

# Exploring the Relationship Between Pain and Perception

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## Abstract

It is the goal of this paper to contribute to the conceptual understanding of pain. We specifically explore the relationship between pain and perception, surveying three philosophical works that define pain somehow or other in terms of perception. We critique this work and also explore some of its empirical implications. We briefly consider for each of these accounts how pain can be learned (or unlearned), what role distraction plays in pain processing, and the kinds of chronic pain research proponents of the account would favor. We consider whether the various accounts of pain offer significant empirical distinctions and conclude with a request for assistance from cognitive psychologists.

**Keywords:** pain, perception

## Introduction

While all of us are personally familiar with pain, we have little understanding of it from an objective point of view. We have observed that a subject's state of mind can affect her pain experience, as when she is under hypnosis or in a state of anxiety, but we do not know how to make sense of this observation. People with the same bodily injuries sometimes report drastic differences in the amount of pain they feel. It also appears that people sometimes learn to feel pain under circumstances that initially did not hurt. In all of these cases, are people really experiencing varying degrees of pain or could it be that the pain is constant and some other variable is changing? How can such a question be answered?

People on opiates sometimes say they are in pain but that it does not bother them. Some experts say that since pain that is not bothersome is impossible, we should infer that these subjects are misspeaking. Others take the claims of patients on opiates to be true and use them to motivate new accounts of pain. Some clinicians claim that some people who believe they are in pain are simply imagining it even though their pain behavior is similar to those subjects whose pain is indisputably real. Others argue that a sincere report of pain leaves no room for doubt concerning whether or not a subject is in pain. How are we to determine which, if either, is the right response to these cases?

The various positions people take on these issues impact those who are suffering along with the scientific research that would seek solutions for them. It seems, though, that scientists cannot resolve these disputes through empirical studies if they cannot agree about when, and to what degree, pain is present in their subjects. Using an arbitrary but precise definition of pain may help scientists to agree about when their subjects are in "pain", as they have defined the term, and what the correlated physiology is. It cannot shed

light on the above issues, however, which concern our ordinary concept, not the arbitrary, scientifically defined one.

Some philosophers take the above disagreements as evidence that our concept of pain is incoherent, for instance, Dennett (1978). They argue that there is no fact of the matter regarding whether or not pain can be learned or imagined or whether someone could have pain that does not bother them. We believe that this conclusion is premature and that there is more to be learned about pain from the difficult problems described above. Nelkin (1994) wrote that "...the common-sense concept [pain] does seem to pick out an important kind of experience – even if common sense only dimly understands the experience – and science needs to explain *that* type of experience, not something else totally unrelated to it."<sup>1</sup> We shall attempt to shed some light, in particular, on the notion that pain somehow or other is to be understood in terms of perception. We also hope to encourage a much needed dialog between philosophers and psychologists about the usage of terms such as 'sensation' and 'perception'. We conclude with the observation that conceptual analysis can take us only so far in making sense of pain in terms of perception and that the final judgment regarding the relationship between pain and perception must be based on which cognitive model is best supported by empirical considerations.

## Pain is not a Simple Sensation

There is a view of pain sometimes taught in medical textbooks that pain is a kind of sensation resulting from somatic pain receptors delivering signals to a pain center in the brain. This view implies, first, that pain is a basic sensation, i.e., it is a simple linear process that begins with the stimulation of sensors at the location of the pain and ends with a judgment that there is pain at such and such a location. This view seems not to recognize the complicated data surrounding pain described above. The consensus among scientists who study pain seems to be that such a view misses all of the interesting complexity surrounding pain (Chapman, 1986).

In recent philosophical literature, the view that pain is a basic sensation is also largely rejected. Among other reasons, philosophers like to point out that there seems to be no single sort of sensation common to all pains. There also seems to be no pain processing center in the brain which receives such sensory signals. Rather, there are many regions of the brain that are active in any case of pain experience. These observations have led to a proliferation

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<sup>1</sup> p. 326

of alternative accounts of pain, the most promising of which incorporate into the concept of pain some sort of role for perception.

### **Pain and Perception**

Perception is typically thought of as complex information processing, involving low-level input to the sensory organs, which process it into higher-level information, the final output being a depiction of some aspect of the outside world. Scientists assume that this processing is influenced by cognitive factors such as attention and stability, other sensory modalities, associations, memories, beliefs and attitudes. Thus, what one sees (or does not see) can be influenced by one's expectations and focus of attention, as well as what one was seeing moments earlier. What one hears can be influenced by what one sees. Whether one smells rice or popcorn can depend on one's belief concerning which food is normal for the setting. What pain researchers realize is that if pain is a product of perception then one can expect such influences to play a role in one's experiences of pain. Just as one can "see" a deer when hunting only to learn later that one has shot the neighbor's dog, one can have pain in a circumstance in which there is only a light touch and no bodily damage. In fact, researchers can credit the mysteriousness of all of the empirical data described above to the complexities of perception and clinicians can more easily avoid the temptation of categorizing odd cases of pain as being "merely in the head". If pain is the result of a perceptual process, they can accept the patient's claim that his pain is real. Pain formerly understood as "merely in the head" can now be understood as a very real product of the head.

