Disclosure

of things evolutionists don't want you to know

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Bird Brains

Are smaller brains really better?

The September/October, 2020, issue of *Discover* magazine contained an interview titled, "The Ecology of Dumb," in which Geoffrey Giller interviewed ecologist Trevor Fristoe, who made the claim that, for some birds, having a smaller brain is better because it requires less energy.

The article began in the usual way: what scientists formerly believed turned out to be wrong. In this case, the startling new revelation concerned birds that don't fly south for the winter.

> Those that tough it out year-round tend to have big brains relative to their body size, which help them figure out how to manage life in the changing landscape — or so scientists had thought. [1]

Of course, that was wrong. Why should we be surprised that scientists have been feeding us wrong information for so long? ☺

> But Trevor Fristoe, who grew up in Alaska, knew that small-brained birds could also thrive in such environments. An avid birder, Fristoe is an ecologist and evolutionary biologist at the University of Konstanz in Germany. In a recent study, he found how small-brained birds can fare well near the poles: Rather than relying on big brains, some instead specialize their diets, eating only plants that are hard to digest but available throughout the winter. [2]

That's right! Birds with small brains are smart enough to know that food that is hard to digest is nutritious. ☺ Birds with big brains haven't figured that out. ☺

Because the article is an interview, it mixed Giller's ideas with Fristoe's, making it hard to keep track of who believed what. Since neither the big-brained birds nor the small-brained birds were smart enough to fly south for the winter, one could argue that all the birds were dumb, regardless of the size of their brains. ☺

The more I tried to explain the article logically, the less sense it made. The interviewer did not specifically reference the recent study Fristoe wrote, but I was able to find it. After reading Fristoe's study, it was clear that the interviewer (whose brain size is unknown) didn't understand what Fristoe was saying.

Sometimes when you are interviewed by a fool, you wind up looking like a fool. That's what happened to Fristoe. He did some good work which is actually worth discussing. Fristoe isn't as stupid as *Discover* made him look. In his well-written study, Fristoe addressed two main topics:

1. The connection between digestion and brain activity.
2. The connection between brain size and intelligence.

Food For Thought

Evolutionists struggle with the fact that a big brain requires lots of energy to function. Humans need lots of food for thought.

> The human brain is unusually large. It has tripled in size from Australopithecines to modern humans and has become almost six times larger than expected for a placental mammal of human size. Brains incur high metabolic costs and accordingly a long-standing

[1] Geoffrey Giller, *Discover*, August 11, 2020, "In the Bird World, It Takes Big Brains or Big Guts to Survive in Extremes", https://www.discovermagazine.com/planet-earth/in-the-bird-world-it-takes-big-brains-or-big-guts-to-survive-in-extremes

[2] *ibid.*

question is why the large human brain has evolved. [3]

The generally accepted notion, which might actually have some truth, is that since it takes energy to think and energy to digest food, a body can do one or the other, but not both at the same time. In particular, Fristoe was faced with this conundrum:

> … difficult-to-digest but readily available foods … [such as] Buds, twigs, and conifer needles tend to be abundant year-round in many high-latitude habitats and are typically easily accessible even when snow is plentiful. However, these readily available food items are potentially incompatible with the high metabolic demands of large brains because they are fibrous and require a large, energetically costly gut to digest. [4]

The notion is certainly plausible. Perhaps you have felt sleepy, and found it hard to concentrate after eating a big meal. That's the premise of Fristoe's study, and he presents data to back it up.

In the *Discover* article, Fristoe was quoted as saying,

> I lived through winters [in Alaska] where you can go outside and it's almost post-apocalyptically cold. You would see these big-brained birds up there; ravens were the most conspicuous animals around. While you were running from your car, you'd see a raven picking through garbage bags in the back of a pickup truck or eating French fries, finding ways to survive in this super-extreme environment. But you can also find ptarmigans and spruce grouse, these guys that are really representative of small-brained groups. I wanted to look at that. Were these just rare exceptions to the general pattern, or is there something else there going on? We had a code name for this line of questions: the ecology of dumb. [5]

The birds with big brains were getting lots of calories eating junk food, while the birds with small brains were eating low-calorie, hard-to-digest buds, twigs, and needles. Why?

