

Online Experiments for Language Scientists

Lecture 5: Frequency learning

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Reminder about Assessment 1

- Due on 10th November
- Read the assignment brief
(<https://kennysmithed.github.io/oels2022/assessment/AssignmentBrief2022.pdf>)
- I'll set aside time for questions in next week's lecture
- No questions after 10am on Monday 7th November!

Ferdinand, Kirby & Smith (2019)

Ferdinand, V., Kirby, S., & Smith, K. (2019).
The cognitive roots of regularization in
language. *Cognition*, 184, 53-68.

Large frequency-learning experiment run on
MTurk

- Do domain (linguistic vs non-linguistic) and
demand (tracking 1 vs 6 frequency
distributions) influence **regularization
behaviour?**



Vanessa Ferdinand
(formerly Edinburgh,
now Melbourne)



Simon Kirby
(Edinburgh)

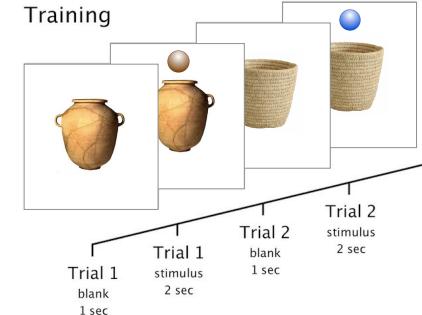
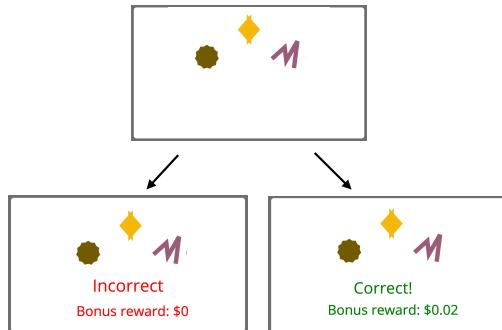
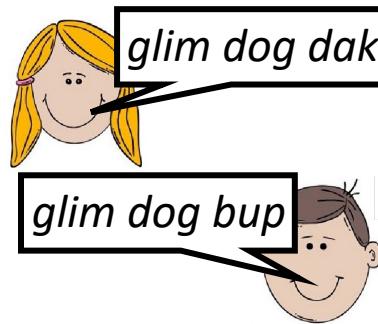
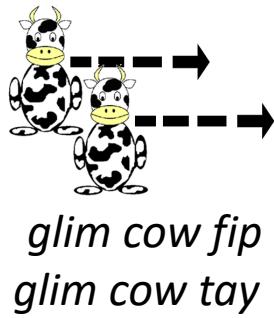
Variation in language

Languages exhibit variation at all levels (paraphrase, synonymy, allomorphy, allophony), but variation is **constrained**

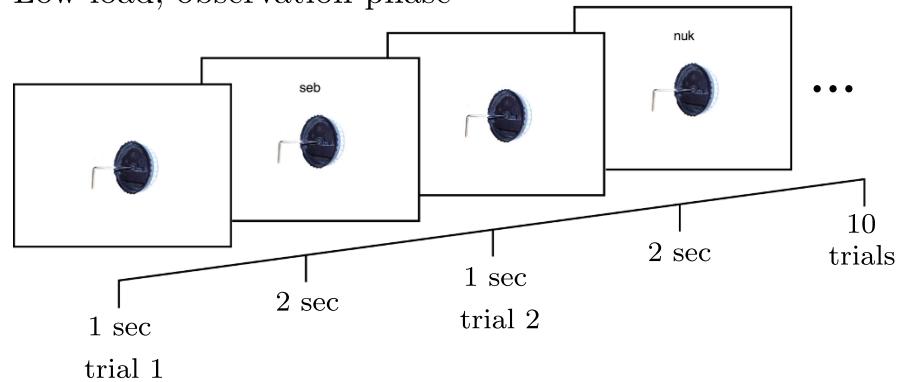
- Languages have lexicons and grammars
- Linguistic (phonological, lexical, syntactic, semantic) or sociolinguistic **conditioning** of alternation
 - English past tense allomorphy: hunt/**id**/ vs fish/**t**/
 - Noun classes: *la chaise*, *le sofa*, *la fille*, *le garçon*
 - T-glottaling: glo/**t**/al vs glo/**?**/al

Why is language like this?