But saying pain has something or other to do with perception is not saying all that much. What is the perceptual process and how is pain experience tied to it? What, exactly, is perceived when we have pain?

### **On Perceiving Pain**

One view of pain, rarely made explicit, is that what is perceived when we have pain is pain itself. Scientists sometimes seem to write as if pain were the object of a pain-detecting perceptual process. Chapman (1986) writes, "Unless the stimulus source is clear and the stimulus is intense, noxious sensory input is characterized by substantial uncertainty. When uncertainty exists, the impulse barrage is susceptible to classification at several different levels of information processing. Such classification may reduce it to a trivial pain experience, lead to an experience that is not pain but some vaguely similar sensation (e.g., tightness, cramping), or it may amplify the sensory signal and associate it with great threat."<sup>2</sup> Aydede and Guzeldere (2002) at times talk explicitly of pain perception and describe it as a form of "inner perception".

We find the notion of pain as an object of perception to be confused. We think that whatever one means by perception,

it must at least involve information processing that leads to a depiction of the way some aspect of the world is. Whatever pain is, it is not something in the world (or even in the body) that a perceptual system has evolved to detect. To think otherwise, we think, is to take too literally common ways of speaking about pain, such as "I have a pain in my shoulder."

### **Pain is a Sensation Derived From a Perception**

Perhaps pain is a sensation, but one that is the product of a complex perceptual process. Hall (1989) argues that having pain amounts to having pain sensations, where the latter are the sensations that are experienced when the body is in a certain perceptual state. Hall does not say what the objects of such perception are, leaving one to wonder just what he has in mind. On his view the same pain sensation can be felt as pleasant or unpleasant, depending on one's psychology and also on the evolutionary role that particular kind of pain sensation may have played. In other words, there are pain sensations, on the one hand, which are the product of complex perceptual processes, and then there is the matter of our feelings toward those sensations.

To better understand this conception of pain, it may help to look more generally at the difference between perception and sensation. Unfortunately, there is much disagreement among philosophers in this area. What we can say is that sensations are generally understood to be non-conceptual in character and inseparable from experience. They are also often taken to be non-representational. In contrast, perceptions are often understood to have conceptual or cognitive components, they are representational in character, and they are, at least in principle, separable from experience. Following Peacocke (1983), let us say that the representational content of a perception is the way it presents the world as being. Some philosophers hold that perceptual experiences are purely representational. Others hold that while representational, they also have some sensational properties, namely what is left after they are stripped of their representational content. It seems to me that the way to understand Hall's view of pain is from the second perspective. Perception of some sort must take place for us to have pain. What pain is is what is left when one strips the representational content from this perception, i.e., the remaining sensation.

Still, without specifying exactly what Hall has in mind for the object of this perceptual process, it is difficult to make complete sense of his proposal. What is being perceived? And why should one suppose that the affective component of our pain experience, which may well be a part of representational content of the correlated perception, has nothing to do with the sensation derived from this perception? Why wouldn't the resulting sensation we call pain, on this view, incorporate this affective dimension?

Hall's view is also controversial in light of the fact that psychologists take sensations to be low-level stimulations of sensory nerves whose signals are delivered in a linear way to higher-level brain regions without "top-down" influences.

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<sup>2</sup> p. 162

Yet, Hall seems to say that sensations are a function of perception. This is not simply a matter of Hall using poor terminology, for if Hall were to use the phrase ‘phenomenal experience’ in place of ‘sensation’ he would lose a component of his theory that sets it apart from the others, namely that there is a difference between our complete experience when having pain, and the way the pain itself feels. According to Hall, we may find a pain horribly uncomfortable or we may not mind it at all, but in either case what we mind or don’t mind is the same particular sensation.<sup>3</sup>

### **Pain is a Perception or Quality of a Perception**

An alternative view reduces pain experience to a particular perceptual event. Pain scientists are understood to be studying a complex perceptual process. The process usually begins with nociceptors, which fire in response to tissue damage or stress. The information being passed along from the nociceptive system serves both as (1) a warning system, providing information about tissue damage or threat of damage, its extent, and its location, and (2) a reminding system, repeatedly supplying information that injury is present in an area of the body so that physical movement will be adjusted to best enable healing. The warning system, which produces a quicker brighter signal, is dominated by A-delta fibers. The reminding system, which produces an especially unpleasant and diffuse signal, is dominated by C-fibers. Since any perceptual system which is to account for pain must be processing signals produced by these two systems, it seems a natural suggestion that what is being perceived when one experiences pain is the state of the body, and in particular, in cases of injury or pending injury, information about the body at the location where the injury is taking place.

