

# Most species, including humans, who experience early life adversity suffer as adults. How are gorillas different?

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Using the Dian Fossey Gorilla Fund's 55 - year database, researchers found that gorillas who experienced early adversities -- such as parental death or instability in their social group -- but survived until the age of 6 did not suffer long - term consequences in adulthood, in contrast to what has been observed in other species. Credit: Dian Fossey Gorilla Fund

There's something most species—from baboons to humans to

horses—have in common: When they suffer serious adversity early in life, they're more likely to experience hardship later on in life.

When researchers from the Dian Fossey Gorilla Fund and the University of Michigan decided to look at this question in [gorillas](#), they weren't sure what they would find.

Previous studies by the Fossey Fund revealed that young gorillas are surprisingly resilient to losing their mothers, in contrast to what has been found in many other species. But losing your mother is only one of many potential bad things that can happen to [young animals](#).

"Assuming that you survive something that we consider early life [adversity](#), it's often still the case that you will be less healthy or you will have fewer kids or your lifespan will be shorter—no matter what species you are," said U-M anthropologist Stacy Rosenbaum, senior author on the study. "There's this whole range of things that happens to you that seems to just make your life worse in adulthood."

But instead, the researchers found that gorillas who survived past age six were largely unaffected by difficulties they encountered as infants or juveniles. The study is published in the journal *Current Biology*.

Like other species, humans also deal with early life adversity, and the effects of this can follow us into adulthood, such as a shorter lifespan or [health complications](#), Rosenbaum said. But in humans, it's difficult to tease out whether we, for example, develop cancer or die early as adults because of an adverse event early in life per se, or whether it's because of a multitude of behavioral, environmental and cultural factors—or a combination of all of the above.

Studying these early adverse events in nonhuman species could help researchers understand how such events affect humans, and how to

mitigate them.

"When you look at animals, you remove a lot of the variation that we have in humans. For example, they are all eating similar diets, they all get exercise as part of their daily lives, they don't have the opportunity to engage in behaviors with negative health outcomes like smoking," said Robin Morrison, a researcher with the Dian Fossey Gorilla Fund and lead author on the study.

But despite this, in most species it is still the case that early adversity can have negative effects in adulthood, which suggests that there is some kind of deeper biological mechanism there that we don't understand very well, Morrison said. That gorillas show a different pattern suggests these early life adversities can be overcome. Understanding why and how this happens can have significant implications for our own species, she said.

Like humans, gorillas live a long time and have a small number of offspring that they heavily invest in. This makes them a good comparative animal model for understanding the ramifications of early life adverse events. The researchers looked at 55 years of long-term data collected in 253 wild mountain gorillas, 135 of which were male and 118 female. These gorillas live in Volcanoes National Park in Rwanda, and have been monitored for more than five decades by the Dian Fossey Gorilla Fund.

The researchers identified six different kinds of early life adversity: losing a father or mother, experiencing the death of a group member by infanticide, [social group](#) instability, having few age-mates in the social group, and having a competing sibling who was born soon after them. The data included information about how many of these early adversities each gorilla experienced and at what age, as well as how long each gorilla lived.

The researchers looked at what happened when a gorilla experienced none, one, two or three or more adverse events. They found that the more of these adverse events gorillas experienced before age 6, the more likely they were to die as juveniles. But if, despite experiencing early adversity, they survived until age 6—past their juvenile stage—the researchers found no evidence that their lifespans were shorter, no matter how many adverse events the gorillas suffered.

In fact, if a gorilla experienced three or more forms of adversity, it actually lived longer; this group of animals had a 70% reduction in the risk of death across adulthood. But this was driven by greater longevity in males specifically, and the researchers suspect the trend was due to something called viability selection. This means that if a gorilla was strong enough to survive difficult early life events, it might just be a "higher-quality individual," and thus more likely to have a longer life span.

"I was expecting to see that these gorillas would have short lifespans and would not do very well as adults," Rosenbaum said. "We found that these events are definitely associated with a much higher risk of death when you're young. But if you survive to age 6, there's no evidence that those shorten your lifespan at all. This is quite different from what we see in other species."

The researchers have some theories about why these mountain gorillas were so resilient. Gorillas have very tight-knit social groups and prior studies have shown that when a young gorilla loses its mom, it doesn't actually become more isolated: other gorillas fill the gap in social companionship.

"The youngster actually increases its time near other gorillas after the loss of its mom and in particular the highest-ranking adult male, even if he isn't their biological father," Morrison said. "These strong networks

might provide critical social buffering, as has been shown in humans. The quality of our social relationships is a very important predictor of our health and longevity—in some cases, more important than genetics or lifestyle."

Another reason they may be relatively buffered from the consequences of adversity is that mountain gorillas live in a resource-rich environment compared to many other wild primates. It may be easier for a gorilla to survive [difficult circumstances](#) if they are not also constantly dealing with the stress of finding enough food and water, Rosenbaum said.

"For comparison, savanna baboons—who were the inspiration for this analysis—live in this highly seasonal environment where they go through extreme droughts. They sometimes will have to walk miles to get to a water hole. They're often struggling for every single calorie they take in," she said. "That's not the world that mountain gorillas live in. They're often described as living in a giant salad bowl."

The researchers' findings suggest that species similar to our own can have significant resilience to early life adversity. The results also raise important questions about the biological roots of sensitivity to early experiences, and the protective mechanisms that contribute to resilience in gorillas.

"I don't think we should assume that the long-term negative effects of early life adversity are universal," Rosenbaum said. "We tend to talk about this as if it's a ubiquitous experience, and a given that your adulthood is going to be compromised if you live through early adversity.

"But I don't think it's nearly that cut-and-dry, even in the human literature. I think the data are a lot more complex for humans and this research would suggest that they might be more complex for other

animals, too. And I actually think that that's a hopeful story."

**More information:** Robin E. Morrison, Cumulative early life adversity does not predict reduced adult longevity in wild gorillas, *Current Biology* (2023). DOI: [10.1016/j.cub.2023.04.051](https://doi.org/10.1016/j.cub.2023.04.051).  
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