

# In birds, expecting to mate leads to higher fertilization rates

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From an evolutionary perspective, the primary task of an organism is to pass along its genes to future generations. Such genetic transmission is usually assumed to be instinctive. However, a new study shows that species also learn to adapt to their surroundings in order to increase their “reproductive fitness”— the likelihood that they will successfully reproduce.

One form of learning that increases reproductive fitness is Pavlovian conditioning, the ability to associate a neutral stimulus with a stimulus of significance. The classic example comes from Ivan Pavlov and his dogs that eventually salivated at just the sound of a bell, because the bell had been preciously paired with a slab of meat. However, when it comes to reproduction, does learning contribute to more offspring?

Researchers from the University of Texas at Austin decided to test this in the laboratory. Nicolle Matthews and colleagues set out to examine whether learning can contribute to reproductive fitness in a particularly challenging situation — when two males compete to fertilize the egg of a single female.

Matthews hypothesized that if two males mate with the same female compete to fertilize her eggs, paternity will favor the male that received a signal or conditioned stimulus before the mating session.

Using quail, Matthews put the males into two chambers for thirty minutes; they repeated this for five days. One chamber was green and

was located on the floor near a noisy room and the other chamber was white, had a tilted floor, and was located in an isolated room on a table. Whenever the quails were in one of the two chambers, they were allowed access to a female. Thus, the quail learned to anticipate a chance to copulate whenever they were placed in this chamber but not when they were in the other.

On the test day, each female was allowed to copulate with two males. One of the males was in the chamber where he expected to receive access to a female and the other male was in a chamber where he did not expect a female. Using genetic markers, the researchers then collected the eggs of the female quail and tested the paternity.

The results, which appear in the September issue of *Psychological Science*, a journal of the Association for Psychological Science, are clear: The males who were placed in the context that led them to anticipate access to a female just before copulation fertilized seventy-two percent of the eggs laid by the female quail. In other words, the quail who knew they were going to have the opportunity to mate produced more offspring. This is a significant finding because typically when two males mate in quick succession with the same female, no differences in paternity are found, which Matthews confirmed in a follow-up experiment.

The researchers point out that the conditioning most likely had an effect on the rate of sperm release without changing sperm quality or concentration. “Learning and individual experience can bias genetic transmission and the evolutionary changes that result from sexual competition,” write the authors.

Source: Association for Psychological Science

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