

Individual differences and the explanation of sound change

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The actuation problem, as originally posed by Weinreich, Labov & Herzog (1968: 102), remains unsolved: deductive-nomological explanations of particular instances of sound change continue to lie beyond our reach (Lass 1980). But historical linguists have a better record of accounting for general facts about implementation, innovation, and propagation. The observation that some sound changes are implemented in neogrammarian fashion, for example, has long been understood to reflect the double articulation of language: phonological representations consist of recurring discrete categories whose realization in continuous phonetic space is assigned by rule (Paul 1886: 62; Bloomfield 1933: 364-5; Bermúdez-Otero 2015: 379-82). Similarly, Ohala's (1981, 1989) notions of perceptual hypo- and hyper-correction provide an account of innovation that avoids teleology and succeeds in making falsifiable predictions about the relative frequency with which different types of sound change are attested in the history of the languages of the world. Finally, decades of sociolinguistic research have demonstrated that the propagation of innovative variants through a speech community is largely controlled by broad demographic factors such as the age, sex, and socioeconomic status of speakers (Labov 2001).

All of these explanatory models abstract away from differences between individual speakers, focusing instead either on invariant factors (e.g. acoustic law, the overall architecture of mental grammars) or on demographic variables defining broad social groups. Recent work, however, has uncovered growing evidence of linguistically relevant individual differences. One line of enquiry highlights instances of phonetic and phonological variation that fail to correlate with traditional dialectal or sociolectal distinctions: see, for example, the articulatory studies of English /n#k/ sandhi in Ellis & Hardcastle (2002) and of American English /ɹ/ in Mielke, Baker & Archangeli (2016). A complementary strand of research focuses on differences between individuals that may affect the likelihood of their behaving as innovators or as propagators of change. Some of these differences involve personal identity and agency: e.g. a person's degree of affiliation to the traditional life-style of his or her community (Labov 1963, Roberts 2016). Other differences concern subpersonal cognitive characteristics: see Stevens & Harrington (2014) for a review. Indeed, individual language-learning and speech-processing styles diverge across a remarkably wide range of dimensions, including perceptual compensation for coarticulation (Yu 2013), categorical perception (Kong & Edwards 2016), top-down lexical effects in perception (Ishida, Samuel & Arai 2016), and various types of procedural memory (Lee & Tomblin 2015).

The existence of individual differences is thus an undeniable empirical fact, and there are highly suggestive arguments for their possible relevance to patterns of innovation and propagation at the microscopic level. In this paper, however, I argue that, as yet, it remains to be demonstrated that individual differences play a crucial role in explaining any of the general properties of sound change that can be observed at the community and crosslinguistic levels.

One line of argument in this direction focuses on what I shall call 'the problem of stability', i.e. the intuition that less sound change is observed than might be expected in light of the fact that

the biases assumed to drive innovation are always active (Baker, Archangeli & Mielke 2011: 349-50; Sós-kuthy 2013: ch. 2; Kirby & Sonderegger 2015: 2). In this connection, Baker, Archangeli & Mielke (2011) suggest that certain changes may be rare because they only arise through the interaction of suitably different interlocutors; see further Stevens & Harrington (2014). This line of argument encounters a number of obstacles. According to Mielke, Baker & Archangeli (2010), for example, the process whereby /s/-retraction has become categorical in /stɹ/ clusters in certain varieties of English has been driven, at least in part, by pre-existing acoustically covert continuous variation in the articulation of /ɹ/. Whilst this may well be true in the case of English /s/-retraction, it is unlikely that a covert variation trigger can be found in every instance of categorical innovation. If so, this approach fails to provide a general solution for the problem of stability. Similarly, individual differences in perceptual compensation for coarticulation within human populations (Yu 2013) can in principle have an effect on the overall rate of innovation, but they do not by themselves suffice to explain why the same innovation may successfully propagate in one area but not another, leading to the characteristic pattern of branching encoded in phylogenetic trees (cf. the discussion of bifurcations in Kirby & Sonderegger 2013, 2015). To make sense of the latter, we must assume that the learner's acquisition target is the community norm (Labov 2014a, 2014b) and that the likelihood that an innovation will propagate successfully is highly dependent on the structure of the social network and the position of the innovators within it (Milroy & Milroy 1985, Labov 2001, and see below). Once these assumptions are made, it is no longer clear that we need to appeal to individual differences to solve the problem of stability.

A different line of argument suggests that patterns of interpersonal contact driven by broad demographic variables such as age, sex, and class cannot account for the fine detail of propagation at the microscopic level (e.g. Roberts 2016); personal stances indexed through the use of socially meaningful linguistic variants are claimed to play an irreducible role. Substantiating these claims poses formidable methodological difficulties: Lawrence (2017) shows that it is unsafe to infer social-indexical meanings from production patterns; Pierrehumbert (2016: §3.3) warns that exposure and attitudes are hard to disentangle, as people with different outlooks socialize in different ways. In any case, even if speaker identity does play an irreducible role at the microscopic level, it may still be the case that, at the community level, its effects are swamped by those of broad demographic factors. Notably, Baranowski (forthcoming) finds that the distance between social groups as determined by socioeconomic status clearly outperforms attitudinal variables in predicting GOOSE and GOAT fronting in Manchester English. In addition, Baranowski's (2013) study of the low-back merger in Charleston provides support for Labov's (2001) curvilinear hypothesis, according to which change from below tends to originate in the interior social classes rather than the highest- or lowest-status groups. Significantly, Kauhanen's (2017) dynamical systems modelling shows that this curvilinear pattern of propagation arises mechanically in any strongly clusterized network even when social evaluation is completely absent.

In sum, the available evidence is consistent with the possibility that general properties of sound change at the community and crosslinguistic levels can be adequately explained by models that abstract away from individual differences, relying instead on essentially identical agents differing only in their relative positions within clusterized social networks.

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