

Prey-foraging: The collective search or lone-wolf approach?

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Many predators either hunt alone keeping the spoils to themselves or in packs sharing the bounty with others. Deciding whether to tell fellow predators about some tasty prey involves weighing up many pros and cons. In a new paper published in *PLOS Computational Biology*, researchers from Princeton University and the Stockholm Resilience Centre found a simple 'rule of thumb' that may help unravel this complex decision-making behavior. Credit: Unsplash CC0

Wolves in Canada, lions in the Serengeti or fishermen in the Southern Ocean, either hunt alone keeping the spoils to themselves or in packs sharing the bounty with others. Deciding whether to tell fellow predators about some tasty prey is not an easy decision and requires the predator to weigh up many pros and cons.

But when is it useful to share information about the location of a buffalo or rich fishing and when is it foolish? Researchers from Princeton University and the Stockholm Resilience Centre looked for clues for cooperation. The paper, published in *PLOS Computational Biology* shows a simple "rule of thumb" that may help unravel this complex behavior.

The findings are potentially relevant for ecological conservation work but also anywhere there is a limited resource and a group of consumers wanting access whether it be oil or mineral resources, fishing grounds or stockbrokers in financial markets.

Author James Watson from the Stockholm Resilience Centre explains, "Fishermen tend to share information about salmon or other migratory species. But they're more secretive and even territorial about fish stocks that remain more or less in the same place. In Scandinavia mushroom hunters are quite secretive about the location of wild mushrooms in forests, for example."

Using mathematical models of the behavior of predators and prey, the authors found the lone wolf search strategy is most attractive when the time to find prey and the time taken to consume prey are both short. Cooperation, though, is a better strategy when it takes longer to find and consume prey, for example a large buffalo or rich fishing ground.

"This boils down to one central trade-off: the benefit of acquiring information about prey location, and the cost of sharing prey with other predators."

The team identified three essential timescales that control the rate at which predators consume prey: how quickly prey move, how quickly prey are found by searching predators, and how quickly prey are consumed by predators once they've been found. "A large buffalo takes a long time to consume, so over this time period, other predators might move in and share the meat" says Watson.

The next step for the research is to use the new general mathematical formulae to calculate the payoff of sharing information, for different environments. "We want to identify evolutionary stable strategies in social groups. This will help us understand how animals, people and businesses collectively organize around resources," says Watson.

More information: Matthieu Barbier et al, The Spatial Dynamics of Predators and the Benefits and Costs of Sharing Information, *PLOS Computational Biology* (2016). [DOI: 10.1371/journal.pcbi.1005147](https://doi.org/10.1371/journal.pcbi.1005147)

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