

14.75 Recitation 5: Nunn (2022) “On the Dynamics of Human Behavior: The Past, Present, and Future of Culture, Conflict, and Cooperation”

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A model of tradition

- Two possible actions: a and b .
- Two possible states of the world: A and B .
 - a is the correct action for A .
 - b is the correct action for B .
- Payoffs:
 - If you pick the right action, you get β .
 - If you pick the wrong action, you get $-\beta$.
- Probability that the world sustains a shock: Δ .
 - If there's a shock, flip a coin to decide new state of the world.
- Two types of people: traditionalists (T) and non-traditionalists (NT).
 - T s pick a random person from the previous generation and copy their action.
 - NT s pay κ to learn the correct action to play.

The emergence of tradition

- How much do NT s get each turn?

$$\Pi^{NT} = \beta - \kappa$$

- How much do T s get? Depends how many of them there are.
- Define x as the fraction of society that is T .
- Assume $x = 0$ until, due to a random mutation, a T is born.
- The T will copy an NT , all of whom are correct — unless there's a shock!

$$\begin{aligned} E[\Pi^T] &= \beta \Pr(\text{no shock}) + \beta \Pr(\text{good shock}) - \beta \Pr(\text{bad shock}) \\ &= \beta(1 - \Delta) + \beta(0.5\Delta) - \beta(0.5\Delta) \\ &= \beta(1 - \Delta) \end{aligned}$$

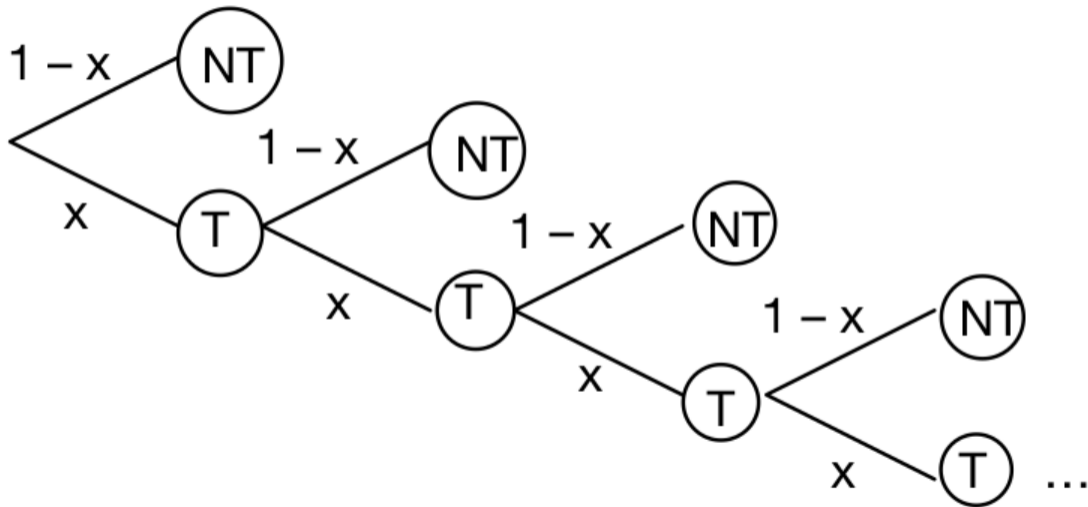
When is it smart to be a traditionalist?

- When the payoff from being T is higher than being NT .
- Continue to assume $x = 0$.

$$\begin{aligned}E[\Pi^T] &> E[\Pi^{NT}] \\ \beta(1 - \Delta) &> \beta - \kappa \\ \beta - \beta\Delta &> \beta - \kappa \\ \kappa &> \beta\Delta \\ \frac{\kappa}{\beta} &> \Delta\end{aligned}$$

- For intuition, set $\beta = 1$.
- If the cost of “research” relative to the benefit from being “correct” is greater than the risk of the world changing, then it is optimal for society to have at least some traditionalists.

If $x > 0$, whom does a traditionalist copy?