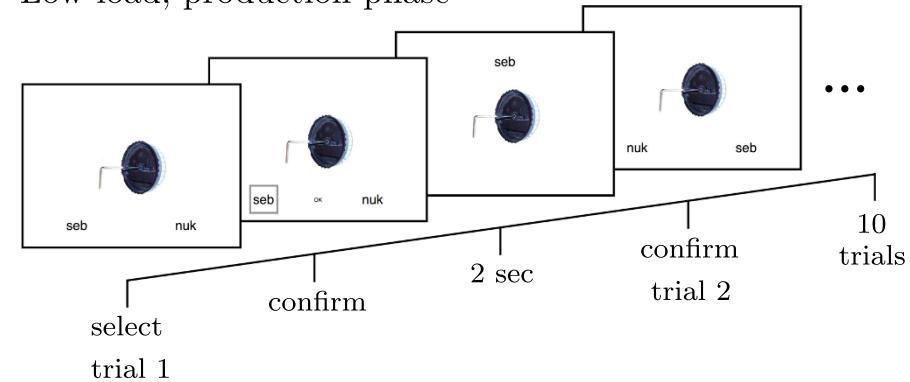
Variation-learning experiments



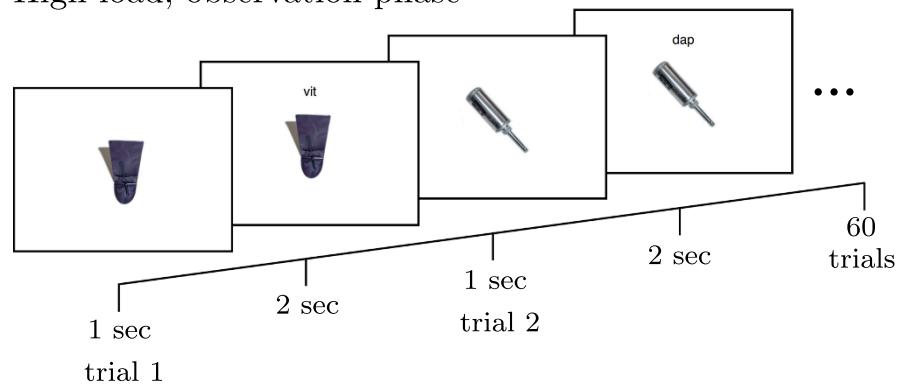
Low load, observation phase



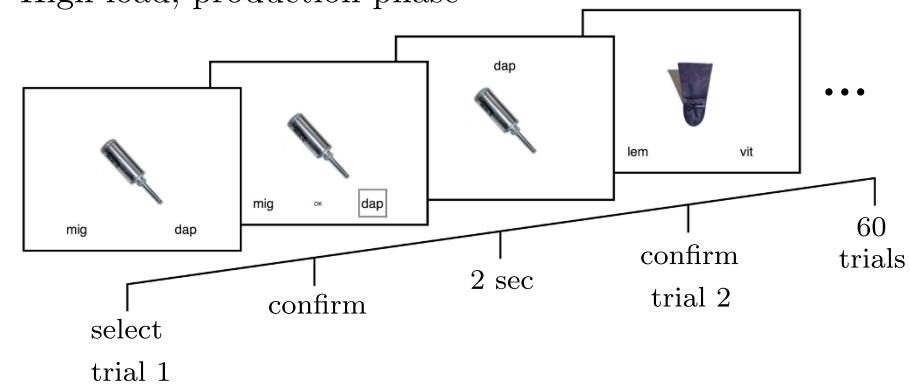
Low load, production phase

