
Week 0 – Phonetics and Phonology

February 13, 2008

1 What is Phonology?

1.1 Questions

- (1) What is phonology? The study of the sound patterns in the world's languages.
- (2) Phonology tries to answer the following questions:
 - a. What are the sound patterns of the world's languages?
 - b. Are these patterns arbitrary or are they predictable from general principles? If so, what are those principles?
 - c. What are possible sound patterns?
 - d. How do language phonologies change over time?
 - e. How can we characterize the knowledge speakers have about the sound patterns of their language?
 - f. How do children learn the sound patterns of their language?

1.2 Productivity

- (3) Phonological knowledge is **productive**.
 - a. 'Blick' tests: Is 'blick' a possible word in your language? Hayes and Wilson (2008) provide a pretty thorough list of papers with 'blick' tests.
 - b. 'Wug' tests: What is the past tense (your favorite derivational/inflectional form here) of 'wug'? Berko (1958) is the classic study from whence 'wug' was coined. See Albright and Hayes (2003) for experimentation and modeling of English past tense intuitions.
 - c. Note experimenters *do not* ask questions as bluntly as these. (Well, maybe they do in the 'blick' tests).

★ Is the number of possible English words (i.e. words like 'blick') finite? What about in other languages?

- (4)
 - a. If finite, then we are not driven to a generative grammar—we could describe our competence with a list.
 - b. If infinite, then we are driven to a generative grammar—a finite device that generates an infinite amount of material.
- (5) The answer is less clear than in syntax, where the question is quickly settled by pointing out there is no longest sentence. Do English words have a maximal size restriction? Other languages?

1.3 Non-arbitrary variation

- (6) When we consider the many dimensions along which sound patterns could possibly vary, the variation appears quite constrained, suggesting the grammars are constrained as well.
- (7) SPE's approach to the limited variation
 - a. Define an evaluation metric over grammars
 - b. Goals of the evaluation metric:
 - (i) Grammars which are highly-valued by the evaluation metric ought to be natural, common patterns.
 - (ii) Grammars which are lowly-valued by the evaluation metric ought to be uncommon, rare patterns.
 - c. We might also expect that highly-valued grammars are easier to learn than lowly-valued grammars (many ways this idea can be implemented)
- (8) In a nutshell, the idea is this: phonologies are constrained because grammars are constrained.
- (9) What are the constraints on grammars? Put differently, how are learners biased to construct grammars from their language experience?

2 The Phonetics–Phonology Interface

- (10) Figure 1 shows the classical view of the phonetics-phonology interface.

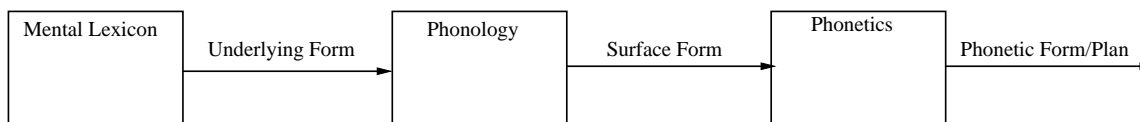


Figure 1: Classic Competence Model of the Phonology-Phonetics Interface

- (11) Explanation of terms
 - a. The *mental lexicon* is a list of lexical items (where we get our URs from)
 - b. *Phonology* here is meant in a narrow sense: the mapping from URs to SRs.

- c. *Phonetics* takes the still-highly idealized surface form and implements a plan of action for the articulators (perhaps taking into account intended perceptual goals) which if executed perfectly in perfect conditions produces the ideal phonetic form.

★ Where do morpheme structure constraints and surface constraints fit in this picture?

★ Where does the notion of limited cross-linguistic variation fit in?

- (12) Practically every aspect of this diagram is controversial.
- a. Representations
 - (i) How should the mental lexicon be represented?
Possible answer 1: phonemic form
Possible answer 2: surface form
Possible answer 3: phonetic form (e.g. exemplar theory)
 - (ii) How should the phonemic form be represented?
 - (iii) How should the surface form be represented?
 - (iv) E.g. are these forms bottlebrushes? or linear sequences of feature bundles (or feature trees?) Can they be underspecified?
 - b. Boundaries
 - (i) Lexical Phonology instantiates a loop between the lexicon and phonology
 - (ii) Phonological patterns are influenced by phonetic factors. Shouldn't there be some kind of arrow from *Phonetics* to *Phonology*?
 - c. Within *Phonology*, are there serially-ordered derivations or can the mapping from URs to SRs be done “in parallel” (i.e. without ordered rules)?
 - d. ... (add your own here)
- (13) This semester we will study many of these questions in the framework of Optimality Theory. Some questions will not be studied, but in such cases I hope to make the assumptions clear.

3 The Intrinsic Content of Features

- (14) Chomsky and Halle's last chapter (chapter 9) of *Sound Pattern of English* (SPE) is titled “Epilogue and Prologue: The Intrinsic Content of Features”. It begins as follows:

Some unresolved problems [section header]. The entire discussion of phonology in this book suffers from a fundamental theoretical inadequacy

... In particular, we have not made any use of the fact that the features have intrinsic content. By taking this intrinsic content into account, we can, so it appears, achieve a deeper and more satisfying solution...

- (15) Chomsky and Halle illustrate what they mean with a number of examples:
- a. For any language with which anyone has described with SPE style rules, replace $[\alpha F]$ with $[-\alpha F]$. Theoretically equivalent, but arguably less natural.
 - b. Natural classes requiring more features to define would appear to be more complex than natural classes requiring fewer features to define. But the class $[\alpha \text{back}, \alpha \text{round}]$ intuitively is more natural than $[\alpha \text{low}, \alpha \text{around}]$ which contains $[i \ e \ i \ \text{æ} \ \Lambda \ \text{ɔ}]$

★ Can you think of more examples?

- (16) The basic problem is how to define the evaluation metric in such a way that it takes into account the “intrinsic content of features”. Chomsky and Halle begin to outline one approach, compatible with SPE, based on markedness.
- (17) Although we will not address this question right away, I hope to examine some answers to this question within the dominant framework today, Optimality Theory (Prince and Smolensky 1993, 2004).

4 Next Week

- (18) We move away from the articulators and acoustic signals you will read about and look at things a little more abstractly. In fact we make precise many of the points discussed today and develop a set of tools we use (and refer to) throughout the course.

References

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