

Can computer models help us understand language vitality in multilingual ecologies?

A view from the Upper Rio Negro, Amazonia

Evani Viotti - University of São Paulo  
Danilo P. Ramos - Federal University of Bahia

These first two decades of the 21<sup>st</sup> century have witnessed the coming to light of a new trend in linguistic research, which takes the phylogenetically and ontogenetically emergence of language, linguistic variation, language change, and language loss as interrelated phenomena, constituting what should be characterized as a complex, adaptive, and self-organizing system (Baicchi 2015; Beckner et al. 2009; Keller 1994; Kockelman 2009; Kretzchmar Jr. 2009, 2015; Lee et al. 2009; Massip-Bonet et al. 2013; McCleary 1996; Mufwene 2008, 2013; Mufwene et al. 2017; Viotti 2013). Interdisciplinary in nature, this approach integrates results and methods coming from different areas of research, such as biology, cognitive sciences, sociology, anthropology, history, and computer sciences. The objective of this presentation is to discuss the results of a recently proposed complexity-based computer model for language choice in a multilingual society (Loureiro-Porto et al., 2017) in light of the dynamics of language practice in Northwestern Amazonia, a region known to be one of the richest multilingual ecologies in Latin America, in which various indigenous peoples belonging to different ethnic groups and speaking languages belonging to different families interact with each other, and also with non-indigenous speakers of Portuguese or Spanish. In their modeling, Loureiro-Porto et al. examine the interplay of the following factors, which they claim are relevant to explain the survival or the loss of a certain language in a multilingual ecology: the role of bilingual speakers; the prestige of one language in detriment of another; the willingness of speakers to shift languages (volatility); and the topological structure of the social network (from random to fully connected networks). They conclude that bilinguals play a central role in language competition: they may accelerate language death in small-world networks, and prevent it in the larger ones, organized in groups more connected to one another than with other nodes in the network. Their findings question the relevance of prestige as a factor that, alone, might be responsible for the survival of a language;

volatility of speakers seems to be more decisive: low volatility slows down the loss of less prestigious languages. And finally the topological structure of the social network is crucial for language competition: the number and frequency of interactions among speakers in different types of networks may determine which language survives and which dies. These findings will be cross-checked against our observation of the social networks in the Upper Rio Negro, especially those which involve the interactions between the Hupd'äh and the Tukanoans, and between them and speakers of Portuguese. Notwithstanding the pertinence of the results obtained by Loureiro-Porto et al., we will show that computer modeling is still far from capturing the complexity of the life-world, in which socio-historical and cultural variables co-exist and conspire with cognitive-affective variables amidst economic and political pressures, impacting language vitality in fundamental ways.