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Noisy Miner and other species taking processed sugar packets

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The Noisy Miner *Manorina melanocephala* is a mid-sized gregarious honeyeater with a widespread distribution in the eastern and south-eastern parts of Australia (Higgins *et al*. 2001). Although a woodland species it has adapted well to human presence and has become common in cities and suburbs within its range (Longmore 1991). The Noisy Miner primarily eats nectar, fruit and insects, and occasionally small reptiles and amphibians (Barker & Vestjens 1990). It also is known to opportunistically eat anthropogenic food items including bread, meat and cheese (Higgins *et al*. 2001; Delgado & Correa 2015).

In 2013-2014, a Noisy Miner foraging behaviour was observed in Wollongong, in which some birds were taking packets of sugar from a table in a local café, flying a short distance, landing, opening the sugar packet with their bill, and then eating the contents (Delgado & Correa 2015). The behaviour was observed on five occasions between October 2013 and May 2014, all at the same café and presumably involving the same cohort of birds each time. The authors noted that the birds were able to discriminate between the sugar packets (which were white) and the similarly-sized packets of artificial sweetener stevia (light green) and instant coffee (black) in containers on the same table. The authors stated it was the first time that this foraging behaviour by Noisy Miner had been reported.

On 6 August 2023 I observed similar Noisy Miner behaviour at a café at Pearl Beach, New South Wales. Packets of sugar were in a glass jar on an empty outdoor table at the café. A Noisy Miner landed on the table, pulled out a sugar packet and flew off with it for a distance of 4 to 5 m. The bird landed on the nearby road, opened the packet using its bill, and ate the contents (see **Figure 1**). A minute or so later, it or another miner landed on the same table and began to pull out another sugar packet. At that point, I intervened, and closed the lid of the jar.

Figure 1. A Noisy Miner at Pearl Beach extracting the contents from a sugar packet that it had opened.

On 11 August at the same Pearl Beach café, at least two individual birds were engaged in the activity. I retrieved a sugar packet from which they had been feeding (see **Figure 2**). It had a hole approximately 10 mm x 10 mm, about the same size as the hole made by the Wollongong birds (Delgado & Correa 2015).

Figure 2. A recovered sugar packet that had been opened by a Noisy Miner at Pearl Beach. The bird made a small hole in the packet, from which it removed sugar crystals.

The jars on the café table contained packets of raw sugar, processed sugar and artificial sweetener

(aspartame-based). I only saw birds taking packets of processed sugar.

In response to my subsequent inquiries to local birdwatchers for similar examples, I learnt that this behaviour by Noisy Miner has become widespread, but seemingly patchily so. Instances were reported to me from Wamberal (near Terrigal NSW) in August 2023 (B. Sampford pers. comm.); Newcastle East in about late 2022 (P. Vaughan pers. comm.); and twice from a café in the Adelaide Botanic Gardens – in about 2018 (M. Clarke pers. comm.) and in November 2022 (J. Logan-Warner pers. comm.). Also, a group of Noisy Miner at a café in Bicentennial Park Sydney have been taking sugar packets for several years (J. Harrington pers. comm.).

DISCUSSION

Sugars and processed sugar

"Sugar" is the generic name for a group of sweet-tasting carbohydrates, many of which occur naturally in plant products (https://en.wikipedia.org/wiki/sugar; accessed 15 August 2023). Two groups of plants, Sugarcane (*Saccharum officinarum*, S. *sinense*, *S. barberi* and hybrids of these) and Sugar Beet *Beta vulgaris*, produce relatively-large amounts of a carbohydrate called sucrose. The juices from those plants are processed commercially to produce "sugar", a widely used food additive/sweetener in our modern world. Processed sugar (also known as refined sugar) is pure sucrose.

Processed sugar as a dietary item for birds

Many bird species cannot digest sugary substances because those birds lack the enzyme sucrase that allows sugars to be metabolised. A bird which does not produce sucrase can become ill if it eats sugar-rich food. However, nectarivores such as honeyeaters, lorikeets and hummingbirds do produce sucrase and thus they can have a sugar-rich diet. Of course, honeyeaters are not exclusively nectar-feeders but nectar is an important component of the diet of many honeyeater species.

Nectar contains up to ~80% sugar (https://www.britannica.com/science/nectar accessed 10 August 2023), with the three main sugars being sucrose, fructose and glucose (Chalcoff 2006). Their ratios in nectar vary, depending upon factors such as the plant species and the local environment (Chalcoff 2006). Sucrose is a disaccharide, formed chemically from one molecule each of fructose and glucose. When ingested by a nectarivore, sucrose is metabolised firstly into fructose and glucose which then become further metabolised, releasing energy (https://www.britannica.com/science/nectar accessed 10 August 2023).

