

## Dialect Contact and Dialect Change: The Effect of Near-Mergers

David Bowie

In 1972, Labov, Yaeger, and Steiner noted the existence of what have been called “near-mergers”—cases in which members of a speech community produce vowel classes differently but at the same time perceive those vowel classes as the same. Since then, several studies have confirmed that near-mergers do, in fact, exist (for example, Di Paolo & Faber 1990; Labov, Karan, & Miller 1991; Di Paolo 1992; Faber & Di Paolo 1995; Bowie 2000). It should be noted that this is a rather counterintuitive finding, as it means that speakers are able to produce contrasts they are unable to hear.

This paper presents results from a study in Waldorf, a town of about 50,000 people in Southern Maryland. Previous work in this community (Bowie 2000) has found that there is a set of mergers in progress in Waldorf among the vowels in the words *pole*, *pull*, and *pool*, and that these are all conditioned mergers limited to following /l/. In addition, when mergers in perception and production were looked at separately, it was found—to simplify somewhat—that a state of merger in perception *and* production was preceded in apparent time by a period of near-merger.

Commutation tests were used to determine the presence or absence of mergers in perception, one test for each of the vowels under study (i.e., one test compared *pole* and *pull*, another *pull* and *pool*, and another *pole* and *pool*). The results of these tests gave a binary value for whether each individual had each pair merged in perception and production.

After the commutation tests were completed, the words rated by the subjects in the commutation tests were put through a linear predictive coding to determine first and second formant values. Each set of formant values was then subjected to a t-test assuming unequal variances with a null hypothesis that the vowels were merged for that formant; a value of  $p < 0.05$  for *both* formants was taken to mean that the vowel pair in question was merged in production. In addition, there were two instances in which an individual's production was distinct, but that distinction was made in such a way that it wasn't reflected in first and second formant values. Those cases were rated as distinct for the purposes of this presentation. It should be noted that the same utterances were tested for evidence of merger in perception and production for each vowel pair, which was done to eliminate the danger of differences due to style or setting. These tests for merger in perception and production were administered to twenty-nine lifelong residents of various

ages, but this paper only reports on the results for the eleven of them who were born between 1965 and 1980.

The same process was carried out with thirteen individuals (all born between 1965 and 1980) who grew up in Waldorf but moved to other parts of North America as adults. For convenience, the individuals who have lived in Waldorf their entire lives are called "lifelong Waldorfians" in this paper, and those who grew up in Waldorf but moved elsewhere as adults are called "Waldorf exiles".

A direct comparison of the behavior of the Waldorf exiles with the lifelong Waldorfians of similar ages shows some interesting differences. Before getting directly into the differences between the lifelong Waldorfians and the Waldorf exiles, though, the linguistic behavior of the lifelong Waldorfians and the Waldorf exiles should be briefly sketched out separately.

The overall pattern for the lifelong Waldorfians born between 1965 and 1980 is shown in Table 1 (next page). In the tables in this paper, "fully merged" in a cell means that the individual in that row exhibits a merger in both perception and production for the pair at the head of that column, and "fully distinct" means that that person maintains a distinction on both perception and production for that vowel pair. "Near-merger" means that the individual exhibits a near-merger for the vowel pair—that is, a merger in perception but a distinction in production. (The fourth logical possibility, a merger in production accompanied by a distinction in perception, does not occur in this dataset.) In general, the lifelong Waldorfians born between 1965 and 1980 as a group exhibit a statistically random mix ( $p \geq 0.35$ ) between near-merger and complete merger (that is, merger in both perception and production) for the vowel pair *pull-pole*, with 64% showing the near-merger and 36% showing the complete merger. This means that they don't behave as a coherent group regarding merger in production, even though they do all exhibit a merger in perception. Similarly, 64% make a full distinction for the vowel pair *pool-pole* and 36% exhibit a near-merger, once again a statistically random mix between these two options ( $p \geq 0.35$ ). This means that the lifelong Waldorfians don't behave as a coherent group regarding merger in perception, but none of them exhibit a merger in production—almost the reverse of the case for *pull* and *pole*. The vowel pair *pull-pool*, though, is more interesting—the lifelong Waldorfians exhibit a near-merger of this vowel pair 73% of the time, a complete merger 18% of the time, and a complete distinction 9% of the time, a non-random distribution ( $p < 0.05$ ).

