

## Not all altruism is alike, says new study

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(Phys.org) -- Not all acts of altruism are alike, says a new study. From bees and wasps that die defending their nests, to elephants that cooperate to care for young, a new mathematical model pinpoints the environmental conditions that favor one form of altruism over another.

The model predicts that creatures will help each other in different ways depending on whether key resources such as food and habitat are scarce or abundant, say researchers from Indiana University and the National Evolutionary Synthesis Center in Durham, North Carolina.

Examples of creatures caring for others at the expense of themselves are well-known. Ants, bees, and some birds will help their relatives raise kids rather than raise kids of their own. Even the simplest of social creatures, such as single-celled bacteria and [slime molds](#) and other microbes, sometimes sacrifice their own well-being for the sake of their group.

Most mathematical models of how cooperation comes to be assume that all forms of [altruism](#) provide similar perks. But the benefits of altruism are different for different behaviors, said study author Michael Wade, a professor at Indiana University and a visiting scholar at the National [Evolutionary Synthesis](#) Center.

For example, some creatures cooperate for the sake of defense, others to find food, and others to care for young, he explained.

In a new study, Wade and collaborator J. David Van Dyken of Indiana

University model the full range of altruistic behaviors to identify the environmental conditions that favor one type of altruism over another.

Their results show that when key local resources such as food or habitat are scarce, altruistic behaviors that provide more of those resources, or that use them more efficiently, will be favored. Think of lions banding together to hunt and take down prey, or honey bees sharing their findings as they forage for food. Many animals guide other members of their group to newly discovered meals, or bring food back to share with their nest mates.

But when resources are abundant, altruistic behaviors that help other individuals live longer, or produce more offspring, will give organisms an edge. Animals such as songbirds, ungulates and chimpanzees, for example, make alarm calls to warn nearby group members of approaching predators, braving danger to protect others.

As local resources wax and wane, one form of altruism may shift to another over time.

"But the bottom line is that the way creatures are likely to help each other when times are tight is different from how they're likely to help each other in times of plenty," Wade said.

**More information:** *Evolution* [doi:10.1111/j.1558-5646.2012.01630.x](https://doi.org/10.1111/j.1558-5646.2012.01630.x)

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