

Chickens remain optimistic in enriched environments despite exposure to stress

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Hanne Løvlie, associate professor, Linköping University, and friend. Credit: Anna Nilsen/LiU

Chickens that grow up in an environment that they perceive as more diverse and manageable, retain an optimistic view of life and cope with

stress better than individuals that grow up in more sterile surroundings, according to a new study published in *Scientific Reports*. A team of researchers lead by researchers from Linköping University, Sweden, measured how optimism in chickens is affected by stress.

With people, you can measure optimism by asking a person whether they see a glass as half-empty or half-full. Most people answer that the glass is half-full, unless they are suffering from depression. But how can you measure optimism in chickens? The method that the researchers used to determine whether an animal had a more or less optimistic attitude corresponds to asking whether the glass is half-full or half-empty. Young chicks were taught to distinguish between black and white, where one of the colours contained a reward, through a process known as associative learning. The chickens were then given a new challenge, and presented with grey symbols intermediate between the rewarded and the unrewarded colours. The researchers measured the response of the birds toward the grey colour where chickens that reacted to grey in the same manner as they had reacted to the rewarded colour were considered to be optimistic. Chickens that reacted to grey similarly to their response to the unrewarded [colour](#) were considered to be less optimistic.

The researchers also measured levels of dopamine, an important signal substance, in the brain of these chickens. In humans, dopamine is linked to well-being and optimism. The results showed that chickens assessed to be optimistic had higher levels of dopamine.

"In this study we wanted to investigate how stress influences optimism, and whether a more complex environment during development can buffer and counteract negative effects of stress," says Hanne Løvlie, associate professor in the Department of Physics, Chemistry and Biology at Linköping University, who has led the study.

In the study, the researchers compared chickens that grew up in rather

sterile surroundings, to those that had grown up in a more complex and stimulating environment.

"One interesting result was that chickens in both types of environments were equally optimistic before being exposed to stress," says Hanne Løvlie.

In order to expose the chickens to stress, the [researchers](#) created an unpredictable environment for them by moving things around in the animals' pens, and expose them to irregular light and noise intervals. The animals were exposed to such stressors for a limited period. It was only when the chickens were exposed to stress that differences appeared: individuals that had lived in a simpler environment lost their optimistic attitude after being exposed to stress, while chickens in a more complex [environment](#) retained their optimistic attitude and thus seemed to be better able to cope with stress.

"If a [chicken](#) can hide under something or fly up and perch somewhere, it can manage a stressful situation better. We believe that the possibility of controlling the situation better resulted in these individuals being able to maintain optimism, even after a period with increased stress," says Josefina Zidar, who holds a doctorate in ethology from Linköping University.

Since the difference between the groups arose only after the animals had been exposed to additional stress, it suggests that repeated stress can reduce optimism.

"It has previously been shown that additive [stress](#) can have unfortunate consequences, and this should be considered in animal husbandry to provide better welfare," says Josefina Zidar.

More information: Josefina Zidar et al. Environmental complexity

buffers against stress-induced negative judgement bias in female chickens, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-23545-6](https://doi.org/10.1038/s41598-018-23545-6)

Provided by Linköping University

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