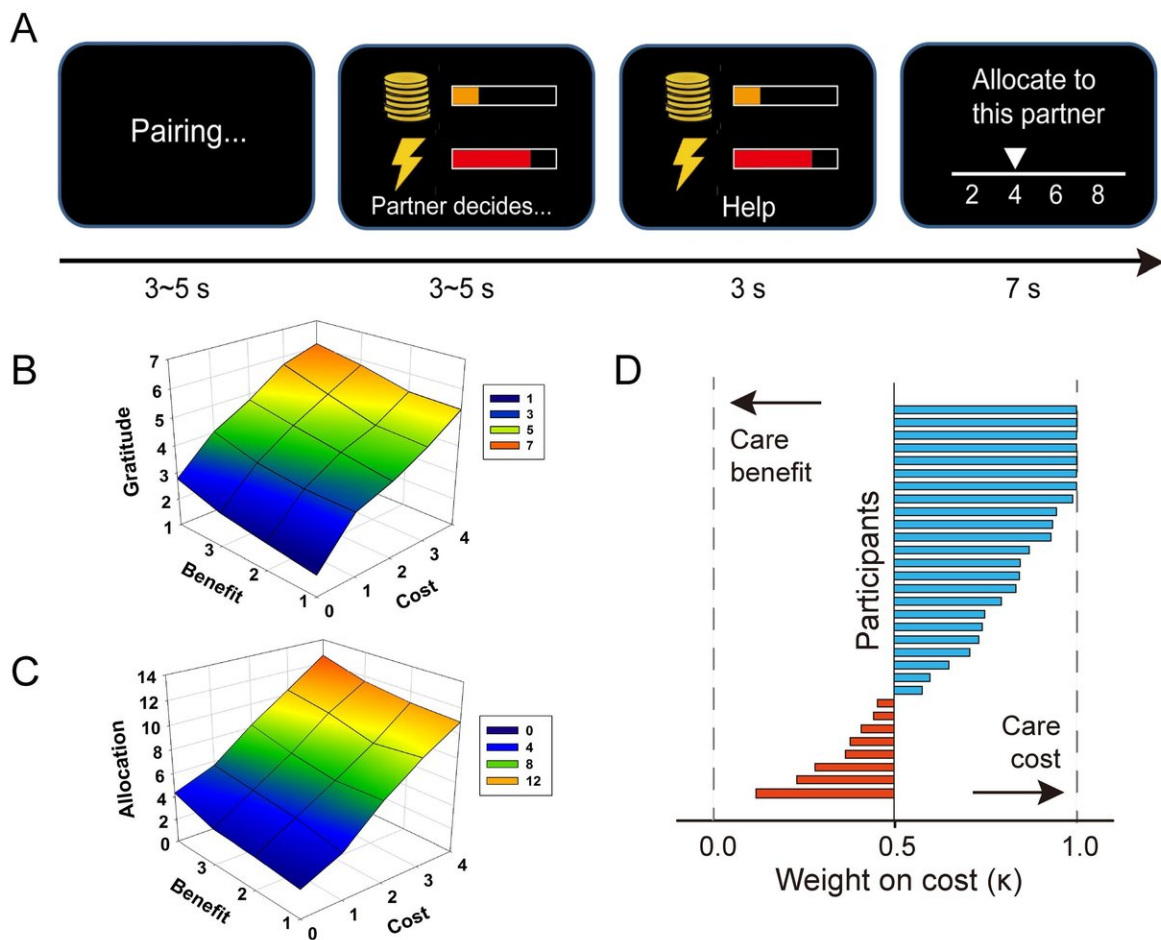


# Neuroimaging research demonstrates how the brain translates altruism into feelings of thankfulness

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Experiment procedure and behavioral results.(A) At the beginning of each trial, the participants were (ostensibly) paired with one of three co-players. Then the participants saw a pain-money pair and waited for the co-player's decision. If the

coplayer chose Help, then the co-player lost the corresponding amount of bonus while the participants would be exempted from the pain stimulation on this trial. If the coplayer chose NoHelp, then the co-player could keep the bonus while the participants had to receive the corresponding pain stimulation. The presentation of the co-player's decision was defined as the critical events in the fMRI data analysis. At the end of the trial, the participant could allocate 20 Yuan (? 3 USD) between him/herself and the co-player, with the knowledge that the co-player was not aware of this procedure.(BC) Post-scan gratitude rating and allocation during scanning (i.e., reciprocity) as a function of self-benefit and benefactor-cost.(D) Relative weight of benefactor-cost over self-benefit in gratitude rating. Credit: Yu et al., *JNeurosci* (2018)

A brain network that gives rise to feelings of gratitude has been uncovered in new research published in *JNeurosci*. The study could spur future investigations into how these "building blocks" transform social information into complex emotions.

Previous neuroimaging research in which participants imagined themselves as survivors of the Holocaust who received food, shelter and clothing from strangers identified the [medial prefrontal cortex](#) and perigenual [anterior cingulate cortex](#) (pgACC) as [brain regions](#) associated with gratefulness. However, it remains unclear how these parts of the brain translate such altruism into gratitude.

Xiaolin Zhou and colleagues addressed this question by having participants play a social interactive game in which their partner would decide whether to pay different sums of money to in order to prevent the participant from receiving a pain stimulation.

By manipulating the pain intensity and cost to the partner to help the participant, the researchers found that partner cost activated brain regions involved in mentalizing while levels of pain reduction were

encoded in regions involved in reward representation.

Connectivity analyses revealed that these regions feed information to pgACC, which tracked feelings of gratitude over time.

Their findings indicate that gratitude may arise from the integration of relevant [social information](#) in pgACC.

**More information:** Decomposing gratitude: representation and integration of cognitive antecedents of gratitude in the brain, *JNeurosci* (2018). [DOI: 10.1523/JNEUROSCI.2944-17.2018](https://doi.org/10.1523/JNEUROSCI.2944-17.2018)

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