

## Perturbing the community grammar: Individual differences and lifespan effects on language production

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The traditional focus of variationist sociolinguistic work is well known to be the nature of patterns of variation at the level of the community, which individual language users are said to learn and reproduce (Labov, 1972, 2012). What Labov (1989:2) refers to as “the illusion that the linguistic community is an aggregate of individuals with an unlimited number of different systems in their heads” is found to disappear when individual behavior is viewed from a community perspective.

However, it is nonetheless the case that individuals do differ in many characteristics which subsequently influence their language output, and could thus perturb their production of even perfectly-learned community patterns. Among these characteristics are physiological and psychological aspects of the language production system (Tamminga, MacKenzie, and Embick, 2016); indeed, several talks at this conference will provide evidence of individual language users differing from one another in their articulation or perception of sounds (e.g. Dediu et al., Mielke et al., Yu). An open question is thus whether these individual differences can come to matter at the community level, and if so, how.

As a step toward an answer to this question, in this talk I consider two such potential differences. Both have to do with the mental representation and production of language: the first is the phonological representation of high-frequency collocations; the second is working memory span. I show that these may even differ **within** a single individual, over time. This thus constitutes a further dimension of heterogeneity within the community: the possibility that various aspects of individuals’ language production may not be stable over time. The extent to which the patterns individuals show in later life are transmitted to younger generations as part of an ongoing process of change, or simply form part of a process of age-grading by which they remain isolated to one age group, are important questions for future research.

The first part of the talk presents a case study demonstrating that language change in later life, when it happens, does not necessarily take the shape of individuals participating in or reversing community-level sound changes, as has generally been the case in the recent work on this topic (Harrington et al., 2000; Raumolin-Brunberg, 2005; Sankoff and Blondeau, 2007; Wagner and Sankoff, 2011). Instead, I discuss a third possible type of later-life change: change in a speaker’s abstract mental representations over time (Guy and Boyd, 1990). This can result in an individual who has properly learned a community pattern of variation nevertheless appearing to deviate from it in his language production.

Data for this part of the talk will be drawn from a case study which examines the speech of Sir David Attenborough, a well-known nature documentary narrator whose career spans half a century. Born in London in 1926 and educated at Cambridge, Attenborough speaks with Received Pronunciation (RP), and is thus a good candidate for examination of the many changes that have been observed in RP in the twentieth century (Wells, 1997). The specific variable studied here is Attenborough’s realization of the approximant /ɹ/ as a tap ([ɾ]). In the RP of the early twentieth century, tapped-r alternated with approximant-r in certain phonological positions: namely, in word-internal position when intervocalic and following a stressed vowel (e.g. *very, forest*), and in hiatus, or “linking” position, between vowels of any stress (e.g. *far away, our engines*) (Rubach, 1996). However, the community has changed away from tapped-r over the past hundred years (Cruttenden, 2014; Fabricius, 2014; Hughes et al., 2012; Wells, 1997).

Looking at two time points, and aggregating over the two phonological environments, I find that Attenborough neither increases nor decreases his rate of use of the conservative tapped-r variant over time: he is stable (Figure 1).

However, splitting out the data by phonological environment reveals a different picture, in which Attenborough does increase his rate of use of the tap over time, but only in linking position (Figure 2). Effectively what this figure shows is that Attenborough matches the community pattern—by which tapping is favored in word-internal position and disfavored in linking position (Fabricius, 2014)—in his early years, but he no longer does so in his later years.

Further dividing up the data, by frequency of the word/collocation in which the /ɹ/ occurs, shows that it is only in high-frequency collocations (*there is, here are, etc.*) that Attenborough has increased his rate of r-tapping in later life (Figure 3).

I propose that these results can be explained if Attenborough’s phonological representations of high-frequency collocations have become more like single words over his lifespan, hence bringing his tapping rate in high-frequency linking position in line with his tapping rate in word-internal position. In other words, his tapping rate has remained stable over his lifespan, with a stable disfavoring effect (acquired from the community) of

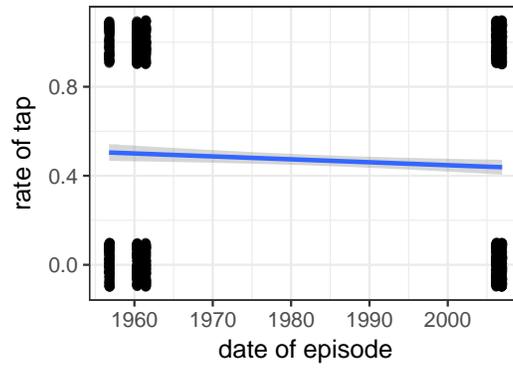


Figure 1: Attenborough's tapping rate over time. The slight change visible is not significant via mixed-effects logistic regression.

