

## Exploring the complementary roles of acquisition and usage in language change

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Traditional attempts to identify a root cause for language change have pitted language acquisition against language usage, assuming that innovation is traceable either to imperfect intergenerational learning, or to cognitive and social processes among adults (Jespersen 1922). This particular dichotomy may obscure the dynamics of change more than it enlightens (cf. Hopper & Traugott 2003). Instead, a more useful distinction may lie between change at the category label level versus changes in mappings from category label to lower level category labels or exemplars (cf. CHOICE in the framework of Evolutionary Phonology; Blevins 2004). Acquisition and usage differ in the pre-existence of established percept-category mappings: in the process of language acquisition, systems of category labels are progressively abstracted from primary data, while in usage, those mappings between category labels and percept types are employed in production and processing.

A wide range of evidence indicates that mappings between category labels and percepts can change with experience, allowing the character of a category to slowly shift over time (reviewed in Pierrehumbert 2001, Bybee 2002). However, there is also a good deal of evidence that the pre-existing pattern of categorial distinctions influences the way that information is perceived and stored. In particular, information tends to be processed in a way that is consistent with and reinforces the existing set of categories (e.g., Ganong 1980, Nosofsky 1988; see also work on L2 acquisition of novel categories (e.g. McCandliss 2002) and work on the perceptual magnet effect (e.g., Guenther and Gjaja 1997). As a consequence, changes in the input pattern may be less likely to prompt change at the category label level within a generation than across generations. This line of reasoning supports a model in which usage-driven change within a system of categories sets the stage for changes in the overall category system in acquisition, which then enables qualitatively distinct, further usage-driven changes, and so on (cf. Andersen 1973).

Two sets of computer simulations of language change were used to explore the effects of language usage versus acquisition in an exemplar-based model. First, we present an exemplar model of morphological change in the lexicon based on the iterated learning paradigm of Kirby (2001). This type of model does not allow change in the number of morphological categories, but only in their contents. In this case, we show that expected frequency-based patterns of irregularity may arise either via iterated learning through transmission with no usage (Hare & Elman 1995, Kirby 2001) or via gradual, usage-based modifications within a single generation. Using this as an example, we make a case that first principles do not tell us whether intra-categorial changes of this sort require acquisition, usage, or both, on analogy with the qualitative similarity of effects of bottlenecks versus drift in the domain of genetic drift (Suzuki et al. 1989).

In our second simulation, we investigate how category label change may influence the behavior of a model of vowel contrast maintenance. Here, we show that shifts in category contents through intra-generational usage set the stage for changes in the number of vowel categories, and that changes in the number of vowel categories in turn set the

stage for further shifts in category contents through usage. In sum, we suggest that usage and acquisition make identifiably distinct contributions to change in different domains of language, and that each may influence the other in predictable ways. This model is consistent with suggestions that intergenerational acquisition reduces variation and accelerates changes that originated in usage (cf. Slobin 2004, Bybee to appear).