• It requires less effort to be acquired as a second language by an adult.
• It poses relatively little difficulty when being translated out of, or being translated into.
• It provides greater specificity for naming and for describing social stratification.
• It has richer resources for expressing emotions.
• It is highly suitable for encoding cooperative endeavor, for conveying information in a succinct and memorizable manner, for functioning as a vehicle for aesthetic expression, for being a conduit for scientific thought and argumentation, and for being effective for mass persuasion.

D gives detailed instructions for weighting the features and comparing the ‘scores’. He concludes the discussion with the encouraging appeal ‘Let’s check it out’ (246). Eager to comply with this request, I first had Kazakh, one of my favorite Turkic languages, in mind. It then struck me that Esperanto, according to the clearly declared purpose of its inventor Ludwik Zamenhof, actually comes closest to the ideal in most structural respects. This artificial language, devised as an international medium of communication, possesses a Eurocentric vocabulary and grammar, but is rather easily learned in different parts of the world, for instance in Japan. Is it disqualified because it does not assist in ‘the process of belonging’, mirroring a certain environment, society, or culture, thus simply lacking a ‘genius’?

D confesses that this book is, ‘in essence, speculation—a hypothesis awaiting confirmation’ (246). It is, however, speculative at a high intellectual level, thought-provoking, stimulating, and inspiring. It provides a wealth of interesting data, drawn from the author’s own ‘forty years of immersion fieldwork’ (vii) on lesser-known languages and analyzed in a lucid way. The book is a veritable compendium of linguistics, a collection of concise but detailed information about the essential components of human languages. It is written in an accessible, enjoyable, and refreshingly clear style. It also brings many other important questions into focus, for example, the varying extents to which speakers of diverse tongues make use of the vast potential resources of human language.

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In this book, San Duanmu proposes a minimal set of distinctive features to account for the segmental contrasts observed in phoneme inventories of about 1,000 languages. This is the first large-scale investigation of this type, and I think phonologists are likely to be surprised by how efficiently these contrasts are accounted for and by which phonological distinctions are not necessary. The book provides a wealth of setting-off points for further work investigating the sound systems of the world’s languages. D has written extensively on prosodic and segmental phonology. Pursuing a minimal set of phonological distinctive features has been a thread through much of his work, culminating in this book.

The project is reminiscent of Jakobson, Fant, and Halle’s (1952) Preliminaries to speech analysis: The distinctive features and their correlates, because it addresses segment inventories
but not classes of sounds involved in phonological rules. Jakobson and his colleagues had the
spectrograph and information theory as new sources of insight, and D has about 1,000 phoneme
inventories reported in UPSID (Maddieson 1984, Maddieson & Precoda 1990) and P-base
(Mielke 2008), enabling him to examine segmental contrasts on a large scale.

The heart of the book is the analysis of inventories, documented in Chs. 2–5. Ch. 6 proposes
the feature system motivated by this investigation. Chs. 1 and 6–8 address several major phono-
logical topics, such as the granularity of speech segmentation, tone features, underspecification,
phonetic realization, and the representations of allophones.

It is helpful to consider the potential implications both internal and external to the study of seg-
mental contrasts. The intrinsic value of positing a universal feature set to account for observed
segmental contrasts is greatest when the features have clear phonetic definitions. Strictly en-
forced phonetic definitions are what separate a restrictive proposal of nineteen binary features
from one that is only falsified by an inventory with more than 524,288 (2^19) segments. Further, if
a feature system that is motivated by inventories can account for other types of phonological ob-
servations, then it involves a fundamental claim about phonology rather than a claim about the
description of inventories. D hypothesizes that the proposed feature system could account for
classes of sounds involved in phonological patterns and provide a model of possible categorical
allophones.

D’s starting point is the principle of contrast, which states that every pair of contrastive
sounds in every language must be distinguished by at least one feature. His method for identifying
necessary distinctive features is to search the inventories to find out how many degrees of
contrast are required in each phonetic dimension (the maxima first principle). For example,
searching the inventories for vowels that appear to differ primarily in backness turns up pairs of
sounds in most languages (which is solid evidence that the feature system minimally needs a bi-
ary backness contrast), but it also yields several apparent backness triplets such as [i i u] and
[e ø ɤ], which suggest the necessity of three degrees of backness. If each of these can be reana-
lyzed in a way that requires only two degrees of backness, then just a single binary feature is
posited. Some of the major results of applying this method are the conclusions that all features are
binary, that vowel quality can be described with four binary features for height, backness, round-
ing, and tongue root advancement, and that phonation differences can be handled exclusively by
[stiff] and [spread]. D points out that binarity is not necessarily predicted by innatism or function-
alist approaches to phonology; it is simply a result of the method he has applied.

