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MA Studies

Distinctive features

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Why are features needed? We saw that phonological systems tend to be symmetrical and that a limited number of phonetic parameters, taken from a fairly small universal set recur in a variety of combinations in different languages. It makes sense to look beyond the phoneme and focus on those basic phonological ingredients, called DISTINCTIVE FEATURES, which phonemes are made of. Besides introducing you to distinctive features, this chapter will also serve as a restatement in a slightly different form of the principles of phonetics which were outlined in the first chapter. There is nothing mysterious about the fact that there is a relatively small inventory

of phonetic features from which languages select different combinations to construct their individual phoneme systems. As all members of the human race are endowed with very similar articulatory and auditory capabilities, it is only to be expected that they will only be able to produce and utilise speech sounds built up from the set which is pre-determined by their biological endowment. The position presented in this chapter regarding distinctive features has not always been accepted by all students of phonology. At one time some scholars, like Bloomfield (1926), would not agree with the claim that the phoneme is not the most basic phonological element. Bloomfield thought that there were no phonologically relevant particles more elementary than the phoneme, although he was aware that on purely phonetic grounds the building block of phonology is untenable, not only because of the arguments which have already been advanced concerning symmetry, but also for other reasons which I explore below. Firstly, even a cursory inspection of the phonology of any language will reveal that the phonological behaviour of phonemes is largely determined by the phonetic features which they are made up of. Consider the behaviour of /r/ in English. It undergoes partial devoicing when immediately preceded by voiceless stops but not when it is preceded by voiced ones:

If you look at it in terms of the implementation of distinct articulatory gestures, it is clear that the signal to start voicing is delayed until well after the beginning of the /r/ due to imprecise adjustment of the articulatory apparatus in the transition from one sound to the next. Looking at sounds in terms of the individual parameters which they consist of allows an insightful expression of ASSIMILATION PROCESSES, i.e. phonological processes whereby one sound changes to become more like some other sound in its environment (see Chapter 5). By highlighting each articulatory parameter and singling out the sub-phonemic particles (i.e. distinctive features) which phonemes are made up of, this approach is capable of treating assimilation

insightfully as an instance of SPREADING of distinctive features. Examine the American English data in columns A and B in [3.2] and suggest reasons why a distinctive feature approach to these data is preferable to an indivisible, atomic phoneme approach: [3-2] A B /pad/ [paed] 'pad' /pan/ [psen] 'pan' /pas/ [pass] 'pass' /pam/ [paem] 'Pam' /pak/ [paek] 'pack' /pag / [paerj] 'pang' Why are features needed? 37 When solving [3.2], you will have discovered that if you treat phonemes as unanalysable entities, you have no straightforward way of showing that the vowel only assimilates the property of nasality from the following consonant if that consonant is nasal as in [3.2B]. The SPREADING of nasality to the preceding vowel is due to the premature, anticipatory lowering of the velum, as the vowel is being produced, to let air escape through the nose during the articulation of the nasal consonant. Distinctive features thus facilitate the statement of assimilation processes by highlighting the various separate gestures involved in the production of speech. No equally natural way of stating assimilation processes is available if phonemes are treated as unanalysable units. An added advantage of the feature approach is that it enables us to highlight the internal structure of a sound. When we do that, it soon becomes obvious that phonological segments have internal structure. Sounds are not bundles of unordered, unstructured phonetic properties. A simple example like [3.3] shows that distinctive features can Whereas [p] is wholly oral and [n] is wholly nasal, the vowel [se] occurring between them is oral to begin with but subsequently becomes nasalised in anticipation of the following nasal consonant. The properties NASAL and NON-NASAL occur together in sequence in the same phoneme. Similar evidence of internal structure is to be found in diphthongs. In words like way [wei] and why [wai] the vowel sound has two distinct vowel qualities, a fact which is reflected in this case in the way in which the two phases of the sound are transcribed. The same point can be made about affricates like [ts], [dz], [tj] and [d3]. They are composite consonants starting with a stop phase and ending with a fricative

phase. In many languages, affricates behave in part as though they were stops and in part as though they were fricatives. Thus we can see that the phoneme is not an indivisible phonological unit. If we revisit the American English example above, a further reason for the espousal of a feature approach should become apparent: distinctive features bring out the fact that, in general, phonological rules apply to NATURAL CLASSES of sounds i.e. sounds which share certain phonetic properties. Thus, it would be bizarre for any language to have a rule nasalising vowels before the following assortment of consonants: [d s k t h], This is a ragbag of sounds which are phonetically very different from each other and which all lack the crucial property of being nasal which is passed on to an adjacent vowel during nasalisation. The chances of such an arbitrary nasalisation rule existing in any language are extremely remote. On the other hand, a rule which nasalises vowels in the neighbourhood of nasal consonants (as in [3.2]) is phonetically plausible and is found in numerous languages. The nasal consonants [m n rj] which condition the nasalisation form a natural class and they all contain the crucial feature of nasality which triggers off the nasalisation of the preceding vowel. Normally, sounds which are phonetically similar display similar phonological behaviour. In order to state the basis of the similarity between a group of phonemes, it is necessary to penetrate beyond the phoneme and scrutinise the phonetic features which they share