Pitcher (1970) holds such a view. He suggests that to have pain is simply to perceive bodily damage. The state of misperceiving bodily damage is similar enough to the state of perceiving bodily damage that we describe the latter as a case of having pain as well. It seems to us as if we are sensing bodily damage, and we have “an immediate inclination to change [our] ‘state of awareness,’ an immediate desire to want it to stop, just as a person who has a pain in the normal cases usually has.”<sup>4</sup> This may be analogous to cases where we report to the eye doctor that we see spots even though we are entirely certain there are no spots where we are looking. On Pitcher’s view, the usual unpleasantness of having pain is due to the fact that

perceiving bodily damage *is* unpleasant for us, perhaps even necessarily so.

Douglas (1998) holds a subtly different view of pain, emphasizing that pain is a sort of response to an object, e.g. a boil or a burn, or a response to an event that is normally damaging to the body, e.g. a slap or a stab. His view is that *how we feel* when we perceive or sense this physical damage is pain. That is, pain is a quality of a mental process. Like Pitcher, Douglas sees pain as neither an object of perception nor a sensation nor any other kind of mental object. Note that on this view, if one perceives bodily damage (through the appropriate perceptual processes), one has pain. The experience does not have to have a particular quality before it can be counted as pain. The very act of perceiving in this way makes it the case that there is a way that it feels, and how it feels *is* pain. At first blush, it seems that on this view pain could, conceivably, not be bothersome. The cases of subjects on opiates could be understood in this light. Due to the effect of the drug, the perception of bodily damage takes on a different, perhaps less bothersome, quality than normal.

### **Contrasts and Comparisons**

What might the difference be between Hall’s view of pain being the sensation resulting from perceiving something and Douglas’s view that it is the way it feels to perceive that thing? The answer to this question must be highly speculative, given the incompleteness of Hall’s account. It seems, though, to be something like this: Pain, for Douglas, while not itself a mental object, is inherently tied to both our beliefs and our feelings. The way that it feels to perceive has everything to do with how we understand (read *represent*) what is happening to us and the emotions such understanding triggers. Our perception of bodily damage is highly cognitively penetrable – our pain is influenced by our thoughts and feelings. In contrast, Hall makes perfectly clear that he means to exclude the affective dimension from pain sensation. A pain sensation may be of one sort versus another sort due to the various beliefs that influence the perceptual process from which the pain sensation is derived. But in the end, the sensation one has is just that, a sensation. For Douglas, how we feel when we have that pain sensation is another matter. It is influenced by our emotions and by facts about evolution. What we take this to mean is that emotional factors do not determine the sort of pain sensation one has but may influence what it is like for a given person to have that sensation.

From a scientific point of view it may seem as if the views of Hall, Pitcher and Douglas, while theoretically different, are empirically equivalent. That is, it may be that every bit of empirical data has an explanation on each view and each view makes the same empirical predications. For instance, on each view, the pain one has is a function of a perceptual process. On each view, the pain one feels can be affected not only by the blocking of nociception but also by changes in the other variables involved in the perceptual process. For instance, by redirecting attention away from a

<sup>3</sup> It would be interesting to compare Hall’s account with the account in (Nelkin, 1991).. Nelkin, proposes that pain is a non-inferential evaluated phenomenal state. As such, there is no pain perception. Rather, there are phenomenal states that are representational (i.e., sensation in my foot which is similar to the sensation of being cut with a sharp object) that are immediately evaluated in a form of introspection (i.e., that [sensation in my foot] means bodily damage.) The comparison might reveal just how central to Hall’s account the role perception really is.

<sup>4</sup> Pitcher, p. 385

bodily disorder on which a subject is focused, his or her perceptual processing could be altered, which, on all three views, could positively impact the experience of pain he or she is having. On both Pitcher's and Douglas's views, the subject's perception of bodily damage changes due to the redirected attention. Perhaps less severe bodily damage is perceived. For Pitcher, a change in one's perception of bodily damage is, by simple definition, a change in one's pain. On Douglas' view, the new perception would, in this case, have a way that it feels that differs in quality from the earlier one – it would be less unpleasant. In contrast to these views, Hall's view suggests different possibilities: either this altered perception would bring with it new, and less unpleasant, sensations or, alternatively, the redirected attention might not impact the perception or the derivative pain sensations, but would instead impact the subject's emotional disposition toward these sensations, resulting in a less unpleasant experience of the *same* pain sensation.

