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The Social Communication Model of Pain

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Abstract

Everybody is an expert on pain, by virtue of biological preparedness and personal experience. Unfortunately, this expertise fails large numbers of people, and we must improve our understanding through theoretical and research advances. A vast research-based literature on the nature and management of pain is now available, and there have been dramatic advances in our understanding and management of pain. Nevertheless, there continue to be major problems in the management of severe acute pain and chronic pain. It is argued that a formulation of pain that explicitly focuses upon social factors would more readily address human needs than models that focus upon biophysical and/or psychological factors alone (intrapersonal processes). Although ancient protective biological systems provide for escape and avoidance of pain, evolution of human capacities for cognitive processing and social adaptation necessitate a model of pain incorporating these capabilities (interpersonal processes). The more inclusive and comprehensive social communication model of pain is described and illustrated.

Keywords: pain, communication, social, theoretical models

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For most people, pain is familiar, expected, and typically self-limiting. They accept it as an unwanted but inevitable feature of life, serving protective functions from birth through death. Nevertheless, they also devote energy and resources to minimizing exposure to pain, as well as to providing protection for others. This reflects appreciation of limits to its beneficial impact, its contributions to human misery, and its potential for destructive consequences to the individual and the community at large. The concerns are justified, even though pain often is well managed or abates because injuries or diseases heal. This is not the case for many people, and its appalling impact must not be underestimated.

In reality, most people will suffer at some time during their lives needless severe acute pain that could be controlled (Melzack, 1990), and 20% to 30% of all persons (estimates vary with survey methodology) will suffer from pain that is persistent or recurrent to the extent that it is reasonably described as chronic (Henry, in press). In one survey of 2,012 Canadians (Moulin, Clark, Speechley, & Morley-Forster, 2002), prevalence of chronic pain was reported to be 29% of respondents, with increased frequency in women and older age groups. For people with chronic pain, self-limiting features of pain have failed; research has been inadequate in its efforts to understand and support control of their painful conditions; the pain has been untreated, undertreated, or inadequately treated (<http://www.canadianpaincoalition.ca/>); and societal efforts to contain pain, as reflected in the health care system, have proven inadequate. This article offers an alternative approach to organizing our understanding of pain by drawing attention to unique and important cognitive and social factors that characterize pain as a human phenomenon.

The protective features of pain motivating behavioural escape represent its primitive essence. Species ancestral to humans and dating remotely back in the course of evolution benefitted when this capacity emerged, because it enhanced the likelihood of survival and reproduction. To a considerable extent, basic and clinical science research effort has been committed to establishing the biological bases of the sensory, emotional, and motivational features of this particular system protective of self-interest. But that is a limited perspective on pain in humans.

Humans evolved and acquired the cognitive (language, abstract reasoning, problem solving) and affective capabilities (e.g., Vigil, in press) necessary to support remarkably complex social institutions and practises. The capacity to protect others, reflected in the potential for empathy, altruism, and compassionate caregiving, appears to be superimposed in more evolved, social species on the ancient self-oriented systems, which in the case of pain supported behavioural escape and avoidance. Although social capabilities emerged in non-human species (Langford et al., 2006; Preston & de Waal, 2002), the

social complexities and institutions associated with appealing to others when in pain and caregiving are particularly well developed in humans. Caring for others ranges from the efforts parents devote to safeguarding infants and children to extensive health care delivery services, systems, and institutions that treat and palliate painful injuries and diseases (Rasiq, Schopflocher, Taenzer, & Jonsson, 2008). Biomedical models concentrated upon the sensory features of pain incompletely represent pain in humans (Craig & Hadjistavropoulos, 2004; Sullivan, 2008) and fail to give consideration to social parameters. Models of pain inclusive of the many social features implicated in the nature of pain and the process of personally attempting to control pain and providing care to others would advance understanding (Blyth, Macfarlane, & Nicolas, 2007). Many of the considerable problems and inadequacies of the systems designed to provide care for people in pain represent social problems and challenges in delivering care.

In effect, pain is often poorly recognized, inadequately assessed, underestimated, and disappointingly managed (Brennan & Cousins, 2004; Foley, 1997; Hill, 1995; Rich, 1997; World Health Organization, 1996). Numerous illustrations can be provided. Amongst the most egregious is evidence that people who are less effective in the social skills needed to engage others in provision of care are neglected. Infants and children, people with disabilities, seniors with dementia, and many others with communication limitations have often had their pain ignored and inadequately treated (Hadjistavropoulos, von Baeyer, & Craig, 2004; Symons & Oberlander, 2006). Even people without communication limitations can suffer because they do not complain, others fail to recognise their needs, or their credibility is challenged (Craig, 2006b). Under assessment has been recognized as a serious problem recently, and massive campaigns have been mounted enjoining health care practitioners to routinely and systematically assess patients in clinics and hospital settings. Care begins with careful assessment and understanding of people's problems. Unfortunately, neglect of assessment is often accompanied by systematic underestimation of other's pain. Comparisons of self-report of pain and the estimates of the person's pain by health care professionals (Kappesser, Williams, & Prkachin, 2006; Prkachin, Solomon, & Ross, 2007) and parents (Chambers, Reid, Craig, McGrath, & Finley, 1999), to name only two groups with responsibilities for caring, usually demonstrate systematic underestimation, with some exceptions described later, leading to failure to deliver needed care. And the inadequacies of care delivered to people suffering acute injury (Smith, Shah, Goldman, & Taddio, 2007; Todd, Samaria, & Hoffman, 1993), postoperative pain (Ng, Dimsdale, Sharagg, & Deutsch, 1996; Owen, McMillan, & Rogowski, 1990), procedural pain (Kennedy & Luhmann, 1999), and chronic pain (Rasiq et al., 2008), to name some possibilities, are well documented (Resnik, Rehm, & Minard, 2001). At a broader level, health care policies and delivery systems often fail to provide for large numbers of people whose pain could be managed (Hadjistavropoulos & Marchildon, 2008; Rasiq et al., 2008), and change is needed at institutional and political levels.

