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EDITORIAL

Translating the expression of pain in the face of uncertainty: The importance of human pain experiments for applied and clinical science

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Abstract

This brief commentary attempts to provide a concise synthesis of social psychology experiments that inform an interpretation of clinical pain. From a social perspective the expression of pain is a complex phenomenon that is greater than the patient's physiology. Numerous experiments show that pain is modulated by social and contextual factors. These experiments point to the role of the listener as a social agent that can modulate the patient's expression. Within the clinical setting the patient's pain experience can be understood as the uncertainty of physical damage and their expression as an attempt to reduce that uncertainty. How successfully this occurs is in part dependent on the empathetic reception of the provider. Chronic pain is a state that is challenging to effectively model in humans but may persist in patients due to an inability to receive effective empathetic reception at the critical time of need (at or near onset). Rather than focusing on pain's alleviation future avenues of pain interventions may do well by turning attention to the most effective ways to impart a message that the patient will be "okay" in a genuinely empathetic manner.

Key words: Pain; Social psychology; Uncertainty; Fear; Catastrophizing; Contextual modulation; Health; Medicine; Pain management

Core tip: The experience of pain has much to gain from a social psychology perspective where experiments modulate the patient's context and affect their expression. Clinicians and providers should understand that listening sends powerful social cues back to the patient in terms of empathetic feedback. When this feedback is provided in a timely fashion (at or near the time of onset) and in combination with ruling out serious medical pathology a clinician can provide powerful signals that changes patient's experience of pain.

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Pain is difficult to study. Typically, clinical pain originates at a specific time and location that is far removed from the controlled confines of a healthcare setting. Experimental pain studies fill the gap between healthcare settings and real-life conditions. Historically, experimental pain studies have focused on medical treatments to decrease discomfort. More recently, social scientists have begun to explore the social and contextual contingencies that surround the experience and expression of pain. Findings thus far reveal a rich but complicated relationship between pain-evoking stimulus and the context in which it occurs. Here we briefly review a social psychological perspective of pain expression and how that perspective might inform interventional philosophy for clinical practice.

Our understanding of pain has been drastically overhauled during the last 50 years. Before this remaking, the Cartesian model of perception guided medical reasoning as follows: a pain stimulus leads to a pain experience, which leads to pain's expression. Initially, this framework fit nicely with medicine's imperative to reduce signs and symptoms (pain's expression) by eliminating the organic cause of the stimulus. However, as empirical observations accumulated, pain's elimination did not follow. Further, the stories of soldiers expressing little pain at war and medicine's inability to find the organic origins of pain both confounded and challenged 20th century investigators. It was the original work by Melzack and Wall that began to dismantle the Cartesian relationship between stimulus, perception and expression[1].

What was originally viewed as an obligatory relationship between stimulus and expression can now be understood as two fundamental parts: stimulus and its relationship to experience and the relationship of that experience to pain's expression. The reaction to aversive stimulus has been called the expression of pain - an objective and quantifiable behavior that occurs alongside the private aversive sensational experience.

Clinicians might not consider the relationship between the sensation and the expression of pain a necessary division but it demands considerable attention. Our own private experience serves a clear example of this difference - how often do we express pain differently in different social contexts? The distinction between internal and external causes of pain perception and the voluntary and involuntary expression pain is what psychology pain experiments seek to explain.

Psychological research has shown the limits of introspection for understanding human behaviors. Social psychologists have long shown that explicit verbal questioning of a subject does not lead to an accurate description of the causes of their behavior[2-4]. The experience of pain is not exceptional in this respect. Individuals given an identical stimulus will report their pain differently based on the immediate social context they are embedded[5-8]. Further this difference in reporting occurs outside the direct awareness of the subject[9]. So where physiology has shown that a pain stimulus does not necessitate a painful experience, social psychology has shown that the pain experience does not necessitate pain's expression.

The challenge for clinicians is to synthesize these diverse findings in a way that allow for their parsimonious use in the clinical setting. In order to do this we encourage the reader to take on a broader view than simply the medical treatment for the alleviation of pain. From a social psychological perspective, pain's expression could be viewed as accomplishing one very important biological goal: to decrease the immediate uncertainty that accompanies the pain experience *via* facilitating social contact and closeness.

Several animal and human studies of experimental pain have shown that uncertainty is a powerful modulator of pain's expression[10-12]. From the human perspective this uncertainty can best be understood in both the fear and catastrophizing constructs that have been applied to pain[13,14]. Both constructs uniquely help the clinician understand the aspects of uncertainty that the patient faces. This view is also supported by findings which demonstrate that areas commonly associated with processing affective behaviors - the insula, amygdala and cingulate - also process uncertainty[15,16]. The cognitive and behavioral overlap between the shared aspects of physical and social pain[17] has also been observed in social experiments[18,19].

