

## INSIDE JEB

## Pecking not so bird-brained after all



A pigeon and a crow wearing their bespoke goggles. Photo credit: Hiroshi Matsui.

Strutting around with their bobbing heads and beady eyes, pigeons are almost a bird-brained cliché. Pecking mechanically at tasty morsels, the persistent animals are unable to alter course once the manoeuvre is launched. Hiroshi Matsui from Keio University, Japan, explains that pigeon pecking is essentially ballistic, and adds, ‘Studies of pecking suggested that it is less flexible, but stable, according to a motor program.’ However, Matsui and PI Ei-Ichi Izawa recently discovered that crows appear to be more adaptable (<https://doi.org/10.1098/rsos.160796>). Fitting crows with long artificial beaks, the duo noticed that the birds could overcome the impediment and learn to aim their enlarged bills precisely to retrieve morsels successfully. However, pigeons never got the hang of dining with outsized beaks. As humans, we guide our hands visually when grasping objects, so

the pair wondered whether vision also held the key to guiding the crow’s pecks. If so, how would crows and pigeons cope if the scientists messed with their view? Could the birds adapt and overcome the challenge to land perfect pecks, or would they misfire continually?

Designing goofy goggles made from dental resin and optical prisms that shifted the position of a tasty morsel 8.5 deg to the right, Matsui gently fitted the birds with their unconventional eyewear and then filmed them pecking to see whether the birds could adapt. ‘Finding a nice prism for bird eyes was difficult’, says Matsui, describing how he stumbled across the specialised films, which were lightweight enough for the birds to wear, by chance. And he recalls how both species were extremely cooperative; ‘The pigeons were very motivated to peck at grains of corn, and we used cheese for the

crows, since it is their favourite food’, Matsui chuckles.

Eventually, after hundreds of attempts, the bespectacled pigeons began adapting their pecking strategy and after 5 days they were finally hitting the mark. However, after a 20 min training period – when the crows missed their aim by millimetres – the goggled birds began improving rapidly and they were consistently pecking their cheesy rewards within a day, despite wearing the off-centred glasses. The crows were able to follow the evidence of their eyes to steer their pecks, instead of launching pigeon-like preprogrammed pecks, over which they had no control.

Matsui and Izawa suspect that the dramatically different pecking strategies could be accounted for by the birds’ lifestyles. ‘Crows are generalists that peck at moving prey, such as small vertebrates and insects’, says Matsui, so the versatile animals must be able to track a snack as they cannot rely on a meal remaining in place. In contrast, preprogrammed pigeons that prefer seeds never have to worry about a nibble wandering off; they can just keep launching the same pecking manoeuvre time and again. But one thing is sure, pecking is not always as bird-brained as it looks.

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**Matsui, H. and Izawa, E.-I.** (2019). Rapid adjustment of pecking trajectory to prism-induced visual shifts in crows as compared with pigeons. *J. Exp. Biol.* **222**, jeb182345.

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