Weakening Resistance:
Progress Toward the Low Back Merger in New York State

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Low back merger (***cot-caught* merger**): low back vowel phonemes /o/ as in *lot*, *cot* and /oh/ as in *thought*, *caught* undergoing widespread merger across United States.

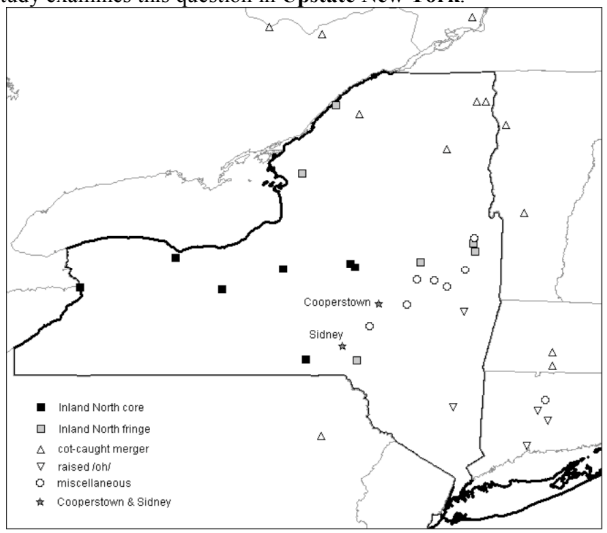
ANAE (Labov et al. 2006) claims regions of "**stable resistance** to the merger", including:

- **Inland North**, subject to Northern Cities Shift (NCS): /o/ fronted away from /oh/
- **Northeast coast**, including New York City: /oh/ raised away from /o/

Herzog's Principle (Labov 1994): "Mergers expand at the expense of distinctions."

Question: **Is "stable resistance to merger" consistent with Herzog's principle?**

This study examines this question in **Upstate New York**:



Map: New York and environs, indicating towns in this study. See Appendix for details.

Results, whole data set (n = 146):

Cartesian F1/F2 distance between /o/~/oh/ diminishing in apparent time (slope –2.13 Hz/year, $r^2 \approx 12\%$, $p < .0001$)

/oh/ slightly lowering in apparent time (slope .53 Hz/year, $r^2 \approx 4\%$, $p < .02$)

/o/ backing in apparent time (slope –1.88 Hz/year, $r^2 \approx 15\%$, $p < 10^{-5}$)

Divide communities in data set into **subsets**:

- **Inland North core**: (nearly) all speakers in data show NCS[1]
  Binghamton, Buffalo, Geneva, Rochester, Syracuse, Utica and Yorkville
- **Inland North fringe** (Dinkin 2008): some but not most speakers in data show NCS
  Glens Falls, Gloversville, Ogdensburg, South Glens Falls, Walton, Watertown
- Communities where ***cot-caught merger*** is complete or in progress
  complete: Arnprior, Burlington, Montreal, Ottawa, Rutland
  in progress: Canton, L. Placid, Morrisonville, Plattsburgh, Scranton, Springfield, S. Hadley
- Communities with **raised /oh/**: average of speaker means has F1 < 700 Hz
  Albany, Middletown, New Britain, New Haven, Poughkeepsie
- **Miscellaneous** communities with none of those features evident in the data set
  Amsterdam, Cobleskill, Fonda, Hartford, Oneonta, Queensbury, Saratoga, Schenectady
- plus **Cooperstown** and **Sidney**: NCS receding in apparent time

Results by subset:

subset	n	/o/ F2 vs. year of birth			/o/~/oh/ Cartesian vs. year of birth		
		r^2	p	slope	r^2	p	slope
Cooperstown	9	.8004	< .005	–4.656	.8286	< .0005	–5.136
Sidney	8	.2915	n.s.		.2289	n.s.	
IN core	18	.4088	< .005	–2.385	.2267	< .05	–2.169
IN fringe	40	.3063	< .0002	–2.259	.3018	< .0005	–2.301
misc.	27	.2025	< .02	–1.400	.2718	< .01	–1.968
merging	32	.1295	< .05	–1.559	.0760	n.s.	
mgr in prog.	24	.4110	< .001	–2.744	.5143	< .0001	–2.978
raised /oh/	12	.1220	n.s.		.0515	n.s.	
ANAE IN rgn.	61	.0001	n.s.		.0094	n.s.	

Table 1: Pearson correlations of F2 of /o/ and the Cartesian distance between /oh/ and /o/ in Hz

- All subsets of data show backing of /o/ in apparent time except communities where /oh/ is raised and communities where *cot-caught* merger is already complete.[2]
- Although /o/-backing is contrary to NCS, it coexists with NCS in Inland North core and fringe; other NCS features are not in retreat (except in Cooperstown and Sidney), and in Inland North fringe, /e/-backing remains in progress.
- No /o/-backing is found in Inland North communities sampled by *ANAE* other than those in New York State.
- /o/-backing appears in communities with and without NCS in New York; it does not respect the boundary of the Inland North region.

[1] Judged by Labov (2007)'s five phonetic criteria for participation in the NCS.

