The effects of contextual factors on learning in a native and a foreign language

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What are we studying?

Contextual factors, namely emotionality and contextual diversity, on foreign language (FL) and native language (NL) learning

Why?

While we can't change the content of a FL class, we can change the context
To find out whether these factors behave the same in an NL and an FL.
To explore whether the FL emotionality reduction applies to learning new information.

What do we know so far?

Emotionality
People remember things with emotional impact better (e.g, emotional content (1), context (2))
People are less emotional in an FL (e.g, 3, 4, 5)

General
There is some evidence that there is more difficulty incorporating lexical items in an FL (7)

Contextual Diversity
The contextual diversity (CD) effect refers to an increase ease of processing, in particular learning (6), with exposure to a term in more varied contexts. It has mostly been observed in the NL and there is little literature on it in an FL.

Experiments

Stimuli & Participants | Procedure | Results

Emotionality

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- 46 objects + description
- 92 names
  (46 objects & 46 foils)

20 seconds / Self-paced / Immediate recall

Learning Phase: Self-Paced Reading
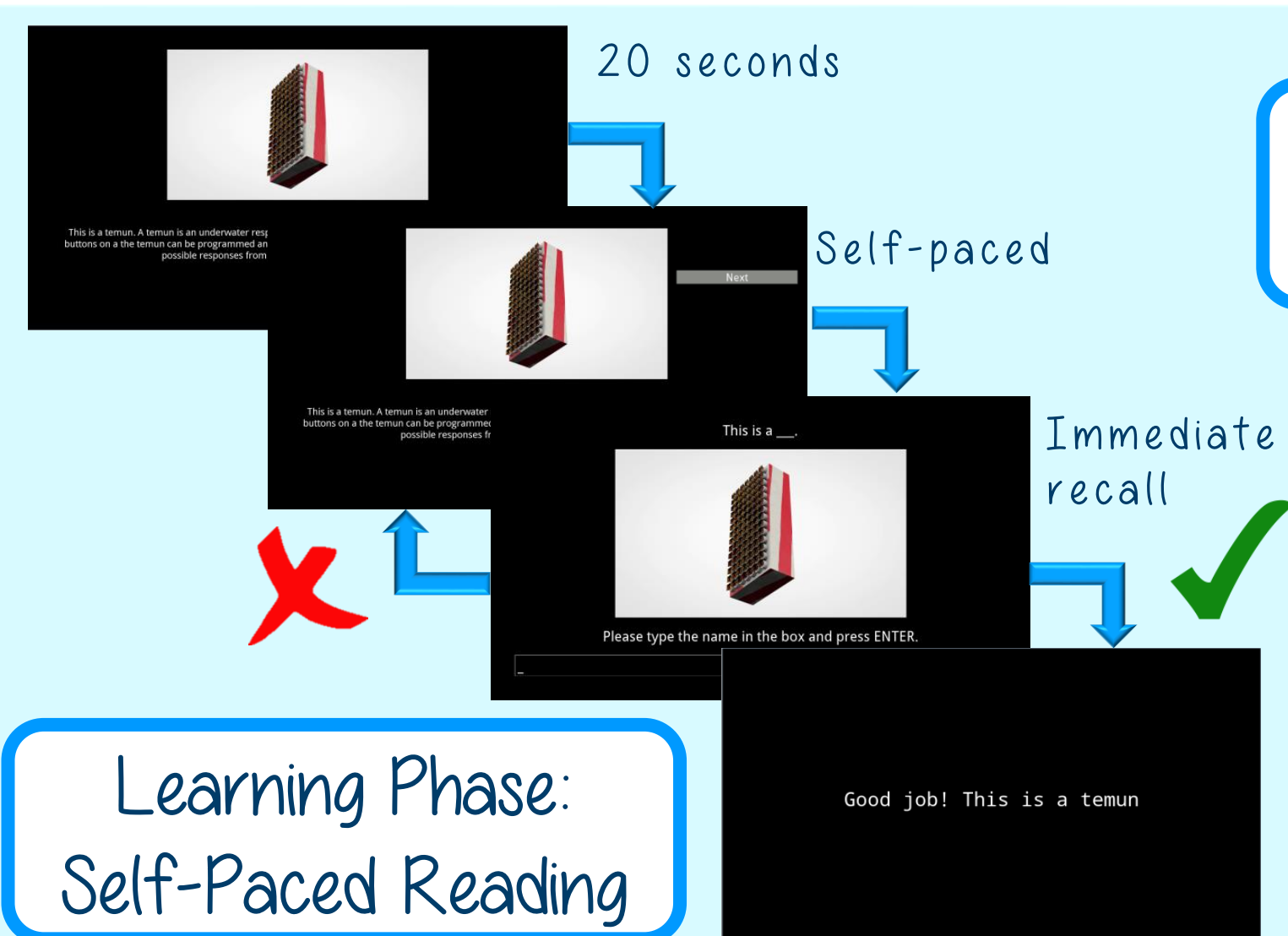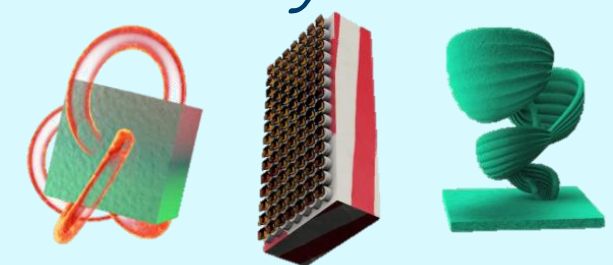
Testing Phase: Name Matching

