



LIGN 110 Section 25202 Week 9

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11/30/2020

This week

- Questions on lecture materials, quizzes, homework, final project?
- Time to finish recording the speakers; start transcribing the recording, and write the paper
- Quiz Week 9 due on Dec. 3, Thursday
- Final paper due on Dec. 11, Friday at 5pm
- Evaluate your professors and TAs! Your feedback is much appreciated!

This week: phonetic categories & speech perception

- **Big questions:**
- How are sounds represented in listener's mind?
- How do language exposure influences listener's perception of speech sounds?
- How do people perceive non-native contrasts?
- What cues (acoustic, visual, tactile) do listeners use when perceiving sounds?

This week: phonetic categories & speech perception

- **Terms:**
- Discrimination: the ability to perceive that two sounds are different
- Identification: the ability to assign different labels to two different sounds
- Categorical perception: Perceiving invariance for within-category tokens in a domain that can vary continuously
 - Heightened discrimination across-category
 - Reduced discrimination within-category

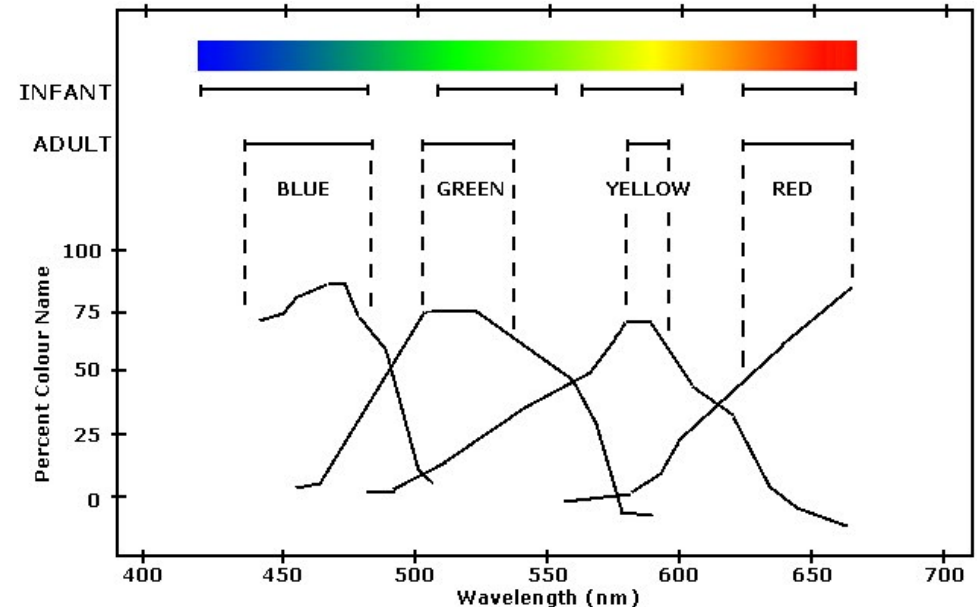


Image source:

<http://web.uvic.ca/~lalonde/psyc335/notes/lecture04.html>

Perceiving non-native contrasts

Experiment:

There are 3 questions.

Each question contains two words.

They are either the same or the different words.

If they are the **same**, write down “**S**”;

If they are **different**, write down “**D**”.