In the introduction to his peer-reviewed article in *Nature*, Fristoe wrote,

> Recent comparative studies on birds have lent support to these ideas by showing that highly encephalized [big brained] lineages are overrepresented in cold, seasonal, and unpredictable high-latitude habitats and are better able to maintain more stable populations when conditions vary as compared to their small-brained counterparts. Nevertheless, not all birds that reside in these habitats year-round have relatively large brains. For example, the grouse (subfamily *Tetraoninae*) occur widely throughout highly seasonal and thermally unpredictable North temperate and arctic habitats but possess some of the smallest relative brain sizes known among birds. Perhaps more surprising is the recent suggestion that, among Galliformes (the larger taxonomic unit to which the grouse belong), there may be a trend toward smaller-than-expected brain sizes in increasingly variable environments. These conspicuous exceptions to the patterns predicted by the cognitive buffer hypothesis have received little attention in the scientific literature, reflecting a possible anthropocentric bias toward investigating the evolutionary forces directly relevant to our own encephalization. However, a better understanding of the evolution of brain size and cognition is likely to result from increased clarity on the ecological contexts that promote both relative brain enhancements and reductions. [6]

In the body of the study, Fristoe used impressive statistical analyses to show that, in temperate climates, you find an even distribution of birds with small, medium, and large brains (relative to their body size). But, in cold harsh climates (like Alaska), small and big brained birds are "overrepresented," and there are hardly any birds with medium size brains. His observation is that it takes either a small brain, or a big brain to survive in a harsh environment. He wanted to know why.

He suggested, "a possible anthropocentric bias toward investigating the evolutionary forces directly relevant to our own encephalization." That sentence is a priceless pearl of wisdom hidden in an oyster of technical jargon.

[3] Mauricio González-Forero & Andy Gardner, *Nature*, 24 May 2018, "Inference of ecological and social drivers of human brain-size evolution", pp. 554–557, https://www.nature.com/articles/s41586-018-0127-x

[4] Trevor S. Fristoe & Carlos A. Botero, *Nature*, 23 August 2019, "Alternative ecological strategies lead to avian brain size bimodality in variable habitats", https://www.nature.com/articles/s41467-019-11757-x

[5] Geoffrey Giller, *Discover*, August 11, 2020, "In the Bird World, It Takes Big Brains or Big Guts to Survive in Extremes", https://www.discovermagazine.com/planet-earth/in-the-bird-world-it-takes-big-brains-or-big-guts-to-survive-in-extremes

[6] *ibid.*.

"Anthropocentric bias" is self-centered pride. We humans think humans are the most highly evolved creatures in the universe. How we think about ourselves influences how we think about everything else.

"Our own encephalization" refers to the belief that man evolved from an ape-like ancestor when he grew a bigger brain. Bigger is better. That's the issue we will address in the next section.

But first, let's ponder Fristoe's conjecture. He thinks that, because we are highly-evolved humans with big brains, humans aren't surprised that highly-evolved (presumably smarter) birds with big brains can survive in harsh climates. It fits nicely with our anthropocentric bias.

But, he says, there are lots of birds will smaller than average brains which can also survive in harsh climates. He says they have been ignored because the idea of a bird evolving a small brain in response to a harsh climate does not fit the evolutionary preconception.

Big Heads

Before we can evaluate Fristoe's conjecture, we have to address the second issue: Specifically, the presumed connection between brain size and intelligence.

Traditionally, brain size has been used to distinguish apes from humans. Evolutionists believe humans have evolved bigger brains, which is what makes them smarter. The size required to be human, however, is purely arbitrary. Here is a little history explaining how the 600 cc brain size became the dividing line between the ape (*Australopithecus*) genus and the human (*Homo*) genus.

