

# How do dolphin mothers speak with their babies?



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## Abstract

Have you ever noticed that people speak differently to babies and toddlers? Caregivers, particularly mothers, change their speech when talking to young children. How? Their speech includes higher pitches. They also use a wider pitch range and shorter sentences. Scientists call these changes in speech patterns child-directed communication, but you can think of it as baby talk. We wanted to find out if

bottlenose dolphins also use child-directed communication. We analyzed the sounds made by female dolphins and found that they used higher frequency whistles when they were with their calves. We also found that the frequency range of their whistles increased. Like humans, bottlenose dolphins speak differently to youngsters than to adults.

## Introduction

Have you ever used baby talk? How does it sound when people talk to toddlers compared to adults? **Research shows that humans change their speech patterns when speaking to young children.** They use shorter sentences. People also talk to children at a higher **pitch** and use a wider pitch range. What does that mean? Pitch is how humans perceive the **frequency** of a sound. So, when caregivers talk to young children, they use higher frequencies. Scientists call these changes in speech patterns **child-directed communication**, but we'll also call it "baby talk" in this article. Scientists hypothesize that one purpose of baby talk is to help caregivers bond with children. They also think that baby talk improves a child's attention and ability to learn language.

Child-directed communication is well-known in human cultures. However, we don't know much about its use by other animals. Squirrel monkeys, rhesus monkeys, and greater sac-winged bats use different **vocalizations** when communicating with young animals. But these changes are different from baby talk. These animals use different sounds when talking to adults or to children. **With baby talk,**



A mother bottlenose dolphin and her calf with hydrophones on their melons (foreheads) during a health assessment. *Photograph taken by Chicago Zoological Society's Sarasota Dolphin Research Program under National Oceanic and Atmospheric Administration/National Marine Fisheries Service Scientific Research Permit No. 15543.*

humans mostly use the same words, just with changes to their pitch and speed.

The only similar example known among animals is adult zebra finches changing their songs when singing to younger birds. We wanted to know if bottlenose dolphins also use child-directed communication. Each dolphin has their own signature whistle, which is a lot like a human name. Dolphins

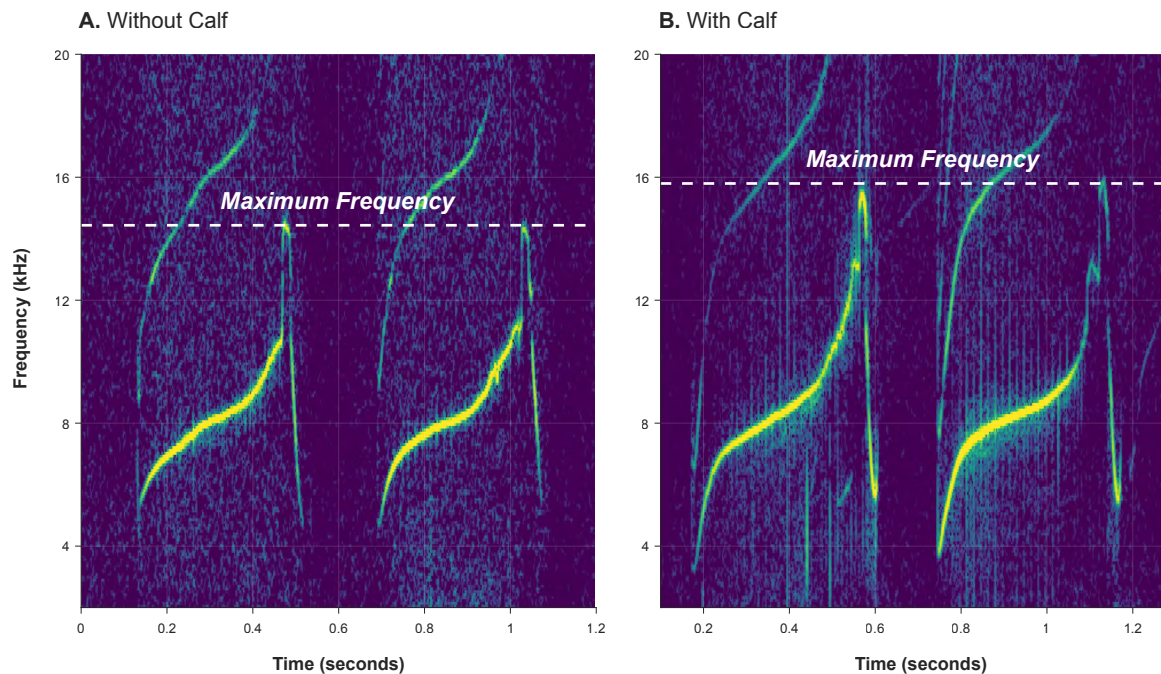
use their signature whistles so that other dolphins can recognize them. They use it in a lot of different situations. That means we could compare a mother's whistle when alone or when with her calf. We hypothesized that female dolphins whistle at a higher frequency when with their calves. We also predicted that they use a greater range of frequencies and shorter whistle pieces, called loops.