[2] Although backing of /o/ in Sidney does not appear as statistically significant on this table, the mean /o/ of the 5 speakers born before 1965 is 143 Hz fronter than the 3 younger speakers ($p < .04$).

Backing of /o/ appears to have **occurred suddenly**: in nearly all cases, there is no statistically significant change in apparent time either before or after about 1960. That is, the only change is **between speakers born before about 1960 and speakers born later**; among the older speakers alone or the younger speakers alone there is no statistically significant correlation between F2 of /o/ and year of birth.

subset	year of split[3]	older speakers /o/ F2			younger speakers /o/ F2			*p* (*t*-test)
		range	mean	*n*	range	mean	*n*	
IN core	1960	1524–1647	1576	7	1379–1526	1461	11	< .0005
IN fringe	1959	1422–1689	1528	11	1313–1498	1420	29	< .002
misc.[4]	1961	1355–1549	1455	12	1301–1494	1389	15	< .005
mgr in prog.	1959	1328–1519	1433	9	1185–1475	1318	15	< .001

Table 2. Difference between older and younger speakers in F2 of /o/ for each subset. "Year of split" denotes latest year of birth included in "older speakers" group.

- In each case, younger speakers' /o/ occupies a range about 100 Hz backer, on the whole, than older speakers', with occasional individual outliers.
- In all cases but one, there is **no significant change** in apparent time **on either side** of the year of split; the exception is the younger speakers in the merger-in-progress communities.[5]
- The backward shift of /o/ occurred **at the same time in each subset** (or earlier in IN core and later in miscellaneous subsets). This means that the backing of /o/ **did not originate in merger-in-progress regions and then spread later to Inland North**.
- In other words, whatever caused /o/-backing must have caused it **in the Inland North core from the outset**.

Why did /o/-backing occur in the Upstate New York portion of the Inland North, but not the rest of the Inland North? **What's the difference** between NY and the rest of the Inland North?

- Upstate New York is (geographically) **closer to the *cot-caught* merger** than the rest of the Inland North: it's **smaller in area** and **shares long borders** with areas where the merger is complete (western PA, Canada, Vermont).
- Thus: Upstate NY subject to more **influence** from merger, causing backing of /o/?
- This **supports Herzog's principle**: NCS not sufficient to protect IN core in Upstate NY from the influence of merger; **mergers expand**.

[3] Due to gaps in the data, the year of split for IN core could be as early as 1950 with similar results, and as late as 1970 for the miscellaneous subset. But a year of split within a few years of 1960 works for every subset.

[4] In this subset, all but 2 older speakers are between 1400 and 1500 Hz. The 5 younger speakers who are fronter than 1400 Hz are from communities with at most two speakers, and it is possible that if more data were available some of these communities would be classified in another subset.

[5] Here 8 speakers born between 1970 and 1986 range in F2 from 1322 to 1475 Hz (with only one above 1385 Hz), and 7 speakers born between 1989 and 1991 range from 1185 to 1311 Hz.

These results **call into question the suggestion of "stable resistance"** to merger:

- If NCS makes a community "resistant" to *cot-caught* merger, it must be because NCS makes /o/ resist pressures that it's subject to in non-NCS phonologies.
- But in Upstate NY, NCS and non-NCS communities are affected in **exactly the same way and at the same time** by /o/-backing.
- Suggests **no phonological difference** between NCS and non-NCS /o/ that could lead to "stable resistance".
- This holds even if /o/-backing is not due to influence of neighboring merged regions.

Conclusion: **Absence of merger does not imply resistance to merger**.

Unanswered question:

- Why should influence of neighboring merged regions manifest as simultaneous one-time 100-Hz backing?
- If neighboring merged regions are not the cause of /o/-backing, what is?

Appendix: Data set

- 10 telephone interviews with upstate NY natives, and 17 with natives of nearby areas, conducted and analyzed by the Telsur project, 1995–2000 (*ANAE*):
  - Albany, Binghamton, Buffalo, Rochester, Syracuse (2 speakers each); Burlington VT, Rutland VT, Springfield MA, Scranton PA, Montreal QC (2 each); Hartford CT, Middletown CT, New Britain CT, New Haven CT, South Hadley MA, Arnprior ON, Ottawa ON (1 each)
- 28 telephone interviews with upstate NY natives, conducted 2006–08:
  - Amsterdam, Canton, Cobleskill, Fonda, Geneva, Gloversville, Lake Placid, Ogdensburg, Saratoga Springs, Schenectady, Sidney, Walton (2 each); Cooperstown (4)
- 91 in-person interviews with upstate NY natives, conducted 2006–08; including Short Sociolinguistic Encounters (Ash 2002) and scheduled interviews:
  - Amsterdam (5), Canton (7), Cooperstown (5), Glens Falls (7), Gloversville (7), Morrisonville (1), Ogdensburg (7), Oneonta (9), Plattsburgh (7), Poughkeepsie (7), Queensbury (2), Sidney (6), South Glens Falls (3), Utica (7), Watertown (10), Yorkville (1)

Vowel formants measured in Praat, log-mean normalized in Plotnik using methodology of *ANAE*. Speakers' F1/F2 means for phonemes are computed disregarding tokens before nasals and liquids.

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