

 NEUROIMAGING

Shopping centres in the brain

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Considering the purchase of the latest gadget or a new pair of shoes, shoppers ask themselves: “How much do I want this?” but also “How much am I willing to pay for this?” In a new fMRI study Knutson *et al.* show that these two questions are associated with activity in the nucleus accumbens (NAcc), mesial prefrontal cortex (mPFC) and insula, and that the activity in these regions predicts whether or not a person will buy the product.

Previous studies involving financial risk-taking games have shown that the NAcc and insula are activated when anticipating financial gain and loss. In real life however, people commonly purchase items for money rather than trade in

stocks and bonds, and the question remained whether the decision-making process in product purchasing involves the same brain regions.

In Knutson and colleagues' study, subjects received US\$20 that they could use to buy any of the products shown on the screen during the scan. In each trial they first saw a picture of a recognizable product, then saw the price of the product, and then had to decide whether or not to buy the item, allowing the researchers to differentiate the neural activity patterns associated with product presentation, seeing the product price, and the decision process. After the scanning session subjects rated the items for desirability and determined how much they would have been willing to pay for them.

Product desirability correlated with NAcc activity during product and price presentation. The mPFC was activated when the price shown was less than the price the subject had in mind for a particular product (in other words, a relative bargain). The decision to purchase correlated

with deactivation in the insula, a brain area that has been associated with the anticipation of pain.

Using regression analysis the researchers found that activation of the NAcc during product presentation predicted purchase behaviour, as did mPFC activation during price presentation, whereas insula activation during price presentation predicted the decision not to buy. Unsurprisingly, product desirability and perceiving the price as too high also predicted whether or not subjects would decide to purchase a product. These findings suggest that the decision about whether or not to buy results from a deliberation between the gain of getting a product and the pain of parting with money to pay for it.

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ORIGINAL RESEARCH PAPER Knutson, B. *et al.*
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