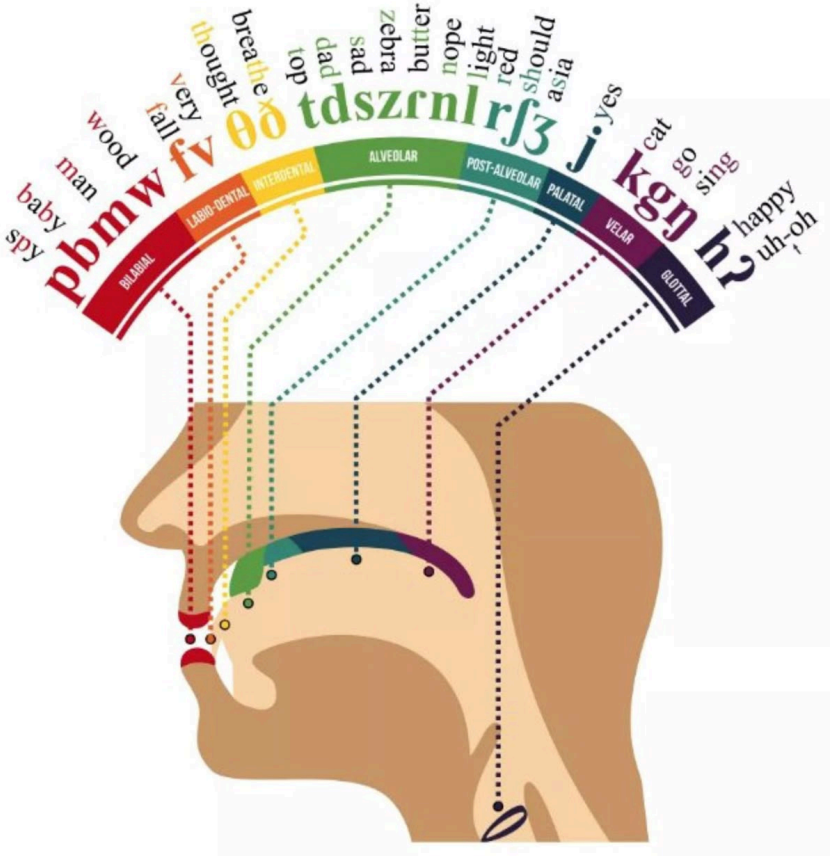
RUTGERS

Phonology I

Merlin Balkhash
Department of Linguistics, Rutgers University
2025/11/21 (updated: 2025-11-20)

Previously on 201



vowel articulation

- tongue **height** (high, mid, low)
- tongue **backness** (front, central, back)
- lip **roundness** (rounded, unrounded)
- **nasalisation**
- **vowel length**
- **pitch** (tone, etc)

categories to differentiate consonants

- **voicing**
  - **whether** the vocal cords vibrate or not
- **place**
  - **where** the obstruction of airflow in the vocal tract is
- **manner**
  - **what type** of obstruction of airflow occurs

]

Some Terms

Phonetics: study of speech sounds as a physical phenomenon

Phonology: study of how languages organize speech sounds into a **system** (pattern)

phoneme: a set of sounds that speakers of a language treat as being the same

- writen in a pair of slahses: **/b/**, **/d/**, **/g/**

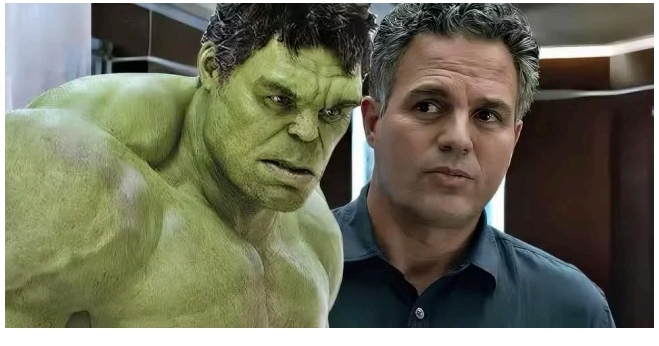
allophone: each individual possible sound that a **phoneme** could surface as