Calculating expected payoff for T when $x > 0$.

- With probability $(1 - x)$ they get to copy an NT , then same as $x = 0$.

$$E[\Pi^T] = \beta(1 - \Delta)(1 - x) + \dots$$

- With probability x they copy a T who, with probability $(1 - x)$, copied an NT . But now there have been two chances for a shock!

$$E[\Pi^T] = \beta(1 - \Delta)(1 - x) + \beta(1 - \Delta)^2x(1 - x) + \dots$$

- With probability $x(x(1 - x))$ they copy a T who copied a T who copied an NT .

$$\begin{aligned} E[\Pi^T] &= \beta(1 - \Delta)(1 - x) + \beta(1 - \Delta)^2x(1 - x) + \beta(1 - \Delta)^3x^2(1 - x) + \dots \\ &= \beta \sum_{t=1}^{\infty} (1 - \Delta)^t x^{t-1} (1 - x) \\ &= \frac{\beta(1 - x)(1 - \Delta)}{1 - x(1 - \Delta)} \end{aligned}$$

The limits of tradition.

- If everybody is a traditionalist, then $x = 1$.

$$E[\Pi^T] = \frac{\beta(1-x)(1-\Delta)}{1-x(1-\Delta)} = \frac{\beta(1-1)(1-\Delta)}{1-1(1-\Delta)} = \frac{0}{1+\Delta} = 0$$

- Then traditionalists copy people who don't know anything for certain.
- Results in essentially random selection of actions.

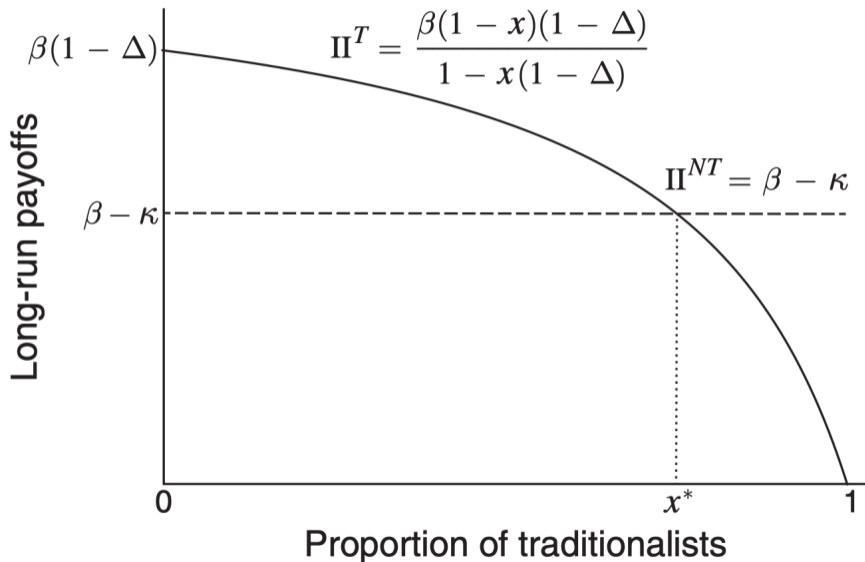
What is the optimal number of traditionalists?

- Assume the world starts at $x = 0$, but then, due to a random mutation, a T is born.
- Assume natural selection: those with higher payoff have competitive advantage. If there is only one T , then the T has higher payoff, so x increases as more and more T s are born.
- Then what? Eventually, we reach equilibrium x^* such that

$$\begin{aligned}\Pi^T &= \Pi^{NT} \\ \frac{\beta(1-x)(1-\Delta)}{1-x(1-\Delta)} &= \beta - \kappa\end{aligned}$$

- It turns out that solving for x gives you $x^* = \frac{\kappa - \Delta\beta}{\kappa(1-\Delta)}$
- The point is that society reaches a steady state.

Figure 1: Equilibrium



Why does tradition work?

