

The Evolution of Egalitarian Sociolinguistic Conventions[†]

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Half a century ago, two works laid the foundation for modern sociolinguistics. Lewis (1969) studied a speech community using a system of symbols and grammatical rules and coordinating on the mapping from symbols to states of the world in order to communicate effectively. Economists and others built on Lewis' work to erect the modern theory of conventions, their persistence and occasional transformations (Young 1998). Subsequent research has shown that languages that are likely to emerge and persist in an evolutionary dynamic are informationally efficient under the constraints imposed by human cognitive and sensory systems.

At about the same time, Brown and Gilman (1960, p. 253) published their "Pronouns of Power and Solidarity" exploring the fact that "a man's consistent pronoun style gives away his class status" and that this "power semantic" had been the norm in many Indo-European languages for at least half a millennium despite recurrent contestation by egalitarian language innovators.

We focus in this paper on what Brown and Gilman (1960) called the T-V distinctions (e.g., the familiar "Tu" versus the formal "Vous" in French), the semantics of which typically involve an ambiguity in that the V pronoun may denote superordinate status as well as plurality (Tabellini 2008). The T-V status markers are far from unique as linguistic features of group

interests and identity. Labov (2011) and other sociolinguists have established, for example, that class-based accents are pervasive. Linguistic markers of unequal status with respect to race and gender are also common.

Here we use recently developed models of conventions to study the evolution of the nonreciprocal power semantic studied by Brown and Gilman (1960). Our objective is to provide a framework that is consistent both with the long term persistence of the T-V distinction (despite the ambiguity intrinsic to the dual use of the V pronoun for status and plurality) and with its recent displacement in many languages by an egalitarian pronoun convention. To do this we consider a population composed of two classes in which communication of relative status imposes subjective costs on the subordinate class and also may serve as a socially valuable coordination device.

As a benchmark, we specify conditions in this coordination game environment under which evolutionarily successful languages are unambiguous and egalitarian, eschewing pronominal markers of status. But we also show that if, as is often the case, the subordinate population is large relative to the elite and linguistic innovations are intentional (rather than mutation-like accidents) then ambiguous and unequal conventions are likely to emerge and persist over a long period, consistent with the history of the T-V conventions.

I. Intentional Linguistic Changes

Changes in T-V distinctions of status when used as a singular pronoun are an example of bottom-up intentional linguistic changes toward egalitarian linguistic conventions. The honorific (nonreciprocal) usage where superiors are addressed by "V" and subordinates by "T" has been in decline (Kachru and Smith 2008). We focus on political transitions, where changes in payoffs to the communication of status may have made transitions between linguistic conventions more likely.

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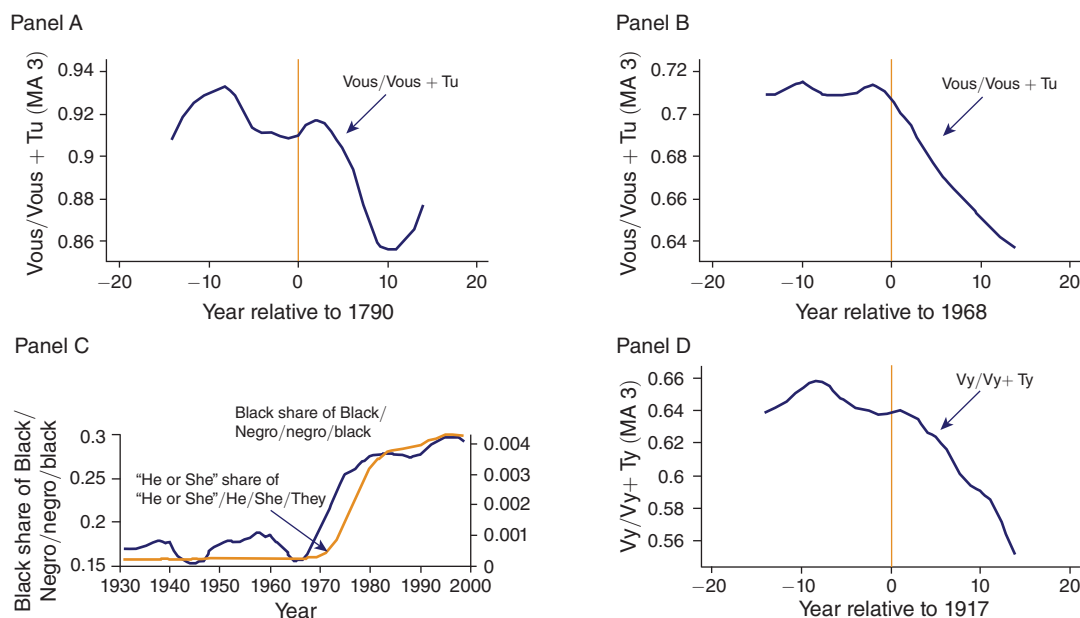