Phonotactics: **rules** for how we combine sounds to form words

- English doesn't allow the velar nasal (**[ŋ]**) at the beginning of a word, but Shanghainese does

/SUPERMAN/

/HULK/



Contrastive and Complementary Distribution

contrastive distribution: when switching out one phoneme for another results in a different meaning

- these word pairs are called **minimal pairs**
- they detect which sounds are **phonemes**
- [**ð**æt] ('*that*') vs. [**m**æt] ('*mat*')

complementary distribution: when switching a sound out for another sound does not change the meaning

- these sounds are allophones of the **same** phoneme
- different environments cause the sound to **change**, but in the minds of speakers they are still considered **one** sound
- [**p**ejs] ('*pace*') vs. [s**p**^{h}ejs] ('*space*')

/p/

/SUPERMAN/

[*Clark Kent*] [*superman*]

[*p*] in [spejs] [*p*^{h}] in [p^{h}ejs]

"Common" Sounds

Different languages **contrast** different sounds, but, there are some **common trends**

more common	less common
[a]	[ă] (nasalised)
[k] *or* [s]	[x]
[t]	[s]
[p, t, k]	[b, d, g]
[d] *or* [z]	[ð]
[k]	[q]

If a language has the sounds on the **right** of each row, then it will also have the corresponding sound on the **left**

Phoneme or *Allophone*?

[step 1] for each word, write the **preceding** and **following** segment for **the sound** you're testing

[step 2] write down each different environment (again, looking at both the **preceding** and **following** sounds)

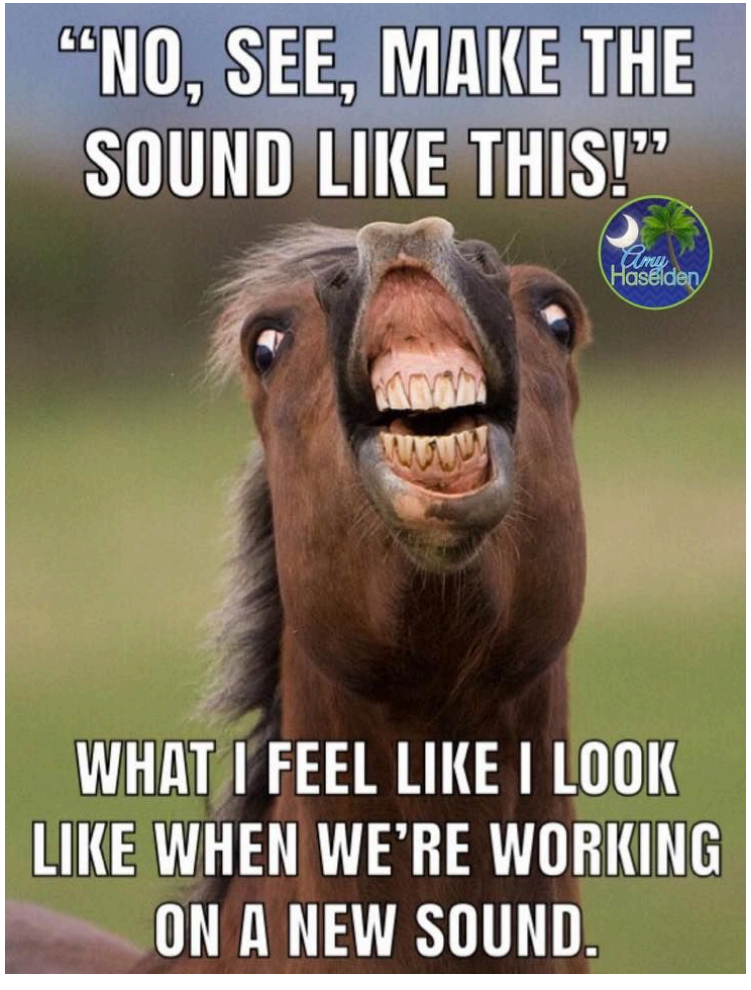
[step 3] see if there are any **common environments** that both potential phonemes share

notes

- **minimal pairs** are used to find evidence that two sounds are **phonemes**
- **#**: word boundary, _: the sound being tested