pseudonym	sex	year of birth	pull-pole	pull-pool	pool-pole
Roy	m	1965	near-merger	<u>fully distinct</u>	<u>fully distinct</u>
Niels	m	1966	near-merger	near-merger	<u>fully distinct</u>
Torren	m	1967	<i>fully merged</i>	near-merger	<u>fully distinct</u>
Blake	f	1969	<i>fully merged</i>	near-merger	<u>fully distinct</u>
Charles	m	1969	<i>fully merged</i>	<i>fully merged</i>	near-merger
Capri	f	1971	near-merger	near-merger	<u>fully distinct</u>
Dayne	m	1973	near-merger	near-merger	<u>fully distinct</u>
Joanne	f	1977	near-merger	near-merger	<u>fully distinct</u>
Helen <sup>1</sup>	f	1978	near-merger	<i>fully merged</i>	near-merger
Deanna	f	1979	<i>fully merged</i>	near-merger	near-merger
Dawson	m	1980	near-merger	near-merger	near-merger

Table 1: Perception and production of vowel pairs for lifelong Waldorfians born between 1965 and 1980

The linguistic behavior of the Waldorf exiles is shown in Table 2. The general pattern for the Waldorf exiles as a group is that 31% of them exhibit a complete merger, 8% a complete distinction, and 62% a near-merger of the vowel pair *pull-pole* (totals do not add up to 100% due to rounding). As with the lifelong Waldorfians, this is a statistically random distribution ( $p \geq 0.05$ ). For the *pool-pole* pair, the picture is very simple—the Waldorf exiles show a

<sup>1</sup> Helen exhibits an extreme rounding of *pole*, in contrast to her less-rounded *pull* and *pool*. Therefore, although formant values show the *pool-pole* and *pull-pole* pairs to be merged in production, they are listed here as distinct in production because the rounding creates a clearly audible distinction. No other individual born between 1965 and 1980 uses such a mechanism to create distinctions that are not reflected in formant values.

complete distinction 100% of the time. The *pull-pool* pair is more interesting, however, both in terms of overall percentages as well as subtler distributions. Looking at the Waldorf exiles generally, 8% show a complete merger of this pair, 38% show a complete distinction, and 54% a near merger. For the entire group, this is a statistically random distribution ( $p \geq 0.10$ ), but as will be shown later, the reality is much more intriguing than just saying that one group has a particular sort of distribution and the other group another.

pseudonym	sex	years away	pull-pole	pull-pool	pool-pole
Tully	m	2	near-merger	near-merger	<u>fully distinct</u>
Delsie	f	2	<i>fully merged</i>	near-merger	<u>fully distinct</u>
Lindsey	f	3	near-merger	<i>fully merged</i>	<u>fully distinct</u>
Max	m	4	near-merger	near-merger	<u>fully distinct</u>
Jacob	m	5	<i>fully merged</i>	near-merger	<u>fully distinct</u>
Monique	f	7	near-merger	<u>fully distinct</u>	<u>fully distinct</u>
Khristina	f	9	near-merger	<u>fully distinct</u>	<u>fully distinct</u>
Miles	m	10	near-merger	near-merger	<u>fully distinct</u>
Licia	f	11	near-merger	near-merger	<u>fully distinct</u>
Sylvia	f	11	<i>fully merged</i>	<u>fully distinct</u>	<u>fully distinct</u>
Jessica	f	11	<i>fully merged</i>	near-merger	<u>fully distinct</u>
Jan	m	13	<u>fully distinct</u>	<u>fully distinct</u>	<u>fully distinct</u>
Alec	m	14	near-merger	<u>fully distinct</u>	<u>fully distinct</u>

Table 2: Perception and production of vowel pairs for Waldorf exiles

What is given above is a *very* rough analysis, of course, and a finer analysis is necessary to determine whether the first impression that the lifelong Waldorfians behave differently from the Waldorf exiles—and therefore, presumably, that leaving Waldorf as adults has had an effect on the linguistic behavior of the Waldorf exiles<sup>2</sup>—actually reflects reality. Looking at the cases in which the individuals exhibit a merger in perception—that is, the cases labeled “fully merged” and “near-merger” in Tables 1 and 2—one finds a clear difference between the lifelong Waldorfians and the Waldorf exiles. This is primarily the result of differing behavior in the perceptual merger of *pull* and *pool*. In this case, the two groups definitely pattern differently ( $p < 0.05$ ), but in a very interesting way.

In perception, all but one of the lifelong Waldorfians merge *pull* and *pool*, but the picture among the Waldorf exiles is more complicated. Not only is there more variation among the Waldorf exiles—eight of them have the merger, while five draw a distinction—but the variation is actually distributed among them in what appears to be a non-random manner. That is, the longer an individual has lived away from Waldorf, the more likely that individual is to be able to consistently perceive a difference between the two vowel sounds. The distinction is only made by those who have been away from Waldorf for seven years or longer, and a direct comparison of the group of Waldorf exiles who have been away that long and those who have been away a shorter amount of time confirms that there actually is a change in behavior at the seven-year mark ( $p < 0.05$ ).