As well, science as a social institution has not received the support it requires to allow us to fully understand these interpersonal and societal issues concerning pain. The current focus on intrapersonal features of pain, its biology on the one hand and the focus on pain and suffering as a psychological experience (Blyth et

al., 2007; Sullivan, 2008), fail to adequately address the complex social nature of the phenomenon.

This article outlines a comprehensive formulation of pain that is inclusive of its multiple biological, psychological, and social features. Attending to humans as adapted to function in complex social environments with added capacities for thinking, feeling, and action that are strongly predicated upon social histories, context, and institutions has the potential to provide a more comprehensive and inclusive formulation of the nature of pain.

To provide the broader framework for organising our understanding of the multiple intra- and interpersonal factors influencing pain and pain management, we have proposed the social communication model of pain (see Figure 1). It has been valuable in organising our understanding of the role of facial expression in communication of painful states (Prkachin & Craig, 1995), explorations of social barriers limiting effective control of pain in infants and children (Craig, Lilley, & Gilbert, 1996), investigation of the challenges of judging pain in infants (Craig, Korol, & Pillai, 2002), the theoretical study of the role of self-report and nonverbal expression in pain assessment (Hadjistavropoulos & Craig, 2002), understanding the challenges of delivering care to children and adults with cognitive and other impairments (Craig, 2006a), and in examining developmental changes in pain experience and expression in children (Craig & Korol, 2008). The current article provides a basic description of the model, includes selected illustrations of various features, and invites efforts to add to understanding the numerous complexities amongst the interactions between biological, psychological and social features of pain.

A major novel feature is inclusion of persons other than the suffering person in the model, as exemplified by caregivers, whether health care professionals, family members, or others in a position to influence the suffering person's pain. Attention could also be directed to how others might assess pain, for example, those indifferent to suffering, those who diminish or derogate the person's suffering by denying its reality, and antagonists or enemies who would exploit the person in pain. These articles should be written. They would tell a different story than those addressing human altruism. Collectively, throughout this article we refer to observers to incorporate all these possibilities, but our primary interest here is in the role of the caregiver.

A linear temporal sequence of tissue damage or stress instigating the experience and expression of pain followed by observer inferences concerning this state and reactions in accordance with how this is interpreted is proposed, even though dynamic, recursive feedback loops within each of the suffering person and observer as well as between these parties must be acknowledged. Each stage involves very complex processes, namely the very complex biology of tissue injury and repair; the complexities of the experience of pain; the varyingly public verbal, nonverbal, and physiological manifestations of pain; the complex reactions of observers as they endeavour to appraise and understand the person's pain; and the complex judgements associated with decisions to deliver or withhold care, amongst other possibilities.

The complexities become more substantial as one considers the numerous interacting determinants of each stage of this sequence (see Figure 1). The model distinguishes intrapersonal and interpersonal sources of influence on both suffering persons and observers. Intrapersonal influences are broadly conceived as what the individual brings to the painful experience. For example,

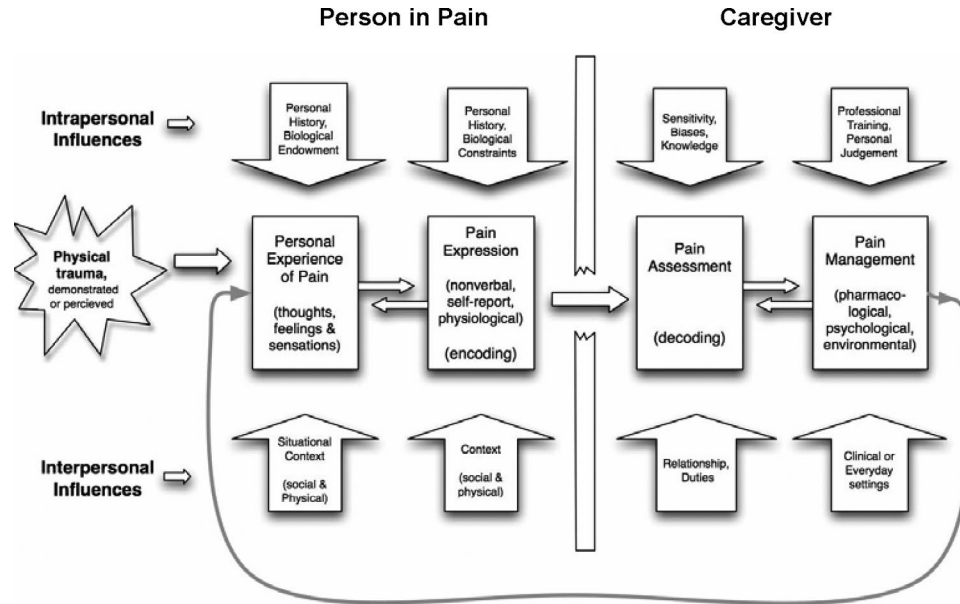


Figure 1. The social communication model of pain. A conceptual model integrating biological, psychological, and social perspectives at the level of interaction between the person in pain and persons present (Adapted from Craig & Korol, 2008, Fig 2-1, p. 10; With kind permission of Springer Science and Business Media).

