Why Labov's incrementation model does not work

Igor Yanovich
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- The right way to model the S-curve and the adolescent peak:
  - For adolescents during the vernacular reorganization phase, we need to define some incrementation function.

    Given incrementation which (i) starts from higher and higher baselines (given by the previous generation), and (ii) ensures that the current year's 17-year-olds overshoot those who were 17 last year, we derive the adolescent peak.

    There may be many incrementation functions that achieve this basic result.
  - However, for such a model to claim adequacy, it also needs to lead to an S-curve of *aggregate change* in the population.

    In other words, when we sum up the innovation's share by all age groups in the society for each year, we want to see an S-curve.

  ⇒ the goal of modeling is to find a function for adolescent increment that also leads to the creation of an S-curve.

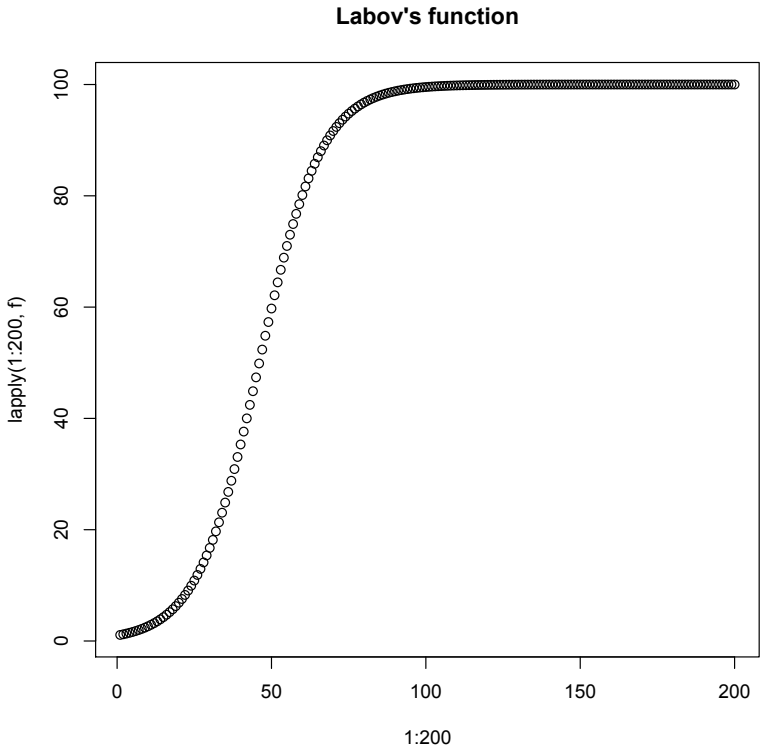
- What Labov (2001) does instead:
  - As for any such model, he needs to define the incrementation slope for adolescents.

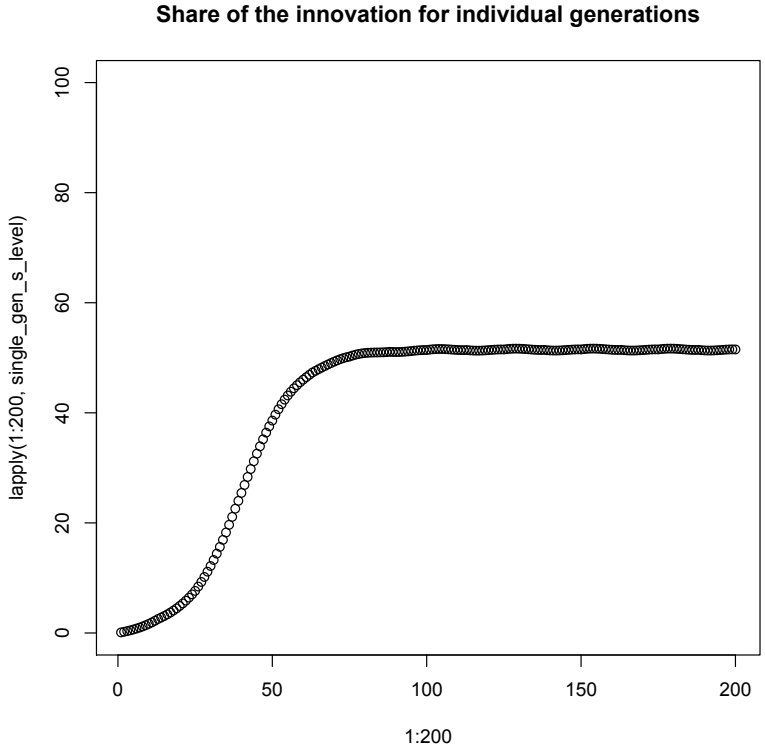
    For that purpose, he uses a logistic function. He just takes a logistic curve going from 0 to almost 100 in 100 years. He then takes the adolescent incrementation slope to be copied from the respective portion of that curve.

