Cornell Research Program on
Self-Injury and Recovery

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How Does Self-Injury Change Feelings?

Who is this for?

Anyone interested in understanding more about the seemingly paradoxical phenomena of how self-injury "works" to change a person's feelings.

What is included?

The effect of self-injury on feelings

How and why self-injury works to make people feel better

Explanation of the neural overlap between physical and emotional pain

What effect does self-injury have on feelings?

Most people go to great lengths to avoid pain and activities or experiences associated with pain. Evolutionarily, this makes sense: pain is associated with injury and potential death, so the instinct to avoid pain is vital to the survival of a species. Why, then, do so many people engage in behaviors that cause pain, like self-injury?

Surprisingly, despite the physical pain, many people who engage in self-injury report that it makes them emotionally ***feel better:***

- Self-injury often occurs when someone is feeling very strong emotions, suggesting that self-injury may help some people cope with bad feelings.[1]
- Many people report that self-injury both reduces unwanted feelings and increases wanted feelings.[2,3]
- These self-report studies are backed up by biological studies, which show that pain may increase physiological indicators of good feelings and reduce physiological indicators of bad feelings.[4,5]

In short, research over the past decade has made the discovery that self-injury really can make people feel better. This finding does not appear to fit with the evolutionary notion that people should always attempt to avoid pain, but it does help to explain why so many people engage in self-injury. This leads to an even more perplexing question: How could something physically painful like self-injury actually make people feel better?

Why does self-injury make people feel better?

One potential explanation for why self-injury makes people feel better is called "pain offset relief." This phenomenon has been discovered, forgotten, and re-discovered several times over the last 100 years, and has only recently been applied to the understanding of self-injury. It works like this:

- **Pain onset.**
  When a knife, flame, or similar stimulus hits the skin, it causes pain. Many people assume that people who engage in self-injury either do not feel pain or "like pain" because they are "wired differently." But recent laboratory research suggests that this is not the case. Across several kinds of pain induction tasks (cold pain, heat pain, and pressure pain), this work has shown that people who engage in self-injury tend to be able to endure more pain than other people, but they still feel pain and find it to be very unpleasant.[6,7,8,9]
- **Pain offset (or removal/reduction).**
  Once whatever is causing the pain is removed or even reduced slightly (i.e., once the pain is offset), it causes people to feel better. Importantly, this pain offset does not simply return people to how they were feeling before the pain began. Instead, they go far beyond that previous point, into a more pleasant feeling often labeled "relief." This is known as "pain offset relief."

Recent work on pain offset relief shows that pain itself does not make people feel better, but something about the removal of pain does.[5]

This is important because it shows that people who engage in self-injury are not "wired differently" to "enjoy pain." It also indicates that self-injury does not simply act as a distraction from bad feelings and thoughts; there is something about the removal of physical pain that brings a strong sense of relief in and of itself. Lastly, it reveals that self-injury may simultaneously (and independently) decrease bad feelings and increase good feelings.[5]

Who experiences pain offset relief?

Many self-injury researchers initially assumed that pain offset relief would be something that is only experienced by people who self-injure or are at-risk for self-injury.[4] Surprisingly, however, pain offset relief appears to be a near-universal phenomenon experienced by nearly all living creatures, not an abnormal psychological or biological feature that predisposes some people to self-injury (see Franklin et al.[5]). Once again, this work indicates that people who engage in self-injury are not "wired differently" to "like pain." People who engage in self-injury simply tap into a natural and powerful relief mechanism that all people (and other organisms) have access to.

Why does pain offset work for self-injury?

As noted above, the instinct to avoid pain greatly facilitates the evolutionary survival of individuals and species. If this is true, then why has nature built in this pleasurable effect of pain that we call pain offset relief? There are a few possible answers for this, but the one we want to focus on here is called "neural overlap."

Many people assume that specific areas in the brain are responsible for specific psychological phenomena. Contrary to this assumption, recent reviews indicate that the brain does not have specialized areas for specific (e.g., fear, happiness) or even general psychological phenomena (e.g., thoughts, emotion, memory).[10,11] Indeed, the typical cortical (processing) area of the brain is involved in many (up to nine!) different tasks at the same time. This work suggests that the exact same brain area may play an important role in a wide range of physical and psychological processes.

Yeah, but how does this work for self-injury?

One of the most common reasons individuals give for injuring themselves is that reduces emotional pain. This may be because the physical pain relief that follows a self-injury event basically tricks the brain into perceiving relief of emotional pain too! This is because researchers have discovered that there is a large degree of "neural overlap" between physical pain and emotional pain (in particular, areas called the 'anterior cingulate cortex' and the 'anterior insulsa'). This work has shown that a brain cannot really tell the difference between "feeling hurt" physically and "feeling hurt" emotionally.[12] Because of this, individuals who are more sensitive to physical pain are more sensitive to emotional pain[13] and to pain relief. It also means that ***feeling a reduction of physical pain,*** such as the relief that follows a self-injury episode (i.e., pain offset), may be interpreted by the brain as a reduction in emotional pain too. This helps to make sense of self-injury:

One of the most common reasons individuals give for injuring themselves is that reduces emotional pain. This may be because the physical pain relief that follows a self-injury event basically tricks the brain into perceiving relief of emotional pain too!

- Emotional pain is difficult for many people to reduce or turn off – it takes a tremendous amount of effort, resources, and energy.
- In contrast, physical pain is very easy to turn off: simply lifting a knife from the skin leads to physical pain offset.
- Due to a common neural overlap, this "physical pain offset" may incidentally alter activity in some areas of the brain associated with emotional pain. As a result, physical pain offset may reduce emotional pain and cause relief.

In sum, recent work on pain offset relief provides one possible answer to the question of "How does Self-Injury Change Feelings?" In particular, this work suggests that:

- Pain itself does not make people feel better, but pain offset does.
- People who engage in self-injury are not "wired differently" to "enjoy pain"; rather, they simply tap into a natural relief mechanism that everyone (and maybe every species) can access.
- Pain offset relief may occur due to neural overlap between physical and emotional pain relief.

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