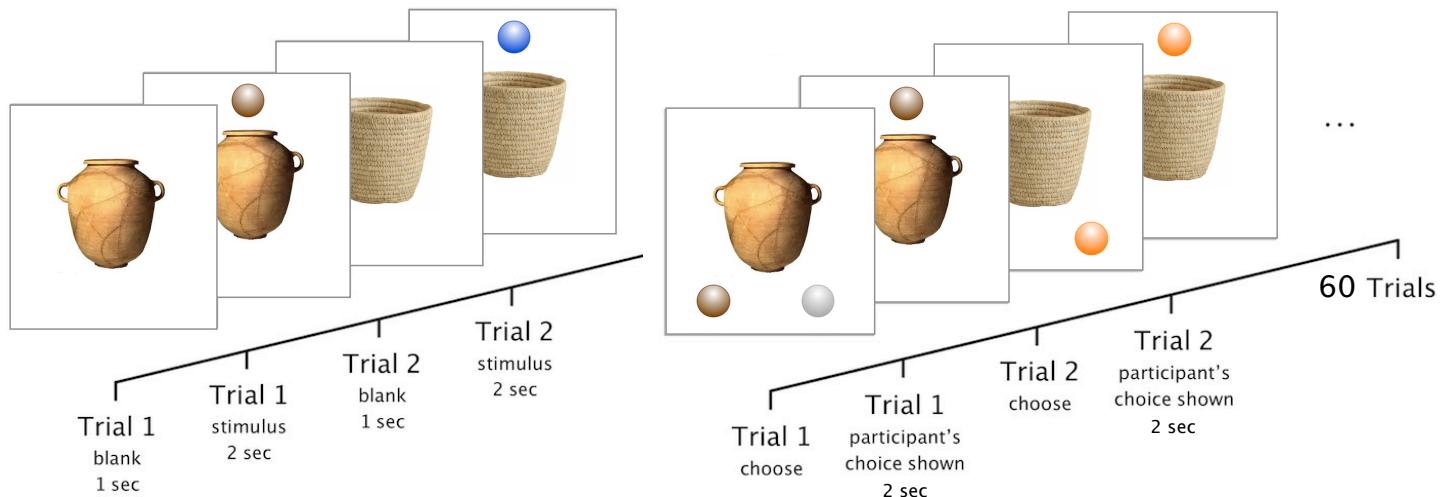


High load, observation phase



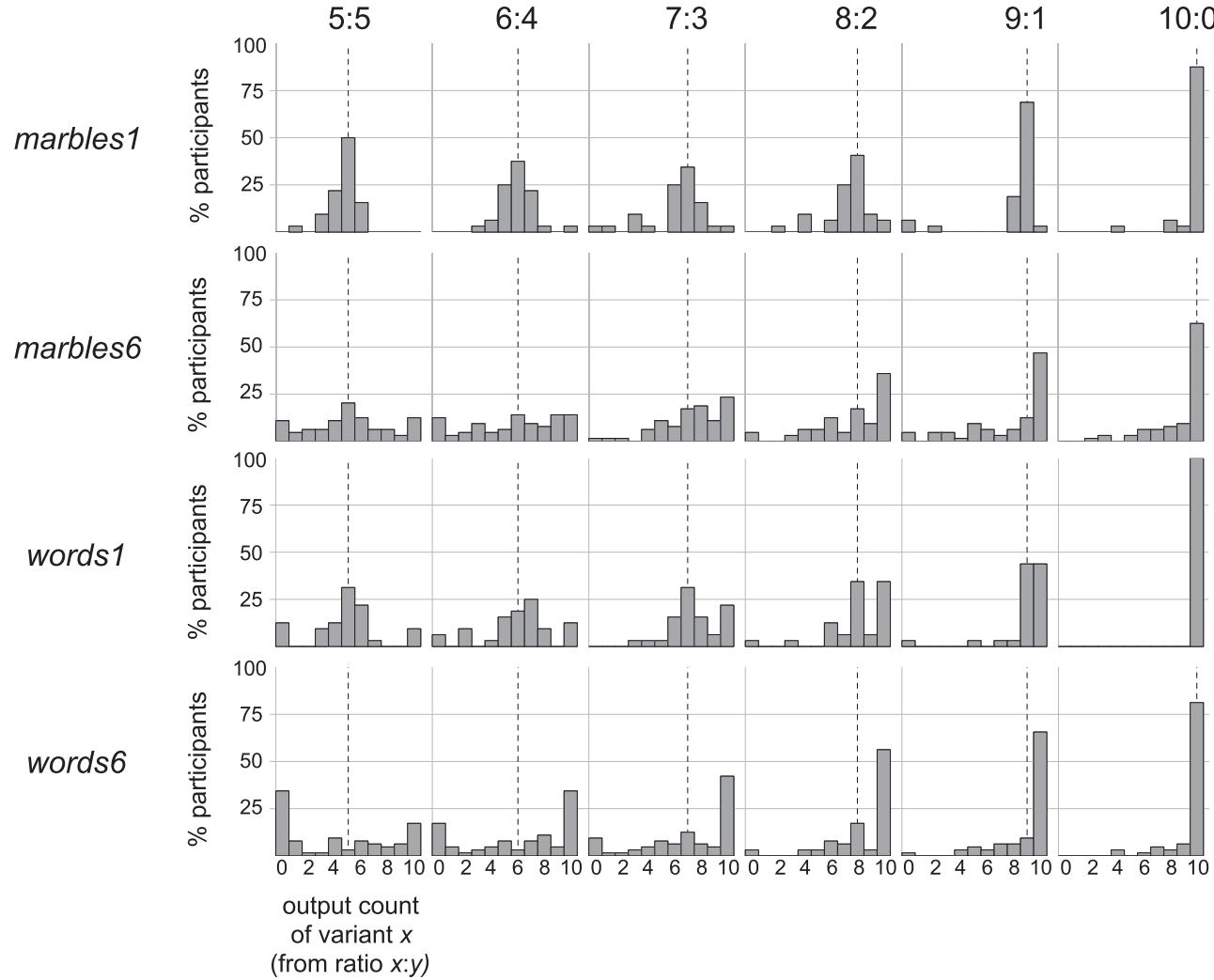
High load, production phase

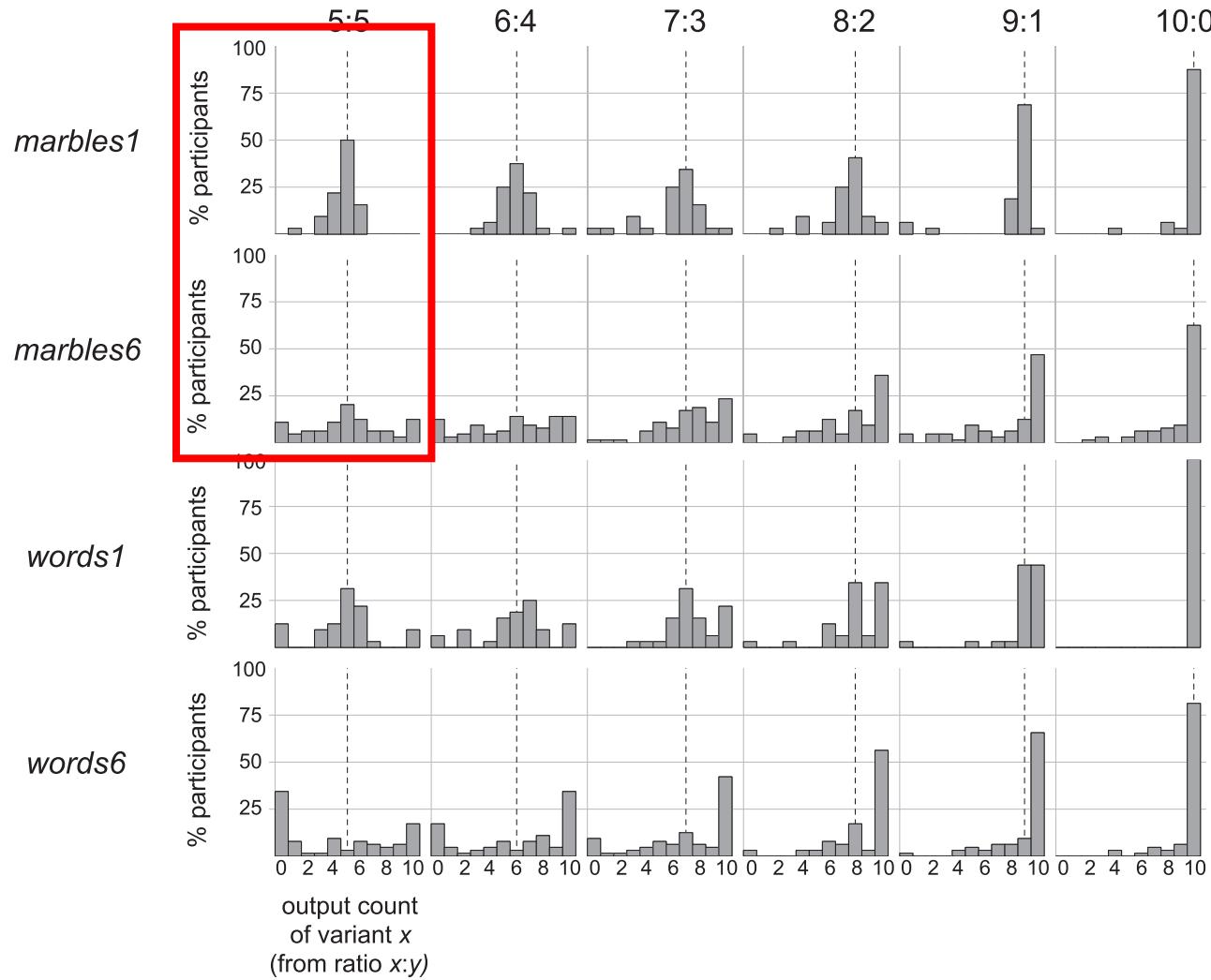


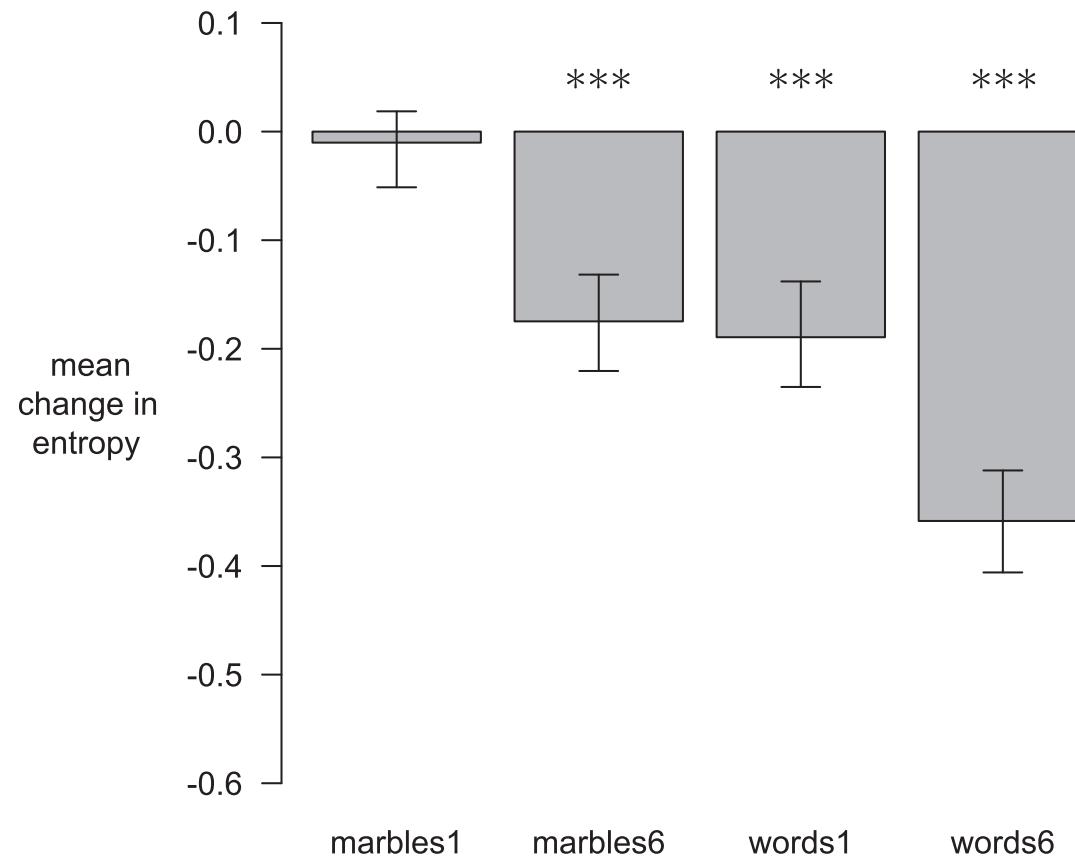


Sample size, study duration etc

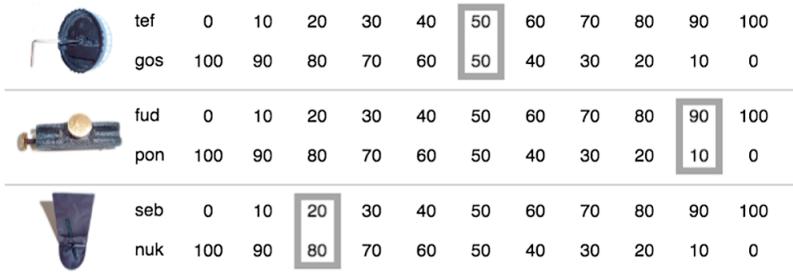
- US-based MTurk workers
- N=512 after exclusions
- 4 minutes (1-item task) or 11.5 minutes (6-item task)
- **\$0.10** (1-item task) or **\$0.60** (6-item task) 😞



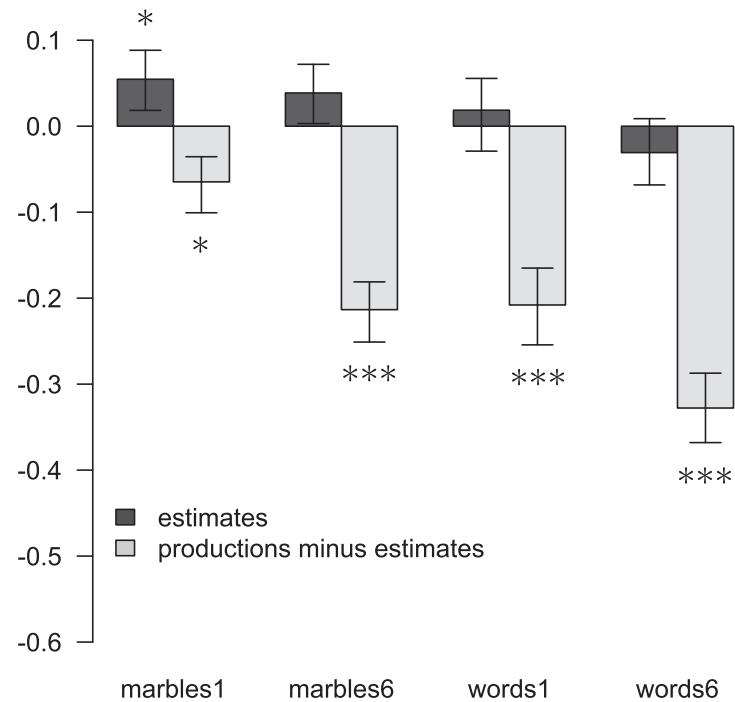




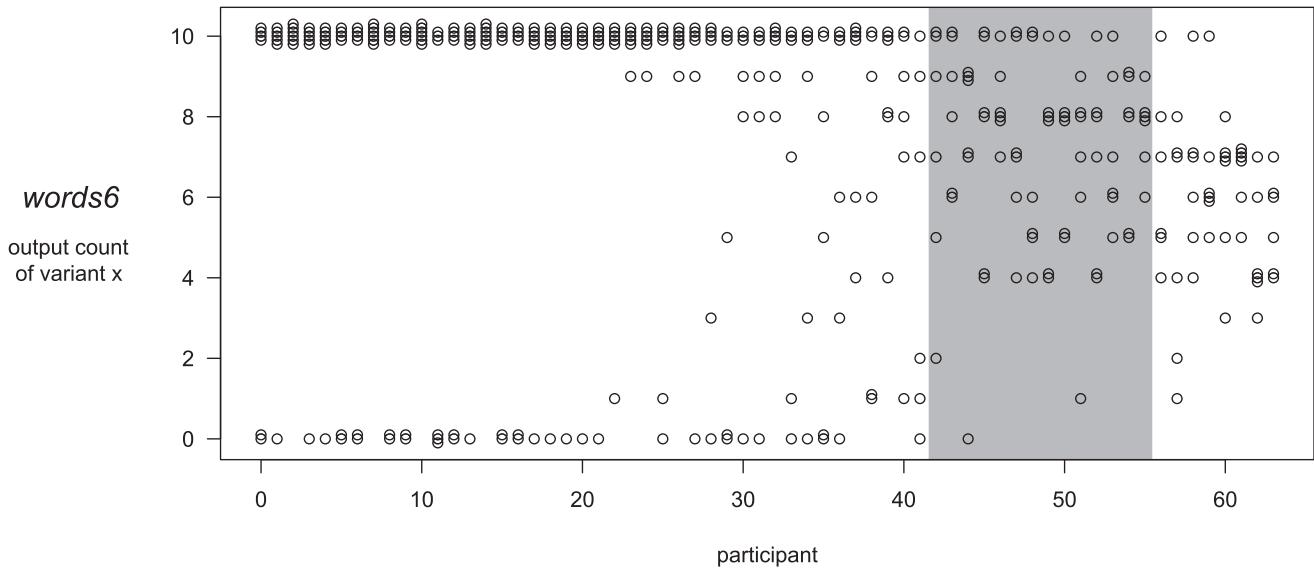
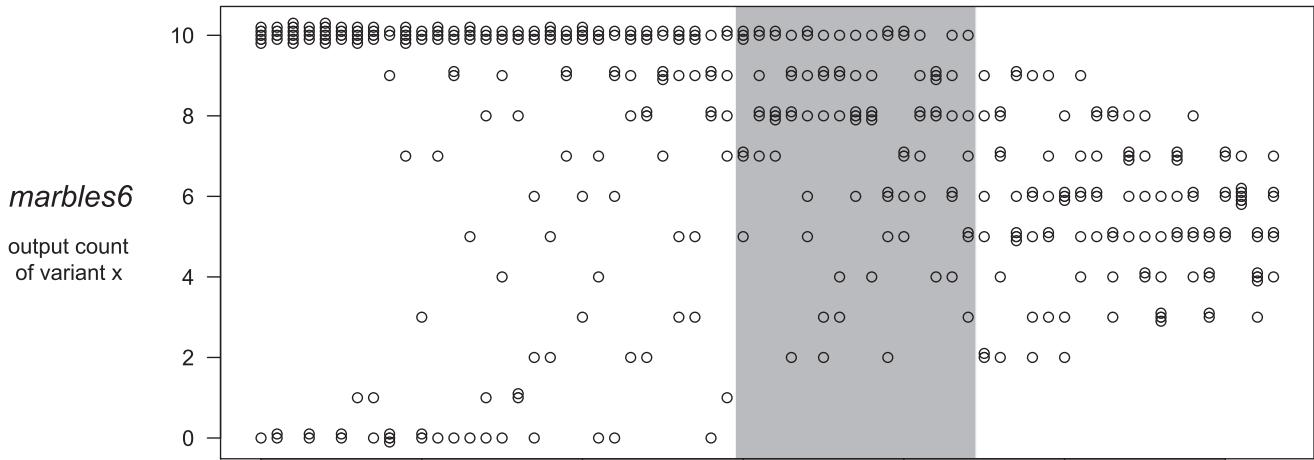
Regularization during encoding, or retrieval?



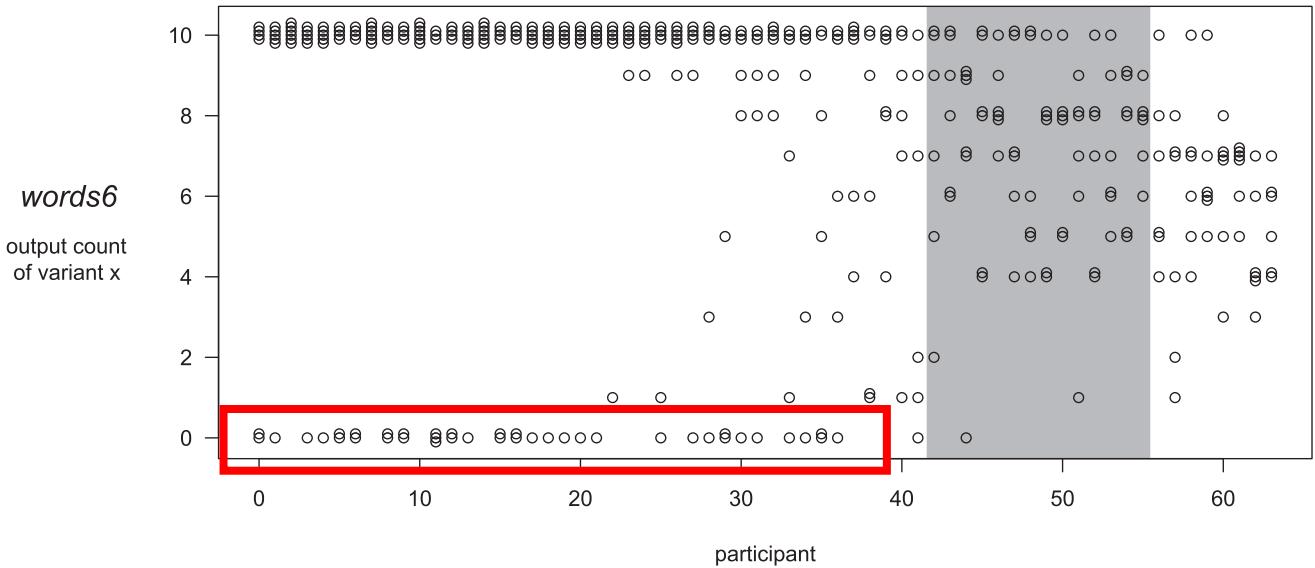
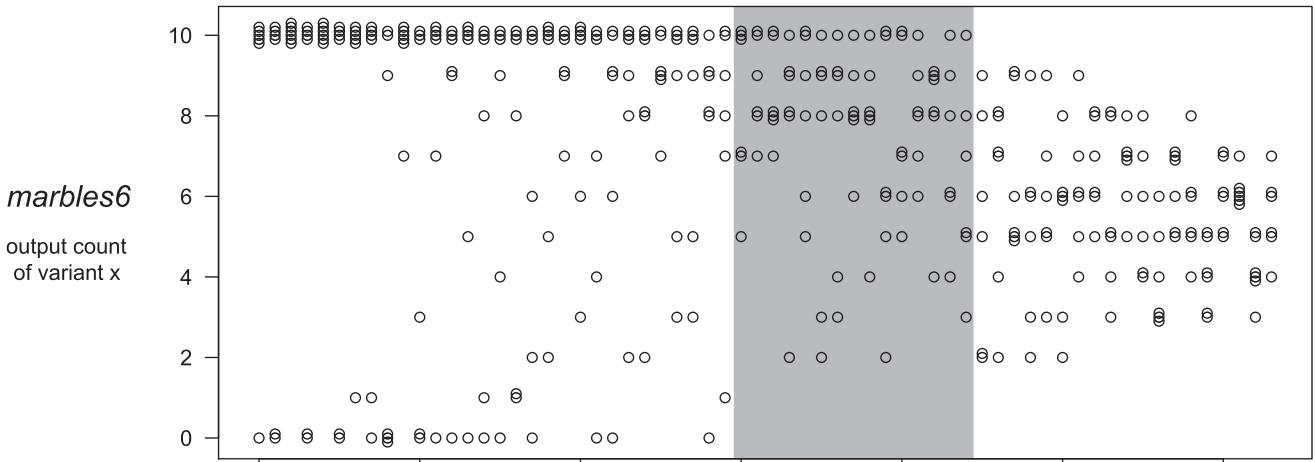
mean
change in
entropy