Perceiving non-native contrasts



Perceiving non-native contrasts

1. D tal “beat” t^hal “plate”
2. D dal “lentil” dal “branch”
3. D tal “beat” ʈal “postpone”

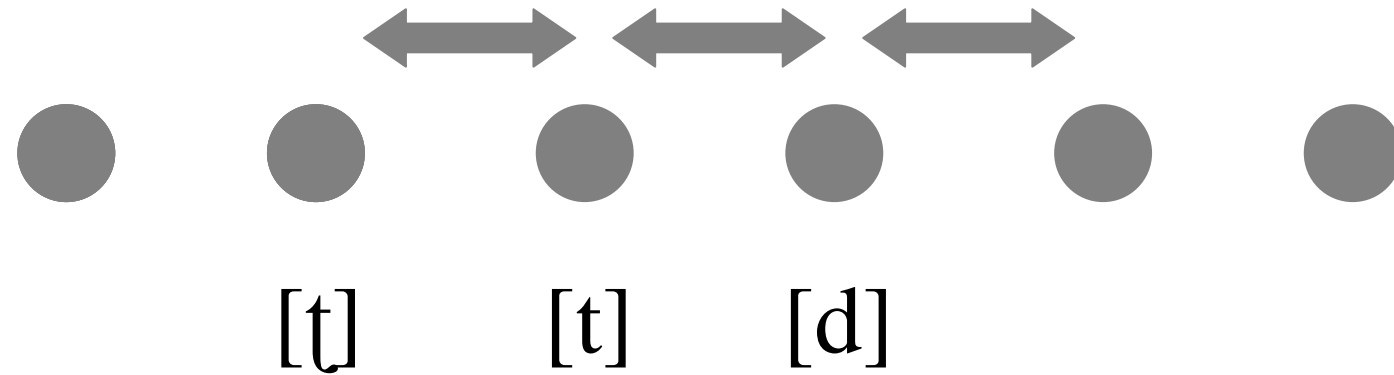
Perceiving non-native contrasts

- Children Speech Perception Model
- Native Language Magnet (Kuhl et al., 1992; 2008):
Phase One: Universal listener (New-born infants)

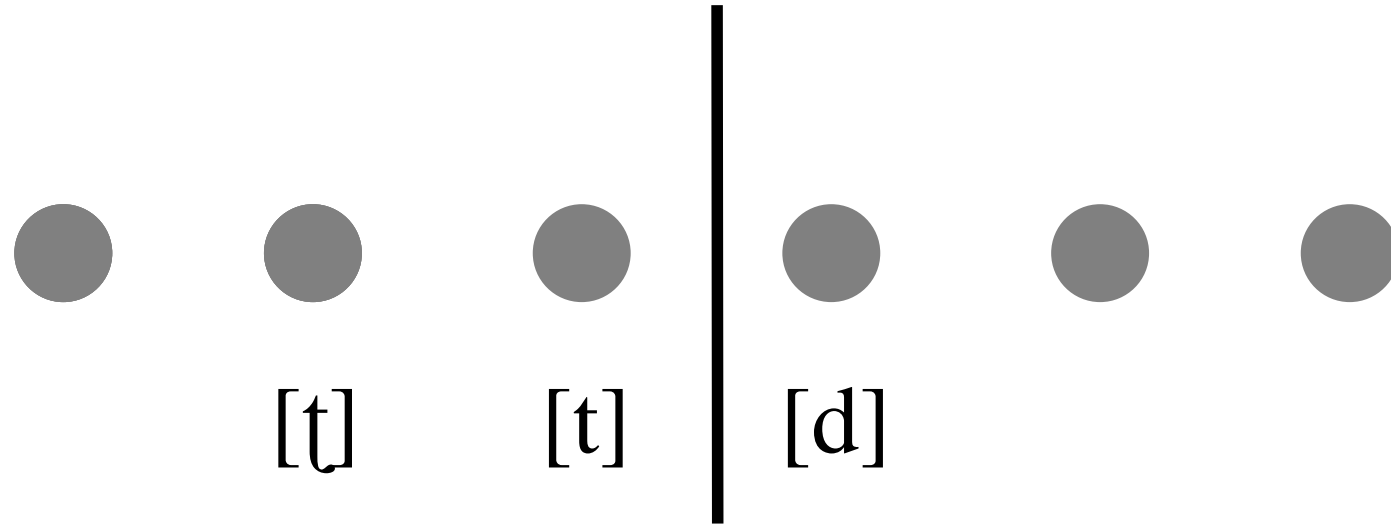
Phase Two: Warping based on statistical learning (6-8 months)

Phase Three: Native categories established (11-12 months)

