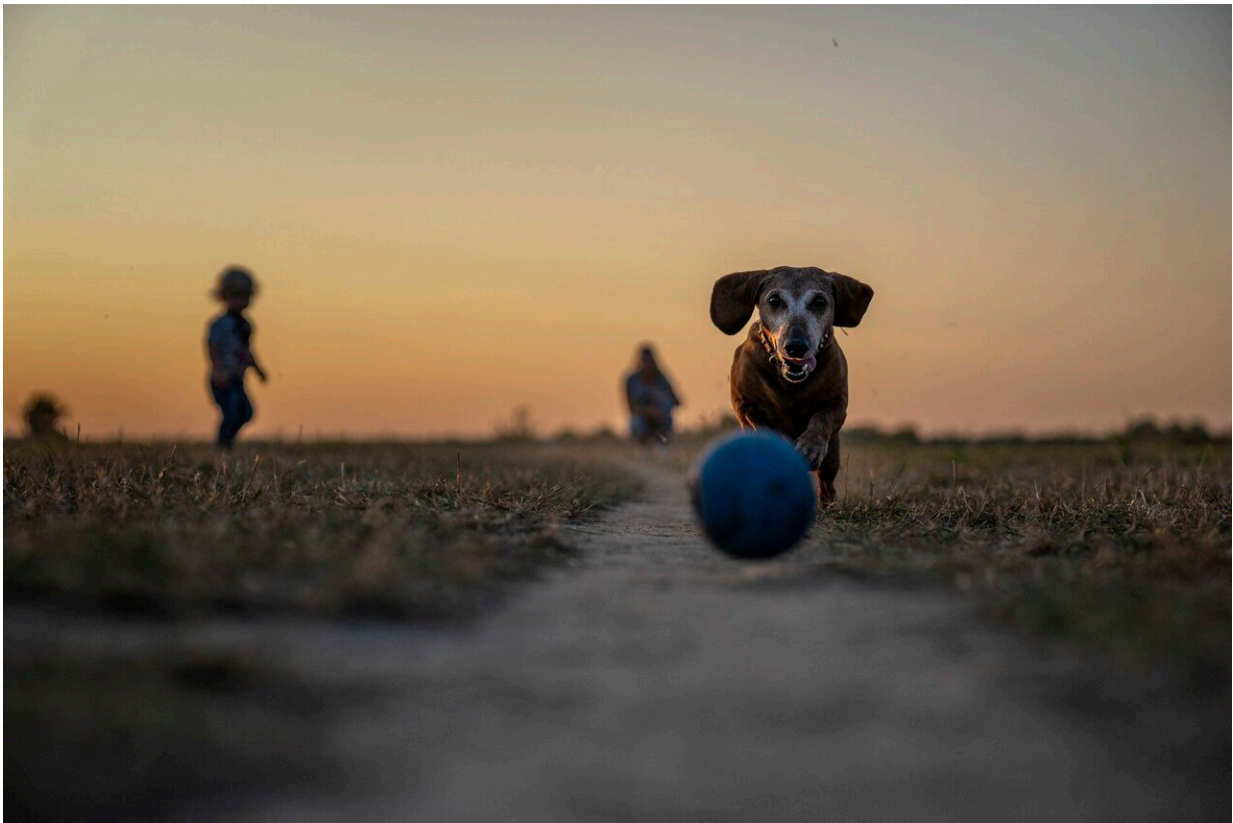


At its core, life is all about play—just look at the animal kingdom

August 13 2024, by David Toomey



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At [Cambridge University Library](#), along with all the books, maps and manuscripts, there's a child's drawing that curators have titled "[The Battle of the Fruit and Vegetable Soldiers.](#)"

The drawing depicts a turbaned cavalry soldier facing off against [an English dragoon](#). It's a bit trippy: The British soldier sits astride a carrot, and the turbaned soldier rides a grape. Both carrot and grape are fitted with horses' heads and stick appendages.

It's thought to be the work of Francis Darwin, the seventh child of [British naturalist Charles Darwin](#) and his wife, Emma, and appears to have been made in 1857, when Frank would have been 10 or 11. And it's drawn on the back of a page of a draft of "[On the Origin of Species](#)," Darwin's masterwork and the foundational text of evolutionary biology. The few sheets of the draft that survive are pages Darwin gave to his children to use for drawing paper.