    This logistic curve comes from nowhere in his analysis. It is there as an axiom.
  - Labov checks that this analysis yields the adolescent peak. This is good, but not specific to his particular choice of function: many incrementation functions will do just as well.

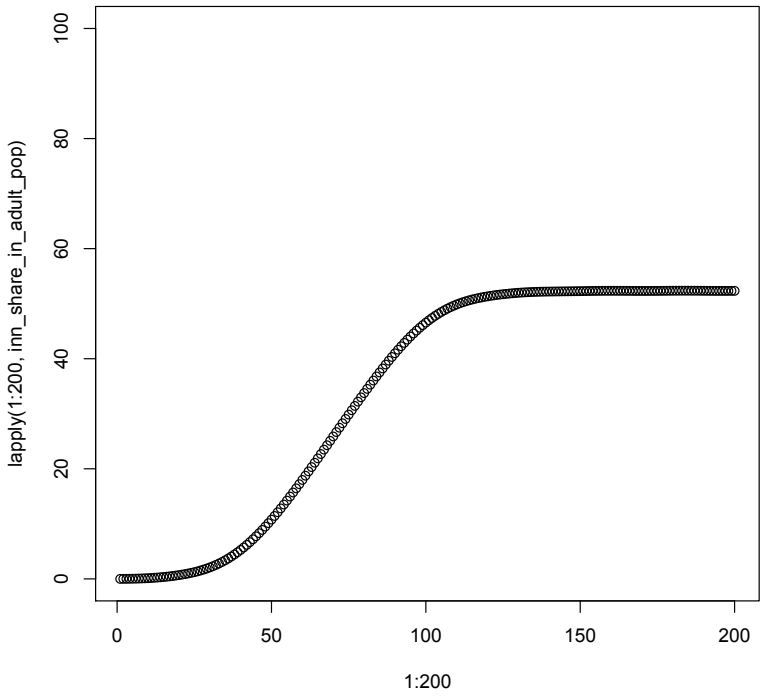
    Importantly, Labov does not check what predictions his account makes for the aggregate share of the innovation in the population.

- So here is how Labov's account works (or rather doesn't):