Select the correct name

This a a ...
Good job! This is a temun
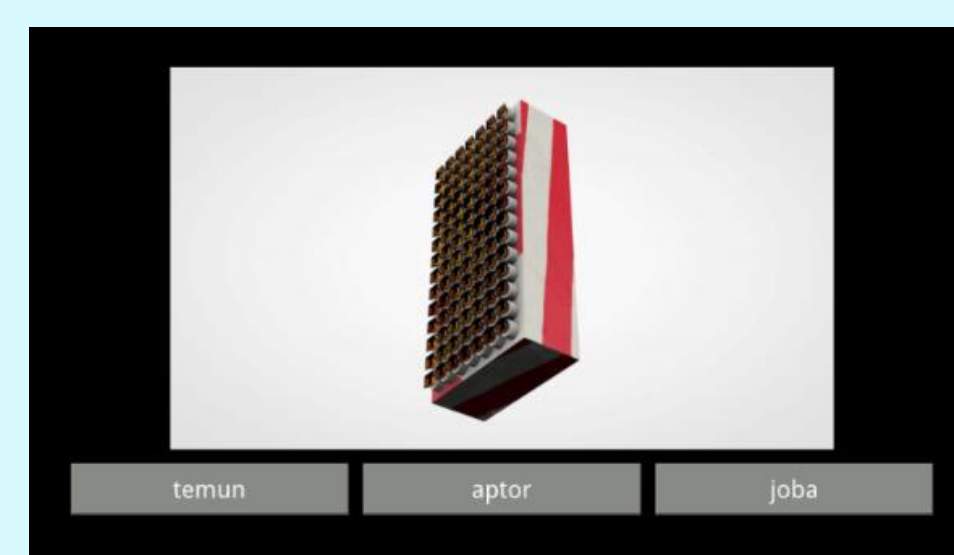
Accuracy
- Positive > Neutral
  $F(1, 41) = 5.93, p=.02, \eta^2 = .13$
- Native > Foreign
  $F(1, 41) = 4.64, p=.04, \eta^2 = .10$
- No interaction
  $p = .92, BF_{01}=3.31, error/=.02$

