

DOES A PAINFUL BREAK-UP REALLY HURT?

At some point in their life, almost everyone goes through a romantic break-up. If you are part of that large group, you might have told friends that the break-up was "painful" and that you were "hurt" by the rejection. We've seen in this chapter that the brain has characteristic responses to physical pain. But here's an interesting question: Does the brain respond in the same way to intense social pain as intense physical pain?

To address this question, a team of researchers recruited 40 participants, all of whom had weathered an unwanted break-up of a romantic relationship sometime in the six months before the study (Kross et al., 2011). The researchers made a distinction between the emotional response to pain and the actual physical experience. Physical pain causes emotional distress, as does social rejection. Earlier research confirmed that people's brains show similar patterns of emotional responses to both physical and social pain (MacDonald & Leary, 2005). However, the researchers wanted to demonstrate that intense social pain also brings about the same brain response as the actual sensory experience of pain. To provide this demonstration, the researchers asked participants to experience both physical and social pain while undergoing fMRI scans.

For physical pain, the participants experienced trials on which intense heat was applied to their left forearms. The level of heat was determined separately for each participant so that it was near the limit of what he or she could personally tolerate. In other trials, the participants experienced a warm stimulus that they had agreed was not painful. The contrast

between the hot and warm trials allowed the researchers to see which brain regions were particularly active when the participants were experiencing physical pain.

The study provided a similar contrast for social pain. The participants arrived at the laboratory with two photographs: One of their ex-partners and another of a friend who was the same sex as their ex-. On some trials, participants viewed the headshots of their ex-partners while thinking about the rejection they had felt during the break-up. On other trials, participants viewed the headshots of their friends while thinking about a recent positive experience they had shared. Again, the researchers examined differences in brain response to the painful and nonpainful stimuli.

For each trial, the participants used a 5-point scale to rate the intensity of their distress. Lower numbers indicated greater distress. The researchers wished to equate the intensity of the physical and social pain. The participants' ratings suggested that this goal was met: The average reported intensity of physical pain was 1.88; the average reported intensity of social pain was 1.72.

So what did the fMRI scans show? As you'd expect, the physical pain produced activity in sensory areas of the brain that respond when the body is undergoing harmful stimulation. In addition, just as the researchers predicted, the same brain regions were active when participants ruminated on their break-ups! The conclusion here is, if you've ever claimed that a break-up "hurt," you were absolutely telling the truth.

Attentional Processes

Take a moment now to find 10 things in your environment that had not been, so far, in your immediate awareness. Had you noticed a spot on the wall? Had you noticed the ticking of a clock? If you start to examine your surroundings very carefully, you will discover that there are literally thousands of things on which you could focus. The processes of **attention** enable you to direct your awareness to a subset of all the information available to you. Generally, the more closely you attend to some object or event in the environment, the more you can perceive and learn about it.

What forces determine the objects that become the focus of your attention? The answer to this question has two components, which are called goal-directed attention and stimulus-driven attention (Chun et al., 2011). **Goal-directed attention** reflects the choices that you make about the objects to which you'd like to attend, as a function of your own goals. If, for example, you are contemplating a case full of pastries, you might direct your attention to only those desserts covered

in chocolate. You are probably already comfortable with the idea that you can explicitly choose objects for particular scrutiny. **Stimulus-driven attention** occurs when features of the stimuli—objects in the environment—themselves automatically capture your attention, independent of your local goals as a perceiver. You've experienced stimulus-driven attention, for example, if you've ever been day-dreaming at a stoplight while out for a drive. The stoplight's abrupt change from red to green

attention A state of focused awareness on a subset of the available perceptual information.

goal-directed attention A determinant of why people select some parts of sensory input for further processing; it reflects the choices made as a function of one's own goals.

stimulus-driven attention A determinant of why people select some parts of sensory input for further processing; occurs when features of stimuli—objects in the environment—automatically capture attention, independent of the local goals of a perceiver.