



SUBSCRIBE

THE SCIENCES | MIND | TECHNOLOGY | HEALTH | ENVIRONMENT | PLANET EARTH

PLANET EARTH

From Animals to Human Society: What We Learn When Women Lead

In some mammal species, females lead the pack. What can they teach humans?

By Bridget Alex | February 6, 2020 1:30 PM



2 FREE ARTICLES LEFT

WANT IT ALL? GET UNLIMITED ACCESS WHEN YOU SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER? REGISTER OR LOG IN



stage and screen tells the tale of young male lion Simba's rise to power. But, in the real circle of life, lionesses lead.

Related females band together for life, as the primary hunters and warriors. Transient males join to mate but contribute little else to a pride's success.

The lion queens, however, are an exception. Among mammal species that live in social groups, only about 10 percent have strong female leaders. They include another fierce predator, killer whales, as well as bonobos, famous for their peaceful promiscuity.

Humans, on the other hand, are part of the mammal majority: Our leaders are mostly male. Less than 7 percent of Fortune 500 CEOs are female. Worldwide, fewer than two dozen women are heads of state or government, including Germany's Angela Merkel and New Zealand's Jacinda Ardern. In about 90 percent of nonindustrial societies studied by anthropologists, only men hold political posts.

It's undeniable that males have more sway across institutions, societies and mammal species. But what explains those lionesses, literal and figurative — the females who lead? A multidisciplinary movement to study these outliers is gaining momentum. From hyena clans to corporate hiring culture, researchers are charting the pathways and barriers to female power among mammals, including our own species.

Female Leaders in the Animal World

Bullies, warriors and wise matriarchs In the dry, thorny forests of Madagascar, Verreaux's sifaka lemurs leap between trees with gravity-defying ease. For these primates, there's no question which sex is dominant.

"Females beat up the males," says anthropologist Rebecca Lewis of the University of Texas at Austin. To avoid smacks to the face and bites, males call out submissively when females approach — a chattering *chi chi chi chi*, which is "the equivalent of bowing down," says Lewis. At trees laden with edible fruit, it's ladies first: If a male climbs up, the feasting female may aggressively lunge or glare, and he'll often retreat to the ground.

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



(Credit: Monika Hrdinova/Shutterstock)

But tensions escalate during the dry season, when food is so scarce the animals lose up to 20 percent of their weight. “They’re just really suffering during this time,” says Lewis, who leads a wildlife research station in Madagascar.

One source of sustenance is the fatty baobab fruit. Its thick shell takes sifakas a half-hour to gouge open with their teeth. As a female works to free her own meal, she keeps an eye on nearby males. When one of them breaks open the shell, she claims the fruit like a schoolyard bully, slapping him to surrender.

He “might even hold onto the fruit while she’s eating ... just crying the whole time because he doesn’t want to lose it,” says Lewis.

Eventually he goes on to crack another. She takes that one, too.

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

[SUBSCRIBE](#)

ALREADY A SUBSCRIBER?
[REGISTER OR LOG IN](#)



During the dry season in Madagascar, baobab trees provide a crucial source of sustenance for Verreaux's sifaka lemurs: thick-shelled fruit. (Credit: Maxwell De Araujo Rodrigues/Dreamstime)

Few mammal females attain this degree of dominance — defined by biologists as an animal's ability to subordinate another through force or threat. Among the roughly 5,400 mammal species, in just a couple of dozen do females routinely outrank males during dominance contests. These include spotted hyenas and two types of naked mole rat, but lemur species make up the bulk of the list. For more than 20 species of lemurs, including Verreaux's sifaka, female rule *is* the rule, not the exception.

“The fact that females are socially so powerful in [lemur] societies shows us that more traditional division of sex roles is not some inevitable destiny of mammalian biology,” says Peter Kappeler, a zoologist at the University of Göttingen in Germany. “That gives rise to all kinds of questions, why that might be the case, why lemurs are so different.”

One obvious consideration is what Kappeler and others call the lemur syndrome: Females have traits that are typical of males in other mammal species. Their external genitalia are elongated, appearing more penislike, and their bodies are the same size or slightly larger than a male's. With a mass difference of less than 10 percent, both sexes would belong to the same weight class in boxing. Lady lemurs also display so-called masculine behaviors: play tussling, marking territory with scent glands and intimidating subordinates with feigned or real cuffs and bites.

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



Not every social mammal species led by females has the same structure. For spotted hyenas, females are warriors that take on rival clans and lions. (Credit: S100apm/Dreamstime)

But body size and pseudo-penises aren't enough to explain power dynamics in these species. Nor are hormones: Although pregnant hyenas and lemurs show elevated testosterone levels, most of the time adult females have lower concentrations than males — a puzzling finding scientists are investigating.

