

Measures of education and participation in regional sound change

Amount of education is recognized as a major component of socioeconomic status, and socioeconomic status as an important predictor of individual speakers' participation in ongoing sound changes. Sociolinguists have deployed several different operationalizations of the education construct. For example, Labov et al. (2013) observe a gradual retreat from Philadelphia's stereotyped tense short-*a* system to a nasal system, as well as incipient merger-by-approximation of LOT and THOUGHT. They report that these changes are led by speakers with at least some college education. As Figure 1 shows, however, there is no strong discontinuity separating those who have, and have not, completed at least some college. Specifically, *the more years of college a speaker has completed, the more likely they are to favor the incoming variants*, a fact not accounted for by this binary split. Other studies (e.g., Conn 2005, Labov 2001) have used years of education as a predictor of sound change. However, Prichard and Tamminga (2012) and Wagner (2012) identify a difference between speakers who attend community, regional, and national colleges, with speakers at national colleges being the most advanced despite the fact that these speakers have comparable years of education. In this study we compare years of education and the four-level "education index" developed by Prichard and Tamminga as predictors of participation in regional sound change.

Materials: We perform automated phonetic analysis of 189 speakers from the Philadelphia Neighborhood Corpus (Labov et al. 2013), focusing on short-*a* tensing and LOT-THOUGHT approximation.

Methods: For each speaker and each of the vowel contrasts, we compute a multivariate analysis of variance (MANOVA) on F1 and F2 (in Mel frequency space), with etymological class (in Philadelphia) as a fixed effect. Pillai score is used as a per-speaker, per-vowel measure of contrast contrast (e.g., Hay et al. 2006). To control for date of birth, we then analyze the residuals of a local regression on Pillai score (LOESS; Cleveland and Devlin 1988), with the smoothing parameter chosen to minimize AIC_c (Hurvich et al. 1998).

Results: For both variables, model selection based on the log-likelihood ratio test favors education index over years of education, and the former shows stronger non-parametric correlations with sound change than the latter. These results also hold if analyses are restricted to only those speakers who attended some college.

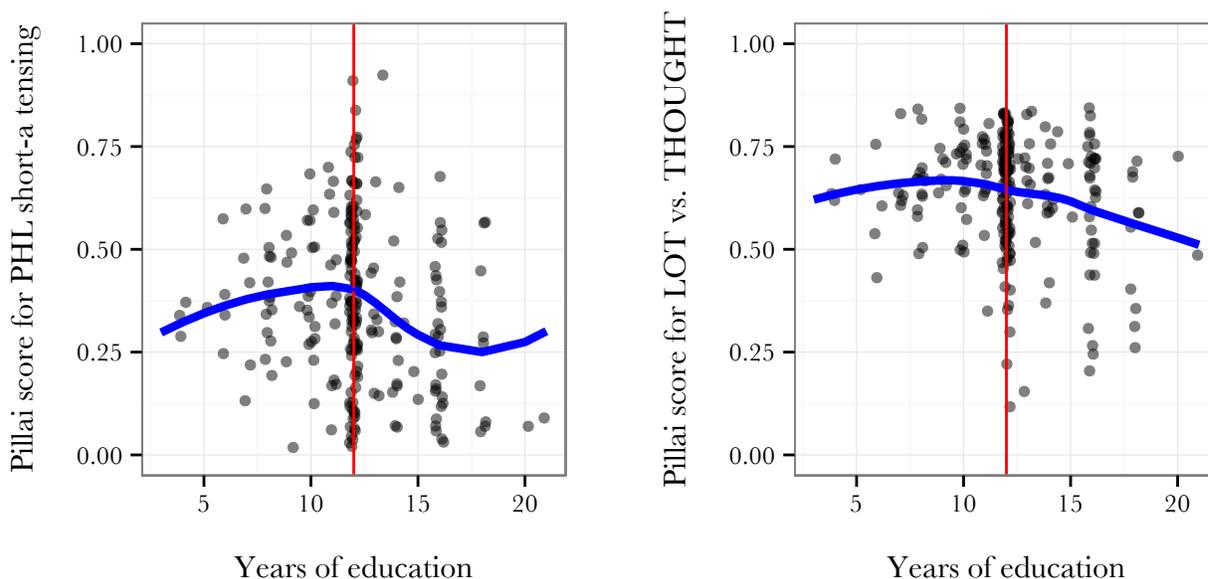


Figure 1: Pillai score by years of education, with a LOESS curve. Each point represents a speaker. The red line separates non-college-educated and college-educated speakers. A Pillai score of 0 indicates no contrast and a score of 1 indicates complete contrast. Scores have been adjusted to control for date of birth.

References

- Cleveland, William S., and Susan J. Devlin. 1988. Locally weighted regression: An approach to regression analysis by local fitting. *Journal of the American Statistical Association* 83:596–610.
- Conn, Jeffrey. 2005. Of moice and men: The evolution of a male-led sound change. Doctoral dissertation, University of Pennsylvania.
- Hay, Jennifer, Paul Warren, and Katie Drager. 2006. Factors influencing speech perception in the context of a merger-in-progress. *Journal of Phonetics* 34:458–484.
- Hurvich, Clifford M., Jeffrey S. Simonoff, and Chih-Ling Tsai. 1998. Smoothing parameter selection in nonparametric regression using an improved Akaike information criterion. *Journal of the Royal Statistical Society, Series B* 60:271–293.
- Labov, W., I. Rosenfelder, and J. Fruehwald. 2013. One hundred years of sound change in Philadelphia: Linear incrementation, reversal and re-analysis. *Language* 89:30–65.
- Labov, William. 2001. *Principles of linguistic change: Social factors*. Malden, MA: Wiley-Blackwell.
- Prichard, H., and M. Tamminga. 2012. The impact of higher education on local phonology. *Penn Working Papers in Linguistics* 18.2:87–95.
- Wagner, Suzanne Evans. 2012. Real-time evidence for age grad(ing) in late adolescence. *Language Variation and Change* 24:179–202.