

Psychology

Relationship partners are valued by the brain region that also values other goods

by **Yohsuke Ohtsubo**¹ | Professor

doi.org/10.25250/thescbr.brk573

¹: Department of Social Psychology, Graduate School of Humanities and Sociology, University of Tokyo, Tokyo, Japan

This Break was edited by Max Caine, Editor-in-chief - TheScienceBreaker

All of us value some friends more than others, and tend to value partners who display signs of commitment to their relationships. This study revealed that this relationship valuation process is executed by the orbitofrontal cortex: a brain region responsible for valuing other goods, such as food and money.



Image credits: sasint – Pixabay

When your friend spends a long period of time listening to your problems, how do you feel? You may come to feel closer to the friend than before or consider them a more dependable friend. Apart from such subjective feelings, evolutionary psychologists assume that what is going on in your head is a recalibration of the relationship value of the friend. The friend's pro-relationship behavior indicates that they value their relationship with you. Precisely because the relationship with you is important to them, they are likely to help you when needed. Therefore, it is reasonable for you to value them in return. Although people don't engage in such reasoning consciously, we have shown that people increase the relationship value of a particular friend after observing their pro-relationship behaviors. Accordingly, we call a partner's pro-relationship

behaviors "commitment signals," which signify their valuation of the relationship with you, and in turn, enhance your valuation of them.

In a new study using functional magnetic resonance imaging (fMRI), we investigated which brain region was responsible for calculating relationship value. Previous research revealed that the brain uses the same area to calculate the value of various goods, such as food and money. According to these studies, the orbitofrontal cortex encodes the value, and some scholars argue that the orbitofrontal cortex converts values of various objects into a common currency. Suppose the orbitofrontal cortex also calculates the relationship value of social partners. In that case, we expected that commitment signals activate the orbitofrontal cortex.

In this fMRI study, we had a total of 22 undergraduate students imagine a series of social situations in which they had (or hadn't) received commitment signals from a real-life friend. In particular, we gave participants a total of 30 variations on the situations: 10 depicting their friend's high-cost pro-relationship behaviors (e.g., spending a long period of time listening to your personal problems), 10 depicting their friend's low-cost pro-relationship behaviors (e.g., wishing you happy birthday), and 10 depicting their failures to act in a pro-relationship manner (e.g., not listening to your problem because they were occupied with something else).

With our results, we confirmed the common currency hypothesis. The orbitofrontal cortex was more active when participants imagined they had received high-cost commitment signals. It was less active when imagining their friend had failed to act in a pro-relationship manner.

After confirming the main hypothesis, we explored whether the activity of the orbitofrontal cortex

would be modulated by loneliness. Our previous behavioral research revealed that lonely individuals did not increase relationship value in response to commitment signals as much as non-lonely individuals. We investigated whether this pattern was paralleled in brain activity. Although the result is still tentative due to the small sample size, we found that the orbitofrontal cortex of lonely individuals was less responsive to low-cost commitment signals than that of non-lonely individuals.

In summary, this study revealed that the orbitofrontal cortex, the brain region responsible for economic valuation, also serves to calculate the relationship value of social partners. In addition, lonely individuals are less responsive to commitment signals—less likely to increase relationship value even after receiving commitment signals. The orbitofrontal cortex activity confirmed this pattern. The orbitofrontal cortex of lonely individuals was less responsive to low-cost commitment signals. These findings help us understand how we can effectively develop close relationships with our friends.