

## **Social Learning in Killer Whales and the Spread of Depredation Behaviours**

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Thirty five years of collective research on killer whales in the wild and in captivity has shown that the species is often slower to take advantage of novel food resources and to explore new objects or areas than smaller-brained species such as dolphins or primates. In contrast, social learning—the acquisition of behaviours used by other members of an individual's social group—is by any measure highly developed in killer whales. This combination of behavioural conservatism and advanced social learning likely underlies the complex and stable cultures of killer whales, cultures that include traditions and conventions related to social interactions, mating, food preferences and hunting techniques. The dominance of social learning over learning by experimentation or innovation likely reflects the slow rate of development, late onset of sexual maturity, and very low reproductive rate of killer whales. In such species, learning from older relatives whose own survival proves that they have essential knowledge is a better strategy for survival and reproduction than taking risks for short-term gains.

The risk-averse nature of killer whales may make them relatively slow to initiate depredation behaviours when confronted with a new fishery and mirrors a situation seen in captivity, where trainers often experience difficulty in switching killer whales from one fish species to another. I believe that two factors are most likely to contribute to depredation in its early stages. First, during protracted periods of food scarcity in the wild, killer whales may be forced to seek out new food resources to survive—in other words, they switch when the risk of starvation exceeds the risk of switching. The second factor relies heavily on chance. The longer the period of exposure to a new food resource, and the more closely the new food resembles a traditional food, the greater the chance that at least one individual will experiment with it. In either case, once one or more individuals overcome an innate reluctance to sample novel prey and become adept at acquiring it, the preference and behaviour may spread rapidly throughout the population by social learning.

The same conservatism that delays the initiation of depredation makes it hard to discourage depredation once it is established. This suggests that efforts to prevent killer whale depredation from becoming established are likely to be easier, cheaper, and more effective than efforts to control it once it is established. Fishermen and fisheries managers are therefore advised to use gear types and fishing protocols that prevent or discourage depredation even in areas where the behaviour is presently absent or rare.