[#_æt] ('*that*') **&** [#_æt] ('*mat*') -- **phoneme**

[#_ejs] ('*pace*') **&** [s_ejs] ('*space*') -- **allophone**



Recitation Topics

- Review concepts of phonemes and allophones and contrastive/complementary distribution
- Practice identifying minimal pairs (and remind students we use minimal pairs to find evidence that two sounds are phonemes)
  - Give students word pairs and ask them to identify which are minimal pairs
  - Give students two contrasting phonemes in English and ask them to come up with a minimal pair that illustrates the contrast
- Practice identifying the phonetic environment a sound occurs in
- Practice identifying whether sounds are in complementary or contrastive distribution and therefore whether they are two separate phonemes or allophones of the same phoneme
  - I'm attaching two datasets you can work through with students, or you can use other datasets – make sure whatever dataset you use is fairly straightforward
  - I recommend asking students to write out the phonetic environment and look for patterns based on that

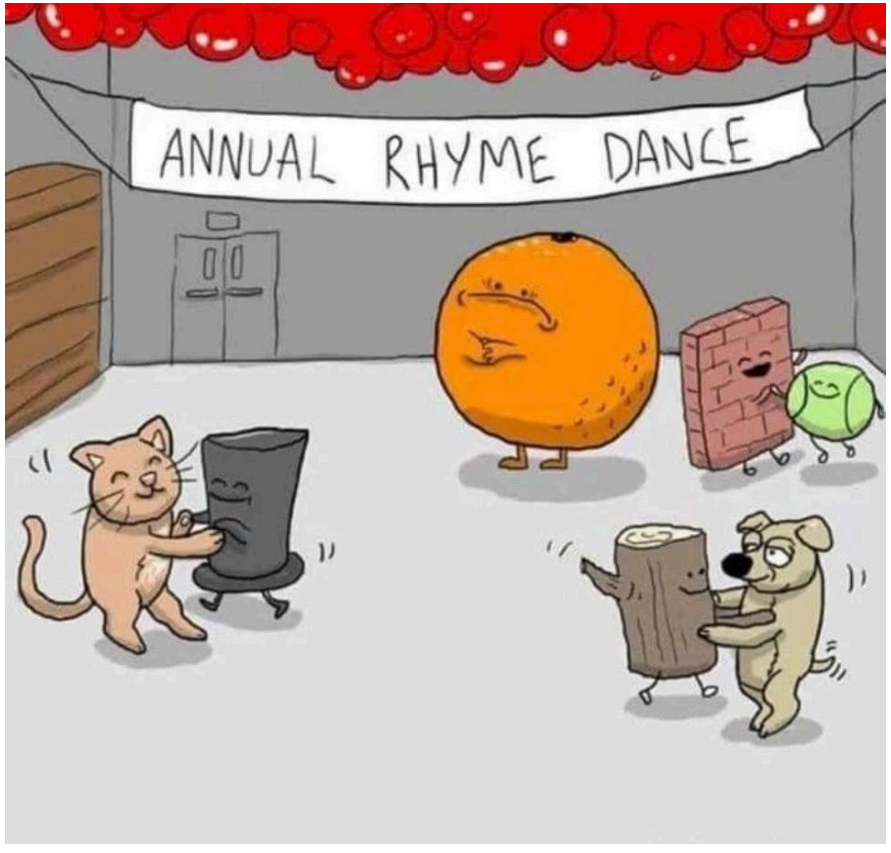
Prac.: Minimal Pairs I

Are the following pairs of words **minimal pairs**? If they are, what **phonemic contrast** do they illustrate?