Thus, nectarivore species are physiologically well-equipped to ingest sucrose and use it as an energy source. Hence it would not harm a nectarivore to eat some processed sugar. Importantly however, nectar also contains traces of proteins, salts, acids, and essential oils (https://www.britannica.com/science/nectar; accessed 10 August 2023). Those trace components are not available in processed sugar. Birds eating nectar would also occasionally ingest insects that had been feeding at the nectar source, thus receiving additional protein supplements for their diet.

It would be unhealthy for a bird to live exclusively on processed sugar as it would not obtain the necessary trace supplements of proteins, essential oils and so on. However, it would not cause any short-term harm for a nectarivore to eat processed sugar, and the bird would receive an energy boost when it ate the sugar.

About the innovation

The phenomenon of birds eating processed sugar is not new. Many bird species will eat processed sugar when it is available to them. For example, sugar solutions are often used to attract hummingbirds to feeding stations (Dunn 2021). Spangled Drongo *Dicrurus bracteatus*, Silver-crowned Friarbird *Philemon argenticeps* and Blue-faced Honeyeater *Entomyzon cyanotis* have been observed eating spilt sugar at a wharf in Lucinda, Queensland in 2015 (G. Voss pers. comm.). Noisy Miner (and other species) have been observed flicking the lids off sugar bowls in cafés (using their bill) and then licking the contents of the bowl (S. Griffin pers. comm.; L. Bunt pers. comm.). However, the innovation of taking packets of sugar and opening them is recent. There are no reports of this behaviour by any bird species until about 20 years ago (the Lesser Antillean Bullfinch *Loxigilla noctis*, see below), and the first record of Noisy Miner doing it was in

2013. But it was only in that same general timeframe that sugar began to become widely available as individual-serve packets at cafés, driven primarily by hygiene concerns (https://en.wikipedia.org/wiki/sugar_packet, accessed 15 August 2023). It seems it hasn't taken long for some species to learn how to exploit this new type of sugar availability.

Reports of similar behaviour by other bird species

In the West Indies the behaviour has been observed in some Lesser Antillean Bullfinch, a forest-dwelling bird in the island of Saint Lucia which has become relatively tame around humans (Reader *et al*. 2002). They were the only species on Saint Lucia observed to have this behaviour. Ten years later, the behaviour had not spread beyond birds inside a *c*200 m radius of the location of the original observations (Ducatez *et al*. 2013).

It has been documented as behaviour by House Sparrow *Passer domesticus* in Auckland New Zealand: in 2017 there was a report of birds regularly taking packets of sugar from a local café, opening them and eating the contents (New Zealand Herald 19 December 2017; https://www.nzherald.co.nz accessed 8 August 2023).

At least four other Australian species have been observed doing this sort of behaviour – Blue-faced Honeyeater in Noosa (P. Vaughan pers. comm.), White-quilled Honeyeater *E. albipennis* in Darwin (L. Finch pers. comm.) and both Rainbow Lorikeet *Trichoglossus moluccanus* and Sulphur-crested Cockatoo *Cacatua galerita* in Sydney (J. Smart pers. comm., G. Stevens pers. comm.).

I also carried out an internet search which revealed several examples of video footage showing bird species from outside of Australia exhibiting the same general behaviour. The species were not identified in those video clips.

Mechanism for learning the behaviour

The endemic Barbadian Bullfinch *L. barbadensis* has recently been split from the Lesser Antillean Bullfinch (Audet *et al*. 2018). It frequently uses opportunistic, innovative feeding behaviours that take advantage of anthropogenic food sources. In contrast, its closest avian relative in Barbados, the Black-faced Grassquit *Tiaris bicolor*, is considered a conservative species; i.e. its behaviours in the wild have little-changed over time. The two species are closely related to Darwin's finches and belong to the family Thraupidae, a neotropical clade that typically shows high rates of evolutionary diversification, colonization, and feeding innovations in the wild (Audet *et al*. 2018).

Researchers investigated wild-caught individuals from both species. The problem-solving skills differed considerably; for example most of the bullfinches quickly figured out how to lift the lid off a jar of food while all the grassquits were stumped by the challenge (Audet *et al*. 2018). These performances were in line with the differences in the birds' innovativeness in the wild (Audet *et al*. 2018). The researchers then compared the expression of all genes in six parts of the brain of the two bird species. A family of genes stood out: glutamate neurotransmitter receptors, especially in the part of the bird brain that corresponds to humans' prefrontal cortex. Glutamate receptors are known to be involved in a variety of cognitive traits in humans and other mammals (Audet *et al*. 2018).

Thus, the ability to learn a new behaviour is related to specific brain chemistry. Some birds can learn quickly, and some can almost never learn.