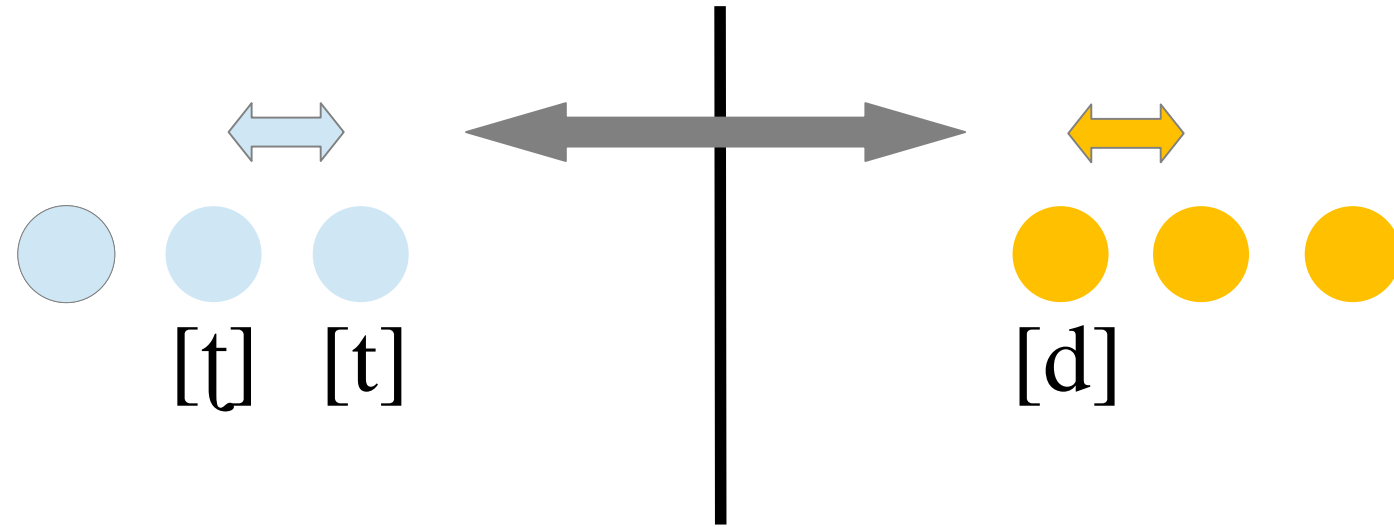
Phase 1: Universal listener



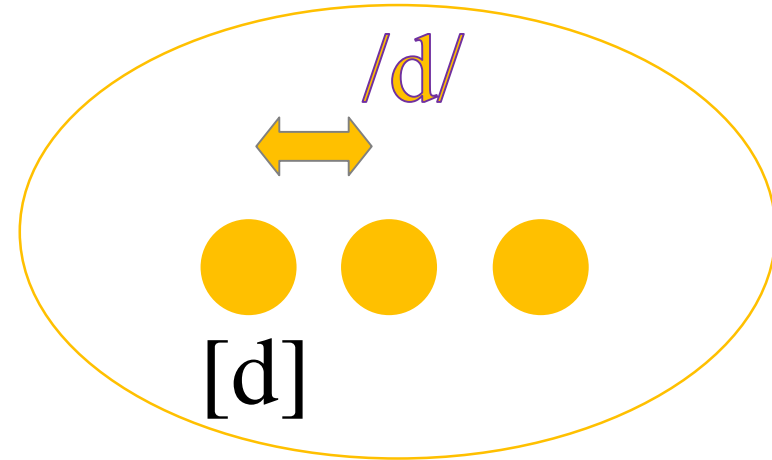
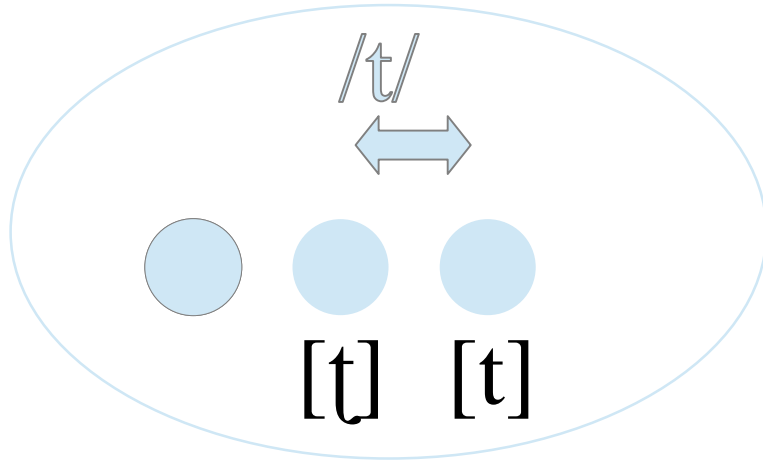
Phase 2: Warping