the experience of pain reflects biological substrates, as well as the totality of the individual's life experience predisposing to particular patterns of experience and expression. Biology determines and limits experience and expression, but, in turn, the biological systems exist only because they were adapted to allow people to function and survive in complex physical and social environments. Interpersonal influences concern the immediacy of the experience and its expression constrained by social context and environmental setting. Similarly, observers bring to the task certain biological dispositions to react to the other person's distress as well as a lifetime history of experiences that influence judgements and decision-making. Interpersonal influences on observers address the impact of the immediate environmental context, social and otherwise, on the types of judgements that are made and actions that may ignore, ameliorate, or enhance pain.

In the following, we explore and illustrate how the various phases of this temporal sequence are better understood by considering different interpersonal and intrapersonal factors that determine the person's pain experience and expression and the inferences and actions of observers, primarily caregivers.

Tissue Damage

It is usually taken for granted that pain is a symptom of tissue damage or stress arising from injury or disease processes. Commonplace events such as lacerations, contusions, and sprains, as well as the more severe fractures and burns, are familiar to most people. Virtually all organ systems, musculoskeletal, gastrointestinal, cardiovascular, and so forth are vulnerable to painful diseases.

The range of acute and chronic forms of pain is considerable (Merskey & Bogduk, 1994). Typical proximal sources are mechanical, ischaemic, and inflammatory. These forms of pain usually are characterised as "nociceptive pain" because the source of pain in tissue damage is relatively easy to identify. Less familiar to

the lay person and more demanding to diagnose is "neuropathic" pain arising from damage or stress to the nervous system itself (Moulin et al., 2007), for example, that arising from mechanical injury to afferent neurons in the case of causalgia or trigeminal neuralgia, or arising from diseases destructive of the nervous system as in the case of diabetic neuralgia, or multiple sclerosis. Management of most pain arising from these sources sensibly and adequately focuses upon treating the disease or injury and palliating the pain, but even then dramatic individual differences in response can often be traced to psychological and social individual differences and considerable suffering can be avoided by attention to these.

Beyond these cases, a surprisingly large proportion of people suffering pain do not have identifiable tissue pathology or other evidence of a pathophysiological process—the best diagnostic efforts have proven unsuccessful. This actuality/possibility is recognised in the widely endorsed definition of pain, "An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (International Association for the Study of Pain, 1979)." This statement explicitly avoids a causal link between tissue damage and pain, declaring that the subjective experience of pain is "associated with actual or potential tissue damage, or described in terms of such damage." The "bible" for disability assessment in the United States, the *AMA Guides to the Evaluation of Permanent Impairment*, 5th edition, (2000) states "... in up to 85% of individuals who report back pain, no pain-producing pathology can be identified..." Waddell (2004) observes that it appears that only 15% to 20% of recipients of United Kingdom disability insurance benefits have clear medical conditions. The difficulties in identifying pathophysiological sources has led to a search for determinants of the experience within the individual (Gagliese & Katz, 2000). Some of the mystery of medically unexplained pain is

yielding to investigations of neuroplasticity that indicate changes in central processing of pain resulting from unresolved injury and disease are associated with the phenomenology of persistent pain (Katz & Melzack, 2008). Irrespective of whether tissue pathology or central neurophysiological states responsible for pain can be identified, the psychological and interpersonal phenomena described here remain important. The experience of pain has multiple determinants in biological dispositions and constraints, life experience and current context. The person in pain may or may not have the skills needed to effectively communicate the nature of their discomfort and needs, and whether the pain receives adequate management will depend upon the assessment and treatment skills of those able to attend to the person in pain.

While not addressed in detail here, one could contemplate how intrapersonal and interpersonal factors relate to risk of pain-related tissue damage. Risks of injury or disease are to a considerable extent under personal control, and often reflecting socialization in the family context. Similarly, social and environmental factors often create the circumstances for painful injuries and disease, for example, in adolescents through contact with foolhardy age peers (La Greca, Prinstein, & Fetter, 2001).

The Experience of Pain

While the experience of pain is comprised of thoughts and feelings as well as somatic sensation, many self-report scales reduce the complexity to unidimensional statements of pain severity; for example, by asking patients to estimate their pain on a 0 to 10 scale (Jensen & Karoly, 2001; Stinson, Kavanagh, Yamada, Gill, & Stevens, 2006). This has been acknowledged as an oversimplification that ignores variation in key features of experience and opportunities to target therapeutic interventions on well-defined targets (Clark, Yang, Tsui, Ng, & Clark, 2002; Williams, Davies, & Chadury, 2000). The data supports multidimensional measurement to extract more meaningful data; for example, sensory discriminative, affective/emotional, and evaluative qualities (Melzack, 1975). Qualitative studies using phenomenological methods demonstrate the remarkable complexity of the thoughts, feelings, and sensations during episodes of pain (Hardcastle, 1999). The advent of brain imaging methodologies to establish cerebral correlates of painful experience demonstrates serial and parallel recruitment of brain activity paralleling the complexity of sensory, affective, and cognitive psychological functions instigated by pain (Ochsner et al., 2008; Price, 2000; Rainville, 2002).

