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## Chicken of the sea

Commentary on [Marino](#) on *Thinking Chickens*

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**Abstract:** Marino summarizes research showing that chickens perform cognitively and emotionally at a higher level than previously assumed. Here, I describe capacities of teleost fishes that parallel those of chickens, including the ability to recognize human faces, perspective-taking, and referential communication. Research on chickens and on fishes reveals an emerging trend in cognitive ethology: abilities once thought limited to a scant few highly intelligent non-humans may actually occur broadly across taxa.

[Jonathan Balcombe](#) is an ethologist and author of several books on animals' capacity to think, feel and experience pleasure. His most recent book, *What a Fish Knows*, explores the remarkable lives of the planet's most misunderstood and maligned vertebrates. Balcombe lectures widely, and currently teaches a course in animal sentience for the Viridis Graduate Institute.

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**Introduction.** Such is the breadth of research on chickens that even a substantial review such as Marino's (2017a,b) cannot hope to cover all that deserves mention. For example: a fascinating study of chickens' subjective responses to human faces, published in 2004. After being trained to make choices by pressing a button with their beaks, six chickens were presented with digitized photos of thirty-five young men and women. In another room, seven female undergraduates chose the most attractive male face from the same stimulus set, and seven male students chose the most attractive female face. When the chickens cast their votes, their preferences were almost identical (98 percent) to those of the students (Ghirlanda et al. 2004).

As I read Marino's review, I was struck — as in the example above — by how many of the cognitive and emotional capacities of chickens (and other avian and mammalian taxa) have also been documented in fishes. In this brief commentary, I will present a few examples and will then speculate briefly on the implications.

**Recognizing Human Faces.** To date, no one has sought to measure fishes' esthetic responses to human faces, but other kinds of studies indicate that it is eminently feasible to do so. Archerfishes have been trained to aim their piscine squirt-guns at human faces presented on a computer monitor above their tanks, making them ideal subjects for such a study. Individual recognition among fishes is commonplace if not universal (Bshary 2006), and recent studies have shown that fishes' keen abilities to discriminate one "shoal mate" from another are

transferrable to human faces. Archerfishes can pick out one familiar human face among as many as 44 new ones, even without visual clues such as hair and ears (Newport et al. 2016).

**Perspective-Taking.** The learning abilities of archerfishes suggest another cognitive capacity in common with chickens, and otherwise routinely reserved for the rarefied realms of “higher” mammals and birds: perspective-taking. Captive studies of archerfishes find that inexperienced individuals are almost entirely without skill at squirting water jets at moving targets, but they can acquire the skill by merely watching experienced conspecifics. After witnessing a thousand attempts (successful and unsuccessful) by another archerfish to hit a moving target, novices were able to make successful shots at rapidly moving targets (Schuster, et al. 2006). This involves assuming the viewpoint of another individual.

**Referential Communication.** If a fish can take the perspective of another fish, then we may expect to find other sophisticated cognitive feats among fishes. Referential communication among chickens takes the form of alarm calls that designate specific categories of danger, including larger and smaller aerial predators (hawks). Once again, the phenomenon can be found in fishes, where it occurs between two predatory species with complementary hunting styles. Groupers of more than one species use head shaking or body shimmying gestures to recruit moray eels to join them on reef hunting forays (Bshary et al. 2006). Hunting as a team, prey fishes have fewer escape options because the eel can pursue prey into the coral matrix, and the grouper can wait to pounce should the target “escape” into open water. Hunting success may be improved as much as five-fold with a partner. Captive studies have shown that groupers favor cooperative eels over reluctant ones, so these associations probably occur between known collaborators (Vail et al. 2014). Groupers will also point at hidden prey, swimming vertically over the location for as long as 23 minutes, and swimming over to a nearby moray eel if the latter is unresponsive (Vail et al. 2013).

Marino discusses other attributes of chickens of which fish examples have been documented, including logical inference, emotional contagion, and personality. In the interests of brevity, I point readers to Balcombe (2016) for more on those and related topics.

**Conclusion.** Studies like these are emblematic of an emerging trend in cognitive biology: that mental abilities once thought limited to humans, then broadened to include a handful of highly intelligent non-humans, may actually occur broadly across taxa. What we now know of fishes — a group traditionally, and fallaciously, relegated to the lower reaches of vertebrate sentience — warrants a more respectful view of aquatic life. As Marino shows, chickens deserve greater respect than we have given them. Fishes, too. For the benefit of both feathered and scaly beasts, it’s time for a new interpretation of the heretofore demeaning phrase “chicken of the sea.”

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