

Explanation in search of observation (Sugden, 2011)

Main Claims

A model is a self-contained system, created by the modeler and possessing exactly the properties that its creator stipulates. In itself, it does not claim to describe any part of the world, even in an approximate, simplified or stripped-down form.

Models are linked to the real world by hypotheses about similarity.

A model can be a potential explanation to phenomena that are not yet observed.

Case Studies

1. Schelling's checkerboard model of racial segregation

Model [\[edit \]](#)

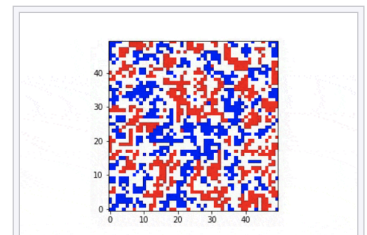
The original model is set in an $N \times N$ grid. Agents are split into two groups and occupy the spaces of the grid and only one agent can occupy a space at a time. Agents desire a fraction B_a of their neighborhood (in this case defined to be the eight adjacent agents around them) to be from the same group. Increasing B_a corresponds to increasing the agent's intolerance of outsiders.

Each round consists of agents checking their neighborhood to see if the fraction of neighbors B that matches their group—ignoring empty spaces—is greater than or equal B_a . If $B < B_a$ then the agent will choose to relocate to a vacant spot where $B \geq B_a$. This continues until every agent is satisfied. Every agent is not guaranteed to be satisfied and in these cases it is of interest to study the patterns (if any) of the agent dynamics.

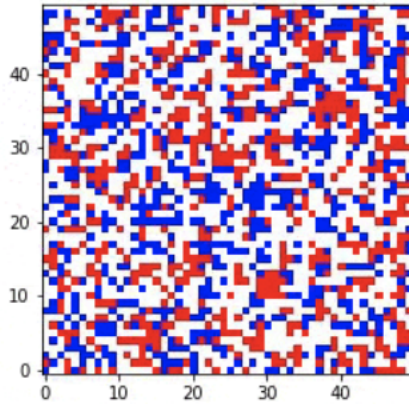
While studying populations dynamics of two groups of equal size, Schelling found a threshold B_{seg} such that $B_a < B_{seg}$ leads to a random population configuration and $B_a \geq B_{seg}$ leads to a segregated population.

The value of B_{seg} was approximately $\frac{1}{3}$. This points to how individuals with even a small amount of in-group

preference can form segregated societies. There are different parameterizations and variants of the model and a 'unified' approach is presented in [\[6\]](#) allowing the simulations to explore the thresholds for different segregation events to occur.



Simulation of the model. Agents will move at each step until the fraction of neighbors that are from their own group is greater than or equal to B_a . For equal sized populations, $B_a \geq B_{seg} \approx 1/3$ leads to the groups segregating themselves.



Linear model: "squeezing-in" mechanism. Not credible in many real-world cases; but would explain a possible case if it is credible.

Checkerboard model: developed from the linear model; serves as an explanation of racial segregation in US housing markets.

2. Asymmetric animal contests
3. The dynamics of hybrid zones

Opponents and Objections

Cartwright: a model shows that C has the capacity to produce E, describes one part of the real world in isolation from others. Requires the assumptions to be widely accepted.

Giere (Sugden agrees): a model is constructed by scientists; a hypothesis asserts the similarity between the model and the real world.

Inductive inference: from the similarity of the effect to the similarity of the cause.

-Objection: mere similarity is insufficient to support an inductive inference.

-Maybe inference to the best explanation?