

How Bee Hives Make Decisions

Curious Cat Science and Engineering Blog

[The Secret Life of Bees](#) [1] by Carl Zimmer

The decision-making power of honeybees is a prime example of what scientists call swarm intelligence. Clouds of locusts, schools of fish, flocks of birds and colonies of termites display it as well. And in the field of swarm intelligence, Seeley is a towering figure. For 40 years he has come up with experiments that have allowed him to decipher the rules honeybees use for their collective decision-making. "No one has reached the level of experimentation and ingenuity of Tom Seeley," says Edward O. Wilson of Harvard University.

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Enthusiasm translates into attention. An enthusiastic scout will inspire more bees to go check out her site. And when the second-wave scouts return, they persuade more scouts to investigate the better site.

The second principle is flexibility. Once a scout finds a site, she travels back and forth from site to hive. Each time she returns, she dances to win over other scouts. But the number of dance repetitions declines, until she stops dancing altogether. Seeley and his colleagues found that honeybees that visit good sites keep dancing for more trips than honeybees from mediocre ones.

This decaying dance allows a swarm to avoid getting stuck in a bad decision. Even when a mediocre site has attracted a lot of scouts, a single scout returning from a better one can cause the hive to change its collective mind.

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"Bees are to hives as neurons are to brains," says Jeffrey Schall, a neuroscientist at Vanderbilt University. Neurons use some of the same tricks honeybees use to come to decisions. A single visual neuron is like a single scout. It reports about a tiny patch of what we see, just as a scout dances for a single site. Different neurons may give us conflicting ideas about what we're actually seeing, but we have to quickly choose between the alternatives. That red blob seen from the corner of your eye may be a stop sign, or it may be a car barreling down the street.

To make the right choice, our neurons hold a competition, and different coalitions recruit more neurons to their interpretation of reality, much as scouts recruit more bees

Very cool stuff.

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