## Methods

We recorded whistles from a community of bottlenose dolphins in and near Sarasota Bay, Florida. These dolphins are part of an ongoing research program. As part of the program, researchers catch one to four dolphins at a time for a short health check and then release them. During these health checks, we attach a hydrophone with suction cups to each dolphin's melon (or forehead). This makes it possible for us to identify which sounds are produced by which dolphins.

During catch-and-release health checks, we recorded the signature whistles of 19 adult female dolphins. Sometimes a female was with one of her calves, and other times not. We compared the signature whistles of the same females when they were with and without one of their calves.

How did the maximum frequency and the frequency range of the mother dolphin's whistle change when she was with her calf?



## Results

We found that female dolphins produced signature whistles with higher maximum frequencies when with their calves than when they were without their calves (Fig. 1). We also found that the lowest frequency of their signature whistles decreased when with their calves. So, the overall frequency range of their whistles increased.

**Figure 1:**

The signature whistle of a female dolphin (A) without her calf and (B) with her calf.

We did not find a change in the length of each whistle loop. We also found that there was no change in the number of loops used or the time between loops.

## Discussion

Our results show that bottlenose dolphins use child-directed communication. Female dolphins increased the frequency range of their signature whistles when with their calves. This is similar to the increase in pitch range that occurs when humans speak to young children.

Scientists think that humans use baby talk to build social connections. It also helps children learn to speak. Many animals use different sounds or songs to talk with their young. But humans use the same words to talk with both children and adults. That means to help children learn to speak, caregivers change how they say the words when talking with children. Dolphins also communicate with children and adults using the same whistles. But we're not sure why dolphins use baby talk. Maybe it's also to help their

calves learn to whistle. But female dolphins still made these changes when communicating with older calves. So, maybe this helps calves to know when a whistle is directed at them, rather than other dolphins.

Humans tend to use shorter sentences when speaking with young children. We did not find evidence that dolphins use shorter whistle loops when with their calves. Why? Not all dolphins use more than one loop in their whistles. That might be why the loop length doesn't change. Instead, dolphins only change the frequencies of their whistles.

In the past, researchers have observed songbirds to better understand human speech. Our research suggests that dolphins can also be models for studies of how human language developed.

## Conclusion

Our research about child-directed communication in bottlenose dolphins reminds us how important it is in humans. Whenever you speak with a young child, remember that how you say things could be as important as what you say. Change the pitch of your voice the way that their

caregivers do. Use shorter sentences. These changes in how you speak will help you build a stronger connection with the baby or child. They will also help the child learn how to communicate as they grow.

## Glossary of Key Terms

**Calf** – a name used for certain baby animals, including bottlenose dolphins.

**Child-directed communication** – speech changes that happen when talking with children.

**Frequency** – a property of a sound wave that describes how many sound waves pass a specific point per second.

**Hydrophone** – a microphone that records sound waves under water.

**Loop** – the part of a bottlenose dolphin's whistle that may be repeated.

**Melon** – the forehead of the dolphin, which helps the dolphin focus sounds.

**Pitch** – a property of a sound that describes how high or low the sound is, which is related to the frequency of the sound wave. A high-pitched sound has a high frequency. A low-pitched sound has a low frequency.

**Vocalization** – a sound or word produced by the voice.

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## Check your understanding

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How do humans change their speech when talking to babies and toddlers?

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How do dolphins change their whistles when communicating with their calves?

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What do scientists think are the reasons that humans and dolphins use child-directed communication?

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There are other ways to help a child or adult learn a language in addition to the speech changes we discussed. With a partner, brainstorm some additional ways you can help someone learn a new word or phrase.

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Imagine you are talking to a 9-month-old baby. You are telling them that it is time to eat and what they are going to eat. What would you say to the baby to tell them this information? How would you say it?

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## REFERENCES

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