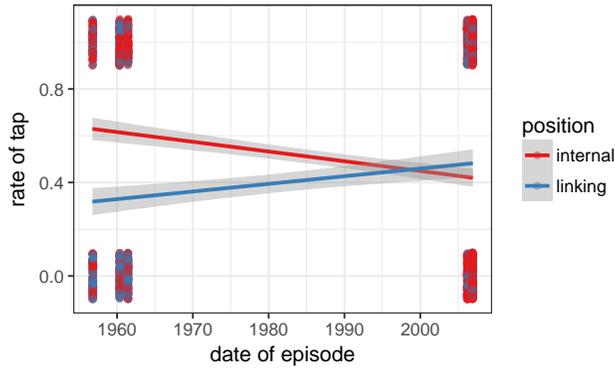


Figure 2: Attenborough's tapping rate over time, by phonological environment. Only the change in linking position is significant.

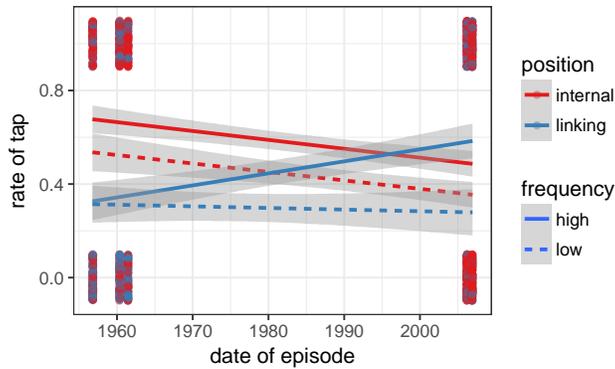


Figure 3: Attenborough's tapping rate over time, by phonological environment and binned frequency. Significant decade\*frequency interaction in linking position; no significant effects in internal position.

linking position; it is his lexical representations of high-frequency collocations that have changed. Had we considered only the pattern he shows in his later years, we might have thought that he had mislearned the community pattern, but viewed in longitudinal perspective, we see that this apparent mislearning is simply an epiphenomenon of a different change.

The extent to which this finding can be replicated with more time points and/or in other speakers is an open question, as is whether this individual-level change has any bearing on community patterns. It's worth noting that this finding recalls the phenomenon referred to in the usage-based literature as "chunking" (Bybee, 2015; Krug, 1998; Scheibman, 2000), which has often been put forth to account for patterns of variation at the community level but which has not, to my knowledge, been demonstrated in the longitudinal behavior of an individual. It is as yet unclear whether and how community-level cases of frequency-driven change like those investigated in the chunking literature have their source in intra-speaker longitudinal changes like this one.

In the second half of the talk, I'll address other cognitive changes which may affect individuals' language production over their lifespans. One clear contender is age-related differences in working memory (e.g. Salt-house and Babcock, 1991). I'll propose that one way these can indirectly affect patterns of linguistic variation is via the advance planning of speech. Many recent models of speech production assume that language production is incremental, with planning and production occurring in parallel. That is, speakers do not mentally form utterances in their entirety before speaking them, but rather plan out the later components of an utterance as they are producing the earlier ones (Ferreira and Swets, 2002). This advance planning is not always perfectly executed: a speaker's ability to plan ahead may be compromised by, for instance, a cognitive load or a distraction, or if the material being produced is particularly structurally complex (Ferreira, 1991; Wagner et al., 2010). In such cases, even though the speaker is eventually able to figure out what they want to say next and carry on, there is a possibility that the linguistic information that eventually materializes in a later component of the utterance was not available at the time of production of the earlier one.

This, in turn, has implications for linguistic variation of the type that sociolinguists are interested in, because many such linguistic variables are known to be conditioned by surrounding elements of language. A known effect of, for instance, following segment on a variable's patterning (such as in consonant cluster simplification, Guy, 1980) should be mitigated, if not erased entirely, in cases where a speaker's planning of said following segment is disrupted. A small body of work is now beginning to confirm this, at least for some variables and some types of conditioning effects (Tanner et al., 2015; Wagner, 2011).

Because the advance planning of language has been shown to be sensitive to individual differences in working memory span (Swets et al., 2014), and because working memory, in turn, changes with age, it seems likely that planning scope, too, changes with age. This means that we could find elderly speakers failing to demonstrate the same conditioning effects we find in other sectors of the population, again not due to mislearning of the community pattern, but simply as an epiphenomenon of other differences. This thus constitutes a second way in which individual differences can perturb community patterns; given the many ways in which individuals can differ, it is likely that there are more.

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