Response Time
- Positive < Neutral
  $F(1, 41) = 5.48, p=.02, \eta^2 = .11$
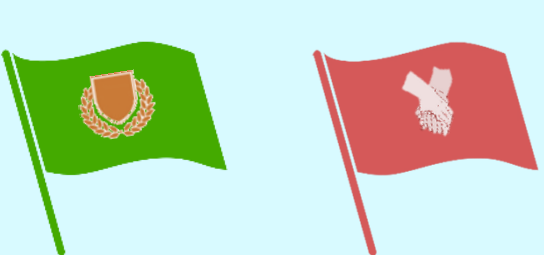- No effect of language $(p > .1)$
- No interaction $(p > .1)$

Average Percentage of Errors and Response Time by Emotionality and Language Conditions

Note: Error bars are 95% CIs

Emotionality

38 🇪🇸 38 🇬🇧
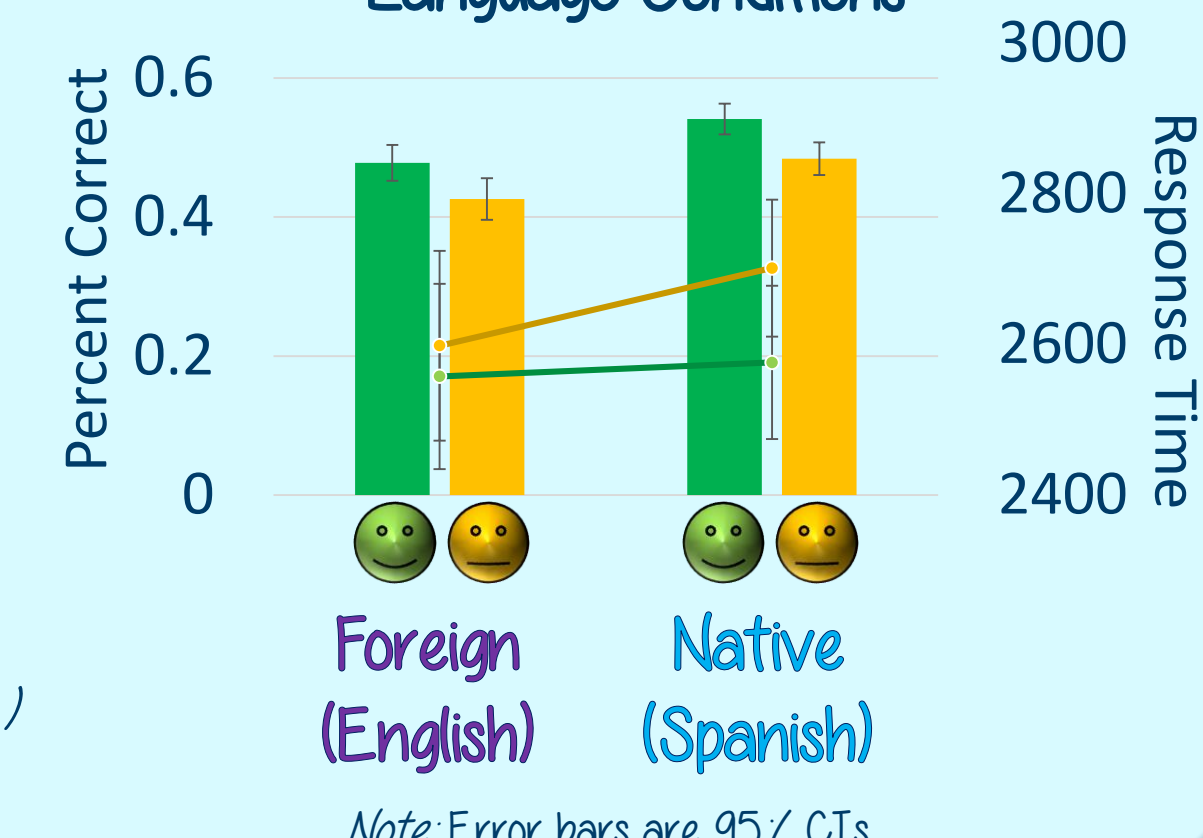
- 2 country descriptions
- 50 "facts" each

