

Brainy courage of the rainbowfish

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The boldest black-lined rainbowfish are those that are born in the wild. Also more fearless are those that analyze information both sides of their brains. This is the conclusion of Australian researchers Culum Brown and Anne-Laurence Bibost from Macquarie University, in a study published in Springer's journal *Behavioral Ecology and Sociobiology*.

The preference to analyze and react to [information](#) with either the left or [right hemisphere](#) of the brain is called cerebral lateralization, and is widespread among vertebrates. Lateralization is seen in the preference of humans or parrots to use one hand or claw over the other or to always turn to the same side when moving around objects.

The researchers first tested wild rainbowfish against captive rainbowfish. They then used a modified version of the mirror test to find out if a [fish](#) showed a lateral preference to view itself with either its left or right eye. Levels of boldness were tested by timing how long it took a fish to emerge from a safe hiding place.

Non-lateralized fish that did not analyze information in a specific brain hemisphere were significantly bolder than both left- and right-lateralized fish. This suggests that fear is heightened when primarily processed by a single hemisphere, making lateralized fish less bold. Previous studies have shown that complex tasks are more difficult to perform when information processing is shared between two [brain hemispheres](#). It therefore boils down to a question of speed. A non-lateralized fish in a potentially life-threatening situation must first draw information from both hemispheres, and compare and integrate it before it can make a decision. Strongly lateralized fish, on the other hand, can act more quickly because they only draw on information from a single hemisphere.

If non-lateralized fish process fear-related stimuli comparatively slowly or inefficiently, it may be that the moderating effect of fear is somewhat lessened in comparison to strongly lateralized fish. The researchers think this may result in a reduced level of fear generally, or perhaps the decision to explore is already made before the moderating effect of fear comes into play. Either scenario would adequately explain their observation that non-lateralized fish are bolder than lateralized fish.

The researchers were not surprised that wild fish were significantly bolder than captive-reared fish, as previous work they had done showed that populations that are hunted by predators were braver than those from low-predation areas.

"The similarities between personality and laterality are certainly intriguing and hint at a single underlying function or mechanism," says Brown. "We suggest that these aspects of personality traits are actually caused by variation in laterality."

More information: Brown, C. & Bibost, A-L. (2014). Laterality is linked to personality in the black-lined rainbowfish, *Melanotaenia*

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