

## **Phonemes, Alphabets and Exemplars: How can Language Be Symbolic?**

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A new view of what a phonology will be presented. This is a new story, still under development, about the relation between speech and language. Evidence against the classical notion of the phoneme as the foundational unit of language has been piling up. Evidence of exemplar memory for words, of a role for frequency-of-occurrence in sound change, the availability of nonphonetic and subsegmental phonetic detail in speech memory, the importance of the temporal structure of speech, and so on, argue against the idea that people use segments in moment to moment linguistic cognition of any kind. We must abandon speech segments, that is, Cs and Vs, as significant cognitive units for a language performance.

It seems that what speakers learn about their language are statistical properties of the raw speech signal. They learn various regularities -- including some that are rather like consonants and vowels, but also others like syllables, clusters, common phrases, etc. And the distributions of these regularities in a very high-dimensional space are what listeners use for perceptual parsing of speech and in memory of words, and even for production (especially in the young).

But what about our strong intuition that it is natural to divide speech into Cs and Vs? Comparison of alphabet-illiterates and literates suggests that the intuitive rightness of phonemes and phonetic segments is almost surely a consequence of our lifelong dependence on alphabetic writing.

Phonology actually serves other purposes -- especially to provide building blocks for speech, thus simplifying perception and long-term memory in subtle ways. These phonological regularities reduce degrees of freedom and thus facilitate speech processes. However, each speaker is idiosyncratic. Each creates their own statistically constructed version of the linguistic regularities. These regularities are not required for perception or production and play a minor role in these processes. (But they are similar enough across speakers that it is possible to use a conventional alphabet to model them.)

So our error has been to mistake the somewhat symbol-like composable patterns that are the data of phonology to be evidence of real symbols. We have allowed the structure of orthographies to bias our perceptions, and we tried to collapse two different systems on two different time scales. There is *Language as Social Institution*, an emergent system over a community of speakers, and then there is the *Linguistic Processing* of utterances in real time by individual speaker/hearers. The first facilitates the second but does not play a direct symbolic role.