

## Hypotheses of Natural Phonology (I and II)

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Natural Phonology deals with the production and perception of speech sounds – as well as with their alternation and variation – in terms of a set of universal phonetically-motivated phonological processes that are applied or instantiated in language-specific ways. Automatic, un-morphologized phonological processes delimit the phonemic inventory of a language, govern automatic alternations, account for the native ‘accents’ of speakers, constrain first and second-language perception and pronunciation, and are the engine of phonological variation and change. In this two-part paper, we will outline the principal hypotheses of natural phonology, and how they follow naturally from the basic tenets of the theory.

Phonological processes are ‘natural’ or universal in that their motivation is phonetic. They reflect the limitations of the human vocal and auditory apparatus, but they are mental operations, not physical slips. Each process eliminates a difficulty or optimizes a particular kind of segment or sequence. Acquisition of the phonology of a language is learning to produce process inputs, thus avoiding or limiting process application. So if a language has some voiced obstruents, learning to pronounce the language requires learning to suppress any process that eliminates them. (Once the suppression is accomplished, the input no longer seems difficult.)

Each process is subject to a number of implicational conditions on its application, and these may be invoked differently in different languages. E.g., if obstruent devoicing applies preferentially to back obstruents (for aerodynamic reasons), one language may devoice only velar obstruents, another may devoice all except labials, etc. These implicational conditions reflect the degree of difficulty (along specific parameters) that the input presents, and they may be segmental, positional, or prosodic. Multiple conditions may be imposed on a given process, and these various conditions may intersect. (E.g. devoicing may affect all obstruents in syllable-final positions, but may affect only the more-back obstruents in initial positions.) Process application may also be limited by stylistic or social considerations, and these conditions may interact with the phonetic requirements.

One of the most persistent and crucial tools of language description and comparison, of historical phonological change, of loan phonology, and of phonology in general has been the phoneme inventory of a language. Natural Phonology provides an explanation for the existence of phonemic inventories and phonemic perception. Fortitive processes optimize individual segments; lenitive processes optimize sequences. Context-free processes (often fortitions) limit the inventory of possible segments in a language, converting ‘impossible’ segments into possible ones in perception and in production. Context-sensitive processes (often lenitions) account for allophonic deviations from the limited set of ‘possible’ segments left by the applicable fortitions, allowing hearers to dismiss them as unintended. The fortition-lenition interaction creates the phoneme inventory of a language and underlies phonemic perception.

This view of phonemic perception accords with and to some degree explains why children quickly lose their initial ability to perceive virtually all phonetic distinctions and shift (almost before they begin to speak) to perception of only the differences that are distinctive in the ambient language.

Although perception, intention, and long-term memory refer to a level of representation composed of phonemes, phonological processes do not refer to segments, but only to feature combinations and prosodic domains. These prosodic domains are determined when the segmental lexical representations are mapped, in terms of features, onto the prosodic units of the particular utterance,. Processes apply to stretches of features within prosodic domains; so, for example, context-sensitive nasalization (which applies in English to sonorants, not just to vowels) may affect the entire sonorant portion of the syllable in words like *elm* and *barn*, and it may, in casual speech, affect the entire stress-group in words like *borrowing*.

Processes may be sensitive to the presence or absence of a feature: i.e. feature specifications are categorical. But once the lexical representation is mapped onto a real-time prosody, features are interpreted ‘gradually’ based on the features they are combined with, in a given segment. (For example, [i, e, æ] are all [+palatal] (front) but a [+palatal] segment that is [+high] is *more palatal* than one which is [-high], so [i] is *more palatal* than [e, æ]. Implicational conditions on processes reflect the degree to which a feature is present. (So, for example, if non-high palatal vowels condition consonant palatalization, high palatal vowels (*ceteris paribus*) also do so).

Besides being sensitive to phonetic degrees of features (as reflected in the implicational conditions), processes also respond to some general principles, like the Rich-Get-Richer Poor-Get-Poorer Principle (*Sounds which have a higher degree of a given feature increase that feature, and sounds that have a weak degree of a feature lose it*), or the Similarity Principle (*Assimilation between less-similar sounds implies assimilation between more-similar sounds*), which is a syntagmatic reflection of the former principle.

Process application in Natural Phonology is simultaneous, but this simultaneity is modified by some conditions (e.g. Fortitions First, Lenitions Last; allowance of Iterative application), which we will outline and briefly illustrate.

We will also briefly illustrate the application of processes in child speech. The question of how a process might progress from affecting children’s speech to becoming a phonological change in the adult language of the community hinges on variable process application in adult speakers. A process may begin as optional and limited, but increase its phonological and stylistic domains over time.

It seems obvious that fortitive and lenitive changes may have opposite results, but even within a process type, processes may result in opposite changes (e.g. vowel raising and vowel lowering are both potential fortitions) and there are often alternative resolutions to a given phonetic difficulty (devoicing, implosion, and pre- or post-nasalization of voiced stops are all fortitions). The ‘selection’ of particular process applications by a given language community is affected by prosody, but the choice of one or another resolution to a phonetic difficulty may ultimately be arbitrary.