

SCIENTIFIC STUDY

Hurting? Being in love can help take away your pain

By Sandeep Ravindran

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“One word frees us of all the weight and pain of life. That word is love.”

It's been more than 2,500 years since the Greek playwright Sophocles wrote those words, but scientists have now proved that being in love can actually reduce pain. And they've also shown why.

Love may tap into some of our oldest brain pathways, making us feel so euphoric that we ignore pain, according to a recent study at Stanford University and the State University of New York at Stony Brook.

The scientists found that students in love felt less pain while staring at a picture of their significant others. In addition, love acted through the same brain pathway as several strong painkillers and addictive drugs such as heroin and cocaine. Studying the effect of love on these pathways might not only tell us more about love itself but could



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— Sara Parke, on test subjects
at Stanford University

Love

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also help us find ways to treat both pain and addiction.

"It was a nice connecting of the dots between what we understand of the neural systems of love and what we understand of the neural systems of pain," said Dr. Sean Mackey, chief of the pain management division at the Stanford University School of Medicine and one of the study's researchers.

Love acts on the same brain systems as any intensely rewarding experience, such as winning the lottery, said Arthur Aron, a social psychologist at SUNY Stony Brook who collaborated with Mackey.

Aron has been a "love researcher" for 30 years, but he never thought to study pain until he attended a big neuroscience conference five years ago in Washington, D.C., and shared a hotel room with Mackey.

"Sean and I really hit it off," Aron said. As he and Mackey discussed what brain pathways each studied, they realized they were talking about the same ones, and they decided to study the interaction between love and pain.

In July 2007, the researchers started recruiting Stanford undergraduates for their study.

"It's the easiest study I've ever recruited for," Mackey said. The students put up fliers around campus, and "within hours, we had a dozen couples knocking on our door."

Sara Parke, a Stanford undergraduate and research assistant in Mackey's lab at the time, said numerous students would approach her to ask about the study.

"Our participants were some of the happiest people that you'd meet," she said, noting how excited they were to see neuroimages of their brains in love. "They had all these questions: 'Am I in love?' 'Is my part-

ner in love?' 'How much in love?' 'Are we going to be together forever?'"

Having so many volunteers allowed the scientists to screen for those who described themselves as intensely in love and also scored highly on a "passionate love scale," a standardized measure of romantic feelings.

Additionally, the group considered only students who had been in a relationship for nine months or less.

It was a good thing the eight women and seven men picked for the study were as happy and excited as they were, because the next step was to subject them to "a very intense, acute pain experience," said Jarred Younger, a Stanford assistant professor who conducted the study while a postdoctoral researcher in Mackey's lab.

To inflict pain, the scientists used a heated probe on each student's hand and slowly increased the temperature until the pain be-

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— Dr. Sean Mackey

came intolerable. Students rated their pain on a scale of zero to 10, with zero being "no pain at all," and 10 being "the worst pain imaginable."

The researchers then generated pain levels of zero, four and seven while students lay inside a brain scanner looking either at a picture of their significant other or of someone they found equally attractive.

Students felt a lot less pain when they stared at their partner's picture. And the more time students had previously said they spent thinking about their partner, the greater their pain

relief. Students who spent more than half of the day thinking of their significant others experienced three times more pain relief than other participants, Younger said.

Parke remembered one participant who was just wildly in love with his partner.

"His answers to the love questionnaire were hilarious," she said. "He picked the maximum level on every single answer."

That student experienced the most pain relief, Parke said. He and his partner have been together for several years, and "they're still really enthusiastic about each other," she said.

But participants also experienced pain relief while performing distracting word association tasks, thinking of responses to questions such as, "What are some sports that don't use a ball?" Previous studies had shown that such distractions could reduce pain.

When the scientists

compared brain images from the love and distraction tasks, "the results were very exciting," Mackey said. "Love engaged all the regions that we were hoping that it would engage. But even better, it clearly demonstrated that it works in an entirely different way than distraction."

Understanding these powerful rewarding pathways could help develop pain medication with fewer side effects, or find behavioral ways to treat pain. Studying the brains of people in love could also help understand relationships. And the researchers plan to study other kinds of love, such as maternal love or long-term love.

But, Mackey said, he didn't want to make the experience of love too clinical.

"Our hope," he said, "is not to diminish the experience of love, or the wonderful attributes of love, but instead to provide a little better understanding of the how and why."