> … in order to assign the appellation *Homo* to the new fossil [*Homo habilis*], Louis [Leakey] had to modify the accepted definition of the genus. Until that time, the standard definition, proposed by the British anthropologist Sir Arthur Kent, stated that the brain capacity of the genus *Homo* should equal or exceed 750 cubic centimeters, a figure intermediate between that of modern humans and apes; it had become known as the cerebral Rubicon. Despite the fact that the newly discovered fossil from Olduvai Gorge had a brain capacity of only 650 cubic centimeters, Louis judged it to be *Homo* because of its more humanlike (that is, less robust) cranium. He proposed shifting the cerebral Rubicon to 600 cubic centimeters, thereby admitting the new Olduvai hominid [*Homo habilis*] to the genus *Homo*. [7]

There is no actual science behind the 600 cc threshold. Louis Leakey simply wanted his fossil discovery to be a human, not an ape, so the threshold was changed.

Evolutionists use brain size as a measure of intelligence, and therefore, the degree of evolution. This makes us wonder, since intelligence can be determined by brain size, why bother to administer IQ tests? Why not simply measure the head size? ☺

If brain size determines intelligence, how is it that a tiny ant found the bag of granola on top of my refrigerator, knew how to chew through the plastic, and told all his friends to come and enjoy the feast?

Fristoe's Findings

Fristoe found,

> Among small-brained birds, we found that, while tropical species exhibit higher-than-expected diet quality (Fig. 4a, c), species in cold, thermally variable climates include almost exclusively those that are able to subsist on vegetative plant material (Fig. 4a, b). [8]

That might be better stated the other way around. Fristoe found that birds which subsist on vegetative plant material (buds, twigs and needles) all have small brains. Presumably that is because that diet doesn't supply enough energy for a big brain.

> Large-brained species, on the other hand, were generally found to be those that include only small proportions of vegetative plant material in their diets, particularly within the tropics, where the number of species with low-quality diets is significantly lower than expected by chance (Fig. 4a–c). [9]

In other words, the big-brained species eat junk food to get enough calories to fuel their big brains. ☺

> The single exception is small-bodied, small-brained species, which are almost entirely absent (Fig. 4g–i), suggesting that small-brained birds rely on large bodies to deal with the extreme winter conditions in these environments. Such a requirement may come from the need to be more metabolically efficient

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[7] Louis Leakey, *The Origin of Humankind*, 1994, page 35

[8] Trevor S. Fristoe & Carlos A. Botero, *Nature*, 23 August 2019, "Alternative ecological strategies lead to avian brain size bimodality in variable habitats", https://www.nature.com/articles/s41467-019-11757-x

[9] *ibid.*

> or capable of withstanding longer periods of low food abundance. However, it is also possible that small-brained birds need to be big instead because their low-quality diets require a sufficiently large gut for the efficient digestion of fibrous plant materials. [10]

When he talks about small-brained birds, he is not talking about small birds. He is talking about birds that have small heads relative to other birds of the same size.

Other Factors

Fristoe realizes that there might be other factors besides brain size that are important.

> Brain size has been implicated in a number of life history trade-offs that influence reproductive output and population growth. Specifically, large-brained species typically require long and costly periods of parental care, limiting their ability to raise a large number of young. Accordingly, a negative upper-bound constraint in the relationship between reproductive output and brain size observed in our global sample of resident birds … is indicative of a strong trade-off. In contrast, a shallower slope for the lower constraint means that, while some small-brained species are able to produce large and/or frequent clutches, others can adopt a strategy of relatively slow reproductive output. … This small-brain-slow-output strategy is common in stable tropical regions but becomes progressively underrepresented, up to the point of exclusion, in high-latitude environments where conditions vary and winters are harsh. [11]

Even though we deleted the statistical data, that might have been hard to follow. Let's try to explain it this way: The theory of evolution depends upon survival of the fittest. The species that produce the most offspring who survive long enough to reproduce, are the species which become dominant. There are two different approaches to reproductive success: quantity and quality. You can be like a fish, and spew out lots of eggs, leave them alone, and hope that enough of them survive; or you can be like a bird who lays just a few eggs, and sticks around to take care of them.

Fristoe observed that big-brain birds have few young, but they take good care of them. Although small-brain birds sometimes have small broods in temperate climates, that reproductive method just doesn't work in Alaska. Small-brain birds have to lay lots of eggs frequently in cold climates to survive.