FIGURE 1

Notes: Clockwise from top left 15-year windows around political events: Vous/(Tu + Vous) relative frequency in the 2012 French Google N-grams corpus around 1968 and 1790. Russian Vy/(Vy + Ty) around 1917. All are 3-year moving averages. Transitions in group titles: relative increase in fraction black and three-word phrases that are “he or she” following the 1960s.

A good example is French, as shown in Figure 1, which plots the relative frequency of “Vous” to “Tu” (case-insensitive) in the Google N-grams database. While this is naturally noisy and imperfect data,¹ it shows a relative increase in the “Tu” form around the French Revolution. While we cannot distinguish between formal and informal symmetric (versus asymmetric) use, this is consistent with revolutionary norms of egalitarianism that prevailed during the Revolution.

The revolutionary Committee for the Public Safety denounced “vous” as a feudal anachronism; Robespierre *tu’d* the Assembly’s President. Anderson (2007) writes

the idea of using tu in all circumstances was first proposed in an article in the Mercure National on December 14, 1790 ... No laws were passed registering

the mandatory use of tu but...[it]...began to spread. Now the baker’s apprentice could address his master and clients in a familiar form, a practice that had been strictly forbidden.

The N-gram data in the figure also show a sharp change following the student movements of 1968, with activists again deliberately using “Tu” to address superiors.

The Russian revolution provides another example as can be seen in the Russian corpus in Figure 1. A demand of revolutionary workers during the Lena strike of 1912 was to be addressed in the polite mode (Stites 1988). The use of the honorific within the Soviet army was abolished in 1917. During and after the revolution, Russian intellectuals and activists intentionally began using the informal mode of address universally. These challenges to the convention diffused into a larger linguistic change (Corbett 1976).

Deliberate bottom-up challenges to status quo conventions also typically fail. The seventeenth century Society of Friends (Quakers) founded in the mid 17th century by George Fox who

¹The frequencies are calculated from the universe of books digitized by Google, see Michel et al. (2011) and discussion in the online Appendix.

raised the banner of Plain Speech, according to which the informal “Thou” or “Thee” was prescribed for all social interactions rather than the asymmetric formal “You” or reverential “Ye” (innovations introduced by nobility after the Norman invasion). Fox wrote: “...when the Lord sent me forth into the world, He forbade me to put off my hat to any, high or low: and I was required to Thee and Thou all men and women without any respect to rich or poor, great or small” (quoted in Brown and Gilman 1960, p. 269). But little came of it, and the informal pronouns eventually were all but abandoned, while “you” lost its status connotations. Yet, these egalitarian challenges also sometimes succeed, as shown in the changing race and gender terms in Figure 1, which we discuss more fully in the online Appendix.