Ladefoged (2007) also proposed a feature set meant to account for all segmental contrasts,
based on his own phonetic data and other phonetic descriptions of languages exhibiting rare con-
trasts. These two feature proposals demonstrate opposite approaches to a splitter-lumper prob-
lem: Ladefoged sought to represent phonological contrasts and phonetic differences, and D seeks
only to represent phonological contrasts. Ladefoged examines phonetic data and reports five de-
grees of contrastive vowel height, and D examines inventories and reports only two. Ladefoged
reports nine coronal places of articulation and four associated tongue shapes, and D reports three
coronal places that can be produced with or without tongue-body involvement. D’s approach is
clearly a more aggressive effort to make sure that every proposed feature really is necessary to
contrast the segments in at least one inventory. This process of reanalyzing apparent exceptions is
really the heart of the book, and whether or not readers accept the book’s conclusion depends on
whether they accept how the reanalyses are conducted. Some of these decisions are sure to be
controversial, but the method is described explicitly enough that even a very skeptical reader is
likely to learn something about what happens when the method is applied.

Some of the reanalyses are supported by phonetic evidence in the original sources or other de-
scriptions. For example, avoiding a tense/lax distinction in consonants involves reinterpreting ap-
parent tense/lax consonant contrasts using other features (length, aspiration, breathiness, and
stop/fricative contrasts). One instance of this is in Godoberi, whose original source (Kodzasov
1996) describes the lax consonants as also being aspirated, and so D’s feature system treats them
as [+spread]. In other cases phonological evidence is used: Ngizim lateral fricatives resist palatal-
ization, so they are interpreted as already palatalized, and no phonological features are proposed
to describe lateral fricatives. Occasionally, functional load is questioned; for example, the reported [ə]-[a] contrast in Bete is eliminated because the original source supports the contrast with near-minimal pairs that differ in tone. Other reanalyses take the form ‘Segment X can be reinterpreted as segment Y because the inventory doesn’t have segment Y’. For example, [i] is reanalyzed as [i] or [ə] in Ashuku and Tepecano, to avoid three degrees of backness in inventories that already have [i] and [u].

D’s feature system (described in Ch. 6) is explicitly articulatory, drawing on elements of earlier proposals by Browman and Goldstein (1989), Halle (1995), and Ladefoged (2007). Most of the features are organized in terms of seven articulators (lips, tip, body, root, velum, glottis, and larynx). Some of the articulators can be associated with location features [back] or [front], which allows a larger number of places of articulation. [stop], [fricative], and certain other features define manner of articulation. For example, [m] is represented with Lips-[+stop] (bilabial closure), Velum-[−stop] (open velo-pharyngeal port), and Glottis-[−stiff, −spread] (voiced but not aspirated). [i] is represented with Lips-[−round], Body-[+high, −back], and Root-[+advanced].

Many of the vowel reanalyses involve using length and/or a tongue root feature to distinguish vowels originally described using three or more degrees of backness or height. These approaches are tricky for opposite reasons. It is hard to find a pair of vowels that do not differ in length (especially when they also seem to differ in height), so measurable length differences are often readily available to provide an escape from positing further levels of height. D’s reanalyses are limited to instances where an original source reported a length difference. The tongue root can play a role similar to length precisely because it is hard to observe. D’s Root-[advanced] corresponds to the feature [ATR] (advanced tongue root), which Halle and Stevens (1969) proposed in order to represent vowel contrasts observed in West African languages as well as the English tense/lax contrast, because both involved pharynx expansion by means of tongue root advancement. For most of ATR’s history, it has been very hard for most linguists to assess the advancement of a speaker’s tongue root, allowing the feature to serve as an all-purpose tool for reanalyses that are hard to falsify.

The recent proliferation of ultrasound machines among phonologists has made these claims easier to evaluate. For example, Allen and colleagues (2013) have recently shown that Yoruba does in fact use the tongue root for phonological patterns previously described as involving [ATR]. By contrast, Ladefoged (2007:166) presents Danish as an example of a language with four distinct vowel heights, explicitly observing that tongue root position is directly related to tongue height and not an independent feature. D reduces the Danish vowel system to two heights, using Root-[advanced] (defined explicitly as an independent forward movement of the tongue root) to subdivide within high and low vowels, without further data or explanation.

D’s use of [ATR] in such cases is driven by his known feature first principle: that is, use known features (such as [ATR]) before introducing any new features, unless evidence requires otherwise. My concern here is that the relative inaccessibility of evidence for or against [ATR] has led to its overuse. If we say ‘[ATR]’ when we mean ‘[unknown vowel feature]’, we generate a phonological literature that overestimates the frequency of tongue root contrasts and likely underestimates the crosslinguistic diversity of vowel systems. In some languages, like Yoruba, it is clear that the tongue root is independently involved. In others, like Danish, it seems clear that it is not. In most of the analyses in this book where Root-[advanced] plays a critical role, we simply do not know. Having said this, I think D and I agree that these tongue root analyses (and other potentially controversial instances of minimalism) are not a bug but a feature: by identifying the inventories that seem most challenging for a minimalist articulatory feature system, the book does a great job of calling attention to inventories that need further phonetic study.

