Study: Humpback whales aren't learning their songs from one another

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The study, published Tuesday (Feb. 9) in the Journal of Comparative Psychology, analyzed songs from groups of humpbacks that were not in acoustic contact with each other, yet still produced acoustically comparable songs.

"The idea that humpback whales are a distinguished part of the animal kingdom because of their ability to culturally learn songs is apparently not true," says Mercado. "But to me, what the whales are doing is actually more impressive.

"Cultural transmission implies that what's heard is copied. That means it doesn't matter what is heard or what is copied. But what we found is very specific and precise, without a trace of arbitrary vocalization. The songs change over time in a fashion that's even more precise than what humans do when language develops."

The talented club DJ serves as an appropriate metaphor for changing whale song.

"DJs can't just randomly go from one song to the next," says Mercado. "They have to think about beat matching, tempo and mood in order to maintain a continuous flow.

"I think that might be true of the whales. When they make changes, they do so in relation to what preceded it. They're basically beat matching when they change songs—and we found similarities in populations that had no social contact or genetic links."

Mercado says existing research claims that humpback populations isolated from one another do not change their songs in the same way. Each population is original, taking their songs in original directions.

"These things are not true," says Mercado. "I compare songs over 40 years and compare populations that have never been in contact with

Humpback and bowhead whales are the only mammals other than humans thought to progressively change the songs they sing through a process of cultural learning.

But maybe the humpbacks are no longer part of that trio. Humpbacks might be singing songs that are not as 'cultured' as once assumed.

A new study by a University at Buffalo researcher is directly contradicting the widely accepted cultural transmission hypothesis suggesting that whales learn their songs from other whales.

"It seems like that is not correct," says Eduardo Mercado, a professor of psychology in UB’s College of Arts and Sciences. "Our findings indicate that neither cultural transmission nor social learning contributes significantly to how humpback whales change their songs over time.

"I think the results are provocative and will probably make other whale researchers livid or dismissive, but at least the discussion won't be boring!"
Despite large and sometimes rapid changes, whales often end up singing similar songs, according to Mercado. The cultural transmission hypothesis is attractive in part because it's hard to imagine what mechanism might instigate the song variation.

But previous research has relied heavily on subjectively defined categories. Songs sounding like a human snore would be placed in a "snore" category. Any subsequent analysis would depend on how well the categories captured the intricacies of the song.

"I didn't categorize things at all and used purely acoustic measurements," says Mercado, who specifically chose published records of data to avoid any suggestion of cherry picking the data. "This paper is based on direct measurements of sound features without any categorization or subjective labeling."

Mercado says the results of the current study question the role of vocal imitation and cultural transmission in humpback whale song, but they do not resolve why the songs are changing.

"These results tell me that whales are sophisticated in ways that researchers and observers hadn't previously considered," says Mercado. "What we're hearing is a level of acoustic sophistication which is beyond the ability of humans."

"That's something that deserves both appreciation and further study. I'd like to examine why whale song changes and explore the benefit of that change."