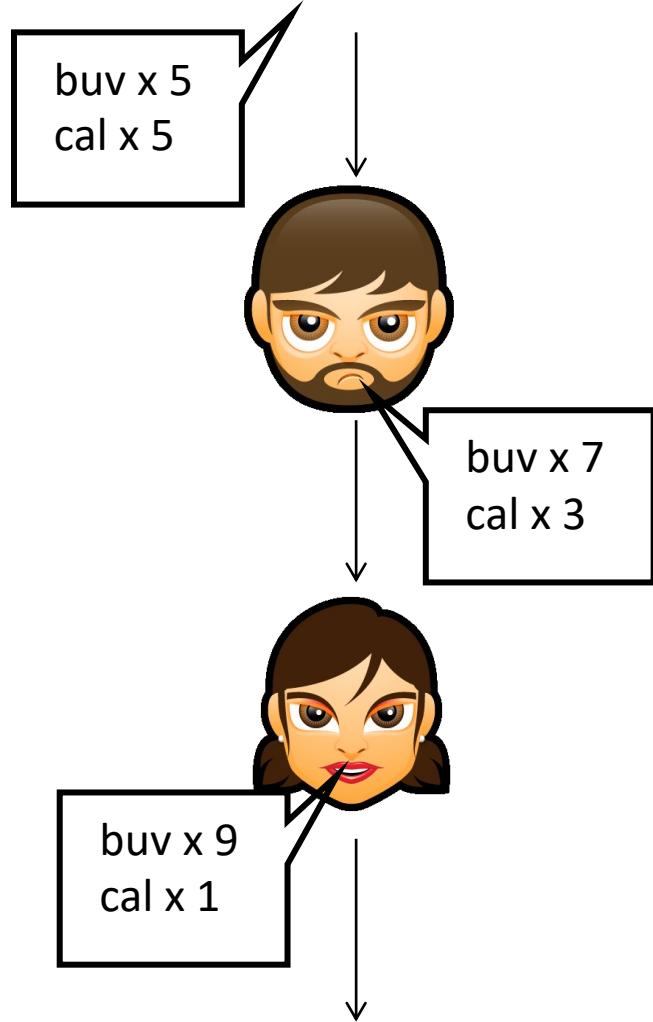
Individual differences



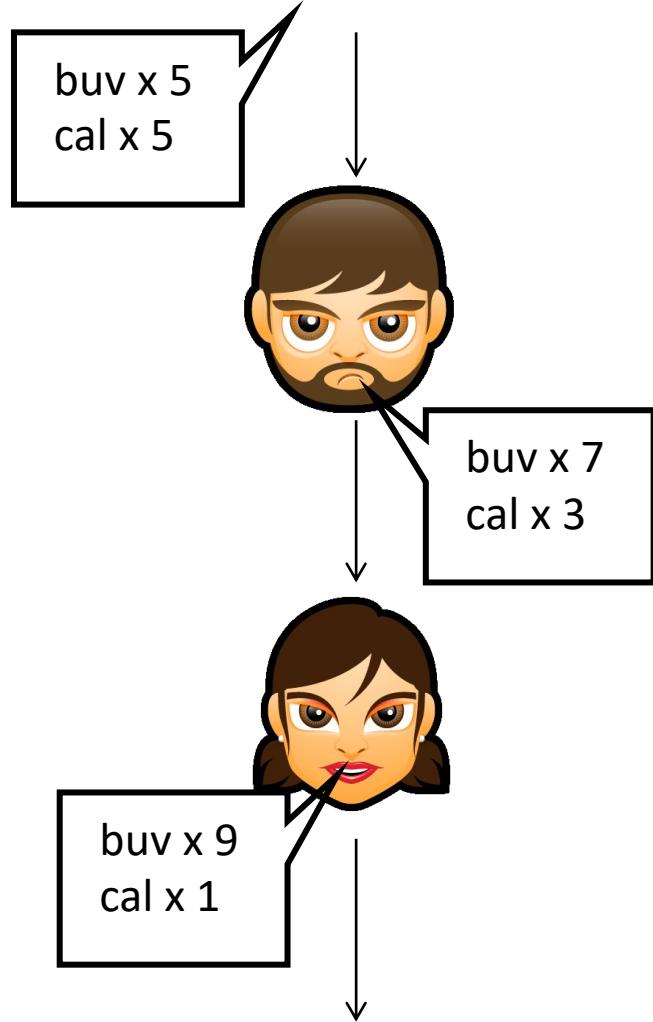
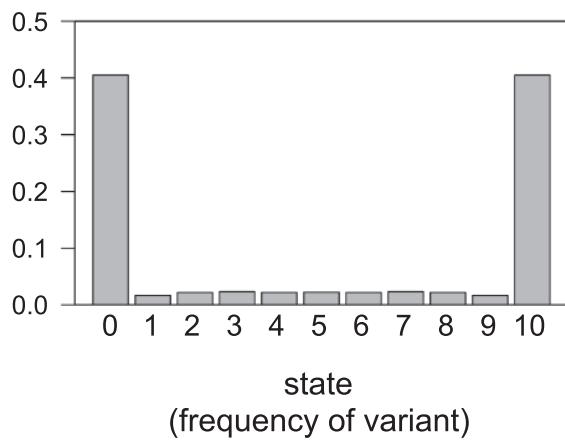
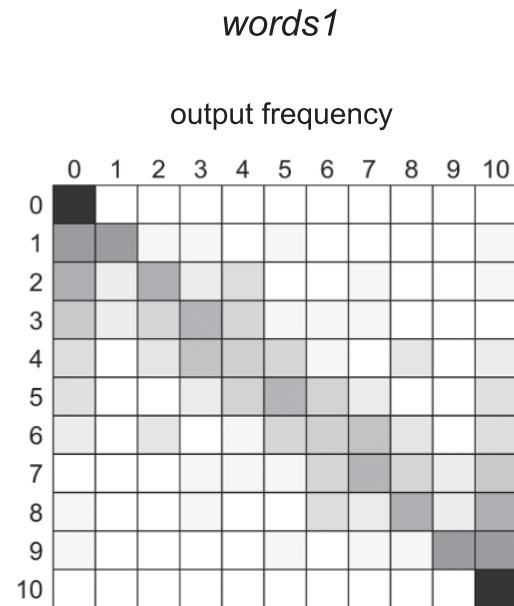
Minority regularizers



Simulating person-to-person transmission (iterated learning)



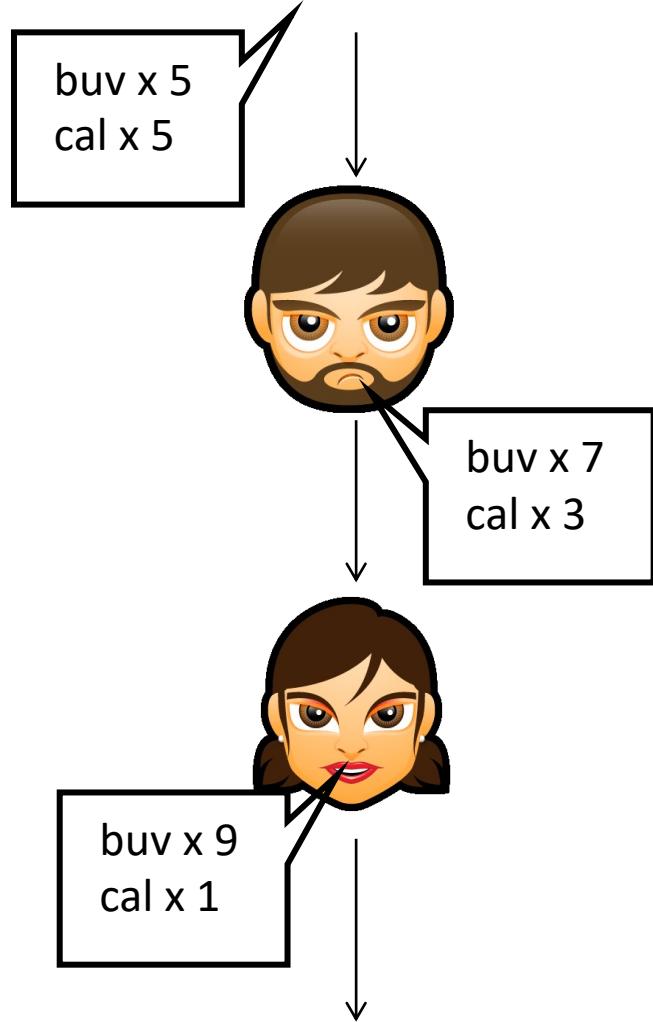
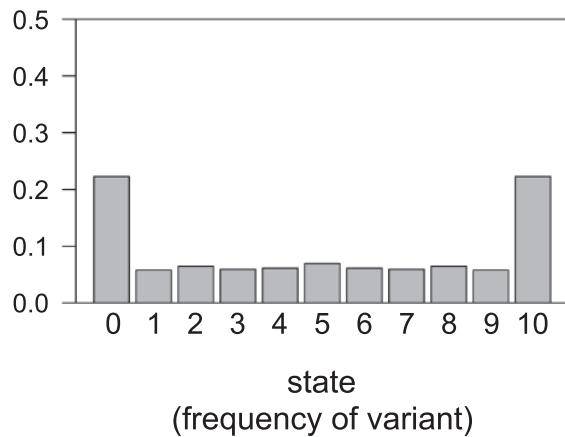
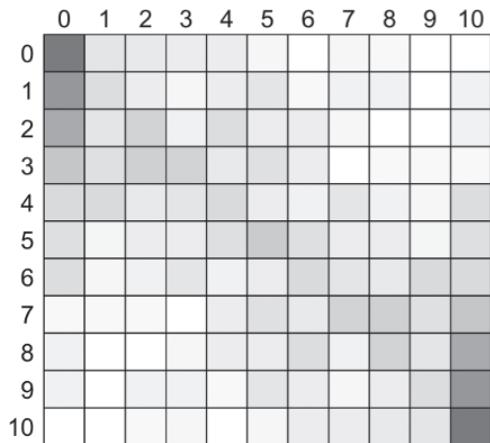
Simulating person-to-person transmission (iterated learning)



Simulating person-to-person transmission (iterated learning)

marbles6

output frequency



Ferdinand et al.'s conclusions

Effects of domain and demand on regularization

- More regularization on linguistic than non-linguistic tasks (why?)
- More regularization when under greater cognitive load

Regularization effects mainly in recall (not encoding)

Simulation of iterated learning can reveal additional differences in regularization (cf. marbles6 vs words1)

Time for Q&A/discussion on this week's reading

Next up

Wednesday, 9am: lab

- A frequency learning experiment

Next week:

- Perceptual learning, audio stimuli