The Culture of Killer Whales

With enduring family relations, unique dialects and diets, and huge celebrations for special life events, the orca has evolved through culture, passing tradition from one generation to the next. By Lori Marino, PhD

Jennie travels about 75 miles a day with her infant son, her mother, her teenage daughter, a grown son, sister and her 80-year-old grandmother in search of food and to explore, play and socialize. Because of the strong cultural traditions she was born into, she eats a very specific diet, communicates in a dialect unique to her group and socializes mainly within her family. Her daily activities reflect ancient cultural traditions passed down from one generation to the next. Her infant son, just like her adult son, will stay by her side for the rest of his life. Her daughter and sister will help her in raising her little one through a long childhood. And she will depend upon the experience, accumulated knowledge and wisdom of her grandmother—the matriarch—to make the right decisions when life becomes hard.

Jennie sounds like a person with an extended family group whose members each have a valued role in a society driven by long-standing cultural traditions shaped over generations. This could be a description of you or me. But Jennie just happens to be a person...
from another species—the orca, better known as killer whales. Cetaceans (the mammalian order in which orcas belong) evolved from a land-dwelling animal about 50 million years ago; fossils show they gradually adapted to a fully aquatic lifestyle over 10 to 15 million years.

Orcas are actually the largest species of dolphin, a member of the cetacean family Delphinidae within the cetacean suborder Odontoceti (toothed whales). They can grow to 25 feet long and weigh 4 to 6 tons. After a gestation period of 18 months, an infant is born who will take more than 15 years to mature to reproductive age. They are, in their natural habitat, very long-lived, with females sometimes reaching the age of 80 to 90 years or more and males 60 to 70 years of age.

Jennie, a composite female I’ve created based on the dozens of killer whales studied over the years, lives in the Pacific Northwest of the United States, in a highly complex hierarchical society consisting of different levels of associations and relations—all based on learned cultural traditions. Her community (known as the “southern resident killer whales,” or SRKW to scientists) is actually a large extended family, known as a clan, comprising three pods named J (with 22 orcas), K (17 orcas) and the largest pod, L (34 orcas). Each pod, in turn, is composed of several “matrilines,” subgroups led by older female matriarchs. Individuals within a matriline, like Jennie, her mother, grandmother, sister, daughter and sons are connected by maternal ties.

Young orca females can help out by baby-sitting for the pod before making families of their own.

Orcas of Puget Sound are besieged by the constant roar of industrial noise disrupting echolocation and navigation.
descent. Jennie stays mainly within her matrilineal group but, at times, she socializes with other pods.

**A TRAUMATIZING PAST**

There are 72 members of the SRKW population living free today, with one in captivity (see sidebar). The clan members have a disturbing history because, from 1965 to 1975, they were routinely culled from Penn Cove, Washington, and taken for use at exhibits at marine parks. Over those years, a third of them were captured or killed, leaving the group decimated as they currently deal with challenges like low levels of their favorite prey, toxic contaminants in the waters, and excess vessel traffic and noise. They remain endangered to this day.

Fortunately, most other orca clans are doing better than the SRKW and, when left alone in the wild, manage to thrive.

Even amidst their challenges, about once a year, all three SRKW pods come together in one location into what’s known as a superpod. The occasion varies. Typically it looks like a greeting ceremony or a pure celebration of life as the three pods mingle and socialize and play. At other times it may more closely resemble a grief ritual after the loss of one of their own. (In 2018, shortly after a young orca from J pod went missing after a long illness and was presumed dead, all three pods came together in what some have interpreted as a group display of togetherness after the loss.)

Jennie’s relationship with her grandmother is vitally important to her survival because, as the matriarch, her grandmother holds the accumulated cultural knowledge of many generations and now, as a female orca “of a certain age,” is entirely devoted to helping other members of her family navigate life successfully. You see, orcas are one of the very few mammals who experience menopause. When female orcas pass through middle age they stop reproducing to concentrate more on helping their children and their grandchildren. This is called the “grandmother effect” and, thus far, it appears only in orcas, beluga whales, short-finned pilot whales, narwhals, sperm whales and, of course, humans.

SRKW usually spend their summer in the waters around Washington state and southwest British Columbia. In the winter, they expand their range to find more food because these whales are gastronomic specialists of the highest order, with chinook salmon making up 80 percent of their all-fish diet. This highly specified diet is a cultural tradition, too. And despite the fact that there are other kinds of salmon, other fish and mammals available, these whales are so culturally conservative that, even when chinook salmon are scarce, they will not switch to a more abundant prey. It is as if these orcas see themselves as “the chinook salmon eaters” and their cultural identity depends upon maintaining this dietary habit.

Cultural differences among separate orca communities stop members who meet up from mingling and mating.

Other orca cultures around the world possess their own dietary specializations. One community off the coast of New Zealand specializes in manta and stingrays, having learned techniques to grab their prey without being stung by their tails.

