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## Even fish society shows social control and nepotism

**Cichlids living in groups tend to turn a blind eye to their relatives shirking their duty to help as desired in various tasks in the group, such as caring for the brood. Animals that are not related to them don't seem to be offered the same lenient treatment. Researchers at the University of Bern have now been able to prove the existence of this form of "nepotism" in fish for the first time in experiments.**

Cooperatively breeding fish such as African cichlids divide the different tasks among the various members of the group. These include, for example, caring for the brood, digging out caves to provide safe shelter, or defending the territory against competitors and predators. So how do they make sure that all this work doesn't simply fall to an unlucky few? Social control is an effective tool: Dominant group members can punish others if they do not do their fair share of the workload. In social cichlids, this happens through physical attacks directed against "lazy" group members. If this does not bring about any improvement, they are expelled from the group, which drastically reduces their chances of survival. But what if it's their own offspring who get lazy? Will they be punished equally severely? As expected, they are treated more leniently, as a severe punishment would jeopardize the dominants' own reproductive success.

Whether the behavior of social animals adheres to this basic principle has been investigated by Prof. em. Dr. Michael Taborsky from the Institute of Ecology and Evolution at the University of Bern and Irene García-Ruiz, who carried out experiments for the current study as part of her doctoral thesis. The Division of Behavioural Ecology at the Institute of Ecology and Evolution is among the world leaders when it comes to the evolution of advanced social behavior. A central model system for this is the African cichlid species "Princess of Lake Tanganyika". This species exhibits a sophisticated social structure, the complexity of which is no less than that of cooperatively breeding birds and mammals – right up to our closest animal "relatives" in the primates. In the current study, Taborsky and García-Ruiz have shown that cichlids' own descendants are punished less harshly if they do not "help out" – that is, that fish engage in "nepotism." The results of the study were published in the journal *iScience*.

### Manipulated helpers

The researchers studied the behavior of cichlids at the Ethological Station Hasli at the University of Bern. In a first step they manipulated the behavior of the subordinate group members so that they could not take part in the care of the breeding couple, essentially making them appear lazy. "We tested how the breeding pairs responded. As expected, the "lazy" brood care helpers were punished

more severely,” explains García-Ruiz, lead author of the study. In the second step, the researchers observed whether the helpers who were so punished improved their work performance, which they did indeed; only when the breeding pair could physically attack a “lazy” helper did it increase its work performance.

### **Common interest supersedes social control**

The crucial question in this experiment was whether the breeding pair expected their own offspring to participate in the necessary care for the eggs. Would they intervene just as harshly if the desired participation in the work did not occur?

“The theory predicts that kinship between social partners ensures that their fitness interests largely coincide, so that performing cooperative activities is in the own interest of all participants,” explains Michael Taborsky, head of the study. “This makes social control less important, so temporary inaction doesn’t need to be punished as harshly.” And indeed, breeding pairs punished those helpers with whom they were related much more leniently.

“This was the first experimental demonstration of the interplay between social control and shared interests in a social system,” says García-Ruiz. “This general principle most likely plays an important role in many animal societies, including humans.” Psychological research is already investigating such relationships. “In order to be able to elucidate the evolutionary basis of this interplay between social control and kinship, however, further studies are now required on groups of other highly social animal species,” summarizes Taborsky.

### **Publication details:**

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### **The Division of Behavioural Ecology of the Institute of Ecology and Evolution**

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