The SPE system of distinctive features

Various shortcomings of the Jakobsonian features came to light in the 1950s and 1960s. It was discovered that the model was too parsimonious. The dozen or so features which it allowed were insufficient to account for all phonological contrasts found in the languages of the world. Furthermore, it was criticised for using the same phonological feature to characterise phonological oppositions which in some cases were manifested by different phonetic properties. For instance, if a sound was

described as GRAVE (which means that most of the acoustic energy used in its production is concentrated in the lower part of the spectrum) you would not be able to tell whether it was a labial like [p], or a velar like [g], since the acoustically defined phonological property GRAVE could be correlated with either labial or velar articulation. Because of these and other inadequacies, Chomsky and Halle (1968) in their book The Sound Pattern of English (henceforth SPE) proposed a major revision of the theory of distinctive features. They replaced acoustically-defined phonological features with a set of features that have, in most cases, articulatory correlates. Furthermore, the number of features was also substantially increased. But, like their original Jakobsonian precursors SPE features remain binary. They have only two coefficients or values, plus (+) indicating the presence of a feature and minus (—) its absence, so that, for example, among other things, a sound like [p] is said to be [—voice] and [— nasal] while [m] is [+ voice] and [+ nasal]. The list of distinctive features given below is based on SPE in the main, but it incorporates some of the modification that have been proposed since 1968. It is not important to 'master' all the details of distinctive feature theory at this stage. They are described mainly in order to show how the system works. But you should come back to this chapter ot refresh your mind as the need to use features arises in later chapters.

i. CONSONANTAL - NONCONSONANTAL [± cons] Consonantal sounds are produced with a drastic stricture along the centre-line of the vocal tract; nonconsonantal sounds are made without such obstruction. Obstruents, nasals and liquids are consonantal; vowels and glides" are nonconsonantal.

2. SYLLABIC - NONSYLLABIC [± syllabic] Syllabic sounds are sounds which function as syllable nuclei; nonsyllabic sounds occur at syllable margins. Normally,

syllabic sounds are auditorily more salient than adjacent nonsyllabic sounds. Vowels are syllabic and so are syllabic consonants such as [J] in bottle and candle or the nasal [n] in cotton and [m] in bottom.

3. SONORANT - NONSONORANT (OBSTRUENT) [± sonorant] Sonorants are produced with a vocal cavity disposition which makes spontaneous voicing easy while nonsonorants (obstruents) have a vocal cavity disposition which inhibits spontaneous voicing. In other words,the unmarked (normally expected and natural) state for sonorants is to be voiced, while for obstruents the unmarked state of affairs is to be voiceless. Vowels, nasals and liquids are sonorant; stops, fricatives and affricates are obstruents.

. CORONAL - NONCORONAL [± coronal] To produce a coronal sound, the blade of the tongue is raised towards the front teeth, the alveolar ridge or the hard palate; for noncoronal consonants the blade of the tongue remains in a neutral position. Dental, alveolar, alveo-palatal, retroflex and palatal sounds are coronal; labial, velar, uvular and pharyngeal consonants are noncoronal.

5. ANTERIOR - NONANTERIOR [± anterior] In the production of anterior sounds, the main obstruction of the airstream is at a point no farther back in the mouth than the alveolar ridge; for nonanterior sounds the main obstruction is at a place farther back than the alveolar ridge. Labials, dentals and alveolars are anterior while all other sounds are not.

6. LABIAL - NONLABIAL [± labial] A sound is labial if it has a stricture (narrowing) made with the lips; if there is no such stricture, the sound is nonlabial. In the literature the alternative feature ROUND is often used to refer to many of the sounds which can also be described as labial. Rounded sounds are produced with a pursing or narrowing of the lip orifice. There is a considerable degree of overlap

between the groups of sounds covered by the features [+ round] and [+labial]. Rounded sounds like [o] [u] and [w] are a subset of labial sounds; consonants like [p b m] are labial but not round. Labial sounds include bilabial and labiodental consonants as well as rounded vowels. All other sounds are nonlabial.

7. DISTRIBUTED - NONDISTRIBUTED [± distributed] Distributed sounds are made with an obstruction extending over a considerable area along the middle-line of the oral tract; there is a large area of contact between the articulators. In nondistribution.