Two questions must be answered before going further, though—to what extent is this change in the Waldorf exiles’ linguistic behavior an effect of the dialects spoken in the places these people moved to? Further—and more importantly—to what extent are we dealing with a group who have had common influences since leaving Waldorf? Looking more closely, it appears that the linguistic influences on the Waldorf exiles, at least regarding the vowel pair in *pull* and *pool*, have been relatively similar. In most cases the Waldorf exiles are now surrounded by varieties of English that keep the vowels in *pull* and *pool* separate in both production and perception. (*Phonological atlas of North America* 1997, 1999a, 1999b, 1999c). The only possible exceptions are Jessica’s residence of Knoxville, Tennessee, where the picture is mixed, and the mixed-dialect military surroundings of Delsie, Miles, and Monique, where the surroundings are necessarily also mixed. In any event, these four individuals are all in surroundings in which *pull* and *pool* are both perceived and produced differently at least in part. As a result,

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<sup>2</sup> This assumes, of course, that the Waldorf exiles patterned with the Waldorf exiles of similar ages before they left Waldorf.

it would appear at first glance that this reversal of the merger in perception is simply the result of individuals being constantly faced with a distinction in production in the region they have moved to. This is, however, not necessarily the case, as the merger in production of *pull* and *pool* is in progress in Waldorf, and the distinction in production is still maintained there by most speakers. Given that, it would seem that simple exposure to a produced distinction is not what allows that distinction to be perceived, or one would expect the lifelong Waldorfians and the Waldorf exiles to pattern the same way. (And, for that matter, one would expect near-mergers to be very rare to non-existent.) It appears, pending data from, for example, individuals who moved to areas with no distinction in perception or production, that this may be a case in which the change results not from exposure to a second dialect, but rather somehow from the shock of lack of exposure to the original dialect.

Given these strangenesses in perception, one might expect similar differences in production between the Waldorf exiles and the lifelong Waldorfians. However, when looking at mergers in production—which are limited to the cases in Tables 1 and 2 that say “fully merged”—one finds that the two groups do not behave statistically differently. Therefore, we have a rather interesting situation—there has been a reorganization of the perceptual system among the Waldorf exiles, but mergers in production have remained inviolate. This seems rather odd—one might expect that an individual could somehow pick up a distinction in perception (particularly if that person is surrounded by such a distinction), but after that one might expect that the individual could use this perceptual understanding to learn to produce the difference. It appears, however, that this sort of restructuring of the perceptual system (in which previously unknown distinctions are learned) is possible, but it cannot be done with the production system (or at least not within the timeframe that these individuals have lived away from Waldorf).

Of course, underlying all this is an even more puzzling issue: How can an individual know that a distinction to be perceived exists at all without first having been able to perceive the fact that there is a distinction to be made? This problem points to the possibility that some part of the perceptual system is actually the underpinning for (at least much of) the alteration that occurs in one's perception upon constant exposure to a new dialect, but the perception that causes such effects is in this case is not consciously accessible. That is, the perceptual system appears to be able to unconsciously (or subconsciously) access distinctions that the individual cannot access consciously, and therefore what is actually being done in these cases is that the perceptual system is restructuring itself to allow conscious access of parts of it that were previously not consciously accessible. After (and only after) this reorganiza-

tion of the perceptual system, the perception system seems somehow to be able to allow conscious access to (at least some of) these distinctions so as to allow consistent distinctions in perception to be made. This is not necessarily *extremely* surprising, given that the produced distinctions in a near-merger situation must be cognitively present in some way to allow for their production even if they are not perceived, but it does show that a workable theory of perception and production cannot be radically modular. In addition, it means that any attempt to develop a cognitive theory of perception and production must recognize that the transmission between the perception and production systems must be set up so that it is asymmetrical.

This ties in well with Di Paolo's (1992) findings that, in cases of near-merger, even when individuals cannot consciously perceive a produced distinction between the sounds involved in the near-merger, they can still unconsciously perceive the distinction in that they can make social judgments based on it. Similarly, Nunberg (1980) found that unconscious access to produced distinctions kept the distinction between the classes of vowels in the words *line* and *loin* separate enough that they survived historically as different vowel classes and are now generally perceived and produced as distinct.