Phase 2: Warping



Phase 3: Category established



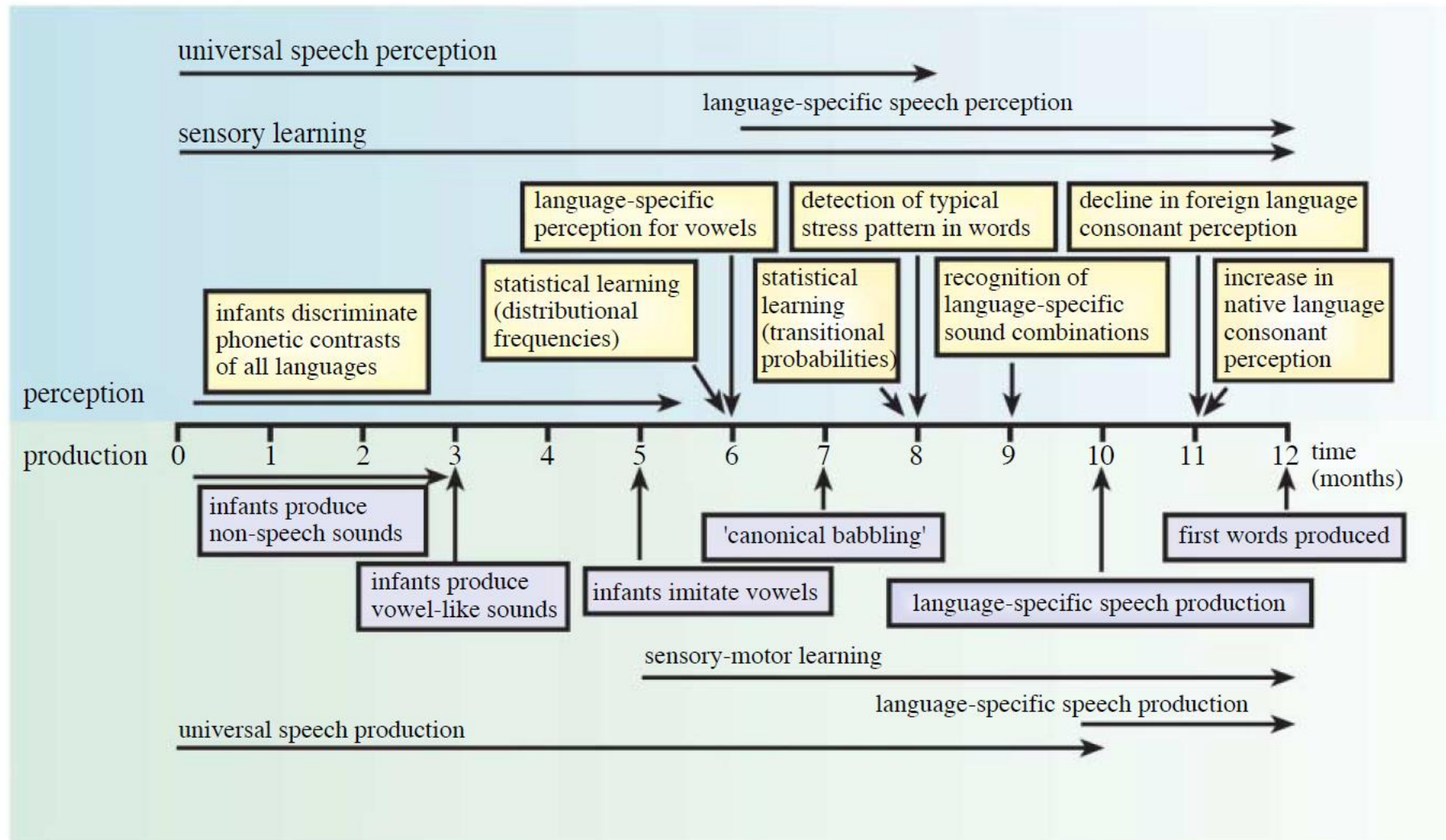


Figure 1 in Kuhl, P. K., Conboy, B. T., Coffey-Corina, S., Padden, D., Rivera-Gaxiola, M., & Nelson, T. (2008). Phonetic learning as a pathway to language: new data and native language magnet theory expanded (NLM-e). *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1493), 979-1000.

Perceiving non-native contrasts

- Perceptual assimilation model (PAM) (Best, 1991)
- Listeners assimilate non-native sounds into native phonetic categories;
- Whether two non-native sounds can be well-discriminated is determined by whether the non-native sounds are assimilated into two different categories or the same.

▪ Assimilation:

Language A Language B

Sound 1 Sound 2



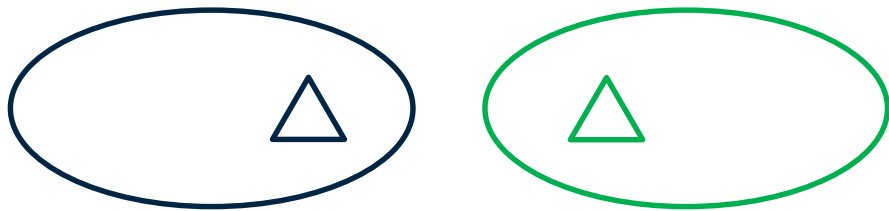
▪ Predicting discrimination by assimilation:

Foreign Language Native Language

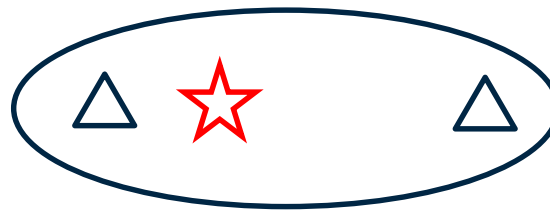


Perceiving non-native contrasts

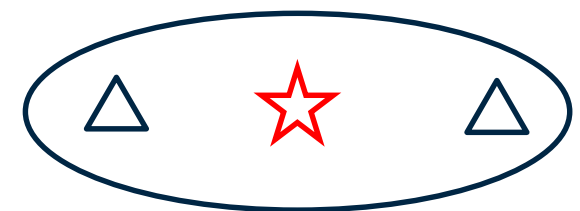
- Perceptual assimilation model (PAM) (Best, 1991)



Two Category Assimilation
(TC)



Category Goodness
(CG)



Single Category
(SC)

Best, C. T. (1991). The Emergence of Native-Language Phonological Influences in Infants: A Perceptual Assimilation Model. *Haskins Laboratories Status Report on Speech Research, 107–108*(July-Dec), 1–30.

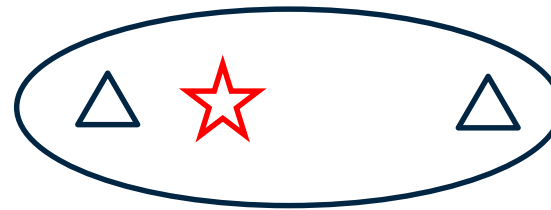
Perceiving non-native contrasts

- Perceptual assimilation model (PAM) (Best, 1991)



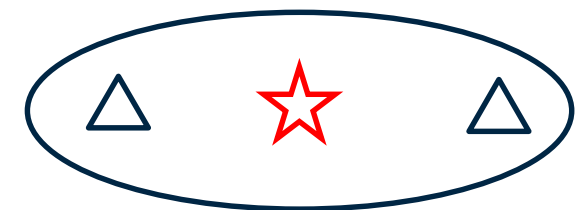
Two Category Assimilation
(TC)

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Category Goodness
(CG)

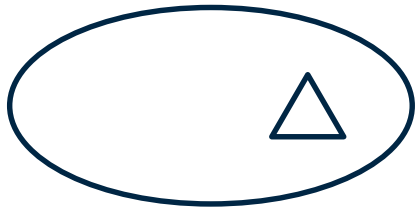
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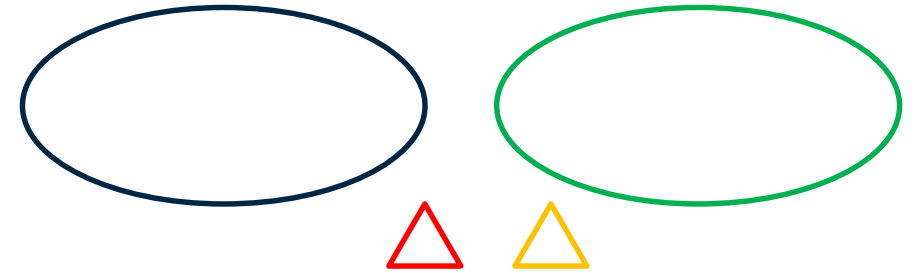
Single Category
(SC)

Perceiving non-native contrasts

- Perceptual assimilation model (PAM) (Best, 1991)



Uncategorized vs. Categorized
(UC)



Uncategorized vs. Uncategorized
(UU)

Experiment designs

- Identification: Listen to a sound and select/transcribe which sound you hear
- Discrimination: Listening to two/multiple sounds and determine whether the sounds are different or the same
 - AX task: Whether A and X are the same or different sound?
 - AXB task: Whether X is the same sound as A or B?
- Tools for designing experiments:
 - Offline: psychopy (<https://www.psychopy.org/>)
 - Online:
 - Amazon mechanic turk (<https://www.mturk.com/>); Testable (<https://www.testable.org/>); TELLab (<http://lab.tellab.org/>); Survey Monkey (<https://www.surveymonkey.com/>); Qualtrics (<https://www.qualtrics.com/>)

Experiment designs

- Identification and discrimination tasks demonstration:
- <http://splab.net/APD/U100/index-e.html>