the importance of conceptualizing these and other approaches in a broader pain curriculum.<sup>134</sup> Cognitive behavioral therapy and self-management approaches foster a sense of personal control and agency, they encourage active engagement and personal responsibility for recovery.<sup>124</sup> These approaches encourage patients to recognize the thoughts they have about pain, either positive or negative, and to identify related maladaptive behaviors. Focusing on cognitive factors, such as treatments that target catastrophization tendencies, reduces pain.<sup>135-137</sup> Furthermore, engagement in cognitive behavioral therapy has also been shown to increase adaptive behaviors known to generally be positive for pain, such as increasing physical activity and taking part in pleasant events.<sup>138</sup> Results from these studies indicate that treatment attending to the psychosocial components of pain have success in improving patients' experiences of living with pain. Greater explanatory leverage follows from explicit acknowledgment of cognitive and social dimensions.<sup>12</sup> In turn, this can also broaden our assessment and treatment of pain in ways which may tap into assessing the experience of pain in a more genuine way.

The social determinants of pain have major implications for policy and practice. It is increasingly clear that better management of at least persistent pain depends upon attention to the social contexts of pain sufferers lives, including consideration of their unique cultural and familial backgrounds, socioeconomic status, education of healthcare professionals to improve specialized knowledge, patients engaging in self-empowerment, and increasing awareness of the general public to reduce stigma. With these changes in the social context of pain must also come restructuring the healthcare delivery systems to reflect the needs of people suffering chronic pain (eg, shortages of healthcare professionals and multidisciplinary care, long waitlists, and financial barriers, particularly for people on low incomes or those without private insurance) in the interest of improving timely and patient-centered access to care. To promote and maintain these changes, greater research attention must be paid to the social parameters of pain, including patient-oriented research to improve understanding of specific populations, including Indigenous persons, ethnic groups, and marginalized communities that often suffer from inequities, discrimination and trauma, and development of culturally sensitive care.<sup>22</sup> Regardless of whether physical, psychological, or pharmacological care is provided, care must be delivered person to person, meaning the interpersonal features of these

patient-provider relationship are very important. Many of these recommendations are included in the recent comprehensive Canadian Pain Task Force Report,<sup>139</sup> compiling input from people in pain, caregivers, and other stakeholders.

With this in mind, we return to the discussion around definitions themselves. As noted, explicative definitions must aim to be as fruitful, exact, and simple as possible, while also being similar to the original term itself. However, caution is usually recommended in revising definitions. As Gupta<sup>10</sup> argued, (a) the definition must not facilitate the establishment of new claims about that which is referred to (ie, the definition itself should not trivialize what is already known about a concept), and (b) definitions should fix the use of the term used, in terms of its meaning (ie, it should be specific and clear). A further revision of the definition of pain to include cognitive and social parameters would not trivialize historical understandings of the concept of pain, viz. what was highlighted in the IASP original and revised definitions. Failure to revise discounts what has come to be known in the research and practice literatures. Given the undeniable role of cognition and social dimensions in the pain experience, it can be said that the current IASP definition does not satisfy the second criterion requiring clear specification of the meaning of pain. It perhaps is noteworthy that investigators are finding the Williams and Craig<sup>12</sup> proposed revision that makes the importance of cognitive and social factors explicit applicable to their work and easy to use.<sup>93,140,141</sup>

While the Key Notes provide further acknowledgment and explanation of factors relevant to the definition of pain, the lack of explicit acknowledgment of cognitive and social factors in the definition itself creates confusion around other aspects of pain. Furthermore, the applicability of these concepts to various stages of the lifespan (ie, childhood and adolescence) could add further clarity to the concepts discussed but this is not addressed. It is acknowledged that creating an exact and simple definition for a concept as complex and subjective as pain is no straightforward task. However, the lack of recognition of all relevant domains in the experience of pain is problematic in its present conceptualization.

## 7 | AN ANALYSIS OF THE SIX KEY NOTES

Use of the Key Notes to expand and qualify the definition is welcomed as they provide guidance in addressing each distinct component of pain from the biopsychosocial perspective. We comment following quotation of the bulleted Key Notes.

- "Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors."

Acknowledging the personal nature of pain experience is important and it is valuable to have the range of determinants noted. Unfortunately, in describing the "personal experience" in the revised definition, attention is directed only to sensory and emotional features and the impact of these determinants on cognitive and social features of the experience is neglected. Psychological and social

factors are most likely to be salient determinants of cognitive and social features of the experience.

- “Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.”

This is a direct and clear statement.

