"IT'S TOO HAT IN HERE?" THE PERCEPTION OF NCS *a*-FRONTING

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What is the role of specific items in carrier phrases in promoting or demoting an advantage in understanding words that contain advanced tokens of change-in-progress sounds? Labov and Ash (1997) and Plichta (2004) note such an advantage for local speakers, but they do not provide evidence about individual features.

In Labov and Ash (1997), carrier phrases contain other tokens of Northern Cities Shift (NCS) and Southern Vowel Shift (SVS) vowels. For the NCS test, *had* and *sandals* occur along with the test item *socks*; for the SVS test, *I* and *knew* occur along with the test item *guy*. In the NCS test, therefore, another vowel of the shift occurs (æ), but not the same vowel as that of the test word *socks*. In the SVS test, however, *I* occurs, the same vowel as in the test item (*guy*). Additionally, the potential misunderstanding is a real word in the NCS test (*socks*) but not in the SVS test (*gah*). Finally, the NCS test gives a semantic/pragmatic clue to the identity of the word; the SVS test does not.

In Plichta (2004) increasingly fronted resynthesized tokens of *sock* (in seven steps of 33 Hz along F2) were embedded in carrier phrases, each one of which contained several words with NCS tokens; all had examples of the *sock* vowel itself:

(1) *Bob, positive, that, his, Shannon* (ɑ, æ, ɪ)

(2) *Cathy, and, said, pot, black, said* (ɑ, æ, ɛ)

(3) *winning, boggle, is, lots* (ɑ, ɪ)

(4) *it, that, common, response, question, on, last, test* (ɑ, æ, ɪ, ɛ)

Although this avoids some of the problems of Labov and Ash (1997)—the potentially misunderstood word exists (*sack*) and the carrier phrase gives no semantic/pragmatic clue to the identity of the item, we are still not sure if retention of the *sock* interpretation further along the F2 continuum was enhanced by the presence of particular NCS vowels.

This experiment uses the 7-step modification of the NCS-shifted vowel in *hot* as in Plichta (2004) but with careful control of the carrier phrase. We selected three young, male speakers from Minnesota who showed no evidence of the NCS. They were matched for weight, height, and vocal quality and read the following sentences:

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Speaker 1	Katie heard *Bob* say the word *hot*.
	Katie heard *dad* say the word *hot*.
Speaker 2	Katie heard her *boss* say the word *hot*.
	Katie heard *dad* say the word *hot*.
Speaker 3	Katie heard *Bob* say the word *hot*.
	Katie heard her *boss* say the word *hot*.

In each phrase there is only one other NCS word—*dad* (æ), *Bob* (ɑ), or *boss* (ɔ). Speaker 1 is always shifted (resynthesized), and Speaker 3 unshifted. Speaker 2 has a shifted *boss* (resynthesized) and an unshifted *Bob*. The word *hot* appeared in each of its seven modified steps in each stimulus sentence. Since each of the three speakers used two carrier phrases, the total was $2 \times 3 \times 7 = 42$. The experiment was mounted on a website with instructions in which the respondents were asked to identify the last word in the stimulus as *hot* or *hat*.

We report here on 44 respondents; the demographic variables are: sex, age (by decades, teens through 70s), and area (NCS or non-NCS). Ethnicity was not considered since only four respondents were not European American. The experimental variables are the following:

1)	Token:	Speaker 1:	1) *Bob*-shifted	2) *dad*-shifted
		Speaker 2:	3) *boss*-shifted	4) *dad*-unshifted
		Speaker 3:	5) *Bob*-unshifted	6) *boss*-unshifted
2)	Level:	the 7-step fronting of the vowel *hot* used in Plichta (2004)		

The data were analyzed with the GoldVarb II program, with identification of the word as *hot* as the applications value (Table 1). The GoldVarb weights are shown only for those factor groups that proved significant, and the "Apps" column indicates the number of times the stimulus was judged to be the *hot* vowel, that is, the number of times the rule "applied." "S" and "U" indicate NCS shifted and unshifted tokens, respectively.

Sex: Women have a considerable advantage in hearing fronted forms. This sensitivity to emerging forms seems to correspond with female leadership in sound change, here even when the respondents are not participants themselves in the change.

Age: Respondents in their 30s (to a lesser extent their 40s) have an advantage in hearing advanced forms. This might seem to be an odd age-graded pattern, but it may be the case that the youngest respondents are not yet sensitive to areal variation and that older respondents are not sensitive to more recent developments.

Area: Oddly, and in contrast to studies cited above, respondents from NCS areas do not have an advantage in hearing advanced forms. Perhaps the determination of region was too gross and allowed rural respondents or others not particularly involved in the shift to be identified as NCS participants.

Token: The shifted items *Bob* and *boss* promoted the continued hearing of shifted tokens of *hot* as *hot* while unshifted *Bob* and *boss* caused items to be interpreted as *hat* when the tokens were even less shifted. This would seem to confirm the

TABLE 1

GoldVarb analysis of *hot–hat* perception

		Weight	%	Apps	Total
Demographic variables:					
Sex	Male	0.386	78	329	420
	Female	0.560	86	689	812
Age	Teens	0.331	77	86	112
	20s	0.485	83	488	588
	30s	0.651	88	172	196
	40s	0.507	84	94	112
	50s	0.487	79	178	224
	60s	1 resp	55	15	28
	70s	KO	100	42	42
Area	NCS	ns	81.6	457	560
	no NCS	ns	83.5	561	672
Experimental variables:					
Token	S-*Bob/boss*	0.543	85	522	616
	U-*Bob/boss*	0.457	81	496	616
	S-*dad*	ns	80.5	276	343
	U-*dad*	ns	82.2	282	343
Level	1	0.868	98	172	176
	2	0.716	94	166	176
	3	0.619	91	161	176
	4	0.475	86	151	176
	5	0.334	77	136	176
	6	0.299	74	131	176
	7	0.161	57	101	176

importance of specific items in carrier phrases, but it also suggests that the influence is local, not system-wide. When the same vowel as the test item (i.e., *Bob*) or a phonetically close vowel (*boss*) was heard, the perception of *hot* was influenced, but shifted and unshifted *dad* had no influence. Perhaps a shifted *dad* will not trigger reanalysis of *hot* since a phonetic space is created (a pull-chain effect) into which the *hot* vowel might move, but the hearer perceives no overlap danger. In the case of shifted *boss*, however, a push-chain influence may be sensed, causing a reanalysis of the space for *hot* (i.e., fronted) to make sure the two items are kept distinct. To coin a phrase, all hearer normalization might be local, requiring a refinement of the long-standing conclusion of Ladefoged and Broadbent (1957) that relative positions of formant frequencies in a carrier phrase influence the perception of a test item.

Level: There was a robust differentiation among levels; GoldVarb weights ranged from .868 to .161, clearly indicating that the fronted vowel of *hot* can be misunderstood as *hat*.

This is a preliminary study; we need more data and will get it. It suggests, however, that perception of items in dramatically changing systems may be more related to such demographic features as age and sex than to region itself; perhaps even education, network, and status are involved. Most importantly, it suggests responsiveness to the local phonetic character of other items in consideration of a speaker's system, but not the construction of an overall representation of the system based on items distant from the one under consideration or on those that impose no threat of overlap. Work with tokens containing even more distant phonetic items in the shift (for example, ɪ and ɛ) and the remaining nearby item (ʌ) may add further justification to this interpretation.

This work continues to convince us that the role of perception is a key element in the study of variation and change with regard to the phonetic realization of items and the role they play in the reorganization of phonological systems.

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