

Starving honey bees lose self-control

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A study finds that hungry bees are more impulsive Credit: coniferconifer licensed under CCBY2.0

A study in the journal of the Royal Society *Biology Letters* has found that starving bees lose their self-control and act impulsively, choosing small immediate rewards over waiting for larger rewards.

Small animals with high metabolic rates need to eat more often than big animals and so are more likely to act impulsively, seeking immediate rewards to avoid starving to death. However, self-control is vital for social groups to function harmoniously.

For [bees](#) this presents an interesting paradox, say the team behind the study, because bees are small with high metabolic rates, but also live in

social colonies necessitating that they act with self-control. They set out to figure out whether a bee's individual energetic states or its social environment drive its behaviour.

The scientists first trained a group of bees to associate different odours with 2 rewards; 1 scent with a large reward of sugar solution and 1 with a small reward of the same solution. The bees had to wait 1 second for the small reward and 5 for the large reward. For bees in a control trial there was no delay between the odour and the reward.

After training the bees, their preferences were tested after 6, 18 and 24 hours of starvation. The team presented the odours on opposite sides of the bees' heads and recorded whether they turned toward the scent of the small or the large reward. When the large reward was associated with a delay the bees' preference for it decreased the hungrier they got.

The team also tested the chemicals in the bees' brains and found that levels of dopamine in the brains of bees that were starved for 24 hours were significantly higher than those who had only been starved for 18 hours. The results show that honeybees can maintain self-control when they aren't hungry but become more impulsive with starvation which corresponds to an increase in dopamine levels.

'The reason a bee can be expected to display self-control under normal circumstances is not necessarily because it is for the 'good of the society', but because it is generally satiated in those settings and is not at risk of starvation despite its [high metabolic rate](#)' say the team. They add that perhaps having access to food from a build-up of communal stores has promoted [self-control](#) in [social groups](#).

More information: Starving honeybees lose self-control, rsbl.royalsocietypublishing.org/doi/10.1098/rsbl.2014.0820

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