It has been useful to distinguish between sensory and affective features of painful experience, recognising that these are capable of varying independently. High levels of sensory input can be offset by dispassionate attitudes, and low levels of sensory intensity can be associated with high levels of fear of pain or catastrophizing thought. In the latter case, ongoing patterns of thinking, coping, and emotional functioning represent an important target of treatment (e.g., Bennett-Branson & Craig, 1993). Psychological risk factors include excessive emotional reactions, for example, debilitating fear of pain or depression (Asmundson, Vlaeyen, & Crombez, 2004; Vlaeyen & Linton, 2000), and destructive thinking, for example, catastrophizing including magnification, rumination and a sense of helplessness (Sullivan, Bishop, & Pivik, 1995; Vervoort, Craig, et al., 2008). Cognitive-behavioural approaches to the control of pain specifically require

identification of distorted thinking and out-of-control emotions (Morley, Williams, & Hussain, 2008).

Less effort has been devoted to identifying social features of painful experience. Nevertheless, one would expect important interpersonal features of pain experience. Serious injuries, for example, those arising from motor vehicle accidents, typically lead to concerns about one's social roles, for example, the ability to contribute to the family or the capacity to earn a livelihood to support others. Injured workers preoccupied with grievances and dissatisfaction at the workplace are less likely to return to work (Hadjistavropoulos, 1999) and engage in excessive avoidant behaviour and inactivity. In general, one can expect to observe deteriorating social relationships, increasing social isolation, and frequently reinforcement for pain and illness behaviour as others engage in oversolicitous concern about the person's well-being.

Intrapersonal Determinants

Each person brings to painful events a range of potential behavioural reactions constrained by inherited adaptations and influenced by life history. Biological systems represent at once the inherited and the acquired dispositions, permitting investigation of the genetic, epigenetic, neurophysiological, and neurochemical substrates of functional adaptations, the preoccupation of neuroscientists seeking to unravel the biological substrates of pain. The biological capabilities underlying the complex experience of pain are also of great interest. A long debate concerning whether infants were capable of experiencing pain focused upon whether neonates and infants were capable of conscious experience (Craig, 1997). The argument was largely resolved by recognising that infants may not be capable of understanding the experience, appreciating its sources, predicting outcomes, or exercising cognitive or behavioural control, features of the pain experience in competent older children and adults, but their behaviour demonstrates sensory, affective, and cognitive features specific to their developmental stage (Anand & Craig, 1996).

One can also pursue determinants of reaction patterns in the life history of the individual, with sources of individual differences most often the preoccupation. Each individual carries within them their personal history of experiences with pain and illness related events, the impact of socialization (Chambers, Craig, & Bennett, 2002), including social modelling within their unique family and culture (Craig, 1978; Hermann, 2007), and exposure to other environmental events such as nutrition and toxic substances. Developmental trajectories reflect ontogenetic dispositions interacting with life experience (Blount et al., 1992; Craig & Korol, 2008; Palermo & Chambers, 2005; Walker, Claar, & Garber, 2002).

Interpersonal Influences

A major challenge is encountered in attempting to demonstrate situational variability in pain experience as one can only infer experience through its external manifestations. Interpreting whether changes in expression reflect changes in experience or are best interpreted as responses compliant to situational demands is a considerable challenge. As discussed later, most of the usual measures of pain reflect both subjective experience and response to situational demands; hence, they confound the sources. Our earliest research demonstrating a powerful impact of social models

on pain confronted this difficulty (Craig, 1978). In controlled studies, we had demonstrated repeatedly that research participants exposed to a variety of forms of induced pain (cold pressor, electric shock, muscle ischaemia, tissue pressure, etc.), while in the presence of another person who presented themselves as more tolerant or less tolerant than the research participant rather dramatically came to match the role model's level of tolerance (Craig, 1978; Craig & Weiss, 1971). Subsequent studies used psychophysical, physiological, and nonverbal measures more likely to directly reflect subjective experience than self-report and led to the conclusion that changes in the social environment were capable of changing subjective experience, as well as immediate response to situational demands (Craig, Best, & Ward, 1975; Craig & Coren, 1975; Craig & Neidermayer, 1974; Craig & Prkachin, 1978). Current advances in the use of brain imaging examining regions of the brain particularly active during painful experience provide novel opportunities to establish whether brain function shifts as a result of changes in social context, with evidence consistent with this proposition (Rainville, Hofbauer, Duncan, Bushnell, & Price, 2002; Rainville & Duncan, 2006). Nevertheless, there remains an important challenge in developing measures of pain that reflect the experience alone.

The Expression of Pain

Observing persons, whether family member, friend, health care professional, or other onlooker, cannot know another's personal suffering unless there are observable manifestations. Pain is often described as a private experience, but in reality there invariably are public manifestations, albeit these may be subtle when the interests of the person in pain are to suppress expression (e.g., Hill & Craig, 2002; Larochette, Chambers, & Craig, 2006). Conventionally, efforts to describe and understand pain expression have focused upon self-report and nonverbal expression.

A broad range of self-report scales has been employed, ranging from simple questions concerning the nature and severity of pain to complex multidimensional questionnaires (Jensen & Karoly, 2001; Stinson et al., 2006; von Baeyer, 2006). Alternatively, assessment has been focused upon direct observation of nonverbal behaviour, including voice qualities, facial expression, protective reflexes and actions, and body language (Labus, Keefe, & Jensen, 2003; von Baeyer & Spagrud, 2007). Good observers also will include observation of coordinated instrumental activity, including effective and ineffective efforts to cope with the discomfort.

