

Context of Chapter 6

- Allegiance Dynamics of Incorporated Populations
 - Previous chapters (Ch 4 & 5) discussed the initial stages of a polity's expansion (incorporating groups)
 - It's all about transfer of loyalty
 - This chapter is about how that loyalty cannot last long...why?
 - Once a polity becomes multiethnic, its ability to function and expand becomes strongly affected by loyalties of incorporated ethnies.
 - Consequences are two-fold
 - No loyalty to empire – no commitment of resources
 - Ethnically different people likely to rebel against empire.
 - THUS, assimilation of multiethnic groups to core, and how fast this process proceeds, has great effect on empire.
 - This chapter deals with “Models of ethnosocial change”, or ethnokinetics

Theory (*Nonspatial models of assimilation vs. Spatially Explicit Models*)

Nonspatial models of assimilation

- **Noninteractive Model**
 - Noninteractive = probability of switching ethnic identity does not depend on what others are doing
 - Assumptions
 - Assumes only 2 groups: core & periphery
 - Assumes population growth rates of two ethnies are the same (growth of either group only through switching allegiance)
 - Assumes peripheral ethnics switch ethnicity and go to core with a constant probability per unit of time.
 - Good historical applications: religious conversion & ethnic assimilation
 - Equation = page 96 → asymptotic growth, first linear – then asymptotic as equilibrium is approached
 - Turchin commentary: this approach is flawed. Assumes as sociologically implausible scenario. (page 96): “Societies are not composed of atomized individuals; instead, each individual is embedded within a social network (or multiple networks) of other individuals... ‘The basis for successful conversionist movements is growth through social networks. Through a structure of direct and intimate interpersonal attachments’ (Stark 1996)”
- **Autocatalytic Model**
 - Network based assimilation/conversion process – space is implicit
 - Based on autocatalytic reaction in chemical kinetics → presence of a compound increases the rate at which it is created. Hence, the name.
 - Assumptions
 - Assumes that the probability of conversion is proportional to the numbers already converted.
 - Assumes ethnic switching in both directions
 - Equation (page 97) – logistic equation. Has two rate parameters p_0 and p_1 ...but only need to know one parameter – the difference btwn the two relative rates = r
- **Threshold Model**
 - Nonlinear
 - Introduction of new parameter C_0 – threshold proportion. When $C > C_0$, the rate of switching to the core identity is positive, because core ethnie has achieved critical mass. When $C < C_0$, the rate of switching is negative.
 - Equation (page 98) → Metastable Dynamics: three equilibria → two stable & one unstable.
 - Outcome of assimilation process entirely dependent on the initial condition.
 - Application: when small groups conquer much larger ethnically different population.
 - Problematic aspect: dynamics determined by whether the global frequency is above or below the threshold, yet it is more plausible to assume that in individual probability of switching identity should be affected by the local composition of society. (same with autocatalytic)

- **Differences between noninteractive & autocatalytic model**
 - Biggest difference: In autocatalytic model → when C (change/switching) is at low levels, it will grow at an accelerating rate (more people have converted or assimilated, the more probable it is that a particular individual will switch identity).
 - Equilibrium that C approaches in the autocatalytic model is 1 (assuming $r > 0$), whereas in the noninteractive model equilibrium can be substantially less than 1
 - NOTE: In both models, relationship between p and C was linear.

Spatially Explicit Models

▪ **Defining Social Space**

- Distance between individuals is measured by the frequency and intensity of their social interactions.
 - Vertical: the position in the social hierarchy
 - Horizontal: rises as a result of patterning in day-to-day activities such as working, raising children, etc.
- Characteristics
 - Anisotropic – downward interaction may be stronger than upward interaction
 - Higher ranked persons tend to belong to wider-scale social networks
 - Geographic features (mountains) tend to attenuate social distance.
 - Contact distribution – from epidemiology -- defined as the probability of disease passing from one individual to another as a function of distance separating them.

▪ **The Autocatalytic Model in Space (page 100)**

- To make model spatially explicit – first redefine frequency of individuals with the core identity C(t) into a spatially varying variable C(x,y,z, and t). x, y = physical space coordinates and z = position in hierarchy; t = time.
- Second – define contact distribution → V(s) = intensity of social contacts btwn two individuals separated by social distance s.
- Assumptions
 - Contact distribution does not vary with space, rank or time.
 - Probability of individual switching identity is a function of the identities of other individuals in the social vicinity weighted by their social distance to the focal individual.
- Note: Graph page 100 → contact distribution should not end abruptly, but there must be some “tail” extending quite far for a few individuals → the thin-tailed case when the tail of the contact distribution declines exponentially or faster with social distance, and the thick-tailed case when the tail declines more slowly.
 - Having a tail implies that the focal individual makes a decision about conversion not only based on what others in the immediate social vicinity do, but also takes into account what the society at large does. → Influence of socially distant individuals is much less than the influence of the close circle of friends and relatives.
 - If the probability of switching identity is directly proportional to the weighted average of identities held by others (weights are given by the contact distribution) → reaction-diffusion model = local source/sink term is logistic & simple diffusion model

▪ **Threshold Model in Space (linear)**

- Behaves differently from autocatalytic model. → How?
 - Initial local proportion of converts must exceed the threshold; otherwise the cult will die out.
 - Size of area initially occupied by the cult must exceed a certain threshold
 - Otherwise, “diffusive losses” across boundary overwhelm conversion rate and it will fail.
 - Most important: threshold model can exhibit only linearly advancing front, no matter what the shape of the contact distribution.
 - Because any converts that get out too far in advance of the main front suffer from the threshold effect: they are locally swamped by nonbelievers.
- In well-connected space coexistence of two identities is impossible. (front goes in one direction or the other)

Comparing all 3 models

- Fastest spread – thick-tails (page 103). Process of conversion begins to grow at an accelerating rate in the locality of the initial group of converts. Before this process can reach the phase where it is locally saturated, the conversion process jumps to several other locations. Rather explosive.
- Characterized by threshold? Then shape of contact distribution does not matter. If all assumptions are satisfied (initial mass of converts, not too high a threshold, and not too great losses of converts by diffusion), then spatial front advances linearly – slower than autocatalytic because in order for the front to advance, numbers of converts at boundary must build up past the threshold.
- **MAIN SUMMARY:**
 - Threshold: Front is “pushed” by high numbers of converts behind it
 - Autocatalytic: Front is “pulled” by interactions of low numbers of converts with the unconverted populations ahead of it.
 - While we should examine trajectories, we should also plot them...which allows closer approach