1. wait, date
2. top, tap
3. fine, line
4. frog, log
5. boot, lute
6. might, fright
7. jeep, peace

focus on the **sounds**

not the **spelling**



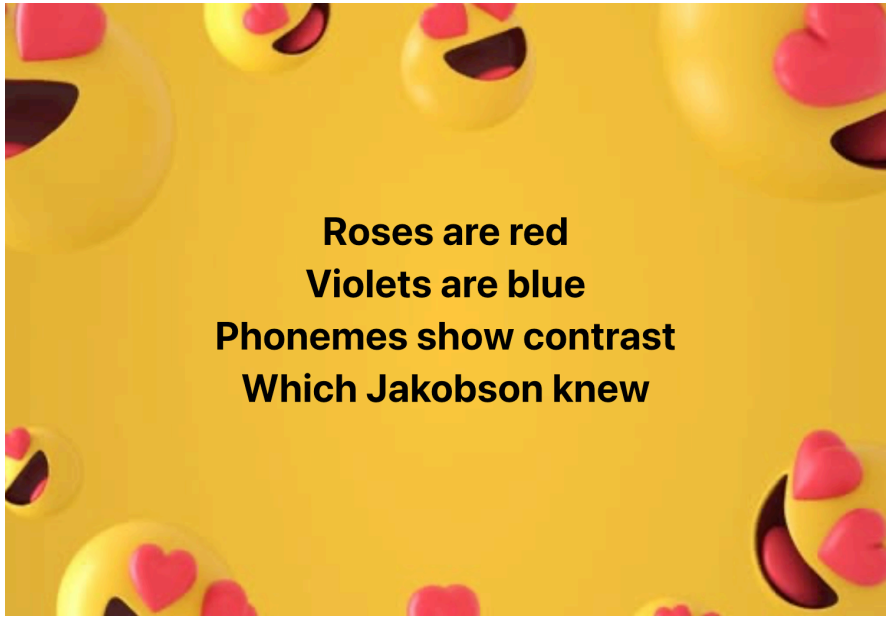
Prac.: Minimal Pairs I

focus on the **sounds**

not the **spelling**

Are the following pairs of words **minimal pairs**? If they are, what **phonemic contrast** do they illustrate?

1. wait, date — **yes [w]** *and* **[d]**
2. top, tap — **yes [ɔ]** *and* **[æ]**
3. fine, line — **yes [f]** *and* **[l]**
4. frog, log — **yes [r]** *and* **[l]**
5. boot, lute — **yes [b]** *and* **[æ]**
6. might, fright — **yes [ɔ]** ***and*** **[æ]**
7. jeep, peace — **no**



Practice: Minimal Pairs II

Find a **minimal pair** to illustrate the following contrasts (the phonemes do not need to be at the beginning of the word):

1. /f/ – /v/
2. /b/ – /p/
3. /θ/ – /ð/
4. /n/ – /ŋ/
5. /a/ – /u/
6. /ʃ/ – /t͡ʃ/
7. /t/ - /θ/

Practice: Sindhi

Examine the distribution of the sounds **[p]**, **[pʰ]**, **[b]** in these words from **Sindhi**, an Indo-European language spoken in Pakistan and India. Do you notice any **minimal pairs**?

If so, what does that mean for these sounds – are they in **contrastive** or **complementary** distribution? Are they separate **phonemes** or are they **allophones** of the same phoneme?

1. [pənu] 'leaf'
2. [vədʒu] 'opportunity'
3. [ʃeki] 'suspicious'
4. [gədo] 'dull'
5. [dəru] 'door'
6. [pʰənu] 'hood of snake'
7. [təru] 'bottom'
8. [kʰəto] 'sour'
9. [bədʒu] 'run'
10. [bənu] 'forest'
11. [bətʃu] 'be safe'
12. [dʒədʒu] 'judge'

Practice: Sindhi

Examine the distribution of the sounds **[p]**, **[pʰ]**, **[b]** in these words from **Sindhi**, an Indo-European language spoken in Pakistan and India. Do you notice any **minimal pairs**?