Self-report has played a special role in pain assessment because of its many desirable features: because pain is a subjective experience, self-report would seem the most direct and useful measure; the availability of language can be seen as a highly prized evolutionary achievement of humans that permits accurate accounts of experience (presence, severity, nature, origins, impact of diseases or injuries, etc.); in research, when the many controls provided by randomised, double-blind, controlled designs are used, accurate reports can be expected; it is useful in providing retrospective accounts of events and experiences; it is methodologically convenient; it validates patient experience; it encourages patient-centred care because it compels social interaction with patients, and so forth. Given these advantages, it is not surprising that clinicians are often admonished to seek self-report, "Pain is what the person says

it is and exists whenever he or she says it does" (McCaffery & Pasero, 1999).

Nevertheless, self-report has limitations in usual or clinical discourse that must be recognised before it can be used effectively. Self-report is often described as the gold standard of pain assessment, but if one does not consider its limitations it can be a form of fool's gold. In the first instance, language competence only slowly emerges in the course of development (Craig, Stanford, Fairbairn, & Chambers, 2006; Stanford, Chambers, & Craig, 2005). It is not fully available to all persons, including infants and young children; people with short-term, lasting, or acquired cognitive and expressive impairments; or those who do not have command of the language of the caregiver (Craig, 2006a). Even those with effective language and social skills can be challenged to describe the complexities of multidimensional experiences in a direct and representative manner. Pain is a very complex experience, with qualities that are particularly difficult to translate into language.

Assuming the person in pain enjoys cognitive and communicative competence, most other limitations arise because speech is not exclusively an "expression" of subjective experience. It confounds painful experience with the need to influence those attending to what the person says. Speech only partially reflects the complexities of thought and people must be selective in what they say; hence, speech typically reflects perceived best interests and this is context driven. Speech and other communicative acts that were not responsive to audiences would be meaningless. The audience may or may not be disposed to care for the individual. People may react by ignoring the person in pain, punishing them for the complaint or display, or exploit them because they are vulnerable. The most skilled patients have learnt to negotiate the social complexities of complex health care settings; others require special attention of clinicians. Of importance, these responses biases and the situational demands that influence expression typically operate outside of consciousness.

But more information is available to sensitive observers than that which comes through verbal communication channels. In the course of social discourse, clinical or otherwise, most people do not attend exclusively to self-report, but pay careful attention to nonverbal expression, thereby enhancing their social effectiveness. Important additional information can be acquired by attending to paralinguistic vocalizations, including crying or moaning and qualities of speech, facial expression, body posture, guarded actions, and coordinated actions designed to ward off or minimise pain. Sullivan, Adams, and Sullivan (2004) notably distinguish between pain expression that is fundamentally communicative and that which is designed to directly protect the individual. Note that even the latter can convey considerable information to the astute observer. Speech acts to protect indirectly, but potentially in a powerful way in the human social environments, by soliciting care from others. Nonverbal behaviour also can be primarily communicative, and have indirect protective consequences, as in the case of facial expression, but it also can provide immediate protection by warding off or eliminating threats, for example, from those who might be violent. Nonverbal expression often is more spontaneous and automatic, rather than under the control of conscious deliberation and planning. In consequence, observers attach considerable importance to nonverbal expression and describe it as more credible. Even though there is some capacity to voluntarily control nonverbal expression of pain (Hill & Craig, 2002), it is typically regarded as

reflexive, whereas self-report is recognised as requiring more personal reflection and deliberation (Poole & Craig, 1992).

Of the many nonverbal sources of information available, facial activity has the most immediacy and impact. Faces are highly visible, people typically attend to them closely, and they display considerable plasticity, hence a tremendous range of information can be available. During conversations or interviews, faces are capable of disclosing emotions, motivation, cognitive dispositions (e.g., attention, intention, interest), and reactions to situations. They provide a context for language, sometimes in supporting roles, but sometimes contradicting what the person says.

During acute pain and exacerbations of chronic pain, a relatively stereotypic pattern of facial display is typically observed (Craig, Prkachin, & Grunau, 2001; Prkachin & Craig, 1995; Williams, 2002) that appears both sensitive and specific to pain. It provokes patterns of cerebral activation in observers that differ from those elicited by observation of non-noxious but aversive emotional displays (Benuzzi, Lui, Duzzi, Nichelli, & Porro, 2008; Simon, Craig, Gosselin, Belin, & Rainville, 2008). The “fuzzy stereotype” has been observed in a broad range of populations including infants, older children, typical adults, adults with cognitive impairment, and other special populations (Hadjistavropoulos, et al., 2001; Kunz, Scharmann, Hemmeter, Schepelmann, & Lautenbacher, 2007; Nader, Oberlander, Chambers, & Craig, 2004). The importance of nonverbal expression in these populations was recognised in a note attached to the International Association for the Study of Pain definition of pain, quoted above, to the effect that “The inability to communicate verbally in no way negates the possibility that an individual is experiencing pain and is in need of appropriate pain relieving treatment.”