Each view also offers a way to understand pain as something that can be learned (and unlearned). Suppose one learns that a chemical one regularly works with is highly carcinogenic and soon after notices for the first time that it hurts to inhale it. Or, perhaps, after several weekly deep muscle massages, one becomes certain of their benefit and ceases finding the experience painful. Since pain is understood on all three accounts to be a function of perception and beliefs are understood to impact perception, it follows that acquiring new beliefs, i.e., learning, on all three views, can bring with it, new pain experience or even a disappearance of pain. For Pitcher and Douglas there is a second way in which pain can be learned. New beliefs can lead to new emotional responses to particular events, which, on their views, can impact one's perceptions just as one's beliefs can. And, finally, though it seems that Hall holds the view that pain sensations are unaffected by emotions, he would clearly allow the new emotions that sometimes accompany new beliefs to lead to new *experiences* of the same pain sensations. Thus, a follower of Hall might say that in the above cases, one comes to experience a given pain sensation as more or less unpleasant, for instance. Note that on this account, the pain sensations remain constant. There is no learned (or unlearned) pain, just learned and unlearned experiencing of a given sensation.

We believe that how one understands the relationship between pain and perception can have direct implications for how one goes about doing clinically oriented research on pain. One might ask in what pain treatment would consist for each of theories above? On Pitcher's view, since pain is defined as the perception of bodily damage, short of fixing the damaged part of the body, one could hope to relieve pain only by affecting the corresponding perception of that damage. On Douglas's view, the aim could be the same, since pain experience is understood to be a quality of the perception itself. Of course, there would be many different ways to affect a perception of bodily damage. One could focus on the lower levels of processing or one could focus on "top-down" influences such as emotions and beliefs.

Some of these ways could be described as teaching a subject not to feel pain.

Hall's view of pain entails different possibilities for pain treatment, and therefore different research foci. To relieve pain, one could aim to affect a subject's experience of his pain sensation, while leaving the sensation in tact. This goal would focus on his emotional disposition. Or, one could aim to modify the sensation itself by modifying the corresponding perception, as Pitcher and Douglas would have you do. But for Hall, this aim would involve impacting lower-level processing or possibly high-level beliefs, but not, it seems, emotions.

It is difficult to rule out a different possibility for relieving pain, on Hall's conception of pain -- it could be that the sensation that normally underlies a particular perception could be impacted by a drug, say, without affecting the perception itself. This would open the door for treatments that aim to change, not our perceptions nor our emotions, but the sensations such perceptions produce. This possibility is clearly ruled out on Pitcher's understanding of pain. A parallel possibility may exist from Douglas's perspective on pain -- perhaps a drug could impact the way that it feels to have particular perception. This would depend on whether anything besides the perception itself impacts the way that a perception feels

## Conclusion

It might appear that all three accounts can explain the same mysterious pain phenomena, since on all three accounts beliefs and attitudes impact how one feels during one's experience of pain. In fact, the different cognitive models these accounts of pain suggest may contain enough variables to support explanations of just about any pain phenomena. On the other hand, it also is possible that these accounts imply differences that really are empirically significant. At the very least, it seems that whether a pain scientist thinks of pain as Hall does or as Pitcher or Douglas do would make a difference to the questions one seeks answers to. For example, whether one thinks of chronic pain (in the absence of any signs of bodily damage) in terms of illusory reporting by a perceptual system or as an abnormal way of experiencing a normal sensation will lead to different biases and different research agendas. In the latter case, one might consider the effects of various anti-depressants on chronic pain. In the former case, one might seek more detailed knowledge of the bodily damage detecting system to see what might be causing the "misfire." And while it may be that both research agendas ultimately contribute to our knowledge of how to treat chronic pain, it is reasonable to expect the steadiest flow of clinical advances when we arrive at a strong model of the processing systems that underlie pain.

So, should philosophers conclude that the ultimate way to resolve the above debate is to refer it to the psychologists? If there really are empirical differences in the competing ways of understanding pain in terms of perception, then ultimately it should be up to those doing the empirical work

to tease out which perspective corresponds to the strongest cognitive model. Perhaps this much is clear: one way to move forward in the philosophical debate regarding the relationship between pain and perception is for psychologists to offer their two cents regarding the underlying cognitive models. . They could also offer their opinions on whether the various relationships proposed by the philosophers really have empirical significance.

But to request feedback from empirical scientists is neither to give up on the philosophical enterprise nor to dismiss the folk concept of pain as altogether incoherent or unimportant. Nor is it to say that philosophical work on pain has reached its limit. Rather, it is merely to recognize that the philosophical study of pain and the related studies of perception and sensation can benefit from greater knowledge of how psychologists understand such concepts as “perception” and “sensation” and how they think pain is best modeled. Ultimately, our current “folk” concepts of pain and perception and the corresponding psychological concepts are inextricably tied to one another. A greater understanding of either one can help advance our understanding of the other.

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