- To question the wisdom of the previous generation eliminates benefits of tradition.
 - Traditionalists benefit by setting $\kappa = 0$.
 - To “do one’s own research” would require $\kappa > 0$.
 - Why reinvent the wheel?
- Traditionalists need not know the reason for the tradition: simply follow tradition because it has been good for society.
- No point in arguing: traditional beliefs are not founded in logic.
- This may result in motivated beliefs, confirmation bias, other cognitive biases.

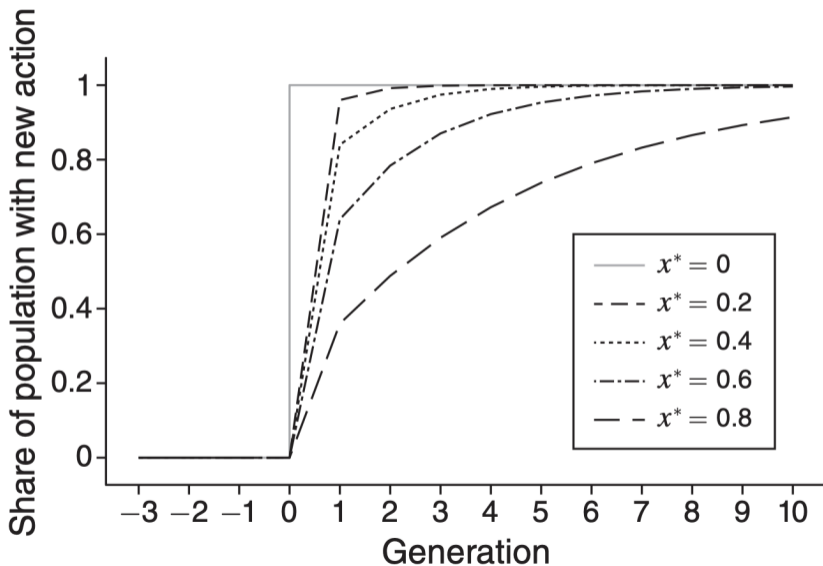
Fun examples of benefits of tradition

- Boiling corn in ash or limestone to make dough in Latin America prevents pellagra (Katz, Hediger, and Valleroy 1974).
- Spices are antimicrobial (Billing and Sherman 1998).
- Belief in high god (e.g., Abrahamic religions) increases cooperation, social cohesion (Norenzayan 2013).
- First Nations peoples in Canada burn bones, examine resulting cracks to decide where to hunt, leads to optimal hunting strategy: random, which people are naturally bad at (Bar-Hillel and Wagenaar 1991).
- Use of rituals reduces anxiety, improves performance (Brooks et al. 2016). Belief in rituals and magic useful for difficult and dangerous deep-sea fishing in Melanesia (Malinowski 1948).

Other consequences of the model

- A more frequently changing world means fewer traditionalists: $\uparrow \Delta$, $\downarrow x$.
- The more costly research means more traditionalists: $\uparrow \kappa$, $\uparrow x$.
- The more traditionalists, the longer it takes for society to adjust to a bad shock.
 - I.e., **persistence** (events from the past influence beliefs today) and therefore **mismatch** (persistent beliefs that are inappropriate for today's world).

Figure 2: How long does it take for society to adjust to a bad shock?



Examples of mismatch

- Hatched sea turtles follow bright light: moon reflected off water... or a street light (Salmon et al. 1995).
- Indian migrants consume less calories because their food preferences don't match what's cheapest in their new home (Atkin 2016).
- United States used to have extremely high social mobility (The American Dream). No longer true, but people still believe it (Alesina, Teso, Stancheva 2018).
- Medicine used to be dangerous. No longer true, but many mistrust it:
 - French colonial campaigns in DRC (Lowe and Montero 2021);
 - Leper colonies in Colombia (Ramos-Toro 2019);
 - Syphilis study in Tuskegee, AL (Alsan and Wanamaker 2018);
 - CIA's fake vaccine in Pakistan to catch bin Laden (Martinez-Bravo and Stegmann 2022).

Mismatch causes disagreement.