Returning to the division between the experience and expression of pain, the difference between the patient who chooses to express their pain and the one who does not may amount to the uncertainty that accompanies the aversive stimulus, as well as the uncertainty of social defection (social harm) of other people in the immediate context. Humans are the quintessential social animal and seek interpersonal certainty in their social environment. The patient seeks this certainty (about the present and future environments) when the expression of pain occurs[20]. The updating of expectations can be due to characteristics of a health provider's interaction (implicit) as well as their explicit message. In other words what mediates whether an individual accepts a persistent pain experience as an inevitable part of the human experience or goes onto develop a chronic expression of pain can be the result of two dimensions: interpersonal trust (*i.e.*, safety and certainty in the social interaction) and the uncertainty of the aversive stimulus.

The dimensions of social and physical uncertainty interact during pain's assessment, which can both potentiate pain expression (*e.g.*, low uncertainty of social agents; intimacy-induced hyperalgesia) and attenuate pain expression (*e.g.*, high uncertainty of social agents; fear-induce hypoalgesia). Following this reasoning, it is the uncertainty of one's physical condition that accompanies the aversive experience that motivates the patient to find a sympathetic ear to express their pain, and the perception of trustworthiness (lack of threat) of people in the immediate social context that moderates the translation of pain sensations into momentary pain expression[21].

To put this in a more clinically concrete example, the clinician who does not engender the patient's trust

is likely to inhibit the patient's expression. Likewise a clinician who earns more of the patient's trust will in turn receive more of the patient's expression. A clinician may be tempted to hope that the inhibition of a patient's expression is the same as experiencing less pain. Yet no such guarantee can be given. Further, the only way to for the clinician to encourage a dialogue about the significance and the meaning of one's pain - in order to reduce the averseness of physical uncertainty - is by its expression. Therefore in crafting an empathetic dialogue it is imperative for a clinician to work at earning the patient's trust.

Turning to interventions for pain, in the absence of signs of serious pathology, perhaps the best treatment is the genuine message by providers that the patient is physically safe (*i.e.*, physical damage is not continuing to occur) and that there is no reason to expect that a recovery will not occur. This might be as simple as saying "you're alright" but often might involve more than just direct explicit messaging. For example, the use of therapeutic touch, empathetic listening or allowing the patient to fully tell their story may all be necessary parts of the therapeutic ritual (referred to as the placebo mechanism) that may provide the contextual security the patient is seeking[22,23]. Further, rather than the provider following the inclination to provide immediate relief we strongly feel that having open empathetic conversations about the relation of the pain experience to patients' values and functioning is the best way proceed.

Finally, we find ourselves full-circle by concluding that acute pain and chronic pain are different, each in terms of their precipitating stimuli, contextual influences and associations with other aspects of affect (*e.g.*, emotional valence). Experimental social manipulations of pain are performed acutely and no model exists to experimentally induce chronic pain in humans. Additionally, chronic pain represents an unruly challenge to the patient-provider relationship. For example, one challenge may be to reinterpret the patient's expression, an expression that could have persisted because the uncertainty in one's condition was never fully addressed. Instead of allowing for expression to occur providers may be tempted to promise relief alongside treatment and while this promise may provide the temporary certainty that the patient craves, when the pain returns, doubt is likely to creep back in. Repeated enough times, the patient in this situation may become caught in a cycle. Breaking this cycle may not necessarily be about fixing the patient but improving the provider's ability to form an open and empathetic discourse about pain.

We humbly accept that treatment of pain is a course that is littered with challenges and even this parsimonious perspective will not fully account for all the variability encountered along the way. A social psychological perspective has much to contribute to the study of pain. Given the extensive evolutionary history that the expressive role of pain has played in our survival and its biological robustness it may be counterproductive and even professionally stifling to consider a world where the elimination of human pain is possible. As providers we cannot control nor predict and thus must remain tentative about the unanticipated physical, social and/or emotional traumas that our patients can and will experience. However, after the patient's expression of pain to an empathetic clinician and serious disease related pathology is ruled out, what remains for the clinician is building a relationship that allows for the genuine forecasting that life is (and will be) alright for the patient. It is when this message is delivered carefully, responsibly and empathetically that the patient can learn to face the uncertainty of the experience of pain with less averseness.

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