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Schelling's Segregation Model: Parameters, scaling, and aggregation

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Abstract

Thomas Schelling proposed a simple spatial model to illustrate how, even with relatively mild assumptions on each individual's nearest neighbor preferences, an integrated city would likely unravel to a segregated city, even if all individuals prefer integration. This agent based lattice model has become quite influential amongst social scientists, demographers, and economists. Aggregation relates to individuals coming together to form groups and Schelling equated global aggregation with segregation. Many authors assumed that the segregation which Schelling observed in simulations on very small cities persists for larger, realistic size cities. We describe how different measures could be used to quantify the segregation and unlock its dependence on city size, disparate neighbor comfortability threshold, and population density. We identify distinct scales of global aggregation, and show that the striking global aggregation Schelling observed is strictly a small city phenomenon. We also discover several scaling laws for the aggregation measures. Along the way we prove that as the Schelling model evolves, the total perimeter of the interface between the different agents decreases, which provides a useful analytical tool to study the evolution.

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