- Variation in traditions is greater across societies than within (Desmet et al. 2017).
- Disagreement about gun rights in US could be driven by mismatch.
 - In the past, gun ownership may have increased safety: surviving life on lawless frontier or enforcing slavery and Jim Crow (Buttrick and Mazen 2021).
 - Today, gun ownership decreases safety (Angelmyer et al. 2014).
- Racism also could be driven by mismatch.
 - Racist beliefs necessary to justify slavery, and those beliefs persist (Acharya et al. 2016), under assumption that the world is zero-sum (McGhee 2021).
 - Post-industrialism, world is not zero-sum; racism reduces innovation (Cook 2014).
 - Almost half of per-capita GDP growth in the US from 1960–2010 came from reallocation of female and black talent into the labor market (Hsieh et al. 2019).

Policy to eliminate mismatch could make a big difference.

- Carlana et al. 2022: Kids of immigrants to Italy underestimate quality (and, therefore, returns to) education — but only for boys.
 - Tutors and career counseling corrected beliefs for boys.
 - Had no effect for girls — didn't cause overcorrection.
- Bursztyn et al. (2020): Men in Saudi Arabia overestimate how much other men disapprove of wives working outside of the home.
 - Informing men of beliefs of peers caused increase in their wives applying for jobs.
 - Biggest effect on those whose beliefs were most wrong.
- Heller et al. (2017): In Chicago, “culture of honor” necessary for young men.
 - Aggression, guns, etc., mismatched for school environment.
 - Intervention didn't try to eliminate culture, just learn how to apply it to the right situations.

Policy to eliminate mismatch could also backfire.

- Lansing 2007: Rice farmers in Bali follow Hindu-based beliefs.
 - Timing of farming coordinated around religious calendar — one harvest per year, allowing land to flood during fallow.
 - Post-Green Revolution, Asian Development Bank mandated using new rice varieties, broke coordination, no more flooding.
 - Insects destroyed crops — normally are killed by coordinated flooding.
- McGuirk and Nunn (2021): transhumant pastoralists (nomadic people who raise livestock, rotating pastures by seasons) are seen as “backwards.”
 - E.g., Jakaya Kikwete, president of Tanzania (2005): “Our people must change from being nomadic cattle herders to being modern livestock keepers. We are producing little milk, export very little beef, and our livestock keepers roam throughout the country with their animals in search for grazing grounds. We have to do away with archaic ways of livestock farming.” Nigeria has banned it, and other countries are planning on doing the same.
 - But it may be better for the environment: move to where fertile land is available at the moment, letting worse-off fields recover, leaving manure.
 - Turkana in Kenya struggle after switching to standard farming (Campbell et al. 1999)

Anybody see a contradiction here?



Shouldn't everyone just be a nontraditionalist?

- $E[\Pi^T] = E[\Pi^{NT}]$, but no risk of mismatch for NT . Seems stupid to be a T .
- But everybody relies on tradition!
- Example: COVID-19. Easy to say “trust the science.” But you didn't do the research! You trust it on blind faith. To truly be an NT , you would have to...
 - Run the study yourself.
 - Built the machines to run the study.
 - Discover the very existence of viruses.
 - Invent science itself.
 - Keep the discoveries to yourself, since you have no way of learning language.
- A significant part of what makes humanity special — and successful — is culture i.e., a set of traditions. Without it, we would have to start from scratch, rendering us but wimpy, hairless, stupid chimpanzees.
- Question is not whether to follow tradition; rather, which traditions to follow.

I am WEIRDer than I like to think.

- **Western, Educated, Individualistic, Rich, Democratic.**
- WEIRD traits have been the most successful (in material wellbeing) since the 1500s.
- May be worse suited to tackle future challenges.
 - Climate change requires thinking about future generations — not *rugged individualism*.
 - Preventing war and pandemics requires working with other countries — not competing against them.
- Nigerian Chief Elesi of Odogbolu to the West African Lands Committee in 1917: “I conceive that land belongs to a vast family of which many are dead, few are living and countless others unborn.”