Handout #5

Working with natural classes

Natural classes

- Phonological patterns are patterns in the distribution of **classes of sounds**, defined in terms of **classes of sounds**.
- So the most important skill in phonological analysis is the ability to look at a set of sounds and determine if they have anything in common, i.e. if they form a natural class.
- Consider, for example, the following set of vowels.

A vowel inventory

	Front	Central	Back
High	**i**		**u**
Mid	**e**		**o**
Low		**a**	

Vowel classes

- In this set of vowels:
  - What are the vowels that are [-back]?
  - What are the vowels that are [+lab]?
  - What are the vowels that are [-ATR]?
  - What is the feature specification for the set [a, o, u]?
  - What is the feature specification for the set [e, a, o]?

A consonant inventory

	Bilabial	Alveolar	Alveopa-latal	Velar
Voiceless plosives	p	t		k
Voiced plosives	b	d		g
Voiceless fricatives		s	ʃ	
Voiced nasal stops	m	n		ŋ

Consonant classes

- In this set of consonants:
  - What are the consonants that are [-back]?
  - What are the consonants that are [+voice]?
  - What are the consonants that are [-son]?
  - What is the feature specification for the set [p, t, k]?
  - What is the feature specification for the set [p, t, k, s, ʃ]?

Japanese

- In Handout #3, we saw a dataset for Japanese that included the following sounds:
  - Voiceless plosives: t, k
  - Voiceless affricates: ts, tʃ
  - Voiced fricative: z
  - Voiced nasal stops: m, n
  - Vowels: i, e, a, o, u

Japanese

- In our analysis, we ended up with two rules:
  - Rule 1: Change an alveolar stop into an alveopalatal affricate if it occurs before a high front vowel.
  - Rule 2: Change an alveolar stop into an affricate if it occurs before a high back vowel.
- How would these rules be formulated in formal notation, using distinctive features?

Luganda

- The Luganda dataset in Handout #3 included the following sounds:
  - Vowels: i, e, eː, a, aː, o, oː, u, uː
  - Plosives: t, k, b, d, g
  - Affricates: dʒ
  - Fricatives: f, fː, sː, z
  - Nasal stops: m, n
  - Sonorant oral consonants: l, ɾ, w, j

Luganda

- Restate the following phonological rule in formal notation:
  - Change a lateral approximant into a tap if it occurs after a front vowel.

Chatino (Mexico: Kenstowicz and Kisseberth 1979: 40-42)

- Voiced vowels: [i, e, a, o, u]
- Voiceless vowels: [i̥, e̥, ḁ, o̥, u̥]
- ki̥ˈsu "avocado"
- ku̥su̥ʔˈwa "you will send"
- se̥ˈʔe "place"
- ʃi̥ˈʔɪ "sad"

Chatino (Mexico)

- tạˈʔa “fiesta”
- tịˈhi “water”
- tụʔˈwa “mouth”
- kiˈno “sandal”
- siˈju “juice”
- suˈla “open!”
- tiˈje “stomach”

Chatino (Mexico)

- laˈʔa “side”
- loˈʔo “where”
- ndiˈki “you are burning”
- nguˈʃi “tomato”
- ˈkiʔ “fire”
- ˈhaʔ “grass mat”
- kạˈta “you will bathe”

Distribution

- What is the distribution of the voiced vowels relative to the voiceless vowels?

Analysis

- Phonemes: / /
- Rule (in formal notation):

- Give the underlying representation of the word [kʰusʰʔˈwa].

German: Velar [x] and palatal [ç] (Wiese 1996)

- axt “eight” (*acht*)
- bux “book” (*Buch*)
- lɔx “hole” (*Loch*)
- hoːx “high” (*hoch*)
- ʀaʊxən “to smoke” (*rauchen*)
- laxən “to laugh” (*lachen*)

German: Velar [x] and palatal [ç]

- ɪç “I” (*ich*)
- ɛçt “real” (*echt*)
- lɛçəln “to smile” (*lächeln*)
- ʀaɪçən “to reach” (*reichen*)
- byːçəʀ “books” (*Bücher*)
- høːçstəns “at most” (*höchstens*)
- mʏnçən “Munich” (*München*)
- kɪʀçə “church” (*Kirche*)

German: Velar [x] and palatal [ç]

- çiːna “China” (*China*)
- mɛːtçən “girl” (*Mädchen*)
- çɛmiː “chemistry” (*Chemie*)
- flʊxt “escape” (*Flucht*)
- flʏçtɪç “fugitive” (*flüchtig*)

German

- State the distribution of [ç] and [x] in German.

- List the phoneme(s): / /

German

- State the phonological rule in formal notation:

German: Derivation

Underlying representation	/ /	/ /
Rule		
Surface representation	[axt]	[ɪç]

References

- Kenstowicz, Michael and Charles Kisseberth (1979). *Generative Phonology: Description and Theory*. Academic Press, San Diego.
- Wiese, R. (1996). *The Phonology of German*. Oxford University Press, Oxford.