

Language Change

Using ABM to Model Change in Language Over Time

What Is Language Change?

Over time, languages change. Fifteen hundred years ago, the language that is now English had five cases and three genders, and would be completely incomprehensible to a modern English speaker (as anyone who has tried to read Beowulf knows.)

Languages don't all change at the same rate. Old English had three descendents: Modern English, Scots, and Yola. Here is a short sample of Scots:

We twa hae run about the braes,
and pou'd the gowans fine;
But we've wander'd mony a weary fit,
sin' auld lang syne

And here is a short sample of Yola:
(Now extinct, Yola was spoken in Southern Ireland.)

Fade teil thee zo lournagh,
co Joane, zo knaggee?
Th' weithest all curcagh,
wafur, an cornee.

All three languages diverged at about the same time, but Yola is clearly much more difficult for a Modern English speaker to understand than Scots.

Model Rules

In this model, language is represented by a list of numbers that correspond to attributes of the language. Usually, the model is run with three, which are assigned to the red, green, and blue components of the color of each patch:

On every tick, languages mutate themselves and then attempt to talk to their neighbors. If their languages are similar enough, they succeed, and both languages get closer together by an amount proportional to their similarity.

Parameters

- Rate at which languages mutate.
- Rate at which languages influence each other.
- Number of other patches that each patch tries to talk to per tick.
- Distance at which languages are no longer intelligible.

Results

1. Increasing the rate at which languages influence each other makes them more different from each other, not less.

On the left, patches influence each other at 25% of the distance between them. On the right, everything is identical except that patches influence each other at 100%.



2. With a low mutation rate, a low influence rate, and a high number of interactions per tick, dialect continuum-like patterns emerge:

