Perceptual Advantage from Generalized Linguistic Knowledge

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UC San Diego

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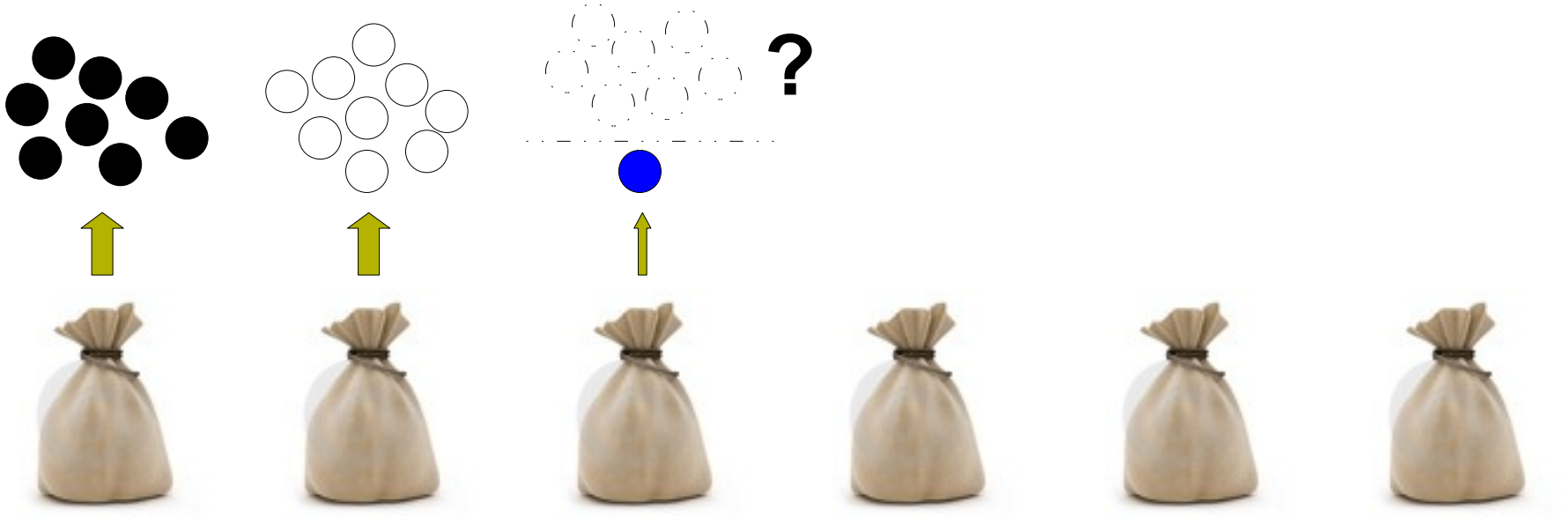
Main questions

- People are excellent learners.
- They have useful implicit knowledge about languages they already speak (e.g., about phonology).
- Do they make (implicit) generalizations about languages based on this knowledge?
- Do they use these generalizations (implicitly) when exposed to novel languages (e.g., in speech perception)?

Background: overhypotheses

- People are good at making implicit generalizations
  - We learn 'overhypotheses' that allow generalization of knowledge. (Goodman 1955, Kemp et al. 2007)



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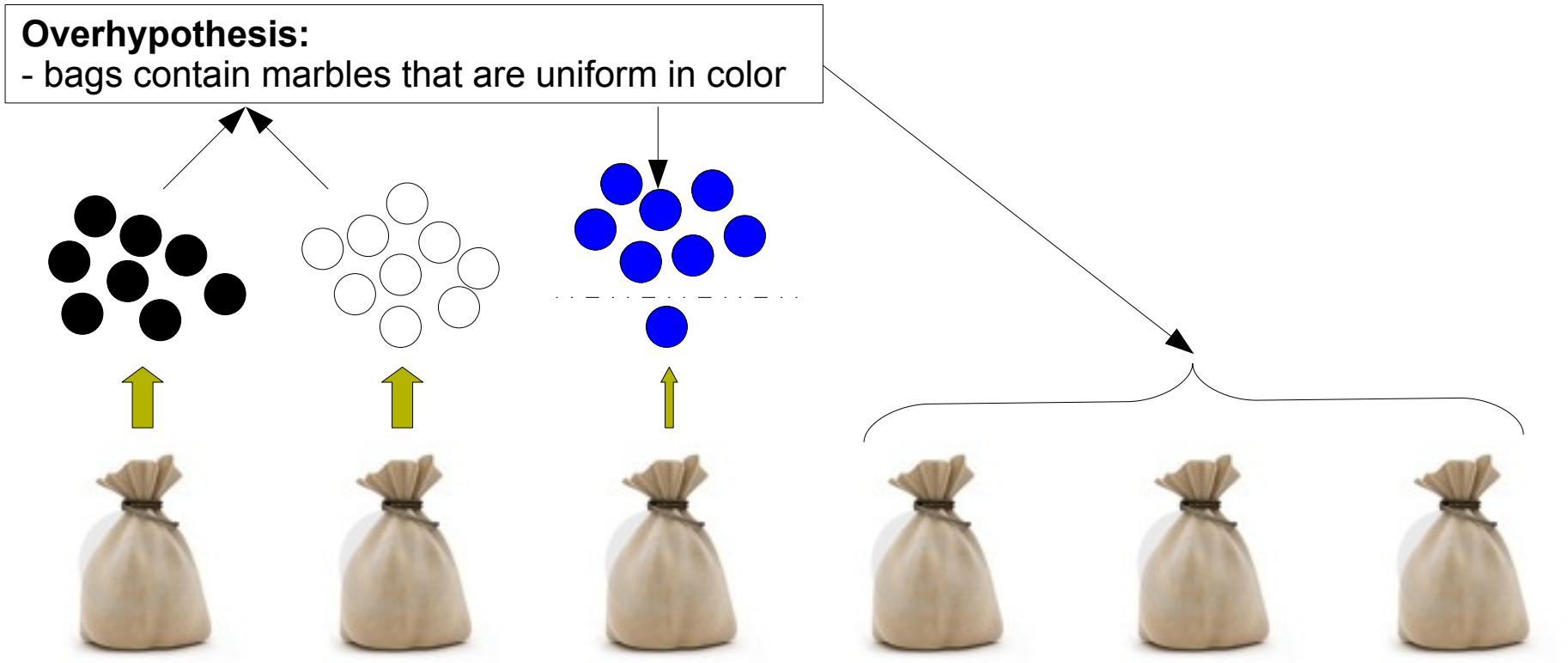
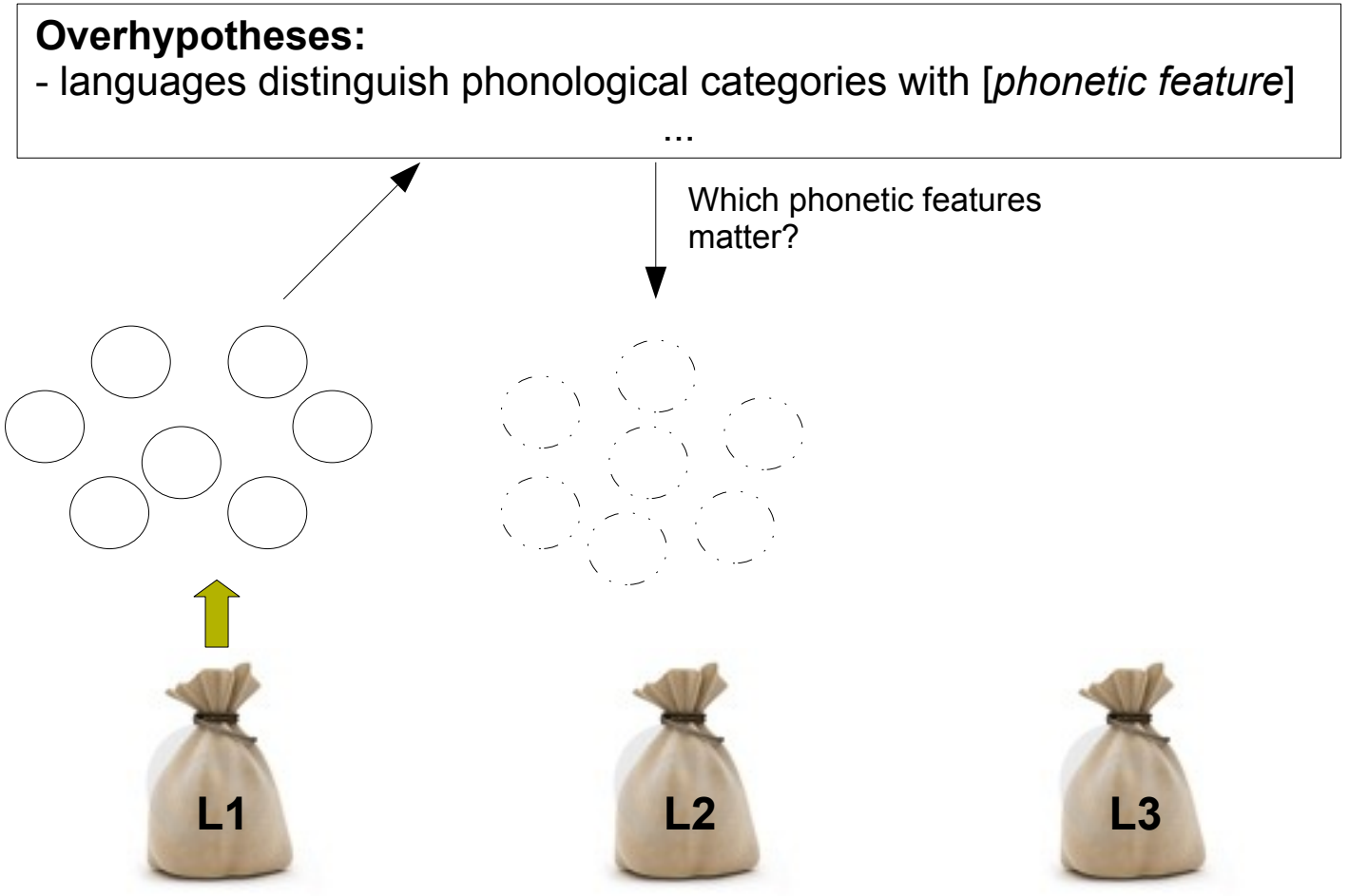


Proposal

- Applying the overhypothesis approach to nonnative speech perception.



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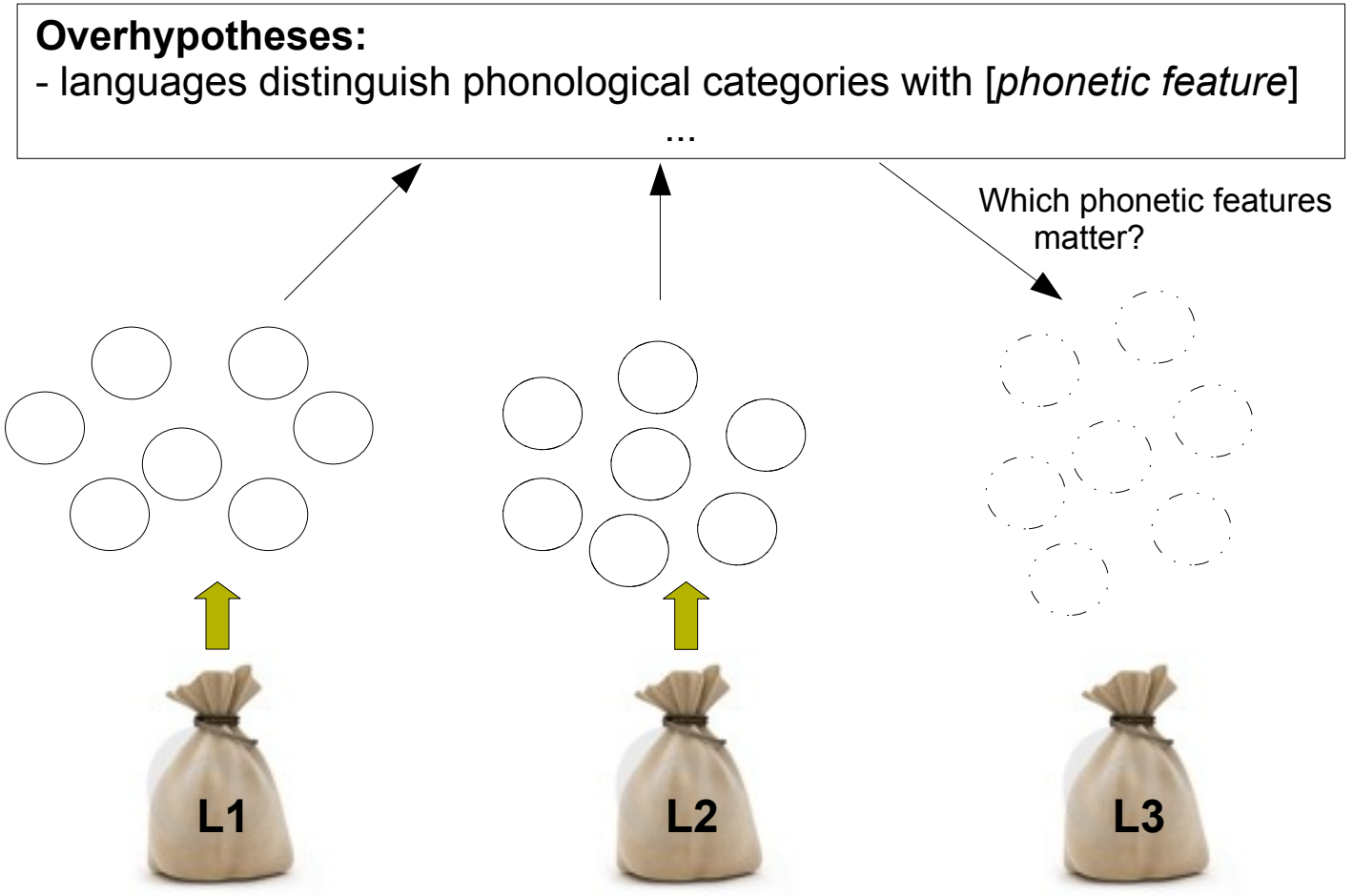
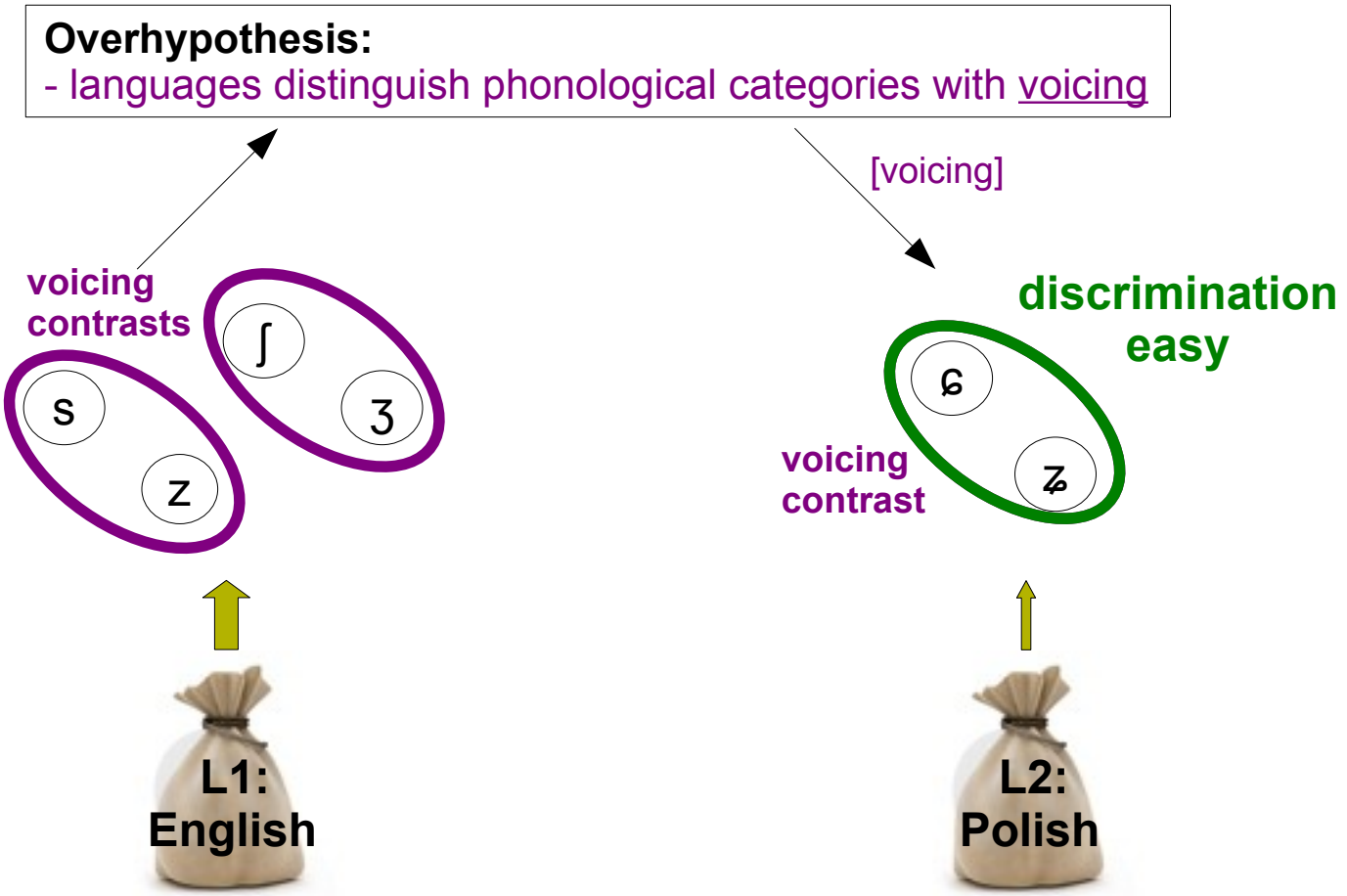


Example 1

- The proposed approach explains known results:
  e.g., why some nonnative contrasts are easy to discriminate.

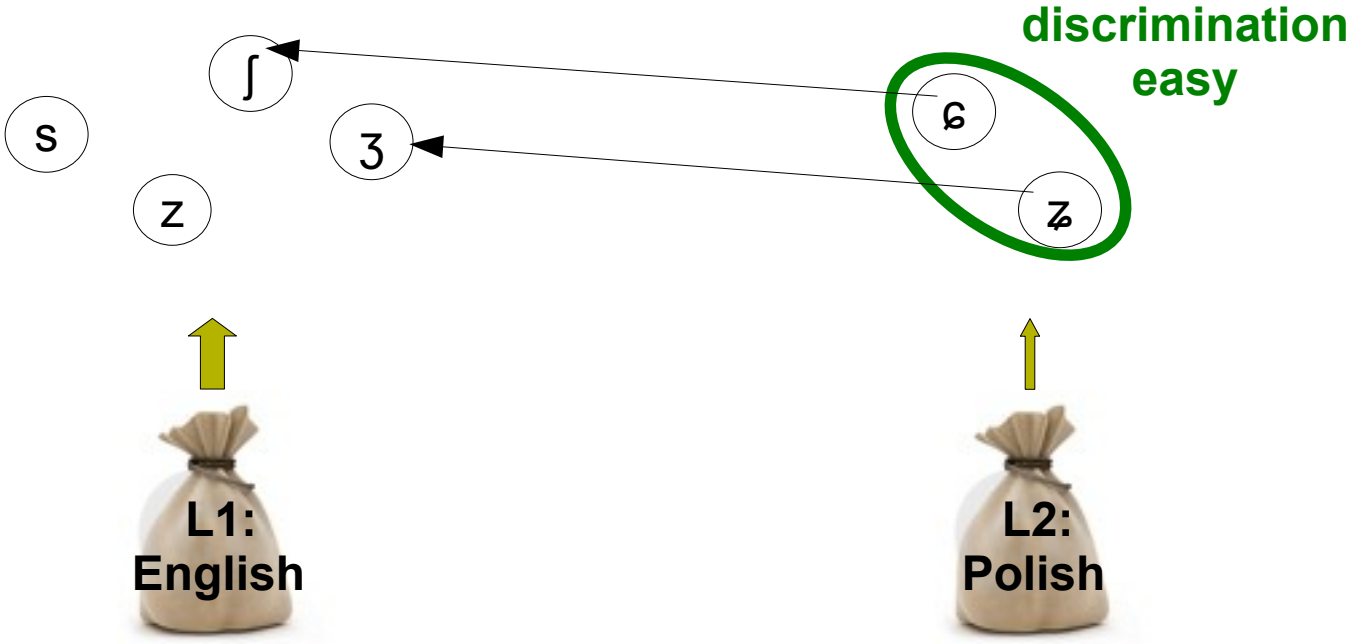


Example 1

- Existing approaches provide a different explanation

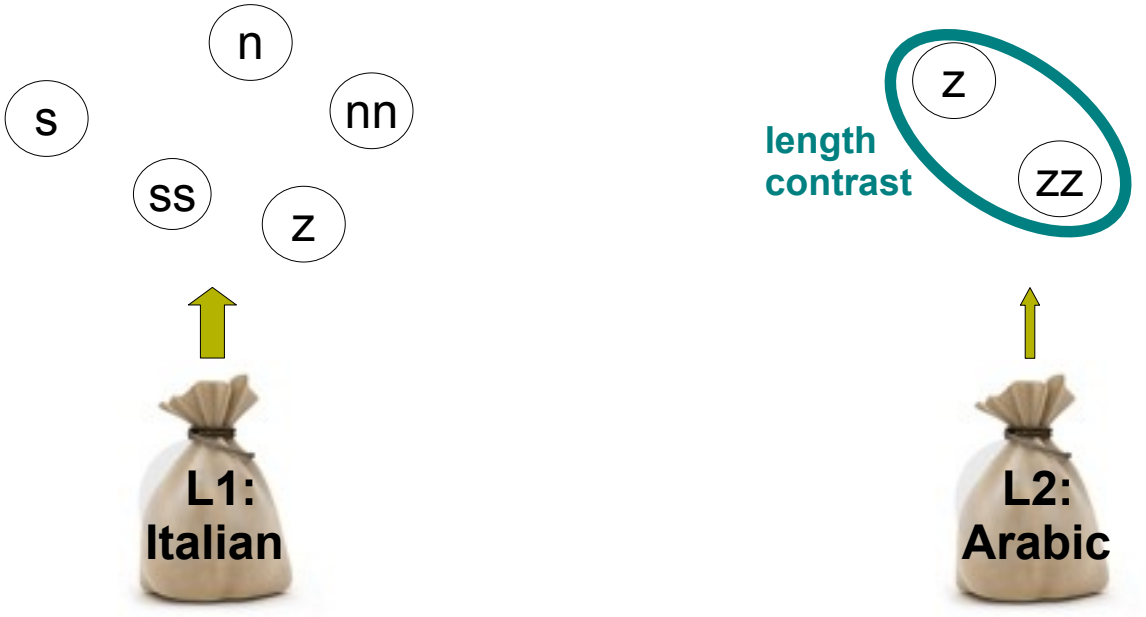
  Perceptual Magnet Effect (Kuhl 1991)
  Speech Learning Model (Flege 1995)
  Perceptual Assimilation Model (Best 1995)

  - Nonnative sounds get mapped onto L1 categories that are acoustically or articulatorily similar.



Example 2

- The two accounts make different predictions for some cases.



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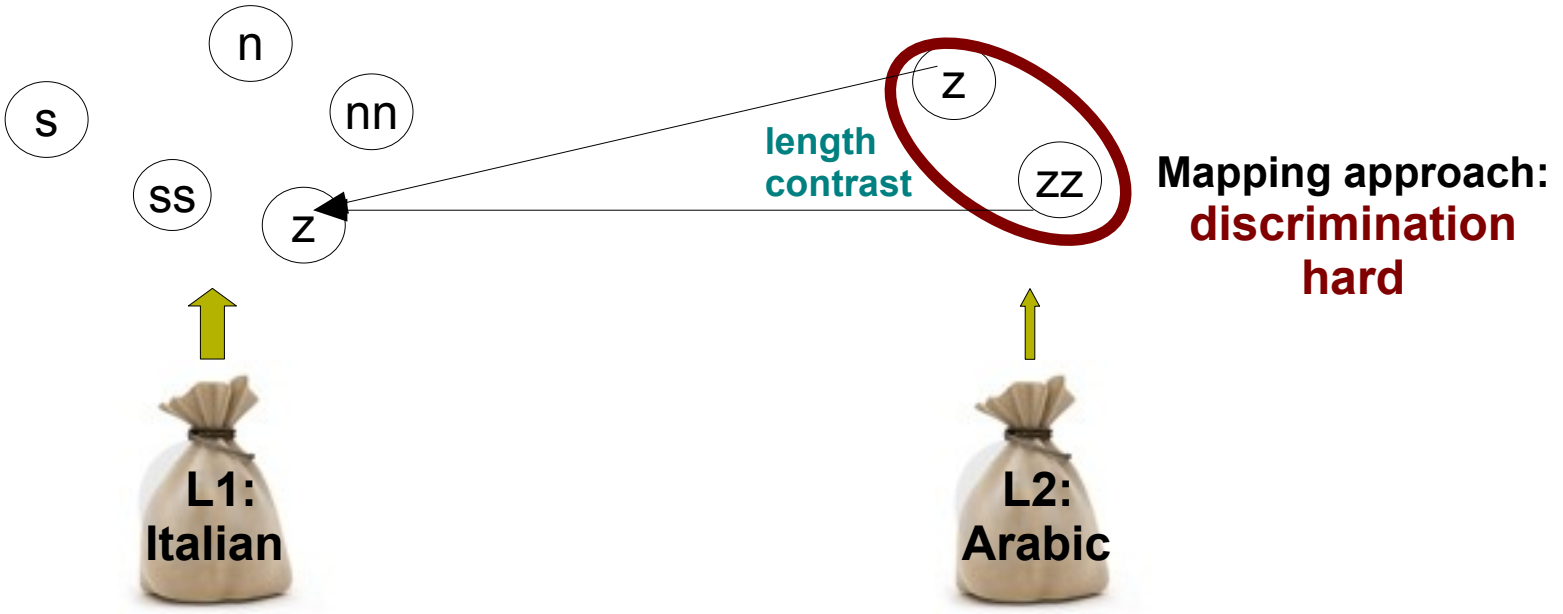

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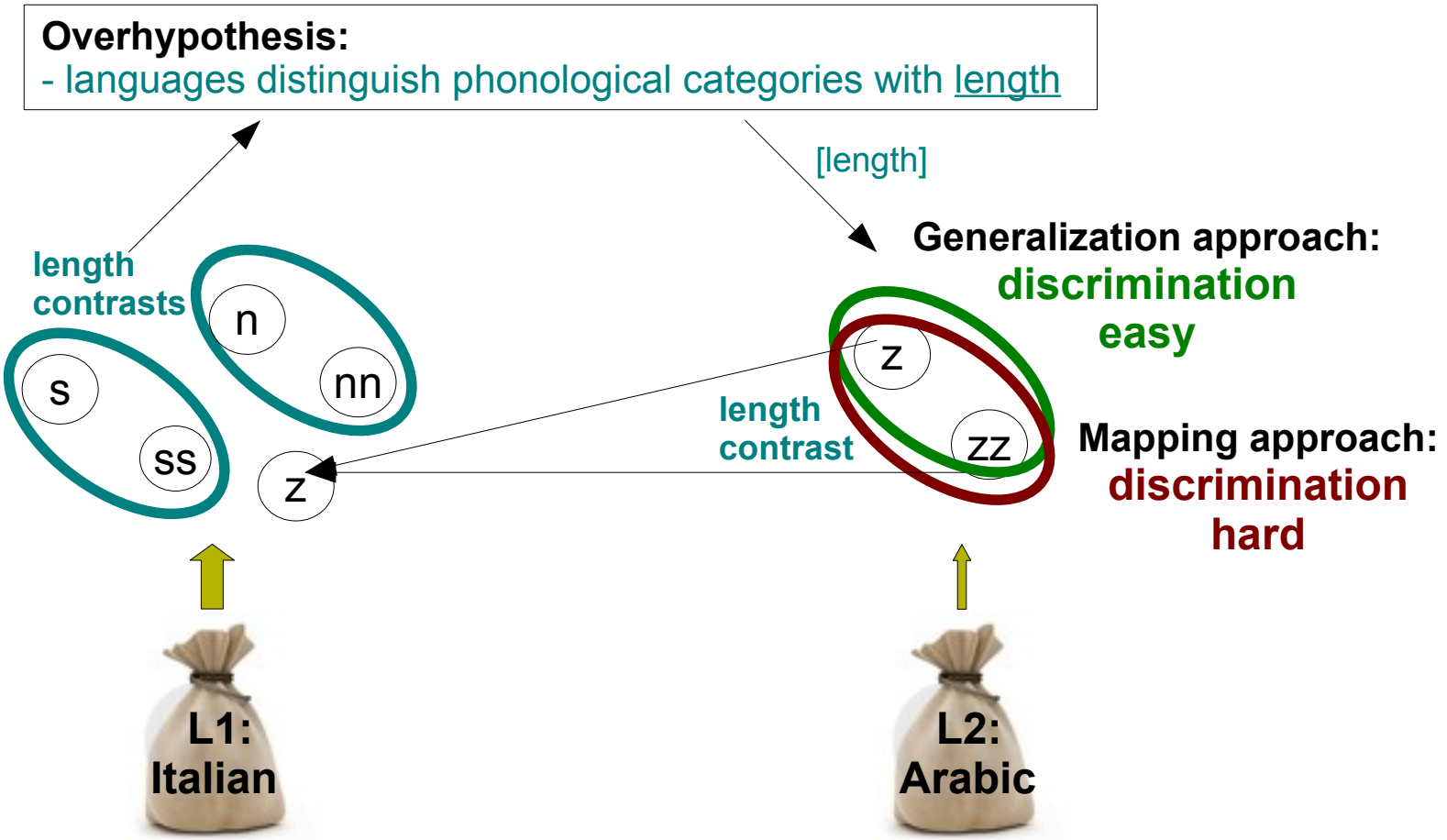
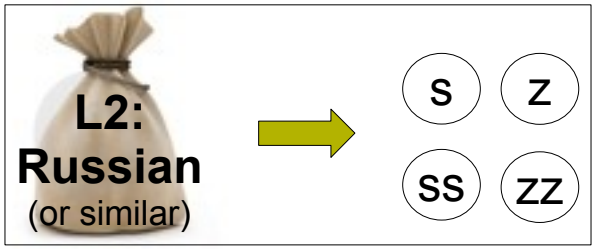
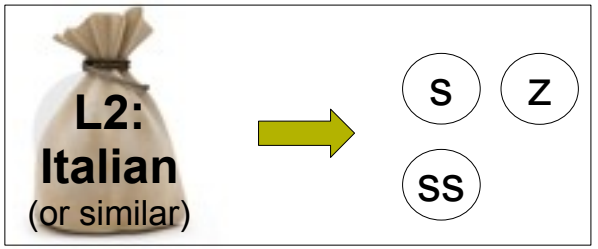


Experiment 1

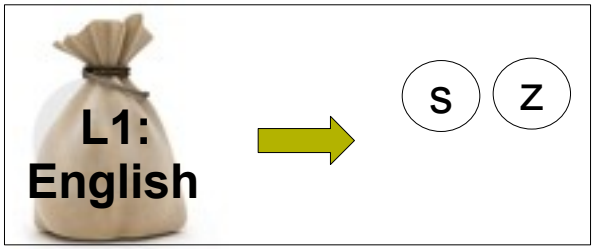
Participants:

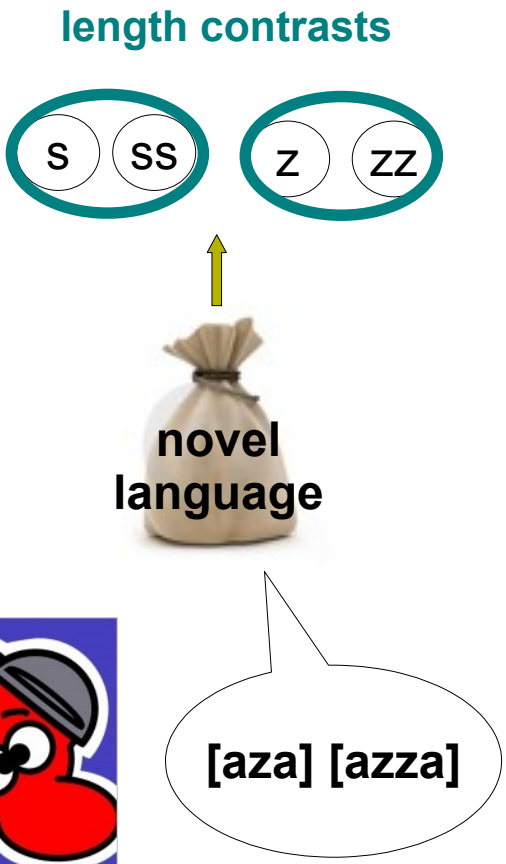
40 *length-contrasting* bilinguals (L1: English)





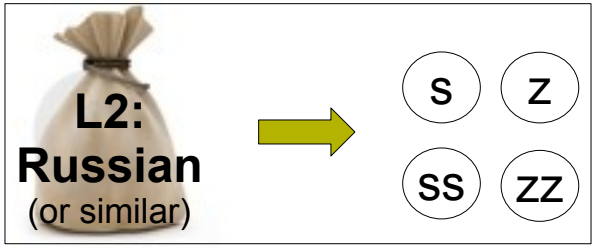
40 *no-length-contrast* monolinguals



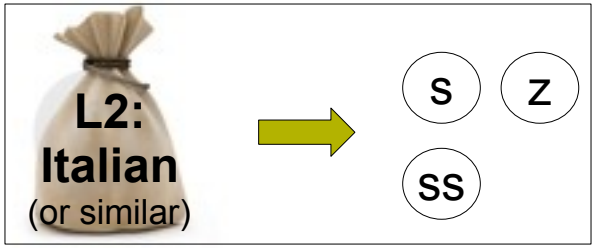


Experiment 1: predictions

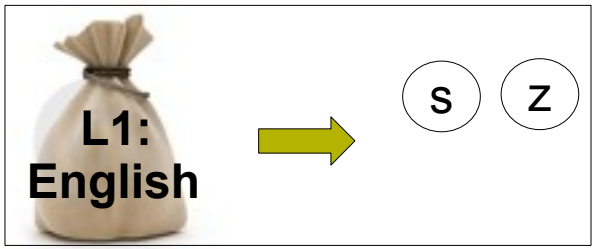
[ss]&[zz] bilinguals



[ss] bilinguals



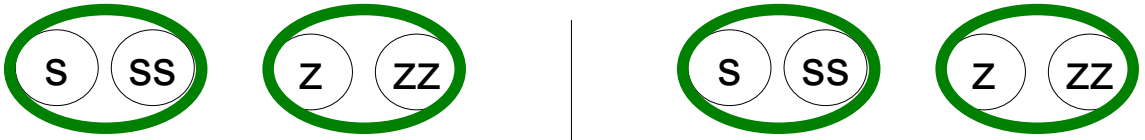
Monolinguals

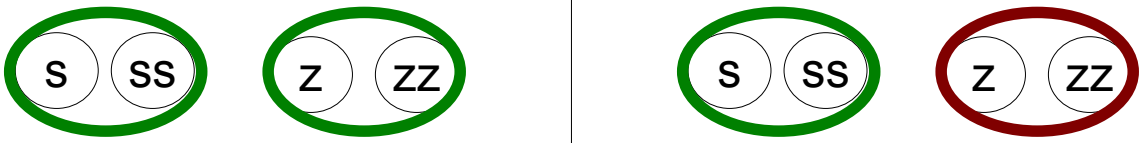


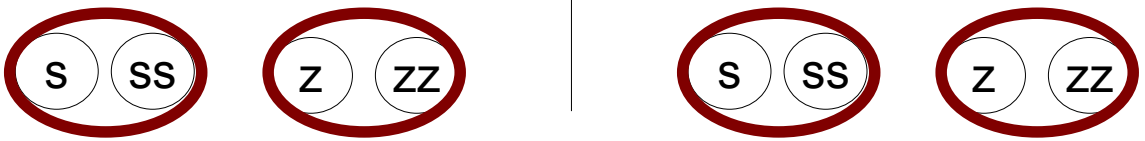
Generalization approach

Mapping approach

discrimination easy

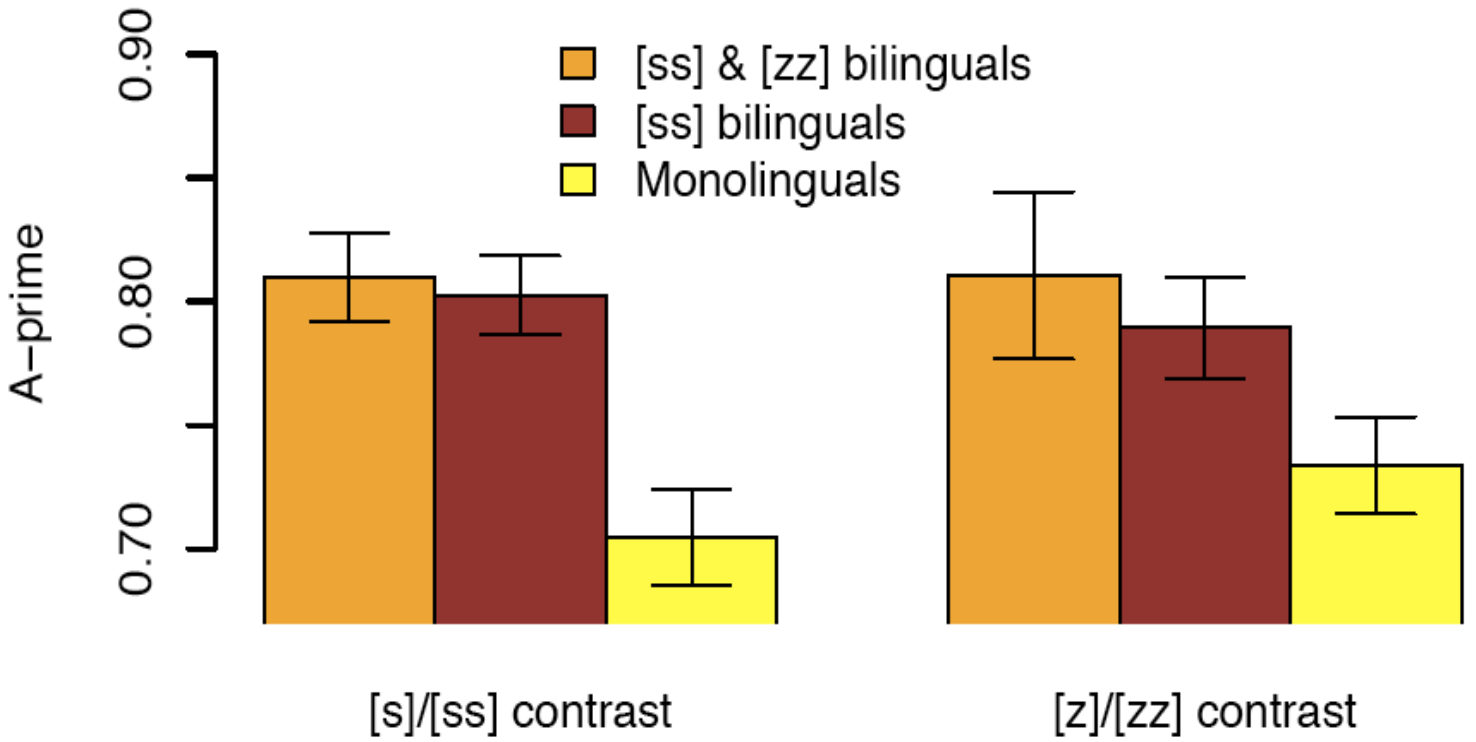






discrimination hard

Experiment 1: results



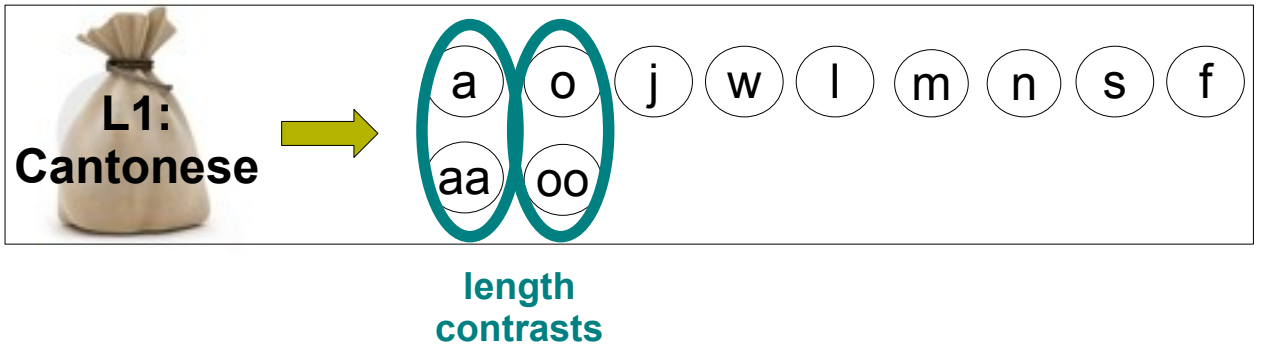
Experiment 1: discussion

- The results are consistent with the generalization account.
- But:
  - Maybe what matters is being bilingual?
  - What if the novel contrast is not-so-similar to the known contrast?

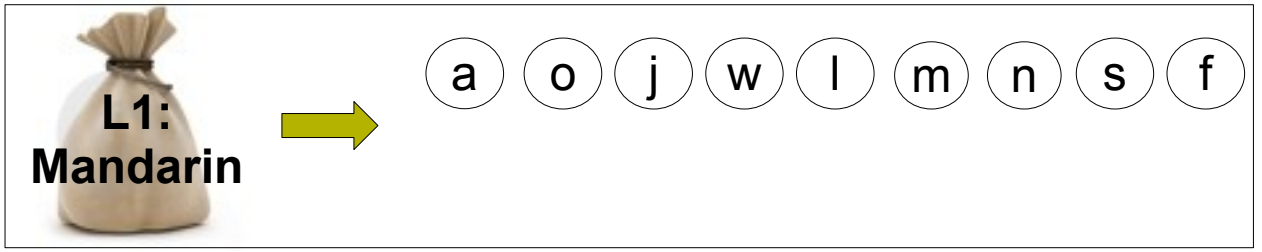
Experiment 2

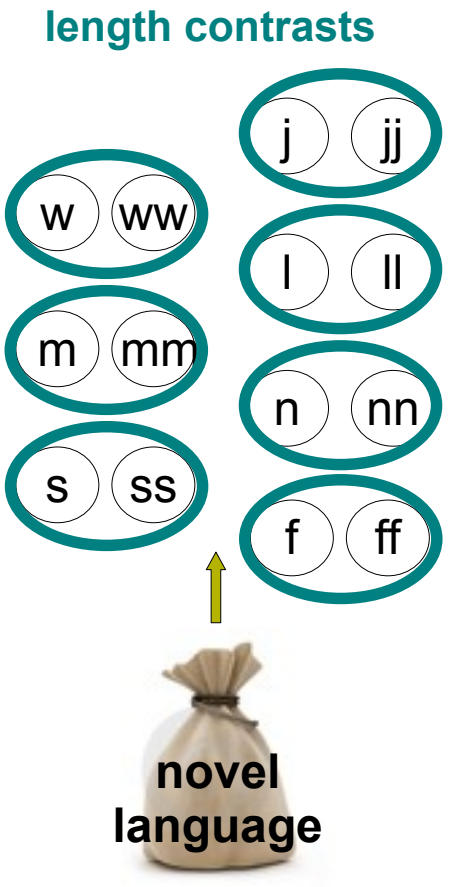
Participants:

24 *vowel-length-contrasting* trilinguals (Cantonese-English-Mandarin)



24 *no-length-contrast* bilinguals (Mandarin-English)





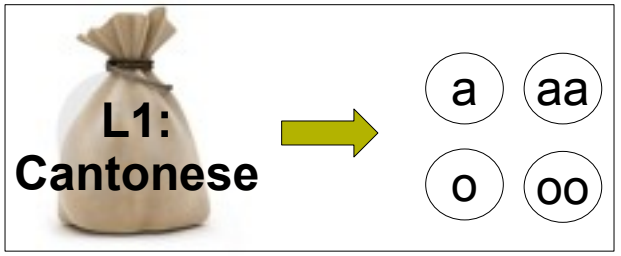
Experiment 2: predictions

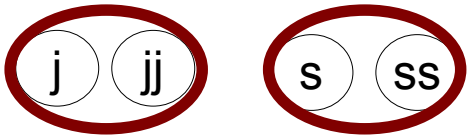
Generalization approach

Mapping approach

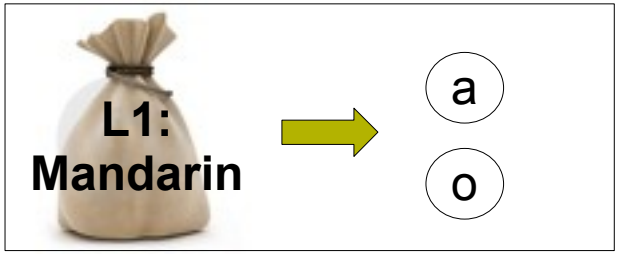
discrimination easy

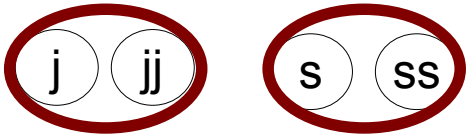
Vowel-length-contrasting speakers

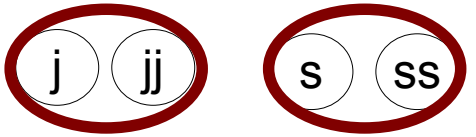




No-length-contrast speakers







discrimination hard

Experiment 2

Participants:

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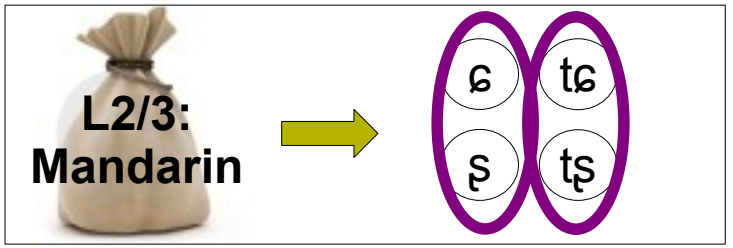
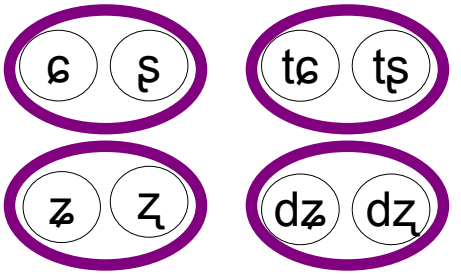


control contrasts
(place of articulation)



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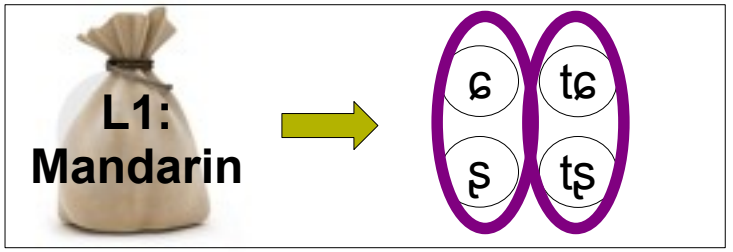
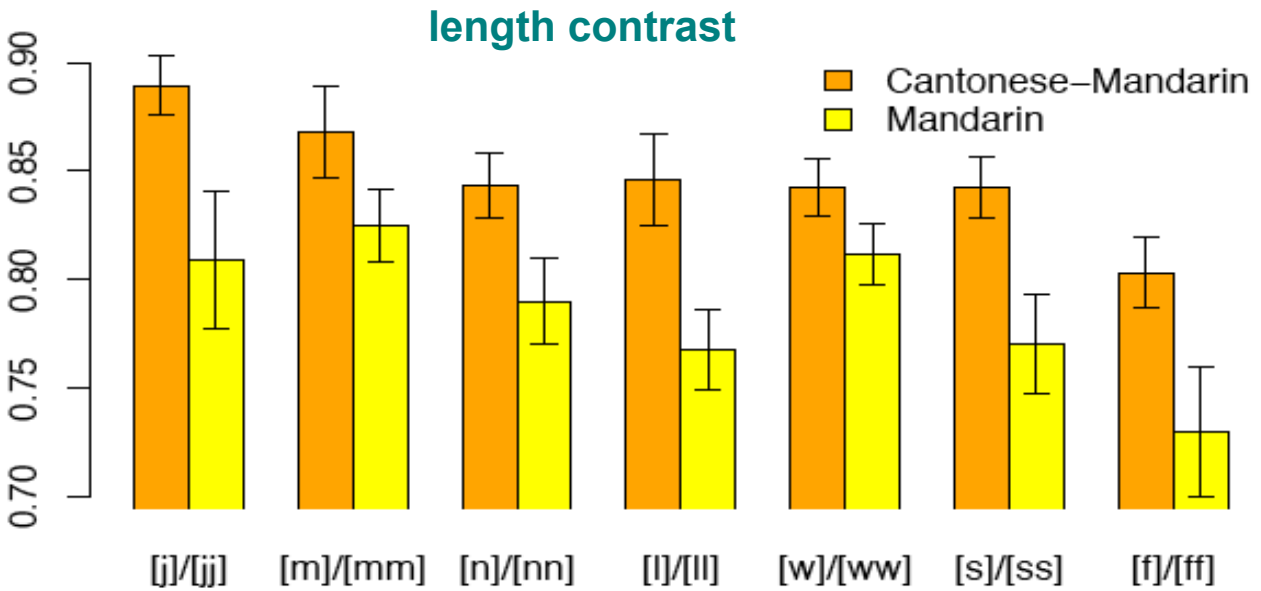
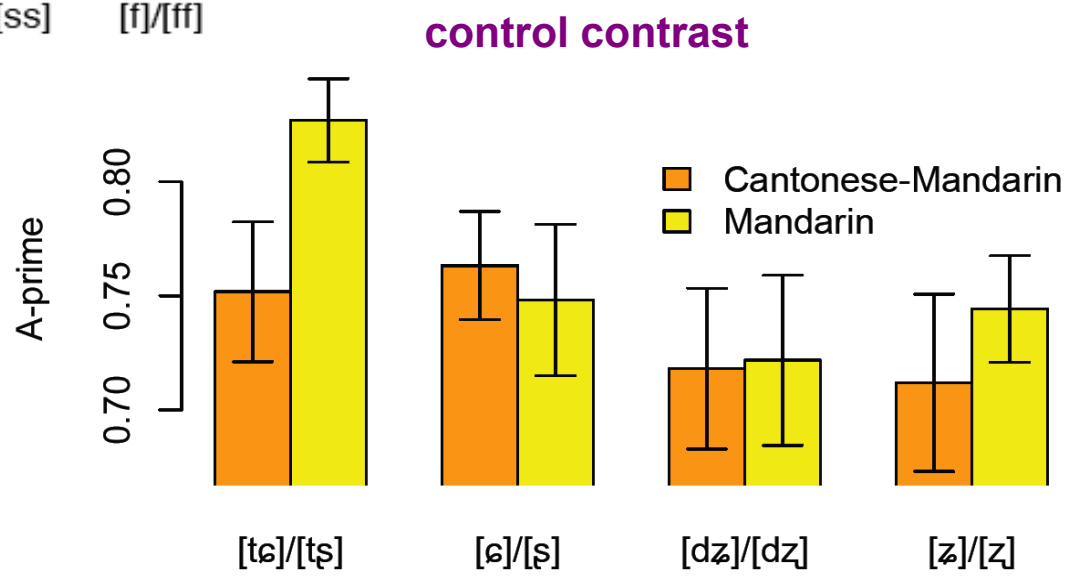


- Prediction: no difference between the two groups.

Experiment 2: results





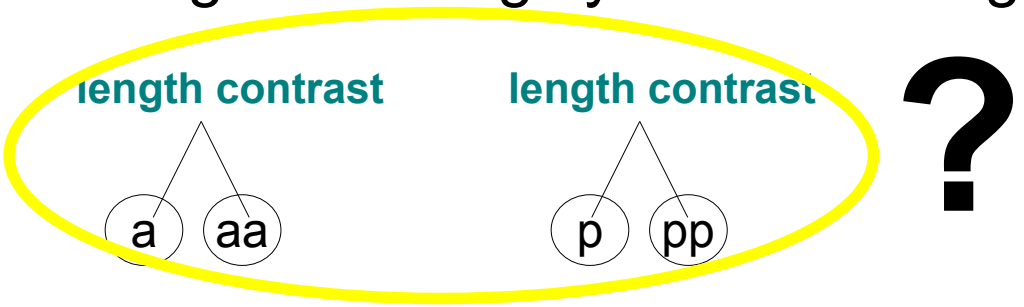
Experiment 2: discussion

- The results are consistent with the generalization account.

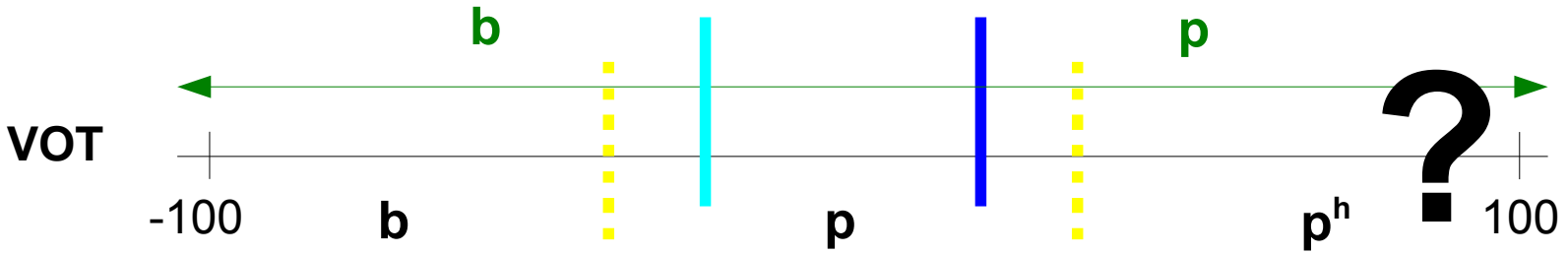
- This suggests that learners are able to generalize their phonological knowledge in nonnative speech perception.

Future work

- More types of generalization
  - Generalizing across highly dissimilar segments



  - Inferring novel category boundaries



- The link between overhypotheses and perception

Thank you

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