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# Killer whales (Orcinus orca) and Bell Laboratories: What can information theory tell us about the communication system of this species?

Kenna Lehmann[a] and Jason Wood[b]
[a]University of California, Dept. of Evolution and Ecology, Davis, CA 95616, USA
[b]Beam Reach Marine Science and Sustainability School, 7044 17th Ave NE, Seattle, WA 98115, USA

In the 1950's Shannon and Weaver developed information theory as a statistical tool to determine the structure and organization within communication systems. More recently information theory has been applied to the study of animal communication. We gathered acoustic recordings of the Southern Resident killer whales in the inland waters of Washington State, USA, and British Columbia, Canada, from both land based and boat based acoustic arrays. Recorded calls were categorized using the accepted call catalog for this population. In this paper we will present our results from applying various Shannon entropies to the documented call sequences. One notable result is that the call repertoire is more redundant than is ideal to convey the maximum amount of information. This may be a result of their particular social system and behavioral ecology, or may be an indication of the amount of noise present in their acoustic environment. Comparisons will also be made with measures of information theory in other species.