

Friend and foe? How crabs avoid getting eaten

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Despite their simple compound eyes crabs have evolved a smart way to tell the difference between friend and foe, new scientific research has revealed.

Scientists from The Vision Centre have found that fiddler [crabs](#) quickly learn to recognise if an approaching creature is a threat, a mate or or a harmless passer-by - according to its direction of approach.

“Fiddler crabs have extremely poor sight, with no depth perception and no ability to see in detail,” says Ms Chloe Raderschall, a researcher from The Vision Centre and The Australian National University. “In a situation where every ‘blob’ that moves in the environment can be a threat, they have to strike a balance between succumbing to paranoia – and ending up as bird feed.

“Crabs achieve this through a process called habituation where they learn from repeated events to differentiate threats from harmless objects. Humans too use habituation: for instance we learn to ignore the sound from an air conditioner once we grow accustomed to it.

“We found that crabs have a very selective and finely tuned habituation response – instead of relying solely on the physical appearance of an object, they associate the object with its past behaviour in their living environment, such as its direction of approach.”

In the study, the researchers used dummy predators to approach groups

of fiddler crabs from two different compass directions.

“We did two dozen runs of a dummy approaching from direction A without attacking the crabs, and within five runs, the crabs started to ignore it,” Ms Raderschall explains. “When we switched to another dummy coming from direction B, the crabs were scared witless and headed straight to their burrows.”

When the researchers switched back to direction A, they found the crabs did not attempt to escape, indicating that they clearly distinguish between the dummies approaching from the two directions, she says.

“As both dummies were identical and there was no difference in the timing of their movements, we conclude that the crabs used the direction of approach to determine whether an approaching object was a threat or not.”

Ms Raderschall explains that this finding confirms that crabs have an extremely specific habituation response. This contradicts previous assumptions found in most text books that habituation is a simple learning mechanism based mostly on physical appearances.

“Their identification of a dangerous or harmless object is closely associated with their memory of how the object behaves, rather than how it looks.

“Apart from very simple visual cues, they don’t really have other ways to detect predators, and this study provides clues as to how animals with relatively poor vision can adapt and survive over time.”

The paper ‘Habituation under natural conditions: model predators are distinguished by approach direction’ by Chloe A. Raderschall, Robert D. Magrath and Jan M. Hemmi was published on 23 November 2011 in *The*

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Provided by The Vision Centre

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