If so, what does that mean for these sounds – are they in **contrastive** or **complementary** distribution? Are they separate **phonemes** or are they **allophones** of the same phoneme?

1. **[pənu]** 'leaf'
2. [vədʒu] 'opportunity'
3. [ʃeki] 'suspicious'
4. [gədo] 'dull'
5. [dəru] 'door'
6. **[pʰənu]** 'hood of snake'
7. [təru] 'bottom'
8. [kʰəto] 'sour'
9. [bədʒu] 'run'
10. **[bənu]** 'forest'
11. [bətʃu] 'be safe'
12. [dʒədʒu] 'judge'

Practice: Sindhi

Examine the distribution of the sounds **[p]**, **[pʰ]**, **[b]** in these words from **Sindhi**, an Indo-European language spoken in Pakistan and India. Do you notice any **minimal pairs**?

If so, what does that mean for these sounds – are they in **contrastive** or **complementary** distribution? Are they separate **phonemes** or are they **allophones** of the same phoneme?

1. [pənu] 'leaf'
2. **[vədʒu]** 'opportunity'
3. [ʃeki] 'suspicious'
4. [gədo] 'dull'
5. [dəru] 'door'
6. [pʰənu] 'hood of snake'
7. [təru] 'bottom'
8. [kʰəto] 'sour'
9. **[bədʒu]** 'run'
10. [bənu] 'forest'
11. [bətʃu] 'be safe'
12. **[dʒədʒu]** 'judge'

Practice: Sindhi

Examine the distribution of the sounds **[p]**, **[pʰ]**, **[b]** in these words from **Sindhi**, an Indo-European language spoken in Pakistan and India. Do you notice any **minimal pairs**?

If so, what does that mean for these sounds – are they in **contrastive** or **complementary** distribution? Are they separate **phonemes** or are they **allophones** of the same phoneme?

1. [pənu] 'leaf'
2. [vədʒu] 'opportunity'
3. [ʃeki] 'suspicious'
4. [gədo] 'dull'
5. [dəru] 'door'
6. [pʰənu] 'hood of snake'
7. [təru] 'bottom'
8. [kʰəto] 'sour'
9. **[bədʒu]** 'run'
10. **[bənu]** 'forest'
11. **[bətʃu]** 'be safe'
12. [dʒədʒu] 'judge'

Practice: Sindhi

Examine the distribution of the sounds **[p]**, **[pʰ]**, **[b]** in these words from **Sindhi**, an Indo-European language spoken in Pakistan and India. Do you notice any **minimal pairs**?

If so, what does that mean for these sounds – are they in **contrastive** or **complementary** distribution? Are they separate **phonemes** or are they **allophones** of the same phoneme?

1. [pənu] 'leaf'
2. [vədʒu] 'opportunity'
3. [ʃeki] 'suspicious'
4. [gədo] 'dull'
5. **[dəru]** 'door'
6. [pʰənu] 'hood of snake'
7. **[təru]** 'bottom'
8. [kʰəto] 'sour'
9. [bədʒu] 'run'
10. [bənu] 'forest'
11. [bətʃu] 'be safe'
12. [dʒədʒu] 'judge'

Practice: Sindhi

Examine the distribution of the sounds **[p]**, **[pʰ]**, **[b]** in these words from **Sindhi**, an Indo-European language spoken in Pakistan and India. Do you notice any **minimal pairs**?

If so, what does that mean for these sounds – are they in **contrastive** or **complementary** distribution? Are they separate **phonemes** or are they **allophones** of the same phoneme?

1. [pənu] 'leaf'
2. [vədʒu] 'opportunity'
3. [ʃeki] 'suspicious'
4. **[gədo]** 'dull'
5. [dəru] 'door'
6. [pʰənu] 'hood of snake'
7. [təru] 'bottom'
8. **[kʰəto]** 'sour'
9. [bədʒu] 'run'
10. [bənu] 'forest'
11. [bətʃu] 'be safe'
12. [dʒədʒu] 'judge'

Practice: Quechua

Examine the sounds **[u]** and **[o]** in this data from **Quechua**. Write down **all** of the environments in which each sound occurs. Do you notice any patterns?
Does the pattern suggest the sounds are in **contrastive** or **complementary** distribution? Are they separate **phonemes** or **allophones** of the same phoneme?

