

# Romantic rejection stimulates areas of brain involved in motivation, reward and addiction

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The pain and anguish of rejection by a romantic partner may be the result of activity in parts of the brain associated with motivation, reward and addiction cravings, according to a study published in the July issue of the *Journal of Neurophysiology*.

The study's findings could have implications for understanding why feelings related to romantic rejection can be hard to control, and may provide insight into extreme behaviors associated with rejection, such as stalking, homicide and suicide—behaviors that occur across many cultures throughout the world.

In the study, researchers used [functional magnetic resonance imaging](#) (fMRI) to record [brain activity](#) in 15 college-age, heterosexual men and women who had recently been rejected by their partners but reported that they were still intensely "in love." The average length of time since the initial rejection and the participants' enrollment in the study was 63 days, and all participants scored high on a psychological test called the Passionate Love Scale, which determines the intensity of romantic feelings. All participants said they spent more than 85% of their waking hours thinking of the person who rejected them, they yearned for the person to return and they wanted to get back together.

Participants each viewed a photograph their former partners. Then they completed a simple math exercise, such as counting backwards from a random four-digit number by 7, to distract them from their romantic thoughts. Finally, they viewed a photograph of a familiar "neutral"

person, such as a roommate's friend.

The researchers found that looking at photographs of the participants' former partners stimulated several key areas of the participants' brains more than looking at photos of neutral persons did. The areas are:

- the ventral tegmental area in the mid-brain, which controls motivation and reward and is known to be involved in feelings of romantic love,
- the nucleus accumbens and orbitofrontal/prefrontal cortex, which are associated with craving and addiction, specifically the dopaminergic reward system evident in cocaine addiction, and
- the insular cortex and the anterior cingulate, which are associated with physical pain and distress.

The researchers note that their findings supply evidence that "the passion of 'romantic love' is a goal-oriented motivation state rather than a specific emotion" and that their results are "consistent with the hypothesis that romantic rejection is a specific form of addiction."

Those who are coping with a romantic rejection may be fighting against a strong survival system that appears to be the basis of many addictions. The data help to explain why the beloved is so difficult to give up.

## **Hope for the Lovelorn**

There is hope for the lovelorn, however: The researchers found that the greater the number of days since the rejection, the less activity there was in the area of the brain associated with attachment, the right ventral putamen/pallidum area, when the participants viewed photographs of their former partners. Also, areas associated with reappraising difficult

emotional situations and assessing one's gains and losses were activated, suggesting that rejected individuals are trying to understand and learn from their difficult situation--what could be an adaptive response to rejection. If attachment responses decrease as the days go by and falling out of love is a learning process, there could very well be physiological evidence that time heals all wounds.

**More information:** <http://jn.physiology.org/>

Provided by American Physiological Society

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