

New paper shows growth pattern for religious groups, nation states

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A new paper in *PLOS ONE* by External Professor Michael Hochberg and colleagues computes how human social groups pass through different phases in their growth, structure, and behavior.

"We find support for empirical patterns in religions and nation states that a small number of [large groups](#) come to dominate the landscape and that these coexist dynamically with much larger numbers of small scale groups," says Hochberg.

The researchers use transitions between single and [multicellular organisms](#) to show how chance emergence in more hospitable environments has a snowballing effect by which the big get both bigger and fewer, and much more numerous small groups stay small due to

competition, or are destroyed through warfare with other groups.

The basic pattern emerging from this complex system of interactions within and between groups is a U-shaped distribution in human [group](#) sizes. However, this simple and robust result depends crucially on assumptions about the relative growth rates of small and large-scale groups, the productivity of the land they occupy, and the outcomes of warfare.

"The results of our model recapitulate the basic shapes of size distributions of religious groups and nation states, and provide mechanism for understanding how these distributions may have come to be and where they may be heading," says Hochberg.

Hochberg stresses the need for future enhancements of their model to better represent certain phenomena from first principles, such as adaptive decision-making and fragmentation due to scalar stress in large-scale societies.

More information: "A Life-Cycle Model of Human Social Groups Produces a U-Shaped Distribution in Group Size." *PLoS ONE* 10(9): e0138496. [DOI: 10.1371/journal.pone.0138496](https://doi.org/10.1371/journal.pone.0138496)

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