II. An Evolutionary Linguistic Model

Our model is a contribution to an evolutionary sociolinguistics that draws on both our previous work on intentional evolutionary equilibrium selection and a rich literature in evolutionary linguistics, which we cite more fully in the online Appendix. Like Lewis, we represent a language as a convention, that is, a mutual best response of speakers who may adopt differing languages. By the evolutionary success of a language convention we mean roughly the likelihood over a very long period of time that a population will coordinate on that particular convention when speakers typically best respond by conforming to the status quo convention but occasionally innovate, responding idiosyncratically and deviating from the convention.²

We model language evolution as a decentralized process in which the common-language coordination outcome may occur as an unintended emergent property of uncoordinated interactions, not a result mandated by some central authority. But while linguistic outcomes are unintended, language behaviors—conformity or resistance to a convention—are deliberate. When individuals deviate from the prevailing

convention, they do so, not in error, but intentionally, adopting an alternative convention in which they would be better off, were the rest of their class to do the same.

We build on the model of language of Nowak, Plotkin, and Krakauer (1999), extending it in a number of ways. We incorporate two populations, A and B , where both population sizes N_A and N_B are large and $N_A = \eta N_B$, where η is the relative group size of A . We assume that the payoffs are asymmetric so as to capture a “battle of the sexes” logic: a common language convention is preferred by both populations, but they differ on which convention they prefer.

Members of the A population are randomly paired with B s and may, with equal probability, be a sender or a receiver. A language strategy is a probability matrix mapping objects to symbols (the sending matrix). For example, a sender who utters “letter” could with some probability intend “one of the items making up the alphabet” and with the complementary probability “a written message.” The transpose of the sender matrix is the “receiver” matrix that decodes symbols back into objects.

Communication is successful if the object signaled by the sender is decoded correctly by the receiver. Since the receiver matrix is the transpose of the sending matrix, communication occurs with highest probability when both agents are coordinating on the same language. Unsuccessful communication results in a payoff of 0.

We divide the space of objects to be communicated into “Regular” (R) and “Status-relevant” (S). Agents get a payoff of 1 from successfully communicating the R objects. When communicating about the Status relevant objects there is some total payoff to successfully communicating status differences. For example, passage through a doorway may be coordinated by the norm that the higher status person goes first, and the benefits of observing this norm (avoiding collisions or endless deferring to the other) may be communicated by some aspect of the language on which the two coordinate, such as the T-V distinction.

We denote this total benefit by ρ , and we imagine systems of economic and social interaction in which this might be a considerable magnitude. For example, if costly conflicts are sometimes avoided by the mutual recognition of status differences, as with the rule that a subordinate must cede to a dominant (observed in many primates), then ρ would be substantial.

²More technically an evolutionarily successful language is stochastically stable. A Nash equilibrium (for example a language convention) is *stochastically stable* if the resulting ergodic distribution of strategies in the population puts positive mass on that equilibrium as the rate of idiosyncratic play goes to zero.

greater where those who are disadvantaged by the current nonreciprocal power semantic are aware of their inferior status and are willing even at a cost to themselves to challenge it by deviating from its asymmetric pronoun use.

Besides varying the degree of intentionality ι , we allow for unequal population sizes parameterized by η above. As in Hwang, Naidu, and Bowles (2017), these modifications allow stochastic evolutionary game theory to be used to model equilibrium selection in environments where there are conflicts of interest between groups that differ in size, payoffs, and level of internal organization and mobilization.

Some of our results are unsurprising. Across parameter values, the unequal language will be relatively more persistent, the more valuable is the communication of status differences (the greater is ρ) and the lesser the ambiguity in accomplishing this (the greater is x). We also find that when innovation is intentional a population that has a higher rate of idiosyncratic play or is smaller in size will be favored and will spend more time speaking the convention they prefer. This unsurprising result appears consistent with recent changes in gender and racial language, especially in light of the fact (see the online Appendix) that in these cases media and government played important roles in amplifying the influence of a few innovators.

Other results are more counterintuitive. When idiosyncratic play is sufficiently intentional, the dynamic we have modeled, like that in Young (1998) favors languages that are egalitarian: an unequal language (that is P^u with a small θ) with a higher ρ may be less persistent than a more equal variant of P^u with higher θ .