Darwin's biographers have long recognized that play was important in his personal and [familial life](#). The [Georgian manor](#) in which he and Emma raised their 10 children was furnished with a rope swing hung over the first-floor landing and a portable wooden slide that could be laid over the main stairway. The gardens and surrounding countryside served as an open-air laboratory and playground.

Play also has a role in Darwin's theory of [natural selection](#). As I explain in my new book, "[Kingdom of Play](#): What Ball-bouncing Octopuses, Belly-flopping Monkeys, and Mud-sliding Elephants Reveal about Life Itself," there are many similarities—so many that if you could distill the processes of natural selection into a single behavior, that behavior would be play.

No goal, no direction

[Natural selection](#) is the process by which organisms that are best adapted to their environments are more likely to survive, and so able to pass on the characteristics that helped them thrive to their offspring. It is undirected: In Darwin's words, it "[includes no necessary and universal](#)

[law of advancement or development.](#)"

In contrast to foraging and hunting—behaviors with clearly defined goals—play is likewise undirected. When a pony frolics in a field, a dog wrestles with a stick or chimpanzees chase each other, they act with no goal in mind.

Natural selection is utterly provisional: The evolution of any organism responds to whatever conditions are present at a given place and time. Likewise, animals at play are acting provisionally. They constantly adjust their movements in response to changes in circumstances. Playing squirrels, faced with obstacles such as falling branches or other squirrels, nimbly alter their tactics and routes.

Natural selection is open-ended. The forms of life are not fixed, but continually evolving. Play, too, is open-ended. Animals begin a play session with no plan of when to end it. Two dogs play-fighting, for instance, cease playing only when one is injured, exhausted or simply loses interest.

Natural selection also is wasteful, as Darwin acknowledged. "[Many more individuals of each species are born than can possibly survive](#)," he wrote. But in the long term, he allowed, such profligacy could produce adaptations that enable an evolutionary line to become "more fit."

Play is likewise profligate. It requires an animal to expend time and energy that perhaps would be better devoted to behaviors such as foraging and hunting that could aid survival.

And that profligacy is also advantageous. Animals forage and hunt in specific ways that don't typically change. But an animal at play is far more likely to innovate—and some of its innovations may in time be adapted into new ways to forage and hunt.

Competing and cooperating

As Darwin first framed it, the "struggle for existence" was by and large a competition. But in the 1860s, [Russian naturalist Pyotr Kropotkin's](#) observations of birds and [fallow deer](#) led him to conclude that many species were "[the most numerous and the most prosperous](#)" because natural selection also selects for cooperation.

Scientists confirmed Kropotkin's hypothesis in the 20th century, discovering all manner of cooperation, not only between members of the same species but between members of different species. For example, clown fish are immune to anemone stings; they nestle in anemone tentacles for protection and, in return, keep the anemones [free of parasites, provide nutrients and drive away predators](#).

Play likewise utilizes both competition and cooperation. Two dogs play-fighting are certainly competing, yet to sustain their play, they must cooperate. They often reverse roles: A dog with the advantage of position might suddenly surrender that advantage and roll over on its back. If one bites harder than intended, it is likely to retreat and perform a play bow—saying, in effect, "My bad. I hope we can keep playing."

Natural selection and play also may both employ deception. From butterflies colored to resemble toxic species to wild cats that [squeal like distressed baby monkeys](#), many organisms use mimicry to deceive their prey, predators and rivals. Play—specifically, play-fighting—similarly offers animals opportunities to learn about and practice deception.

To live is to play

Darwin wrote that natural selection creates "[endless forms most beautiful and most wonderful](#)." Play also creates beauty in countless ways, from

the aerial acrobatics of [birds of prey](#) to the arcing, twisting leaps of dolphins.

In 1973, [Ukrainian-American geneticist Theodosius Dobzhansky](#) published an essay with the take-no-prisoners title "[Nothing in Biology Makes Sense Except in the Light of Evolution](#)." Many biologists would agree. Perhaps the most satisfying definition of life attends not to what it is but to what it does—which is to say, life is what evolves by natural selection.

And since natural [selection](#) shares so many features with play, we may with some justification maintain that life, in a most fundamental sense, is playful.

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