

Crazyness – On Phonetic Substance and Sets of Phonological Features

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The program of substance-free phonology introduced by Hale & Reiss (2000, 2008) argues that phonological representations and computation should exclude any reference to phonetic categories (phonetic substance: markedness, phonetically informed constraints). In this view, phonology is a system of computation which works over abstract symbols, and it functions independently from phonetics.

However, the substance-free program is not a monolithic bloc and indeed, frameworks adhering to the broad label "substance-free" can be sorted into two categories based on a fundamental assumption concerning the nature of phonological primes. Broadly speaking, there are two ways of considering phonological features, each of them being mutually exclusive with the other. In one camp are those who defend a substance-free phonology with a universal feature set included in UG, each of which has a phonetic correlate (Hale & Reiss 2008, Reiss 2018a, Reiss 2018b).

A different view on the matter is entertained by those who argue that there is no universal feature set, and as such features emerge based on environmental information, i.e. on a language by language basis (Odden 2006, Hall 2007, Blaho 2008, Samuels 2011, Ioasad 2012). In such frameworks, it is non-sensical to speak about universal phonetic correlates for phonological primes; the phonetic correlates of the primes are worked out by individuals for each language.

There are two kinds of argument which bolster the latter approach to substance-free phonology (which may be called 'radical'): one concerning dynamic processes, i.e. crazy rules (Bach and Harms 1972) in phonology, and one concerning static properties, i.e. the existence of arbitrary phonological classes. A crazy rule is a synchronic process which does not make sense phonetically speaking. For example, $l \rightarrow \text{ʁ} / V_V$ in Sardinian (Scheer, 2015).

An example of a phonetically arbitrary phonological class is that of rhotics, where a phonetically disparate set of segments come together to form a cohesive class in phonological terms. For example, Portuguese [r] and French [ʁ] have homologous phonotactic roles, but cannot be usefully united using a traditional set of features. Phoneticians have searched for a phonetic common denominator (Lindau 1985) in the class of rhotics, both cross-linguistically and within languages with rich variation such as Brazilian Portuguese, but to no avail.

The radical viewpoint has interesting and far reaching consequences for acquisition. In

theories with a universal set of phonological primes, the learner can simply derive phonetic correlates of features in underlying forms based on the articulatory or acoustic cues that correspond to the feature in question. In radical substance-free frameworks, on the other hand, learners cannot rely on a phonetic correlate provided by a universal set of features to identify phonological primes. Instead, arguments have been made that learners rely on other clues: both phonological – contrast (Hall 2007, 2014, 2018) and distributional facts (Mielke 2008) – as well as extra-linguistic – vowel dispersion (Boersma and Hammann (2008), Hall (2011)) – to derive emergent features. In this view, phonological primes have language specific phonetic correlates, but are uninformed of phonetic categories.

This overview of the current state-of-the-art in substance-free phonology sets the stage for a discussion of data which could weigh in favor of one camp of the other.

To this end, I present some data that the radical substance-free camp has on its side, which poses problems for the universal feature substance camp. I argue that there is no objection against the view of acquisition based on environmental information only (emergent features and vowel dispersion), and this paves the way for a truly substance-free view of phonology. As a result, the segmental area of phonology (though not the area above the skeleton, i.e. syllable and metrical structure) are managed by domain-general, rather than by domain-specific mechanisms: humans do not use any mechanisms specific to language in order to acquire segmental and phonemic structure. All they need is their general capacity of categorization, i.e. the transformation of a gradient signal into discrete symbolic items. In this sense the segmental / phonemic area of phonology lies outside of the Language Faculty, as hinted at by Hauser et al. 2002.