- “Through their life experiences, individuals learn the concept of pain.”

This Key Note provides an unfortunate and ambiguous claim which could be taken to imply that the neonate is born a “blank slate,” or capable of indifference to pain with aversive qualities learned later. This language fails to capture the interaction between biological predispositions and life experience and the complexity of the experience. Natural selection provided neonates with adaptive biological dispositions to experience and express pain, including fear and distress, as well as flexible capacities to learn through personal and vicarious experience. The expression “the concept of pain” is an oversimplification of what can be learned; life experience transforms sensory, emotional, cognitive, and social features of the experience, as well as how to express it in a manner appropriate to social circumstances. Social learning theory<sup>34,142,143</sup> provides a particularly relevant basis for understanding how social processes are implicated in how children learn the nature of pain and its expression. Early childhood, when life experience has its major formative impact and families intensely focus upon the well-being of the child, is of particular importance. This model posits that learning occurs through observation of others and other learning opportunities and is maintained by reinforcement when children display modeled and socially sanctioned behaviors. When adults signal panic or worry during personal experiences with others, or when children are in pain, children may then learn to fear pain as well.<sup>144,145</sup> There is a strikingly high correlation between children's reports of pain and parents' reports of pain they had experienced.<sup>146</sup> Similarly, parental reactions to children's pain expressions have a strong formative impact.<sup>147</sup> Children's observed reactions to pain may result in negative (eg, avoidance of the painful scenario) or positive (eg, attention focused on their fear) reinforcement. Children also learn to interpret social information from age peers, caregivers, and other adults. In this manner, subjective meanings of pain are acquired through social experiences, whether the thoughts and strategies address the physical danger posed by pain (eg, “how serious is this?”, “what should I do?”), the emotional overtones of the experience (ie, social conditioning of anxiety and fear), or concern about the social implications of the event (eg, “are others in danger?”, “will I be able to perform at work, school, or home?”). Not only can caregivers influence pain in the moment of a painful sensation, but they can continue to shape children's experiences of pain through discussion of memories of the painful experience. For example, greater elaboration when caregivers discussed the painful event with the

child has been related to more accurate or positive memories of the painful event, relative to caregivers who engaged in less elaboration.<sup>148</sup> General social context may also influence children's perception of pain and can therefore impact their learning about pain. For example, in positive and exciting scenarios, children were more likely to rate their pain as lower, relative to when they were in negative scenarios.<sup>149</sup> Given the significance of cognitive development (which happens within a psychosocial context) in childhood, the impetus to focus on cognitive and social processes of pain becomes even more salient.

- “A person's report of an experience as pain should be respected.”

Use of the term “report” was unfortunate, given it commonly refers to verbal report. As an anonymous reviewer of this paper put it, “I think this note returns to valuing verbal report over all else, thereby disadvantaging people with no or minimal verbal skills of all ages.” Nonverbal information should be explicitly recognized as it is invaluable in research and assessment of the myriad and typically vulnerable populations who do not have language skills available to them, but it also has an impact on judgments about pain in typical people. Failure of this note to explicitly acknowledge the role all sources of information concerning the pain a person is suffering is an egregious error. Respect for all persons is a basic requirement within most professional ethical codes. Respecting communications of pain of all types means doing so regardless of age, ability, or modality of report. For example, the Canadian Code of Ethics for Psychologists (4th Ed., Principle I: Respect for the Dignity of Persons and Peoples, I.1)<sup>150</sup> indicates that practitioners exercise respect for the knowledge, insight, and experiences of others. In the context of pain, this would indicate that we treat all patients, including children, as experts on their own experiences and honor the information available through its appropriate use. Respect for human dignity is also the first principle in the American nursing code of ethics.<sup>151,152</sup> Just as respect for persons is clearly identified within professional codes of conduct, as a field, we must also ensure we take responsibility for integrating respect into every aspect of pain management, including when patients are reporting pain. This same respect must also be paid to children's expressions of pain, which are often not taken seriously.<sup>153,154</sup>

- “Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.”

We are in agreement; pain can often negatively impact social and psychological well-being. Children unfortunately are not immune to this effect and ongoing pain can have adverse effects on their psychosocial well-being. Children with chronic pain conditions are more likely to develop elevated levels of anxiety which has been linked to worsened functional pain-related disability.<sup>155</sup> Children's peer relationships also are often negatively impacted by their pain, due to participating in fewer activities with peers.<sup>156</sup> There is also evidence to suggest that co-morbid anxiety may also

be related to great school anxiety.<sup>157</sup> This may therefore extend into scholastic function as well, where children with chronic pain conditions are shown to have greater issues with school attendance and academic success.<sup>156</sup>

- “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.”