Intrapersonal Determinants

Humans, amongst other social species, appear well adapted to communicate states of distress to others. In the course of evolution, survival, hence reproductive fitness, would appear to have been served by both expression of pain related distress and sensitivity to states of distress in others. Expression would serve as warnings of physical threat and danger, on the one hand, and present opportunities to protect and provide caregiving on the other. The former perhaps was antecedent to the latter, because self-interest would be expected to precede protection of others. However, signalling pain also has the potential to signal vulnerability. Ancestral humans living in proximity to enemies and exposed to physical threat from harsh environments, predators, and antagonists would be well served by the capacity to modulate pain reactions in a manner that would optimise outcomes. From a contemporary perspective, it remains the case that signalling pain does not invariably lead to compassionate reactions, and people tend to be careful about when and with whom they communicate painful distress. It is conceivable that the usefulness of the capacity to modulate pain expression has led to difficulty in interpreting the meaning of expressions of painful distress. The fidelity with which signs of distress specifically signal pain is limited. It is often uncertain whether the presence or absence of information concerning pain represents subjective experience or whether they are facilitated or inhibited consistent with situational demands.

The biological substrates of motor expression of emotional states have been explored (e.g., Rinn, 1984), providing insight into

the regulatory systems engaged in the expression of pain. Of major importance is the observation that motor activity is subject to control by both involuntary and voluntary systems. This supports the proposition that expression, of all types, needs to be understood in terms of both possibilities. At the one extreme would be motor reflexes permitting immediate withdrawal from tissue damaging events. At the opposite would be carefully controlled expression designed to convince others of the gravity of one’s distress, in its absence.

Most people, but not all, have the capacity to exercise those personal and interpersonal skills needed to cope with painful events, as they have intact somatic systems and cognitive, emotional, and behavioural competence arising from healthy genetic endowments, relatively disease and illness free upbringing, and beneficial child rearing. The capacity to use language and other social skills emerges progressively as children grow older (Craig et al., 2006; Stanford et al., 2005). Other people suffer developmental disabilities and delays or brain injuring accidents and social environments that do not support healthy adaptive behaviour when in pain. Hence, they are handicapped in terms of the personal and social skills they are able to exercise when confronting painful situations (Hadjistavropoulos et al., 2001).

Clinicians working with children in pain know that assessment and intervention strategies must be developmentally appropriate and sensitive to the child’s language and family and ethnic background (Craig & Korol, 2008). Extraordinary consideration to unique characteristics is also needed for people with disabilities. For example, accessing care when in pain is a particularly challenging task for people without the usual social and language skills most people are able to exercise and these deficits are also complex as they may be the product of expressive disabilities or cognitive impairment (Craig, 2006a). A long history of neglect of preverbal infants, children with profound developmental disorders, people with intellectual disabilities, and seniors with dementia, to name some special populations, can be identified (Hadjistavropoulos et al., 2001; Symons & Oberlander, 2006).

Interpersonal Influences

Expressions of pain that can be characterised as primarily automatic (e.g., reflexive withdrawal, crying in the newborn, paralinguistic vocalizations, facial expression) and primarily controlled (language, skilled social and physical actions) are adapted to engage others in care provision, with the latter more subject to voluntary control (Hadjistavropoulos & Craig, 2002). Nevertheless, both display evidence of social modulation, not necessarily conscious, perhaps because the consequences can be of great importance. Even infants display sensitivity to context. For example, lower infant pain expressivity is observed when mothers have a dismissive style of responding to the children (Pillai Riddell, Stevens, Cohen, Flora, & Greenberg, 2007). Although it is easy to assume those to whom one communicates painful distress would be at least benign in responding, and more likely sympathetic and caregiving, many examples of situations where this would not be the case can be provided. The ancient environments to which *homo sapiens* became adapted probably were more dangerous as a result of the presence of predators, physical environments not constructed for comfort and safety, and the presence of tribal enemies. Signalling pain could attract predators or signal vulnerability to antagonists.

While discussion of ancient environments is speculative, the analysis is supported by current studies demonstrating audience effects on the expression of pain. People who are alone, rather than in the presence of strangers, are more inclined to display facial expressions of pain (Badali, 2008; Kleck et al., 1976). Greater spontaneity in pain expression is also evident when children are observed by a parent rather than an adult stranger (Vervoort et al., 2008). However, this effect was only observed amongst children who did not display high levels of catastrophic thought about pain, suggesting sensitivity to the setting requires external focus in thought. Those whose thinking was characterised by high levels of alarm consistently displayed high levels of the facial display of pain, thereby displaying pain relatively indiscriminately and suggesting modulatory controls were not efficient. There are exceptions to the principle that pain expression will be suppressed in the presence of potential antagonists, with expression less inhibited in the presence of solicitous others (Newton-John, 2002). Self-report of pain is also greater in the presence of lower status persons (Williams, Park, Ambrose, & Clauw, 2007). The role of the social context in pain expression requires further careful consideration.

Sensitivity to the immediate social context also is demonstrated in studies examining whether facial expressions of pain can be faked or suppressed. A study of 8- to 12-year-old children's reactions to cold pain is illustrative (Larochette et al., 2006). They were asked to either hide the reaction or to pretend to experience pain when it was absent. The children were more adept at suppressing the display than at faking it. They also reported hiding pain more often than faking it, at times to avoid embarrassment when with peers and on other occasions so as not to worry their parents. Examples of dissembling were reported to be to get attention, to get out of school, as a joke, and to get a sibling in trouble. Studies of adults demonstrate that the faked facial display of pain differs structurally from the genuine display (Craig, Hyde, & Patrick, 1991; Hill & Craig, 2002), and observers exceed chance in detecting faked pain, but only marginally so (Hadjistavropoulos, Craig, & Poole, 1996; Hill & Craig, 2004). These studies demonstrate exquisite sensitivity to the social context.