1. [k**u**sa] 'nice'
2. [q**o**mer] 'green'
3. [tiŋk**u**] 'meeting'
4. [p**u**ka] 'red'
5. [q**o**sa] 'husband'
6. [p**u**ŋk**u**] 'door'
7. [aʎq**o**] 'dog'
8. [s**u**wa] 'thief'
9. [q**o**sq**o**] 'Cusco'
10. [q**o**tʃa] 'lake'

u	o
k_s	q_m

- **note**: [w] is not in IPA table, it is both bilabial and velar (co-articulation)

Practice: Quechua

Examine the sounds **[u]** and **[o]** in this data from **Quechua**. Write down **all** of the environments in which each sound occurs. Do you notice any patterns?
Does the pattern suggest the sounds are in **contrastive** or **complementary** distribution? Are they separate **phonemes** or **allophones** of the same phoneme?

1. [k**u**sa] 'nice'
2. [q**o**mer] 'green'
3. [tiŋk**u**] 'meeting'
4. [p**u**ka] 'red'
5. [q**o**sa] 'husband'
6. [p**u**ŋk**u**] 'door'
7. [aʎq**o**] 'dog'
8. [s**u**wa] 'thief'
9. [q**o**sq**o**] 'Cusco'
10. [q**o**tʃa] 'lake'

- **note**: [w] is not in IPA table, it is both bilabial and velar (co-articulation)

u	o
k_s k_# p_k p_ŋ k_# s_w	q_m q_s q_# q_s q_# q_tʃ

Practice: Kazakh

Examine the sounds [ɑ] and [æ] in this data from **Kazakh**.Do you notice any patterns?
Does the pattern suggest the sounds are in **contrastive** or **complementary** distribution? Are they separate **phonemes** or **allophones** of the same phoneme?

1. [qɑr] 'snow'
2. [kærɬ] 'old'
3. [ɑq] 'white'
4. [zɑɴʁɑr] a name
5. [ækelu] 'to bring'
6. [gæzet] 'newspaper'
7. [ɬŋkær] a name
8. [æke] 'father'
9. [ɑʁɑ] 'brother'
10. [ʁɑlɯm] 'scholar'
11. [gælon] 'gallon'
12. [qɑzɯ] 'horse intestines'

ɑ	æ
q_r	

- **Note:** [ɴ, ʁ, q] is uvular and [ŋ, g, k] is velar

Practice: Kazakh

Examine the sounds [ɑ] and [æ] in this data from **Kazakh**.Do you notice any patterns?
Does the pattern suggest the sounds are in **contrastive** or **complementary** distribution? Are they separate **phonemes** or **allophones** of the same phoneme?

1. [qɑr] 'snow'
2. [kærɬ] 'old'
3. [ɑq] 'white'
4. [zɑɴʁɑr] a name
5. [ækelu] 'to bring'
6. [gæzet] 'newspaper'
7. [ɬŋkær] a name
8. [æke] 'father'
9. [ɑʁɑ] 'brother'
10. [ʁɑlɯm] 'scholar'
11. [gælon] 'gallon'
12. [qɑzɯ] 'horse intestines'

ɑ	æ
q_r #_q z_ɴ ʁ_r #_ʁ ʁ_# ʁ_l q_z	k_r #_k g_z k_r #_k g_l

- **Note:** [ɴ, ʁ, q] is uvular and [ŋ, g, k] is velar

Homework VII is due this Sunday (**Nov 23rd**)

reading materials:

Phonology: The Function and Patterning of Sounds

in O'Grady et al.'s *Contemprary Linguistics: An Introduction*

Thanksgiving week (the week of Nov 23), recitation will be **asynchronous** work

Slides created via the R package **xaringan**.