This note effectively directs attention to the broad range of behaviors manifest during pain<sup>158,159</sup> that could signal to careful observers the distress the individual is experiencing. The phrase “inability to communicate” seems vague given the potential range of actions available to observers. Who are these people unable to communicate? Many people who do not have self-report skills effectively engage in nonverbal communications. Nonverbal communication is widely acknowledged as an important source of information about pain, in both people with verbal communication limitations and in people able to verbally articulate painful distress.<sup>115,116</sup> The earlier definition referred to the importance of nonverbal manifestations of pain when verbal report was not available, perhaps the phrase “inability to verbally communicate” is what was intended in the revision. The notion that all features of the expression of pain must be respected is of particular importance in the context of pediatric pain. Historical and inappropriate emphasis on verbal self-report as the only valid method of assessing pain left children vulnerable to improper treatment.<sup>152</sup> There is also evidence to suggest that healthcare providers are skeptical of children's ratings of their own pain, often assuming they may be inaccurate or misrepresentations.<sup>154,160</sup> This may ultimately lead to underestimation,<sup>154</sup> which in turn result in undertreatment of children's pain.

Children's reports cannot be discounted simply because they are often provided through nonverbal means. Doing so severely limits any opportunity for children to express their pain and have it treated appropriately. Returning to social aspects of learning pain, when children share reports of their pain which are subsequently discounted, this has the potential to teach children that their experiences of pain are invalid. Internalizing this messaging may lead children to withhold future reports of pain and influence their experience of pain management throughout the rest of the lifespan. Alternatively, if children's reports of pain are treated as valid and elicited appropriately, children may instead learn that pain is something they can communicate about and seek support for, ultimately leading to healthier and less problematic experiences of pain management in the future.

## 8 | CONCLUDING THOUGHTS

We would argue that the current IASP definition best serves the interests of the biomedical community and the industries that support biomedical interventions, whereas a broader definition

incorporates the interests of multidisciplinary researchers and practitioners who attach importance in their understanding and management of pain to cognitive and social parameters. It is important that scientists and caregivers make explicit those features of life experiences, knowledge, and the social contexts of their work that shape patients' experiences of pain. Furthermore, it is critical that this more comprehensive conceptualization of pain be presented in the definition in a way that increases its relevance and applicability to the ever-growing interdisciplinary field of health professionals who treat clients with various types of pain, from physicians and nurses, to physical therapists, psychologists, social workers, and beyond. It is critical to work with a comprehensive definition that acknowledges the role of the cognitive and social experiences of pain to ensure that all healthcare providers are working with a universal understanding of pain when engaging in treatment. This ultimately will facilitate provision of the best possible care for clients when practitioners see their unique role reflected in the definition of pain (eg, working with cognitions, social support), in the same way that it increases validation for patients when they can see their broad experience of pain reflected in the definition as well (eg, worry thoughts about pain, learned fear of pain through social learning).

With reference to the criteria for good definitions described above, adding cognitive and social features to the revised definition serves a variety of purposes. It explicitly acknowledges empirically based features of the subjective experience and encourages consideration of a richer explanation of the multiple dimensions of pain in both practice and research. As well, the definition would remain reasonably simple, and be specific and clear.

While the revised definition of pain has more steps to take toward encompassing the social and cognitive aspects of pain, the key points give rise to necessary considerations which have important implications for pediatric pain. Drawing more attention to the importance of respectful and fair assessment of pain highlights the importance of ensuring children's reports of pain and nonverbal expression receive due respect and are taken seriously to improve pain management. Ultimately, with greater emphasis on respecting children's reports of pain, verbal, and nonverbal, this may address the known deficit of pain management received by children and could be a meaningful step, among other efforts around knowledge mobilization, to change practice and improve uptake of pain management for children. Combined with the notion that pain has socially learned components, this places greater importance on ensuring early pain experiences are taken seriously and handled well, to ensure that what children ultimately learn about pain is positive and constructive, as opposed to something to fear and feel helpless about.

Overall, the current IASP definition remains incomplete. Unduly preoccupied with sensory and emotional processes, it neglects consideration of cognitive and social processes which are demonstrated to be integral to the pain experience. Without a more comprehensive definition, we not only underserve all individuals who experience pain, but children as well whose pain management must be uniquely considered.



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## CONFLICT OF INTEREST

The authors confirm that they have no conflicts of interest to declare.

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