

# Great apes and ravens plan without thinking

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Planning and self control in animals do not require human-like mental capacities, according to a study from Stockholm University. Newly developed learning models, similar to models within artificial intelligence research, show how planning in ravens and great apes can develop through prior experiences without any need of thinking.

Researchers have previously suggested that ravens can plan better than four-year-old children. The new study "What can [associative learning](#) do for planning?" rejects the idea that ravens and great apes have human-like planning capacities.

"Animals can make decisions that lack immediate benefits but that instead may lead to something meaningful in the future. Some researchers have suggested that planning in great apes and ravens develops through thinking, that they simulate future scenarios and make decisions based on such mental simulations. My study shows that planning behaviours and [self-control](#) in non-human [animals](#) instead can emerge through associative learning," says Johan Lind, associate professor in Ethology, at Centre for Cultural Evolution, Stockholm

University, author of the study.

The study uses computer simulations of previously published studies of great apes and ravens. At the Centre for Cultural Evolution, researchers have formulated a new mathematical model of learning in animals, similar to models in artificial intelligence research. This new learning model was subjected to similar scenarios as the ones ravens and great apes experienced in the planning studies, to explore what it takes to exhibit similar planning capacities as those shown by ravens and great apes.

The computer simulations showed that the learning model, that is unable to think or simulate future scenarios, was able to learn to plan as well as the animals did in the experiments. This model is also capable of learning self-control. It can learn to ignore small immediate food rewards to instead choose, for example, a tool that can only be used after a long delay. But after the long delay the tool can be used to get a large food reward.

"We know today that similar learning models within artificial intelligence research can learn to play board games and beat human players. However, these kinds of learning models are often ignored in the study of animal cognition. Animals are often very efficient in learning from their experiences, and this helps them survive in places that often are hostile and competitive," says Lind.

**More information:** What can associative learning do for planning? *Royal Society Open Science* [DOI: 10.1098/rsos.180778](https://doi.org/10.1098/rsos.180778)

Provided by Stockholm University

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