His point (I think) is that it might not be the energy trade-off between brains and guts that is the reason that arctic birds have either small or big brains, but not middle-sized brains. Perhaps birds have to have big brains to take care of the few hatchlings they have, or, if they lay lots of eggs, they don't need big brains to know how to take care of them.

Competing Strategies

Because he is an evolutionist, Fristoe thinks in terms of evolutionary strategies.

> Our data suggest that resident birds in the most thermally variable and unpredictable habitats on Earth exhibit two alternative strategies for coping with environmental fluctuations. The most common strategy is consistent with the main premise of the cognitive buffer hypothesis, which is that enhanced [mental] capacity for behavioral flexibility facilitates coping with variable conditions. Owing to the high [energy] demands of developing and maintaining large brains, the species that have adopted such strategy are constrained to high-quality diets and relatively low reproductive outputs. Instead, the second and less common strategy emphasizes the ability to withstand or recover from environmental extremes by developing a large and expensive gut that can digest readily available fibrous plants, by producing a large number of offspring, and by having a large body size. This lifestyle appears to be largely incompatible with the strong metabolic demands of having a large brain, highlighting the important role that energetic constraints can play in mediating adaptation to extreme environments. [12]

In plain English, Fristoe says birds have to adopt one of two strategies to live in harsh, cold weather. They either had to evolve big brains that make them smart enough to find easily digestible food that has lots of calories, and don't waste energy having lots of children; or they had to evolve a big (thermally efficient) body with a large volume-to-surface-area ratio, a gut that can digest almost anything, have lots of chicks, and a small brain that doesn't use much energy.

He observed arctic birds with big and small brains, but none with middle-sized brains. We don't dispute his observation—but it isn't a "strategy."

A strategy is a course of action designed to achieve a goal. He didn't find any evidence that

[10] *ibid.*
[11] *ibid.*
[12] *ibid.*

birds intentionally grew big brains that are smart enough to find nutritious food; or intentionally grew little brains that don't need many calories to survive, and a big gut that can digest almost anything.

We aren't disputing Fristoe's observations. We are disputing Fristoe's interpretation of those observations, as summarized in the last sentence of the abstract of his study:

> Overall, our findings highlight the importance of considering strategic tradeoffs when investigating potential drivers of brain size evolution. [13]

It appears to be true that birds with small brains and big guts, and birds with big brains and small guts, can live in harsh, cold weather—but that doesn't prove the harsh cold weather drove brain evolution. It simply proves that birds that can't take the cold don't live where it is cold.

Sidebar

Ants and Droids

How big does a brain really need to be?

Ants are perhaps the smallest creatures with brains; but they are smart enough to find food. Since I built some droids before I retired, I wondered how difficult it would be to build a droid that does what an ant does.

The first droid I built (in 1981) was named R2D3 because he was 19 inches wide, and 30 inches high (but more rectangular than R2D2). I built him to do a job I didn't want to do. He stood a few feet away from SNORT (the Supersonic Naval Ordinance Research Track) next to the point on the track where an airplane was suspended. He took data as a rocket sled going mach (classified) carried a DSU-28B target detecting device under the airplane. You can guess why I didn't want to stand there myself. R2D3 survived the sonic boom every time.

A few years later, I had to analyze the telemetry data from the DSU-28Bs when they were installed in AIM-54C Phoenix missiles fired at target drones over the Pacific Ocean. I got tired of driving 4 hours to Pt. Mugu only to have the test delayed for several hours before being cancelled, and having to drive 4 hours back home (which happened frequently). So, I build droid 002 ("James Baud") and left him there at Pt. Mugu. He listened to the telemetry data and printed out the time of intercept, closing velocity, range and angle at detection, and other important parameters, a few seconds after the intercept. He worked so well, I never had to go back to Pt. Mugu again.

The DSU-28B itself could be considered a droid, too, riding along on the missile, looking for a target, and setting off the warhead when it saw one.