Caregiver Appraisal and Assessment

The advantages to knowing that another is in pain and appreciating its sources, nature, and consequences can be considerable. In the nonclinical environment, observing another person in pain is likely to grasp one's attention. The event could signal danger, and paying attention could provide valuable information concerning the nature of the threat, its potential impact and consequences, and allow one to learn how to avoid or limit personal damage and distress (Craig, 1978). Circumstances and personal dispositions might also instigate a less selfish and more altruistic impact. It is interesting to note that the perspective employed (self vs. other) in attending to another's pain influences the pattern of cerebral activation (Jackson, Brunet, Meltzoff, & Decety, 2006). If one comes to empathize with the other person's distress, there is potential for intervening on their behalf. Certainly health care settings are designed to maximise the likelihood this will happen—health care clinicians are typically protected or remote from personal danger and selected and trained to deliver care to others. In sum, there are strong advantages to being predisposed to attending to the painful experience of others.

Nevertheless, the task of pain assessment can be challenging. People in general can be characterised as only “good-enough” perceivers rather than “perfectly accurate” in understanding others' subjective experiences (Goubert, Craig, & Buysse, in press). Despite the apparent advantages of accurate empathy, there may be benefits to less than perfect empathy. Observing others in pain does increase pain sensitivity in observers (Loggia, Mogil, & Bushnell, 2007). But it is not necessary that the observer fully experience the sensory, affective and cognitive features of the suffering person's experience. Social neuroscience research is beginning to demonstrate overlap between a suffering person's experience and that of the observer, but differences also are to be observed (Botvinick et al., 2005; Jackson, Brunet, Meltzoff, & Decety, 2006; Simon et al., 2008; Singer et al., 2006). With respect to pain, cognitive and affective demands would be diminished and vicarious traumatization of the observer is less likely. Health care settings can be extremely stressing for health care professionals, for example, emergency or burn units. Observers have a considerable need to know what is happening to others in pain, but they need not suffer unduly.

The social communication model acknowledges the complexity by recognising multiple sources of input, including not only the expressive behaviour of the person in pain but also a range of contextual factors to which observers attend. Is there evidence of tissue insult in the form of injury or disease or the conditions capable of instigating same? Could the expression of distress reflect some other highly distressing circumstance evocative of say fear, anger or disgust? Medical or psychological assessment could lead to revised judgements because of diseases predisposing to greater or lesser levels of pain, or personal dispositions to experience or modulate expression in a manner inconsistent with pathophysiological processes. Recognising that pain assessment is the product of a complex appraisal of multiple sources of information is important.

Goubert et al. (in press, 2005) have proposed a model for understanding pain empathy that recognises the complex judgemental task. Empathy is defined as a sense of knowing the personal experience of the other person. Three major groups of contributors are recognised. The first, characterised as “bottom-up” cues, comprises those potential sources of input already described, ergo, the event, the behaviour of the person who may be suffering from pain and other information to which the person might be sensitive (medical evidence of tissue pathology, physiological sequelae of disease or injury, social or physical contextual information consistent or inconsistent with pain, etc.). As described elsewhere in this article, these are recognised as instigating relatively specific somatic, autonomic, and central physiological activity in observers when pain is present, as well as affective and cognitive representations.

The Goubert et al. (2005) pain empathy model also includes the important contribution of “top-down processes” to pain appraisals or attributions. These are consonant with the social communication model distinctions between factors that the person confronting another's pain brings to the situation and those that are more situational or related to the immediate situation.

Adding to the complexity, again as noted elsewhere, listeners must be aware of the potential for unconscious enhancement or minimisation of the report, or even skilled dissembling (Craig, Hill, & McMurty, 1999).

Intrapersonal Determinants

The response to the pain expression of others can be characterised as a dual process, not inconsistent with the reflexive and reflective reactions of people in pain. Automatic/reflexive reactions have been well-described using autonomic (Craig, 1968) and brain imaging (Botvinick et al., 2005; Jackson, Rainville, & Decety, 2006; Simon et al., 2008; Singer et al., 2006) measures. These reflect more ancient biological systems and are intuitive and emotionally driven.

Parallel but more enduring activity would be associated with efforts to understand what is happening to the person in pain, a process requiring assimilation of complex information, relating it to prior experiences or templates and arriving at considered judgements as to what is happening. These decisions would be expected to reflect more complex cognitive reasoning processes. Observer's belief systems, attitudes, biases, personal learning experiences (e.g., prior personal or vicarious experiences with pain), pain socialization, shared knowledge, and the extent to which the person experiences alarm disproportionate to the plight of the person in pain (catastrophizes) have demonstrable impacts. Sensitivity appears to be acquired through the childhood years, perhaps as a product of maturation of cognitive and affective capabilities interacting with experience (Deyo, Prkachin, & Mercer, 2004).

