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A fox on the prowl in its Bristol, U.K., home. Sam Hobson/Minden Pictures

## Urban foxes may be self-domesticating in our midst

## By Virginia MorellJun. 2, 2020, 7:01 PM

In a famous ongoing experiment started in 1960, scientists turned foxes into tame, doglike canines by breeding only the least aggressive ones generation after generation. The creatures developed stubby snouts, floppy ears, and even began to bark.

Now, it appears that some rural red foxes in the United Kingdom are doing this on their own. When the animals moved from the forest to city habitats, they began to evolve doglike traits, new research reveals, potentially setting themselves on the path to domestication.

"I'm not so much surprised as delighted," by this study, says Lee Dugatkin, an evolutionary biologist at the University of Louisville, who has written about <u>the Russian fox experiment</u> but was not involved with the new work. "This is a 'natural experiment' that is very much in line with what the Russian experiment has found."

The renowned Siberian study immediately came to mind when Kevin Parsons heard about a large collection of red fox skulls at National Museums Scotland. A native Canadian and evolutionary biologist at the University of Glasgow, Parsons had already been struck by the number of foxes he regularly saw on Glasgow's streets, particularly in the early morning. "They'd walk by me and stare, as if asking, 'Why are you looking at me?'" he recalled. "They were fearless."

Curious to see whether the animals had somehow evolved to suit their urban lifestyle, Parsons

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examined National Museums Scotland's fox skull collection. Some 1500 skulls had been collected from 1971 to 1973 in London and the adjacent countryside, when a fox culling campaign was underway. All were marked with their locations, rural or urban. Urban areas were defined as having buildings, streetlights, and no wooded areas, whereas rural sites were wooded and lacked human development.

Parsons photographed 57 female and 54 male skulls and identified key features. <u>A fox's habitat</u> greatly affected the shape of its skull, he and his colleagues report today in the *Proceedings of the Royal Society B*.

Most significantly, the urban foxes, like those in the Russian experiment, had noticeably shorter and wider muzzles, and smaller brains, than their rural fellows. And males and females had very similar skull shapes. All of these changes are typical of what Charles Darwin labeled <u>domestication syndrome</u>.

Overall, urban foxes' skulls seemed to be designed for a stronger bite than were those of rural foxes, which are shaped for speed. Perhaps that's because in the city, a fox can simply stand at a human trash pile and feed on the food we've tossed out, where they may encounter more bones that can only be crushed with stronger jaws, Parsons speculates.

Still, he emphasizes that the urban red foxes are not domesticated. But the study does show how exposure to human activity can set an animal down this path, says Melinda Zeder, an emeritus archaeologist at the Smithsonian Institution's National Museum of Natural History.

<u>Like early dogs</u>, urban foxes would need to overcome their fear of humans to get close enough to eat our trash. And that may have been the spark that led to a host of other biological changes.

Foxes have started down this domestication path before in many parts of the world, Zeder notes. Their bones show up in early farming communities, for example. But unlike wildcats, who entered these communities and <u>transformed</u> <u>into the furballs we know today</u>, these foxes never become fully domesticated. "They never move any farther down the path to domestication," Zeder says. "We don't know why."

**\*Correction, 3 June, 1:40 p.m.:** This story has been updated to reflect the fact that the famed Siberian fox experiment is still ongoing.

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