R2D3, James Baud, and the DSU-28B all used dedicated microcomputers I built from an Intel 8085 microprocessor and a little bit of memory. They had one job to do, and were smart enough to do it. Adding more memory and a more powerful processor would not have made them perform any better.

An Ant-Droid

If I wanted to see if a droid could evolve to do an ant's job, it would (at a minimum) have to be able to move, sense food, and communicate the location to other ants. If it didn't have to be as small as an ant, and if the prototype ant-droid started out having a mobile frame, with a food sensor on it, a signaling device, and a microcomputer, it would have all the necessary hardware to do what an ant does; but it would still lack one critical element. Software would have to evolve to make it work.

If I programmed it to find food, that would be design—not evolution.

If I tried to simulate evolution by putting random numbers in the ant-droid's memory, it would not do anything, let alone go out and search for food, no matter how many times I tried.

For it to evolve by learning how to find food all by itself, I would have to program it to try to find food through trial and error, and reward it somehow when it did find food. I would have to design it to evolve. That would be cheating.

The software in an ant-droid's brain could not evolve without intelligent assistance, nor could algorithms to find food evolve accidentally in a real ant's brain.

Ants have a goal in mind for doing whatever they do; whether it is looking for food, eating food, carrying food back to the colony, building the colony, or telling other ants in the colony where to find food. Evolutionists believe that evolution is purposeless, and has no goal in mind.

It doesn't matter how small a brain is. Even an ant's brain is big enough to know how to do what it needs to do. Brain size doesn't matter. What matters is that the brain has to be programmed to accomplish a goal. It has to be designed to accomplish its goal. That can't happen without a designer.

[13] *ibid.*

by Lothar Janetzko

The Fate of Darwin's Finches

https://www.darwinthenandnow.com/

The fascinating saga of the fate of Charles Darwin's finches

The website review for this month looks at another article suggested by a reader of our website. This website is a blog post written by Richard William Nelson. On the home page of the site, you will find the following tabs: 1) Home; 2) About; 3) Book Preview; 4) Darwin Dilemma; 5) Dating Fossils; 6) Scientific Revolution; 7) Genesis; and a search icon. Typical of blog posts, on the bottom of a post you will find a link to Archives of posts spanning the period of January 2010 to March 2020.

On the About tab you will find some background information about Richard Nelson and the book he has published entitled *Darwin, Then and Now, the most Amazing Story in the History of Science*. As you can tell, the website name comes from the name of the book. A brief summary of the book states "*Darwin, Then and Now* is a chronicle of who Darwin was, how he developed his theory, what he said, and what scientists have discovered since the publication of *The Origin of Species* in 1859. The book details the rise and fall of evolution as a scientific theory. With over 1,000 references from Darwin and scientists, *Darwin Then and Now* retraces how this once popular theory is now recognized as only a philosophy; not a valid scientific theory."

The blog post, Fate of Darwin's Finches, provides interesting details about the role Darwin's finches have played in the development of the theory of evolution. Darwin reached the Galápagos Islands on September 15, 1835, aboard the HMS Beagle and spent about five weeks there. He collected many different types of specimens. "Darwin surprisingly did not record the number of finches collected nor the number loaded onto the ship." As it turns out, thirty-one Galápagos finch specimens reached England.

In 1836, Darwin presented some of his new collection of specimens to a meeting of the Geological Society of London. It was British ornithologist John Gould, who studied the birds in more detail and inferred the evolution of "an entirely new group, containing 12 species" in his report.

In 1839, Darwin published the first edition of the *Journal of Researches*, also known as the *Voyage of the Beagle*. In this book, Darwin never mentions the Galápagos finches. In the second edition of the book published in 1845, Darwin mentions the finches seventeen times, but concedes, "Unfortunately, most of the specimens of the finch tribe were mingled together."

This poses a problem for presenting the case of the evolution of different species on different islands.

More of the saga of the finches is presented in this post.

One interesting feature of the blog posts on this website is that each post has an audio link at the top of the post so you can listen to the post besides just reading it.

There is much to explore on this website. Just select tabs of interest or use the search feature to locate more information about Darwin and the theory of evolution.