A 2019 *Nature Ecology and Evolution* paper on spotted hyenas suggests that disproportionate social clout, rather than physical strength, fuels female dominance. Its authors analyzed 4,133 encounters between mixed or same-sex hyenas, which ended with one animal exerting dominance and the other retreating, cowering or otherwise signaling defeat. Over 75 percent of the time in all matchups, victory went to whichever animal had more potential allies close enough to call for backup. And, in spotted hyena society, high-ranking females have the most allies.

Another 2019 study, published in the *International Journal of Primatology*, looked at several hundred dominance contests between sifaka lemurs of varying ages. Although adult males bow down — with the deferential *chi chi chi chi* — to adult females, males of all ages get into conflicts with juvenile females. The researchers found juvenile females won about a quarter of the bouts and adolescents about half, regardless of body size. Adult females who had offspring past weaning age triumphed nearly 100 percent of the time. Sexual maturity and successful motherhood give these females status.

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



Female orcas are among the few mammals that live decades past menopause, often leading their pods, especially in times of scarcity. (Credit: Ivkovich/Dreamstime)

Follow the Leader

Lewis, a co-author of the 2019 lemur study, has pushed researchers to look beyond physical dominance when investigating power relations. In her other articles, she contends that power — one's ability to make another creature do something — can be reached by alternate means or expressed in other ways.

Leadership is a special kind of power: influence over the entire group. Dominant animals can be leaders, capable of directing collective action. Or they may just be lone bullies at the baobab tree.

Strong female leadership is even more rare than female dominance among mammals. A 2018 study in *Leadership Quarterly* reviewed 76 social species in four decision-making contexts: collective travel, foraging and conflicts within or between groups. Defining leaders as individuals that routinely called the shots in at least two of these realms, the researchers identified eight species run by females: ruffed and ring-tailed lemurs, spotted hyenas, killer whales, African lions, bonobos and two types of elephant.

"It looks like there are these independent evolutionary events where ... the set of circumstances gave rise to strong female leaders," says lead author Jennifer Smith, a biologist at Mills College.

For spotted hyenas and two lemur species, dominance certainly plays a role. But the other five species

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



In contrast to some species where physical dominance is the rule, peaceful bonobos form alliances. (Credit: Andrey Gudkov/Dreamstime)

Killer whales, or orcas, are also one of the few species in which females live decades past menopause. Orca communities especially follow these grandmothers (or great-grandmothers) during hard times, like when salmon prey are scarce, according to a 2015 study in *Current Biology*.

Meanwhile, female lions and bonobos derive strength from numbers. In both species, allied females fend off bigger, stronger males. Kinship unites the lionesses, but bonobos form coalitions of nonrelatives, which groom and fondle each other. Females of this chimpanzee species, “through their cooperative social alliances, are in a way civically larger and more influential than one male,” Smith explains.

Female Leaders In Our Own Species

Bias, biology and breaking through

In the 1970s, a review of historical descriptions of 93 nonindustrial societies found only about 10 percent permitted women to hold political posts — and women were generally less powerful than male

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



THE SCIENCES | MIND | TECHNOLOGY | HEALTH | ENVIRONMENT | PLANET EARTH

affairs. In a 2018 *Evolution and Human Behavior* paper, von Rueden and colleagues found that, at community meetings, less than 10 percent of comments came from women. And when Tsimane ranked fellow villagers based on their ability to influence debates and manage projects, the average male score was higher than the scores of 89 percent of the women.



Among the Tsimane people of the Bolivian Amazon, political leadership is predominately, but not exclusively, male. Physical size, level of education and number of allies are factors in predicting political sway, and women do occasionally emerge as leaders in this nonindustrial society. (Credit: National Geographic Image Collection/Alamy)

And yet, consistent with global surveys, Tsimane political leadership is predominately — but not exclusively — male. Some women leaders exist among them.

Probing the data further, von Rueden's team found factors beyond a Y chromosome that predicted political sway, including a person's size, education and number of allies. The authors concluded that these

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

[SUBSCRIBE](#)

ALREADY A SUBSCRIBER?
[REGISTER OR LOG IN](#)



leadership across human societies — “a topic fraught with potential land mines,” he admits. Evolutionary anthropologists, including von Rueden, think the answer lies at the intersection of biological sex differences and the particular history, customs and environment of any given society.

Thanks to our mammalian roots, women bear and nurse babies. Men are generally larger and stronger — just considering upper-body strength, 99 percent of women have less arm muscle mass than the average man. These biological realities set the stage for sexual division of labor, common across cultures. Men tended to take on riskier endeavors, like battles and big-game hunts, which require coalitions and hierarchical coordination. Tethered to children and homes, women assumed a greater share of domestic responsibilities, forming fewer but more intimate social ties.