Ch. 7, ‘Complex sounds’, deals with types of sounds that appear to be challenging to the model proposed in Ch. 6 and establishes criteria for what is considered to be one sound or two. In order to eliminate contour features from the representation of consonants, Ladefoged and Johnson’s (2011) articulatory descriptions of click, ejective, and implosive consonant production are revised. Clicks are represented featurally as Root-[−advanced] multiply articulated stops, where tongue root retraction is responsible for lowering the tongue body to create suction (contrary, I
think, to present understanding of tongue motion and click production). Ejectives and implosives receive similar analyses involving a single value of Larynx-[raised]. In each case, neighboring sounds provide opposite values of features involved in tongue-body lowering or larynx position, in order to avoid contours within the consonants themselves. A second, alternative, analysis of clicks, implosives, and ejectives treats them instead as consonant clusters.

Since Halle’s (1959) *The sound pattern of Russian*, the classes of sounds involved in phonological alternations have been central to most feature proposals. Setting aside the question of whether a small universal set of distinctive features can describe observed sound patterns, I feel confident that accounting for recurrent sound patterns would require an expansion of the feature set motivated by contrast. Many familiar features, such as [sonorant], [continuant], [strident], [distributed], and [low], are not needed in D’s analysis of inventories. He notes that the [+sonorant] class can be represented in his system as [−stop, −fricative]. However, it is the [−sonorant] class that is active: Mielke 2013 reports eighty-one examples of a phonologically active [−sonorant] class in P-base and no examples of a phonologically active [+sonorant] class. This is a fact about phonological patterning that does not seem to coincide with facts about minimal description of phonological inventories.

Another phonological implication of the proposed features system is that it is meant to provide a model of allophony, namely, that descriptions of allophonic patterns and narrow phonetic description should only involve features that are contrastive in another language (which means that narrow phonetic description does not even include mid vowels in the proposed system). D makes explicit throughout the book that most or all phonetic variation and most or all details of phonetic realization are not meant to be accounted for by the proposed model—that is, the precise way the speech articulators are used to produce speech in a given language is distinct from the phonological representations that refer to them. The usefulness of this approach (restricting phonological analysis to categories that can be defined using features required for the most parsimonious description of segment inventories in other languages) remains to be explored.

This is a book that takes a bold position and identifies a large number of critical cases. It lays out a road map for all kinds of follow-up studies. This makes the book a great resource for anyone who is looking for a self-contained and clearly defined phonological research question, or anyone whose job involves helping students develop such questions. Any of the many apparent exceptions addressed in Chs. 3–5 can be followed up by phonetic or phonological studies. In all likelihood someone is going to evaluate at least some of the claims using PHOIBLE (Moran et al. 2014), a database of inventories from 1,672 languages. Comparing the proposed feature system to phonological classes and other types of phonological observations is likely to reveal a lot about phonology as well.

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Gordon’s Phonological typology (PT) is a survey of the crosslinguistic variation found in selected phonological phenomena. There is an emphasis throughout on explaining such variation, resulting in a book that is highly theoretically informed. There are also many discussions of within-language frequency of phonological categories—something rarely found in work of this type. Overall, PT is a masterful work, written by a highly qualified author: G has many publications in theoretical phonology and has presented extensive typological research as evidence for his theories.

It is important to say what PT is not. It does not propose any new theories, and it is not a textbook. PT is also not a handbook—it does not provide deep exploration of individual topics. Instead, PT bridges the gap between a textbook and a handbook: it provides an overview of topics and serves as a jumping-off point for deeper study in either handbooks or original sources. Accordingly, much of the book presupposes a strong foundation in phonological theory, so undergraduates would find it very difficult, if not impossible, to understand the discussions without help. While it is a survey, PT is not merely a catalogue of generalizations. There is continual emphasis on explanation, and on the many sources of explanation for typological asymmetries, with an excellent overview in Ch. 2. PT presents constant reminders that theories play a necessary role in typological exploration.

PT also has a social goal: to encourage better communication between typologists and theoretical phonologists. Over the past three decades, a great deal of work in theoretical phonology has involved typological research, often driven by predictions of proposals expressed in Optimality Theory (OT; Prince & Smolensky 2004). At the same time, phonology has been less prominent among typologists, leading to what G calls ‘the impoverished position of phonology in typology’ (5; see also Hyman 2007). PT provides a way for typologists to gain quick insight into the crosslinguistic variation of many phonological phenomena, as well as to understand theoreticians’ motivations for their typological work. In a sense, PT is a theoretician reaching out to typologists. To a lesser extent, it also encourages theoreticians to take note of work in typology; PT discusses many databases and descriptions that will help inform theoretical work. By contrast, PT does not provide extensive discussion of the methods used by typologists in their work—not even on such basic issues as how to provide a balanced sample of languages in a typology, and how such balancing might be relevant to theoreticians. So, while PT is a bridge between typologists and theoreticians, it is mainly one-way.

I believe PT will be at its most useful in advanced undergraduate phonology classes and introductory graduate courses. The chapters cover syllables, segmental processes, stress, tone and in-