A Dissertation on Natural Phonology

David Stampe
A DISSERTATION ON NATURAL PHONOLOGY

by

David Stampe

OHIO STATE UNIVERSITY

Including The Acquisition of Phonetic Representation

Reproduced by the
Indiana University Linguistics Club
Lindley Hall, 310
Bloomington, Indiana 47405
November, 1979
PREFACE

The present edition of my dissertation has been retyped, with minor corrections but without pagination changes, from the version submitted to the University of Chicago Department of Linguistics in December 1973. The latter was slightly abridged from a September 1972 version distributed under the title How I Spent my Summer Vacation.

The paper The Acquisition of Phonetic Representation, from 1969 Regional Meeting of the Chicago Linguistic Society, is reprinted here (again with minor corrections) as a convenience to the reader, because much of the discussion in the dissertation presupposes the paper.

The dissertation was originally without footnotes. I have added some here, as 'Afterthoughts,' mostly to explain some subsequent changes in the theory. These are not intended to be exhaustive. For details the reader may be directed to The Study of Natural Phonology, a 1979 paper by Donegan and me (see "Additional References") that furnishes a general survey of recent work.

Columbus, Ohio

July 1979
Since 1965 I have been reporting to the Society on a theory of natural phonology, based on the assumption that the phonological system of a language is largely the residue of an innate system of phonological processes, revised in certain ways by linguistic experience. But since my previous talks have not been published, I have chosen this year to review some highlights of those talks rather than to report on more recent work.

A phonological process merges a potential phonological opposition into that member of the opposition which least tries the restrictions of the human speech capacity. Processes characteristically fall into contradictory sets, reflecting conflicting phonetic restrictions. Obstruents become voiceless irrespective of their context, because their oral constriction impedes the airflow required by voicing, while, on the other hand, they become voiced in voiced environments by "assimilation." Where these processes overlap, for example between vowels, there is a contradiction: an obstruent cannot be both voiceless and voiced. There are three ways by which such contradictions are resolved.

The most radical resolution is by suppression of one of the contradictory processes. The mastery of voiced obstruents in all

---

contexts entails the suppression of the devoicing process mentioned above, with a resulting opposition of voice in obstruents in all contexts except those in which the voicing process merges them.

The second resolution is by suppression of some part of a process—limiting the set of segments it applies to or the set of contexts it applies in. Implicit in each process are various subtle and strict hierarchies, ranging from the greatest generality which is phonetically motivated, to the complete suppression of the process. For example, the devoicing process may be limited to tense obstruents, but not to lax ones unless it is altogether suppressed, because tense obstruents are less favorable to voicing than lax ones. Or it may be limited to voiceless contexts, or initial and final positions, and so forth. Likewise the voicing process may be limited to contexts between vowels, between non-high vowels, or between low vowels, but it may not be limited to apply just between high vowels, for example. In this example the traditional parameter of "sonority" clearly plays a role. Besides such phonological limitations, there are also nonphonological limitations which may be imposed, but these are not relevant to this discussion.

The third resolution is by ordered application. Many languages lack a voicing opposition in obstruents (this can be ascribed to the devoicing process) but their obstruents are voiced in certain voiced contexts by the (later) application of the voicing process. For this pair of processes, application in the opposite order would be indistinguishable from suppression of the voicing process. But many pairs of processes are manifest in either order. For example,
there is an assimilation process changing [t] to [s] before [s], and a process which I will refer to here as absorption, which changes vowel plus nasal to nasalized vowel before spirants. Both processes applied in Latin and Greek. Assimilation changed Latin [nepo:ts] 'grandson' (gen. [nepo:t-is]) to [nepo:ss], which is simplified to [nepo:s], and Greek [o:t-s] 'ear' (gen. [o:t-os]) to [o:ss], whence [o:s]. Absorption changed Latin [sanguin-s] 'blood' (gen. [sanguin-is]) to [sanguis] (by subsequent demasalization) and Greek [hrin-s] 'nose' (gen. [hrin-os]) to [hris]. As the Latin form [mons] from [mont-s] 'mind' (gen. [mont-is]) shows, absorption could not apply after assimilation in Latin. Thus it could not apply to the [Vns] sequence which resulted from the assimilation of [Vnts], but only to original [Vns]. In Greek, however, the order of these processes was not limited at all: [himant-s] 'thong' (gen. [himant-os]) underwent assimilation and then absorption to yield [hima:s]. Since Greek did not limit the effect of either process, it can be assumed to reflect the innate relationship of these processes, whereas Latin reflects a limitation—by ordering—of the effect of the absorption process.\(^1\)

I assume, then, that in its language-innocent state, the innate phonological system expresses the full system of restrictions of speech: a full set of phonological processes, unlimited and unordered. The most extreme processes are usually observable only in infancy: unstressed syllables are deleted, clusters and coarticulations are simplified, obstruents become lax stops, linguals become coronal, vowels merge to [o].\(^2\) The fullest effect of the innate system is seen in the utterances of what might be called the "post-babbling" period,
which, although they are still nonsemantic, characteristically consist of well-articulated sequences of identical and stressed syllables composed of lax stop (or nasal) plus low vowel: [dadada], [papapa], [mamama] or the like. Even this early there is some freedom, in that the stop may or may not be voiced by assimilation to the vowel, the vowel may or may not be fronted by a coronal, a coronal may or may not be palatalized, nasals may or may not be denasalized, and so forth. The first words resemble these post-babbling utterances in structure, and indeed they are often just continuations of these, with semantic import.

Each new phonetic opposition the child learns to pronounce involves some revision of the innate phonological system. It appears that the mechanisms of this revision are the same as those which resolve contradictions between processes: suppression, limitation, and ordering. The child's task in acquiring adult pronunciation is to revise all aspects of the system which separate his pronunciation from the standard. If he succeeds fully, the resultant system must be equivalent to that of standard speakers.

In the view I am proposing, then, the mature system retains all those aspects of the innate system which the mastery of pronunciation has left intact. (But not only those: rules governing phonetically unmotivated alternations are certainly learned.) The processes which survive determine what phonetic representations are pronounceable in the language. For example, there is a process devoicing word-final obstruents (presumably a limited version of the process devoicing obstruents in general) which usually manifests itself immediately upon
the acquisition of word-final obstruents. English-speaking children must suppress this process if their pronunciation is to conform to the standard, but German children need not, because German permits this devoicing: [hund] 'dog/dogs'. As the example shows, the devoicing process governs only the phonetic representation of German words, since the phonological representation of [hund] is /hund/. In other languages it governs the phonological representations as well, in case there is no voicing opposition in morpheme-final obstruents. And in languages which, for example, lack morpheme-final consonants altogether, the process stays in the system but has no overt manifestation. This claim flies in the face of all phonological theories known to me, but it appears to be supported by the pronunciation, in such languages, of foreign words with final voiced obstruents, which, if they are pronounced at all, are characteristically devoiced.4

Students of child language have noted striking regularities in the order in which phonetic representations are mastered. My studies have convinced me that these regularities can be fully explained by independently attested properties of the innate system—its processes, their inner hierarchies, and their interrelations—and by the three mechanisms whereby the innate system is revised. In particular, it appears that there is no need to refer to "implicational laws," such as Jakobson (1940) proposed, since to the extent that these are valid they seem to result entirely from the innate system.

Consider, for example, the implicational laws that affricates imply spirants and spirants imply stops (Jakobson, 51, 55). There seem to be only two general, context-free processes affecting these