**SONG OF THE ORCA**

Individual orcas express their identity through cultural habits, including dialects—sets of calls learned from parents. Each pod uses a distinctive dialect to communicate its social identity. And some aspects of dialects are shared across pods. The more related the pods, the more similar the dialects. In short, the similarities and differences among dialects are a kind of “sound map” of interpod relationships.

The sound repertoire of orcas is as complex as their social relationships. They make different kinds of sounds—clicks, whistles, pulsed calls—used in various ways and in various contexts. Like other dolphins, orcas navigate through echolocation (sonar), producing high-frequency clicks underwater and processing the echoes that bounce off objects at frequencies from 0.2 to 150 kHz, an order of magnitude faster than human sound processing. Whistles and pulsed sounds are combined with echolocation to create a highly complex acoustic landscape that only orcas fully understand.

Like their diet, the dialect of the SRKW community is unique from other orcas. The cultural differences help them maintain genetic distinctiveness as they choose to mate only within their group.
ANIMAL MINDS

COMMUNITY

Different orca groups across the globe, called ecotypes, express different behaviors throughout a wide range of the open ocean and coastal habitats. Each population represents a different culture with a distinct dialect, prey specialization and hunting strategy (many hunt cooperatively like wolves).

Each community of these big-brained, intelligent, emotional and socially complex mammals is unique. Each pod has its own social structure, and each individual orca is irreplaceable.

We know about orcas from decades of observing them in their natural habitat, coming to know each as an individual, and understanding how that individual relates to other members of his or her social group.

And we know, from studying the orcas who have died, that their brains are over twice as large as expected for their body size, are very complex and the most convoluted on the planet, having more wrinkles on the surface than even humans. (Those wrinkles or convolutions indicate how much neocortex, the higher-order-thinking part of the brain, has become elaborated over evolutionary time.) The fact that orcas have a more wrinkled cortex than humans has thought the evolution of two separate species of orcas, as the SRKW and transients continue to diverge in behavior and in biological adaptations. Remarkably, these adaptations are all based on behavior choices and learned cultural traditions adopted by each orca community.

Most people think that animal biology shapes behavior. But this is an example of behavior actually shaping biology!

Whether performing or not depends on captivity or captured from the wild, orcas in display tanks are deprived of everything they need—space, an interesting environment, challenges, continuity in their family and social life, as well as choice about how to spend their days.

The chronic stress of living in tanks weakens their immune systems and leaves captive orcas vulnerable to well-known opportunistic infections like pneumonia, encephalitis, parasites, disorders and candidiasis. These illnesses shorten their life spans considerably with few living past the age of 20. These orcas also exhibit behavioral characteristics such as endlessly swimming in stereotyped circles, remaining suspended on the surface of the water, self-harming and hyper-aggression.

The most well-known case of abnormal aggression is that of Tilikum, the subject of the influential documentary Blackfish. Tilikum was an orca captured from his homeland in Iceland at the age of two years, and has lived without another orca since 1980 in a tank. Tilikum has lived without another orca since 1980 in a tank, though has lived without another orca since 1980 in a tank. The fact that orcas have a more wrinkled cortex than humans has thought the evolution of two separate species of orcas, as the SRKW and transients continue to diverge in behavior and in biological adaptations. Remarkably, these adaptations are all based on behavior choices and learned cultural traditions adopted by each orca community. Most people think that animal biology shapes behavior. But this is an example of behavior actually shaping biology!

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Lori Marino, PhD, is a neuroscientist and president of the Whale Sanctuary Project. She has studied dolphin and whale brains and intelligence for over 30 years.

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An authentic sanctuary is a place where the well-being and independent choices of the residents is the priority—not ticket sales. And in such an environment individuals can flourish.

A handful of cetacean sanctuary projects are now underway around the globe. In 2016, to fund the Whole Ocean Sanctuary Project, a U.S.-based nonprofit organization whose mission is to create a permanent seaside sanctuary for captive orcas and beluga whales. The first of its kind in North America, the sanctuary will be in Port Hilford, Nova Scotia. A beautiful cove that will provide a permanent natural home for about eight whales in an expansive 100-acre netted area with lots of depth for diving and other aquatic animals to interact with. The residents will be fed and provided high-quality veterinary care, and will enjoy the freedom of making their own choices about where to live. To visit the sanctuary go to whalesanctuary.org.

For orcas, says Ms. Marino, “It’s about resurrection. It’s the occasion upon to take a long, deep breath and enjoy the sunset.”

This orca pops up to take a breath and enjoy the sunset. For orcas, each breath of air can be a moment of enjoyment and understanding how that individual relates to other members of his or her social group.

Indeed, when SRKW members meet up with transient orcas wandering into the very same waters of Puget Sound, they share overlapping territories with non-competing diets. The transient whales travel in smaller pods than the SRKW, range wider and have a front-row seat to what every orca community encounters.

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