From this evolutionary background, sex-based stereotypes emerged, which then became amplified or dampened by the particularities of a given society. For example, it’s been proposed that the invention of the plow deepened gender divisions because its use requires substantially more upper-body strength than hoe or stick tilling. This relegated men to fields and women to household labor. According to a 2013 *Quarterly Journal of Economics* study, the plow’s effects persist. The authors compared farming styles of more than 1,200 nonindustrial societies with gender beliefs of their modern descendants. The analysis found that descendants of plow-farmers have fewer women in the workforce and politics, and less-favorable views about gender equality. For example, in Pakistan, where earlier societies relied on the plow, only 16 percent of agricultural workers are women, compared with 90 percent in Burundi, which had traditional hoe tilling.

Evidence-Based Empowerment

Understanding the evolution of male-skewed leadership, says von Rueden, “puts us in a better position to act on behalf of putting more women in positions of power.”

There’s a lot of catching up to do. In the U.S., while women make up half the entry-level workforce, their presence dwindles on each step of the corporate ladder, comprising just a quarter of senior managers, 11 percent of top earners and 5 percent of CEOs in S&P 500 companies, according to a 2019 report by Catalyst, a women’s leadership nonprofit.

Based on metrics like wage gap, share of labor force and percentage of women working, gender equality rose beginning in the 1960s, peaked in the '90s and then stagnated for the past two decades.

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



Decades ago, major American symphonies changed their systems to blind auditions — and saw significant increases in the number of women hired. (Credit: Stokkete/Dreamstime)

A now-classic analysis, published in 2000, underscores such biases. In the 1970s and '80s, major U.S. symphonies changed their auditions so musicians played behind a curtain that concealed their identity. Prior to the policy shift, less than 10 percent of new hires were women. Afterward, the number of female musicians in all orchestras increased exponentially — most drastically for the New York Philharmonic, where, following the change, about 50 percent of new hires were women.

As Chilazi sees it, research has a clear message for organizations trying to level out gender ratios in leadership: Company policies are “much easier to change and much easier to de-bias than our human brains.”

Leading the Nation

Research runs thin when it comes to what is arguably the ultimate glass ceiling: elected national leadership. Starting in 1960 with Sri Lanka's Prime Minister Sirimavo Bandaranaike, 115 women have served as president, prime minister or chancellor of 75 countries, from Brazil to Bangladesh. But, as in the

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



The small number of women who have led their nations include Sri Lanka's Sirimavo Bandaranaike (left) and Germany's Angela Merkel (right). (Credit: Elpisterra/Shutterstock; Everett Collection Historical/Alamy)

Oklahoma State University political scientist Farida Jalalzai's research shows female executives tend to serve in systems with both a president and prime minister, often holding the weaker of the posts. Rather than popular vote, most are appointed by legislatures or winning parties, and into unstable posts that can be challenged. (Recall the no-confidence votes Theresa May faced in the U.K. Parliament.) Another factor: The majority hail from political families — often the wives or daughters of former leaders.

Jalalzai notes that, while 2016 U.S. presidential candidate Hillary Clinton, the wife of a former president, fit this profile, the U.S.'s presidency is a single, powerful head of state, rather than part of a power-sharing dual leadership system. The Oval Office is a tough glass ceiling to crack.

According to Jalalzai, although Clinton failed to win the presidency, the campaign may have shifted perceptions about who can assume the office. A record number of women entered the 2020 Democratic primary, for example. "People didn't take her loss as the lesson that women shouldn't be competing for this," she says. "It showed us, really, the opposite."

Jalalzai found similar effects globally, looking at public opinion surveys taken by 62,000 individuals from over 40 countries. In the 11 nations with female executives during the 2018 study's time frame, people were more accepting of female leaders, interested in politics and likely to vote, especially female

2 FREE
ARTICLES
LEFT

WANT IT ALL? GET UNLIMITED
ACCESS WHEN YOU
SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER?
REGISTER OR LOG IN



Other researchers have focused on local elections with corroborating results. In a 2018 *Leadership Quarterly* paper, researchers found that after the election of female mayors, those municipalities saw more women assuming top- and middle-management positions in public organizations. A study published in 2012 in *Science* considered the consequences of a 1993 Indian law that mandated that a random third of West Bengal villages reserve their chief councilor seat for an elected woman. Based on more than 8,400 surveys conducted in 495 villages, the researchers found that having a woman councilor for two election cycles improved aspirations for girls to pursue higher education and politics. The girls also spent more years in school and fewer minutes per day on domestic chores.

The studies suggest that, while gender equality does not beget female leaders, the reverse may be true: Women in high offices promote gender equality, either directly through policies and appointments, or indirectly by acting as a prominent reminder that women can lead.

animals

2 FREE ARTICLES LEFT

WANT IT ALL? GET UNLIMITED ACCESS WHEN YOU SUBSCRIBE.

SUBSCRIBE

ALREADY A SUBSCRIBER? REGISTER OR LOG IN