It seems probable that observer reactions—automatic or controlled—would vary with the type of pain expression. The physiological data described earlier are clear that automatic/reflexive displays instigate parallel automatic/reflexive reactions in observers. Less obvious would be the subsequent and more protracted efforts to make sense of the observer's behaviour as prior experience, training, and so forth, are brought to bear on the appraisal as to what is happening. Self-report of the usual type is less likely to instigate strong reflexive emotional reactions in observers, particularly in clinical settings where patients are encouraged to be dispassionate, objective and compliant. Patients who dramatize their behaviour suffer the risk of being characterised as faking or role-playing. Certainly language can trigger strong emotions—novelists and actors can be skilled in depicting painful, heartrending situations. But again, patients and others are vulnerable to accusations of fakery or malingering if they attempt this. “Controlled” reactions presented by people in pain (self-report and other conscious, purposeful behaviour) put the patient at risk of accusations of dissembling by virtue of the behaviour being voluntary. Indeed, the expressive behaviour preferred by clinicians, self-report, is most likely to trigger questions about its credibility. And credibility is a serious problem for patients experiencing chronic pain (Craig, 2006a). This is particularly the case with medically unexplained pain, those commonplace instances where no diagnosable physical pathology can be discovered. The absence of this confirmatory evidence leads to distrust. Scarry (1985) observed “To have great pain is to have certainty, to hear that another person has pain is to have doubt”. Morris is reported to have averred that “pain reported by somebody else falls into the category we reserve for whatever is invisible, subjective, immaterial, and therefore unreal” (American Medical Association Guides, 2000, p. 567). Werner and Malerud (2003) in a paper entitled, “It is hard work behaving as a credible patient: encounters between women with chronic pain and their doctors) provided accounts of women with medically unexplained disorders encountering skepticism, lack of comprehension, rejection, being blamed for their condition, and suffering feelings of being ignored or belittled.

Interpersonal Influences

Relationships between observing and suffering persons (e.g., family, health care professionals, competitors) would be expected to have a major influence on observer pain appraisals and willingness to provide care. For example, paediatricians, nurses, and parents (of other children) varied in their judgement of the amount of pain infants were experiencing as a result of immunisation injections, with paediatricians characterising the infants as in less pain than the parents and the nurses intermediate to the other groups (Pillai Riddell & Craig, 2007). It is noteworthy that parents of infants tended to perceive higher levels of pain early in infancy (Pillai Riddell & Craig, 2007), whereas parents viewing infants who were not their own perceived pain as increasing in severity as children advanced through infancy (Nader, Korol, & Craig, in preparation). Contrary to the general principle that people underestimate pain in others, a number of studies have demonstrated that family members and close friends were more likely to overestimate than to underestimate patients' pain (reviewed in Kappesser & Williams, 2008). Pillai Riddell et al. (in press) argue that family members are more likely to subscribe to misunderstandings and fears concerning pain about others in the family and use proxy pain ratings to convey their alarm to others. Brain imaging data shows that the observer's reaction varies with the sex of the observer and the person in pain (Simon, Craig, Miltner, & Rainville, 2006) and is influenced by the relationship to the person in pain (e.g., romantic partner) (Singer et al., 2006). It seems reasonable to assume that kinship or other factors fostering a sense of close relationship would enhance sensitivity to persons in pain.

Attention again needs to be directed to setting events that provoke sensitivity to the possibility that a person of interest may be dissembling, either suppressing, faking or exaggerating pain. While inherent cheating detection predispositions have been described, they also can be primed, with suggestions of the possibility of cheating leading to more conservative estimates of pain (Kappesser et al., 2006; Poole & Craig, 2004).

Care Delivery

A protracted discussion of the basis for pain management practises does not seem necessary, given that the conceptual structure of the model has been addressed several times. Decisions concerning pain management will depend upon: (a) the caregiver's appraisal of the person in pain, as discussed, (b) the professional preparation and other features of the caregiver's personal background, to illustrate intrapersonal influences, and (c) Various characteristics of the setting, for example, does a medical facility have explicit policies concerning assessment and management of pain. Vast compendiums addressing pain management from a medical perspective are available. A less substantial literature describes psychosocial interventions. The latter traditionally were used after biomedical care had failed. At present, it is now obvious that one can identify patients at risk of failing to respond to medical treatment or in need of psychological interventions to interfere with the risk of chronic pain. Assessment and intervention using psychosocial methods then becomes obligatory in the first instance. And strong empirically supported interventions are now available (Kerns, Morley, & Vlaeyen, 2008; Morley et al., 2008).

It would also be a mistake to not attract attention to the broader social contexts in which pain is experienced and managed. They

have a powerful impact for both children (McGrath & Finley, 2003) and adults (Rasiq et al., 2008). The focus here has been upon the interactions between people in need and care providers. A broader macro perspective is desirable (Blyth et al., 2007; Poleschuk & Green, 2008; Skevington & Mason, 2004) because it would enhance dissemination of the research-based knowledge and address transformations in public policy and lead to systematic changes in the health care delivery system. I am impatient to see advances from this perspective.

Résumé

Nous sommes tous experts de la douleur, en vertu de notre prédisposition biologique et de nos expériences. Malheureusement, cette expertise n'est pas suffisante et nous devons en améliorer notre compréhension grâce aux avancées théoriques et à la recherche. Il existe maintenant une importante littérature issue de la recherche sur la nature et le contrôle de la douleur et il y a eu d'importants développements dans notre compréhension et dans le contrôle de la douleur. Néanmoins, des problèmes majeurs persistent par rapport au contrôle de la douleur aiguë sévère et chronique. Il est suggéré que la formulation d'un modèle mettant explicitement les facteurs sociaux à l'avant plan serait plus adapté aux besoins humains que les modèles axés sur les facteurs biologiques et/ou psychologiques seuls (processus intrapersonnels). Alors que les systèmes de protection biologiques primitifs permettent la fuite et l'évitement de la douleur, l'évolution des capacités humaines en termes de traitement cognitif et d'adaptation sociale nécessite un modèle de la douleur incorporant ces capacités (processus interpersonnels). Le modèle de la douleur axé sur la communication sociale le plus complet et inclusif est décrit et illustré.

Mots-clés : douleur, communication, social, modèles théoriques

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