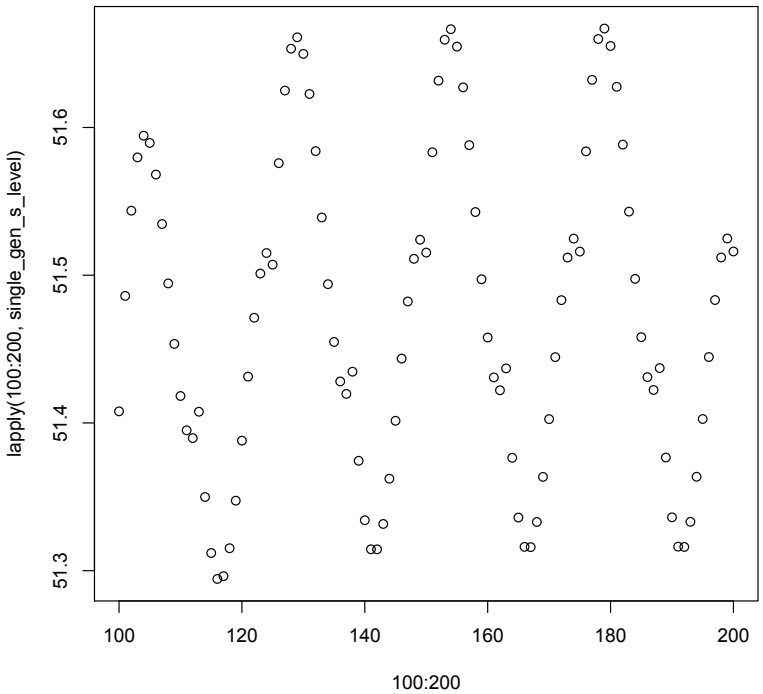


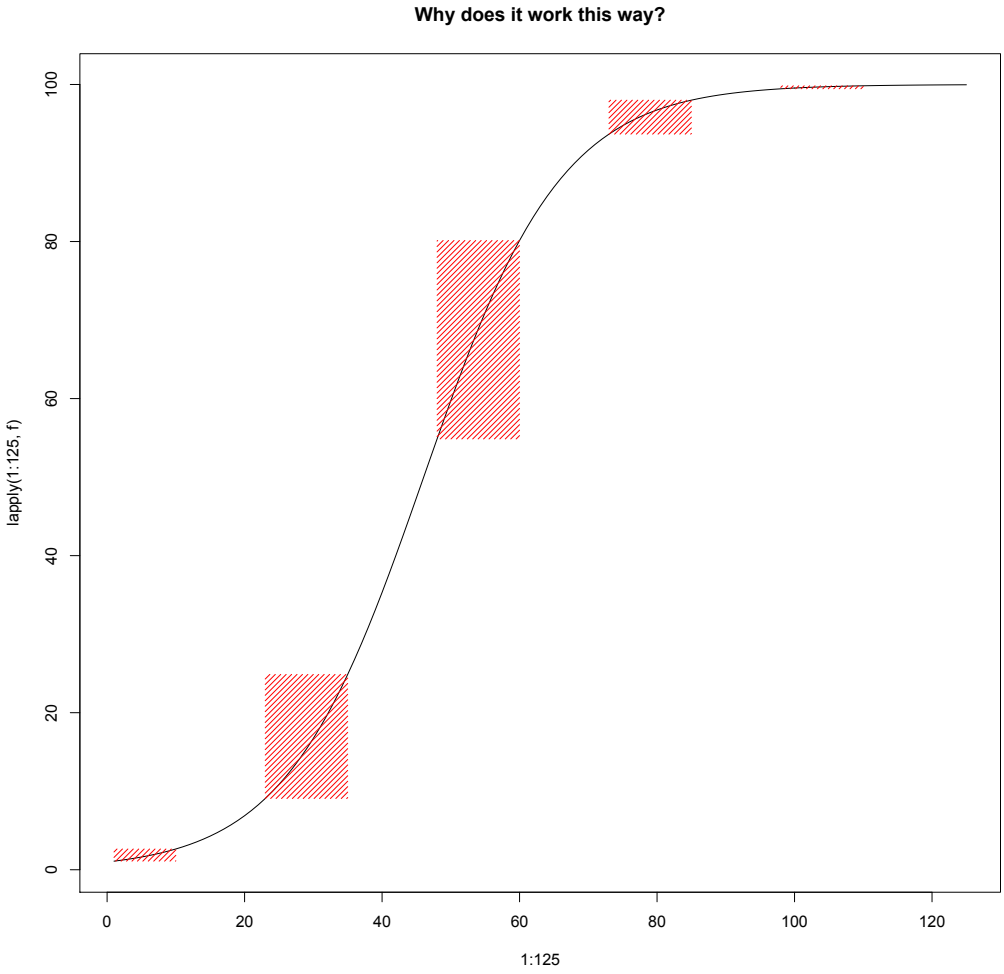


Cumulative share of the innovation, all adults



Zoom in into the share of the innovation for individual generations





- The graph shows the gains (in red rectangles) which a speaker becoming 17 at year 110 of the change will get from Labov's logistic function.

  She herself only gets a tiny increase of the innovation's share, because the original Labov's function has slowed down tremendously by that point.

  Her mother gets a larger increment, as for her the change progressed in years 73-85. To get the baseline for the mother, we need to compute the end stage of the change for the grandmother, who grew up in years 48-60. During her adolescence, she got the largest increase. And the we also look at the great-grandmother and her own mother. The end share for our speaker in year 110 will be the sum of the five increases.

  Now it's easy to see why the top share of the innovation does not get much past 51 units (or percentage points). As we copy from Labov's curve, for each 25-year interval we are going to only copy a 13-year part: recall that we assume that up to 4 and after 17 speakers do not get adolescent incrementation.

  So we will **never** get to 100, the maximum point of the original curve: we will always skip a large part of the original curve.