

# Larger schooling fish found to have stronger attraction forces

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A school of sardines in Italy. Credit: Wikimedia / Alessandro Duci

In schooling fish, collective movement emerges as a result of multiple social interactions between individuals. In a new study led by researchers at Uppsala University, larger individuals have been found to display stronger attraction forces to one another than smaller individuals. Short range repulsion forces, on the other hand, are the same regardless of fish

size.

In nature, some animals move independently from other individuals of the same species. Others form spectacular swarms, flocks or schools. In an attempt to better understand how interactions and the resulting collective dynamics change with group size and age/size of individuals, the researchers analysed the schooling properties of Pacific blue-eye fish (*Pseudomugil signifer*) using a combination of traditional biological methods and approaches originating in statistical physics.

The research group identified the strength of fish interactions at different developmental stages. They showed that whilst the short-range repulsion forces had the same strength for different sized fish, attraction strength increased in larger fish.

To validate these results, the researchers designed a computer simulation based on the experimental observations. The simulated organisms were given varying speeds, and local repulsion and alignment rules. The model was found to successfully capture the dynamics of [schooling fish](#).

"Our study shows how application of interdisciplinary statistical approaches, coupled with informed models of collective motion can help extract useful biological information about social interactions in schools of [fish](#). We expect that our findings could also apply to other animal species that exhibit schooling behaviour," says Dr. Maksym Romenskyy at the Department of Mathematics at Uppsala University.

**More information:** Maksym Romenskyy et al. Body size affects the strength of social interactions and spatial organization of a schooling fish (), *Royal Society Open Science* (2017). [DOI: 10.1098/rsos.161056](https://doi.org/10.1098/rsos.161056)

Provided by Uppsala University

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