Mechanism for the spread of the behaviour in Noisy Miner

There appear to be two possible mechanisms for how Noisy Miner in many different locations have developed the capability to take sugar packets, open them and eat the contents:

1. A Noisy Miner somewhere, learnt how to do it and that capability spread firstly to other birds in that bird's cohort (by them copying) and thence progressively to other groups of Noisy Miner. A variant of this mechanism would be that a Noisy Miner first observed a different species, e.g. Rainbow Lorikeet, opening sugar packets and it copied the behaviour.
2. The behaviour was separately developed by Noisy Miner in multiple locations, approximately contemporaneously.

The Noisy Miner's social organisation has been well-studied (Dow 1979; Higgins *et al*. 2001). Birds

live in colonies, which can be large – sometimes involving several hundred birds. Within those colonies, males spend most of their time outside of the breeding season in coteries of 10-25 males. Those coteries are fairly stable, but smaller groups within a coterie (mostly involving 5-8 males) regularly form temporary coalitions – these are transitory flocks of foraging, bathing, roosting and mobbing individuals (Dow 1979; Higgins *et al*. 2001). Sometimes, members of other coteries join a temporary coalition. Thus, there are frequent close interactions between many individual males. Although females have smaller activity spaces than males and the activity spaces of individual females usually do not overlap, each female interacts with many males (Dow 1979; Higgins *et al*. 2001).

It seems likely that birds within a coterie of Noisy Miner would quickly learn from watching an innovative individual from that coterie that had developed the capability to take sugar packets, open them and eat the contents. Because there is frequent cross-coterie interaction, in the form of temporary coalitions, it seems probable that the sugar-taking behaviour would eventually permeate throughout the entire Noisy Miner colony.

However, Noisy Miner are intolerant of intruders from any other colony of them, and quickly drive an intruder away (Higgins *et al*. 2001). Therefore it is unlikely that birds in another colony would have the opportunity to learn the behaviour by watching it in the original colony. Moreover, there appear to be sizable geographic distances between colonies of Noisy Miner exhibiting the sugar-taking behaviour. Thus, there seems to be no evidence for the new behaviour as having radiated from a single point.

The evidence suggests that the behaviour was approximately contemporaneously developed in multiple locations. That would not be a surprising result by a species which is known to be highly innovative (e.g. see Sulikowski & Burke 2011).

CONCLUSIONS

The capability to take and open sugar packets is not intrinsic natural behaviour but several bird species in Australia and elsewhere have learnt to do so. A distinguishing feature is that they are innovative species that appear to be comfortable living in close proximity to humans.

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REFERENCES

Audet, J-N., Kayello, L., Perillo, S., Cauchard, L., Howard, J.T., O'Connell, L.A., Jarvis, E.D. and Lefebvre, L. (2018). Divergence in problem-solving skills is associated with differential expression of glutamate receptors in wild finches. *Science Advances* **4**: DOI: 10.1126/sciadv.aao6369

Barker, R.D. and Vestjens, W.J.M. (1990). 'The food of Australian birds. Volume 2. Passerines'. (CSIRO: Lyneham, Australia.)

Chalcoff, V. (2006). Nectar Concentration and Composition of 26 Species from the Temperate Forest of South America. *Annals of Botany* **97**: 413–421. DOI: 10.1093/aob/mcj043

Delgado, C.A. and Correa, J.C. (2015). Sugar packet opening by Noisy Miners (*Manorina melanocephala*): A novel foraging behaviour. *Wilson J. Ornith.* **127**: 542-544.

Dow, D.D. (1979). Agonistic and spacing behaviour of the Noisy Miner *Manorina melanocephala*, a communally breeding honeyeater. *Ibis* **121**: 423-436. DOI:10.1111/j.1474-919X.1979.tb06683.x

Ducatez, S., Audet, J-N. and Lefebvre, L. (2013). Independent appearance of an innovative feeding behaviour in Antillean Bullfinches. *Animal Cognition* **16**: 525-529.

Dunn, J. (2021). 'The glitter in the green'. (Bloomsbury Publishing: Oxford, United Kingdom.)

Higgins, P.J., Peter, J.M. and Steele, W.K. (Eds) (2001). 'Handbook of Australian, New Zealand and Antarctic Birds Volume 5: Tyrant-flycatchers to Chats'. (Oxford University Press: Melbourne.)

Longmore, W. (1991). 'Honeyeaters and their allies in Australia'. (Angus and Robertson: Sydney, New South Wales, Australia.)

Reader, S.M., Nover, D. and Lefebvre, L. (2002). Locale-specific sugar packet opening by Lesser Antillean Bullfinches in Barbados. *J. Field Ornith.* **73**: 82-85.

Sulikowski, D. and Burke. D. (2011). Movement and memory: different cognitive strategies are used to search for resources with different natural distributions. *Behav. Ecol. Sociobiol.* **65**: 621–631. DOI:10.1007/s00265-010-1063-4