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## Body Sense

Restorative embodied self-awareness as a pathway to well-being.

by Alan Fogel

### Emotional and Physical Pain Activate Similar Brain Regions

Where does emotion hurt in the body?

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When people feel emotional pain, the same areas of the brain get activated as when people feel physical pain: the anterior insula and the anterior cingulate cortex. In one study, these regions were activated when people experienced an experimental social rejection from peers. In another more real-life study, the same regions were activated when people who had recently broken up with romantic partners viewed pictures of the former partner.



So, if physical and emotional pain have similar neural signatures, why not take Tylenol (acetaminophen) for grief, loss, or despair? People who had experienced a recent social rejection were randomly assigned to take acetaminophen vs. a placebo daily for three weeks. The people in the acetaminophen condition reported fewer hurt feelings during that period. When their brains were scanned at the end of the treatment period, the acetaminophen takers had less activation in the anterior insula and the anterior cingulate cortex.

This study was not done in order to promote acetaminophen and other analgesics as psychoactive drugs. Rather, the idea was to emphasize that over the course of evolution, our bodies decided to take the economy route and use a single neural system to detect and feel pain, regardless of whether it is emotional or physical. While it may be a good idea to take a pain reliever in the acute phase of feeling physical and emotional pain, no one is proposing this a long-term cure for dealing with hurt feelings and grief.

Pain, of course, is always both a physical and an emotional experience. If I stub my toe, in addition to the physical pain, I am likely to be also angry or disappointed with myself or with someone else who is convenient to blame (Why did you leave that box in the hallway where I couldn't see it until I hurt myself? Now look what you've done!!).

Speaking of blaming, I begin to feel annoyed when people who do these studies and also those that apply them clinically don't go far enough into the body: emotional pain doesn't just hurt psychologically; it hurts in MY body. These days, it seems, the discovery of a link between a brain region and a psychological experience gives the experience an aura of authenticity: now we know it's real. People sometimes say, upon reading or hearing that depression, anxiety, and many other psychological ailments have specific neural signatures, "It's not just in my head." Well, I agree, but the brain happens to be located in the head (maybe saying it's



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not just my imagination is more accurate?). Showing only brain activation for a particular experience – without acknowledging a corresponding activation in the peripheral nervous system and a corresponding felt sense in the body -- doesn't do much to convince me that the experience is somewhere else than in my head.

Here's the part that most psychologizing tends to leave out: the brain is massively interconnected with the rest of the body. There are direct neural connections via the brain stem and spinal cord. The circulatory and lymphatic systems also carry neurotransmitters (hormones and immune cells) that find receptor sites in the brain which feedback and modulate the links between brain and body. In this way, every cell in the body – every cell -- is linked into the nervous system and as such, can be sensed and felt, whether or not we allow ourselves to be aware of this psychobiological fact (I feel better now, having said this in writing).

With a physical pain, there is an obvious link between the psychological experience of pain and an awareness of a physical location in the body. The pain seems to come from an elbow, or a toe, or a hip. Weirdly, we can feel the physical pain in that location even though most, but not all, of the processing is going on in the brain. The neural, blood, and immune pathways between brain and body are tagged with body location information, beginning in the spinal cord and with successively more specific tagging up through the brain stem and thalamus, each adding another layer of redundancy and complexity, until the experience becomes conscious and further identified as “mine” in the insula, parietal, and motor cortices. The marvel of the nervous system is that even though body sense awareness is largely a creation of cortical complexity, we feel in 3-D: the pain is “in” my knee, that object is “out there” in space, etc. No one actually knows exactly how acetaminophen increases the pain threshold: it may act specifically in the anterior insula and anterior cingulate, or throughout this whole body network.

So, with this kind of logic, we can come back to the neural similarities between emotional and physical pain. If the similarity is not just in the brain but in the body, it's perfectly reasonable to ask: Where does an emotional pain hurt? If there really is an economy of pain networks that includes both physical and emotional pain, and if physical pain has a body location, then this simple syllogism leads to the conclusion that emotional pain must have a physical location in the body.

In what way might emotions be embodied? All emotions have a motor component. Even if we try to hide our feelings, there will be micro-momentary muscular activation. The anterior cingulate is located right next to the premotor area, which begins the process of forming an emotional expression in the body. The premotor area connects to the motor cortex above it, and then back to the specific muscles of expression.



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Emotional pain may be located in the body in those places where an expression was meant to happen but failed to materialize. If I felt like screaming at the person who left the object in the hall, the object that stubbed my toe, but I didn't actually scream, and in fact, I didn't take my anger out on the person, I might still have residual muscle tension in my neck, throat, and jaw (holding back my angry scream). That neglectful person, for me, is experienced as a pain in the neck or a pain in the butt (the suppressed urge to kick?) or that I'm fed up (a feeling in my chest and gut that I'm going to burst?). Deeper insults go deeper into the body. Rage and hatred are the ultimate gut feelings, down in the bowels (I'm so mad I could puke; You make me sick to my stomach).



The studies cited at the beginning of this post were about social rejection. Where is that felt in the body? A broken heart? Downhearted? Is love and its loss more than metaphorically connected to the heart and chest? Yes, says research from behavioral medicine and health psychology. The sense of safety that comes from being in the company of loved ones is partly created by vagal-parasympathetic activation which promotes an easy and relaxed integration of breathing and heart rate, both of which are located in the chest.

Feelings of insecurity get the heart and the breath out of synch and activate the sympathetic nervous system as if we were dealing with a threat (elevated heart rate and blood pressure), and can create a sense of unease in the chest, and even pain. People who have been hurt by others often have retracted chests and downcast postures, which are muscular ways of protecting the heart and closing off the self from fully engaging with others for fear of being hurt again. And people in insecure relationships are more likely to have cardiovascular (and other health) problems than those who are more secure.

With physical pain, we'd be in big trouble if we could not locate it in our body via the direct inner experience of feeling it. How would we (our brain) know how to deal with the pain (how to move, how to sit, or how to lie down without further injury) in the absence of a location and a direct body sense? Sometimes pain relievers make the important work of the body -- to find and heal the injury -- more bearable but we need to allow

body sense to play a role in feeling into what our body needs.

For emotional pain, an analgesic will help us temporarily but it won't take away the unresolved feelings that never got seen or expressed or really felt. In order to get over grief, resolve anger, and even embrace happiness, we have to really feel those things in the body. We are quick to access the body locations of pleasurable feelings (food, drink, sex, warmth, touch) so why not also let ourselves go to the places of emotional pain? Yes, it hurts for a while, but then – miraculously — there can be relief and the emergence of a new perspective on ourselves and others.



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