To summarize to this point, the most obvious generalization that this study points to is that near-mergers exist. This is not surprising—many studies have found this to be the case in several different circumstances, and it may be considered to be an established conclusion. More interesting, however, are the insights it offers into the interaction of the perception and production systems. Put simply, they function separately, but they can work together. Very direct evidence for this comes from the simple fact that near-mergers exist, which means that mergers in perception and production occur separately, but in some sort of related fashion. Further evidence that the perception and production systems are separate comes from the fact that mergers in perception are reversible in the timeframe of this study, but mergers in production are not.

Therefore, as an initial effort in developing a description of the relationship between the perception and production systems, I offer Figure 1. This diagram is of course only a starting point, but it reflects in a very broad way the reality that this study and others have uncovered to this point, and is primarily intended to stimulate conversation among sociolinguists on the relationship between the perception and production systems (and the effects of that relationship). (I should note particularly that this diagram is intended to reflect what one might call the "natural" relationship between perception and production, and not cases such as, for example, a linguistics student learning to perceive the difference between the vowels in *cot* and *caught*.)

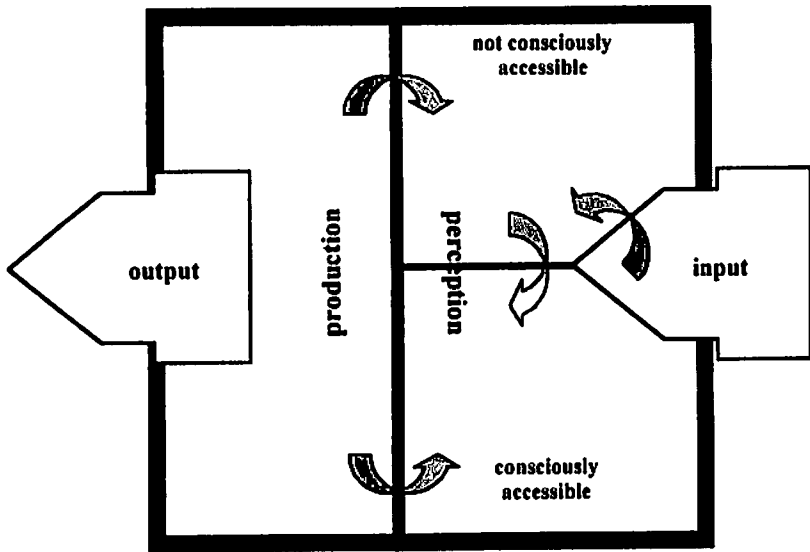


Figure 1: Model of the interaction between perception and production

The curved arrows in this diagram show the direction in which influence in the form of transmission of distinctions appears to occur. It is particularly important to note that the perceptual system is divided into sections which are consciously accessible and not consciously accessible (which I will refer to, for convenience, as the "conscious" and "unconscious" sections of the perceptual system); the full details of the existence and extent of interaction between these two subsystems is unknown at this point. The unconscious section of the perceptual system can influence the conscious portion in that distinctions accessible by the unconscious section can be transmitted to the conscious section, but quite possibly not the other way around. Production, on the other hand, is not subdivided like perception, because it is necessarily not consciously accessible. This study has found that produced distinctions have an effect on the consciously accessible subsystem of the perceptual system, and Di Paolo (1992) has found that produced distinctions can have an effect on the unconscious section of the perceptual subsystem. (I should note that the claim that the production system has a direct effect on the conscious section of the perceptual system is made somewhat tentatively. It may be the case that this is an indirect rather than a direct process, with the reality being a two-step process of the production system transmitting information to the unconscious part of the perceptual system, and then that



information being transmitted from the unconscious to the conscious part of the perceptual system.)

The precise cognitive details of this relationship still need to be worked out, of course. In addition, work on other models of language perception and production needs to be taken into account in developing this model; particularly important are those developed by other work in sociolinguistics, such as the model presented by Nancy Niedzielski, also at NWAV 29 (and also published in this volume). Also, although some details of the relationship between the perception and production systems do follow from the findings of this study, many of the specifics are certainly still unknown. This needs to be looked into further, as the interaction of the perception and production systems and the interaction of the perceptual system with itself are involved in various sorts of linguistic change, and so knowing more about these linguistic subsystems is in the interest of *anyone* studying language change. In particular, sociolinguists should find ways to work with neurolinguists and psycholinguists on investigating the relationship between perception and production, so that the psychological reality underlying these separate but interrelated subsystems can be better detailed. Doing so would allow us to come up with a theoretical framework that would not only give us insight into the *how* of the way language change occurs, but also into the *why*.

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English Department  
Brigham Young University  
3146 JKHB  
PO BOX 26280  
Provo UT 84602-6280  
[david\\_bowie@byu.edu](mailto:david_bowie@byu.edu)