

Caribbean sperm whales found to have a regional dialect

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Sperm whale. Image credit: Ocean Footage

(Phys.org)—A trio of researchers working off the coast of the Caribbean island of Dominica, has found evidence that suggests whales living in the Caribbean Sea have a different 'accent' than whales living in other oceans. In their paper published in *Royal Society Open Science*, Shane Gero, with the University of Aarhus in Denmark, Hal Whitehead, with Dalhousie University in Canada and Luke Rendell with the University of St Andrews in the U.K., describe their multiyear study of sperm whale communities living in the Caribbean Sea and why they believe their findings support the social complexity hypothesis.

For many years scientists have been studying both the communication and social habits of human and other creatures and over time have developed some hypotheses which they believe transcend species. One

of them, known as the social complexity hypothesis, suggests that social structure complexity drives diversity in communications. To find out if sperm whale behavior conforms to the hypothesis, the researchers studied nine individual Caribbean social units (whale groupings) over a period of six years. Recordings were made which allowed for computer analysis of patterns of what are called codas—stretches of clicks and pauses made by [whales](#), perhaps comparable to individual letters in a word, or multiple words in a sentence, for us humans. Many years of study of whales by many scientists has confirmed that the noises whales make are actual communication, not just random sounds generated for no particular reason.

In this new effort, the researchers identified unique codas and assigned them to individuals using photo-identification and other acoustic measurements. Altogether the team was able to identify 21 unique coda types, of which two were dominant, together accounting for 65 percent of all recorded codas. One of them called '1+1+3' has been documented before, but now it appears it is more standard than was known—every individual in every unit made the coda in exactly the same way—but only in the Caribbean—sperm whales in other oceans or even other parts of the Atlantic don't have the same coda, which the team suggests means that Caribbean sperm whales communicate with one another in their own unique dialect. Interestingly, the other dominant coda, called '5R' was created slightly differently between members of the same units, which allowed perhaps, some individuality among group members. Taken together, the researchers suggest that the codas show that sperm whales do indeed conform to the [social complexity](#) hypothesis.

More information: Shane Gero et al. Individual, unit and vocal clan level identity cues in sperm whale codas, *Royal Society Open Science* (2016). [DOI: 10.1098/rsos.150372](https://doi.org/10.1098/rsos.150372)

Abstract

The 'social complexity hypothesis' suggests that complex social structure is a driver of diversity in animal communication systems. Sperm whales have a hierarchically structured society in which the largest affiliative structures, the vocal clans, are marked on ocean-basin scales by culturally transmitted dialects of acoustic signals known as 'codas'. We examined variation in coda repertoires among both individual whales and social units—the basic element of sperm whale society—using data from nine Caribbean social units across six years. Codas were assigned to individuals using photo-identification and acoustic size measurement, and we calculated similarity between repertoires using both continuous and categorical methods. We identified 21 coda types. Two of those ('1+1+3' and '5R1') made up 65% of the codas recorded, were shared across all units and have dominated repertoires in this population for at least 30 years. Individuals appear to differ in the way they produce '5R1' but not '1+1+3' coda. Units use distinct 4-click coda types which contribute to making unit repertoires distinctive. Our results support the social complexity hypothesis in a marine species as different patterns of variation between coda types suggest divergent functions, perhaps representing selection for identity signals at several levels of social structure.

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