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Fast learners are slow to unlearn

Learning is essential to survival. But you also need to be able to alter the behaviour you learned when the conditions change. PhD candidate Krista van den Heuvel has shed some light on how that works with her research on the cognitive flexibility of great tits.

Cognitive flexibility is essentially the ability to relearn something, says Van den Heuvel. The official term is 'reversal learning'. Ordinary (associative) learning means learning and then not forgetting. Reversal learning involves unlearning and applying new knowledge. An example is birds' feeding behaviour with a bird table in the garden. 'If you put out food every day and then suddenly stop, how long does it take the birds to figure that out? That is reversal learning.'

Van den Heuvel developed a test using bird feeders to assess the reversal learning skills of great tits. The great tit can choose from three feeders with freeze-dried mealworms, but only one is open. Van den Heuvel: 'First the bird learns which feeder is open. Then the feeder closes and another one opens, and the reversal learning process starts.'

There are big differences between individual tits in their ability to

adapt. But strangely enough, hereditary traits don't play a role. That is evident from experiments with different generations of tits. The offspring of birds that are fast reversal learners are no different in terms of learning capacity from the offspring of slow learners. Van den Heuvel has an explanation for this. 'I think cognitive flexibility has various components, each of which is genetically determined, but they offset one another.'

Mystery

There were other surprising results from the experiments too. Fast learners turned out to be slower at reversal learning, and vice versa. 'If you are quick to learn a preference, it is harder to unlearn that behaviour,' explains Van den Heuvel. 'If you learn something slowly, you get experience with negative rewards and disappointment. Reversal learning is a tricky phenomenon to study, but I've shed a little light on the mystery.' RK