The intuition behind this result (shown formally in the online Appendix) is that it takes more idiosyncratic play to dislodge the more equal of the two language conventions (P^e), the more unequal is the alternative convention P^u . Suppose a population is using the language without status distinctions (P^e) and that were a transition to the unequal convention to occur, the subordinate group in the population would receive virtually none of the benefits from the communication of status (low θ). Then it would take almost all of the privileged group to play idiosyncratically to make adopting the unequal language a best response for the subordinate group, which would be an extraordinarily rare event. Thus the more unequal is P^u , the

more time will the population spend at the P^e convention.

Yet this case may not pertain to historically relevant environments. When linguistic innovations are intentional (ι large) and there is a relatively large subordinate class (η large), idiosyncratic play can stabilize a convention that is both unequal (θ small) and maximally ambiguous (x close to $\frac{1}{2}$) even where communicating status differences is of little value (ρ small).

The intuition behind this is that transitions are induced by unlikely realizations of the stochastic process generating innovations in which a large fraction of a given population does not best respond. These extreme realizations are more likely in small populations for the same reason that the variance around a sample mean is greater, the smaller is the sample.

This makes it more likely that it is the members of a small population whose innovations will induce a transition. Now if people innovate intentionally their idiosyncratic play induces transitions only in a direction from which they benefit. Under these conditions a small group is advantaged: when deliberately innovating it can easily destabilize an unfavorable status quo convention.

Thus, if the subordinate group is large or less likely to challenge an unfavorable status quo, then evolutionarily successful linguistic conventions—including the nonreciprocal power semantic studied here—need not excel in clarity of communication, as the long persistence of the asymmetrical use of T-V pronouns suggests.⁴

REFERENCES

- Anderson, James M. 2007. *Daily Life during the French Revolution*. Westport, CT: Greenwood Press.
- Brown, Roger, and Albert Gilman. 1960. "The Pronouns of Power and Solidarity." In *Style in Language*, edited by T. A. Sebeok, 253–76. Cambridge, MA: MIT Press.

⁴In Hwang, Naidu, and Bowles (2017) we show how these results extend to games played on arbitrary networks. We provide conditions on the topology of arbitrary networks that can make P^u the more persistent, because a small well-connected set of elite B s can induce a large set of best responding subordinate to change their language with only a few idiosyncratic innovations.

- Corbett, Greville G.** 1976. "Address in Russian." *Journal of Russian Studies* 31: 3–15.
- Hwang, Sung-Ha, Suresh Naidu, and Samuel Bowles.** 2016. "Social Conflict and the Evolution of Unequal Conventions." http://tuvalu.santafe.edu/~snaidu/papers/class_dyn_forcirculation.pdf (accessed February 26, 2017).
- Kachru, Yamuna, and Larry E. Smith.** 2008. *Cultures, Contexts, and World Englishes*. London: Routledge.
- Labov, William, ed.** 2011. *Principles of Linguistic Change, Cognitive and Cultural Factors*. Vol. 3. Hoboken: Wiley.
- Lewis, David.** 1969. *Convention: A Philosophical Study*. Cambridge, MA: Harvard University Press.
- Michel, Jean-Baptiste, Yuan Kui Shen, Aviva Presser Aiden, Adrian Veres, Matthew K. Gray, The Google Books Team, Joseph P. Pickett, et al.** 2011. "Quantitative Analysis of Culture Using Millions of Digitized Books." *Science* 331 (6014): 176–82.
- Nowak, Martin A., Joshua B. Plotkin, and David C. Krakauer.** 1999. "The Evolutionary Language Game." *Journal of Theoretical Biology* 200 (2): 147–62.
- Stites, Richard.** 1988. *Revolutionary Dreams: Utopian Vision and Experimental Life in the Russian Revolution*. Oxford: Oxford University Press.
- Tabellini, Guido.** 2008. "Institutions and Culture: Presidential Address." *Journal of the European Economic Association* 6 (2–3): 255–94.
- Young, H. Peyton.** 1998. *Individual Strategy and Social Structure: An Evolutionary Theory of Institutions*. Princeton: Princeton University Press.

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