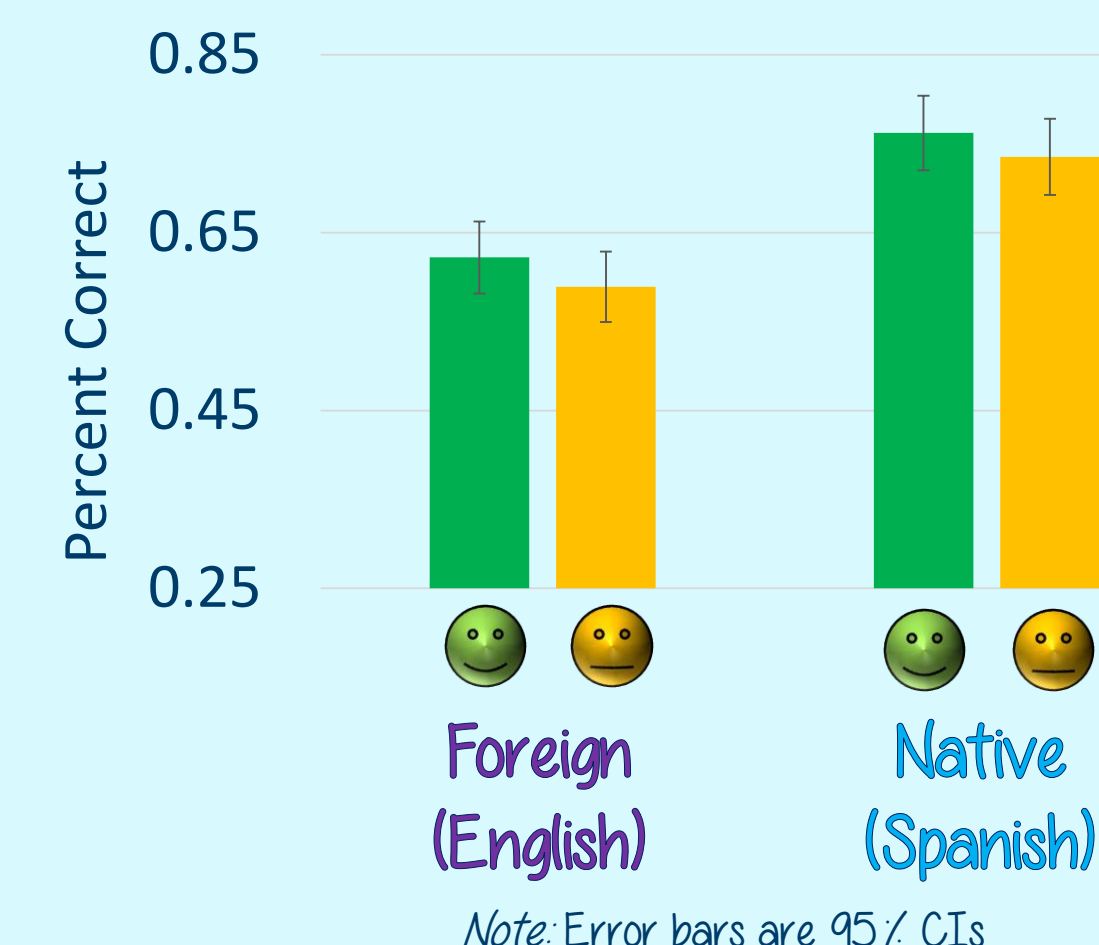**Learning Phase: Passive Listening**

Testing Phase: Multiple Choice Test

What is the oldest monument in each country?
	Mufelo	Tecamer
The opera in the capital		
The roman bridge		
The national museum		
The temple in the capital		

What was the most famous historical character in each country?
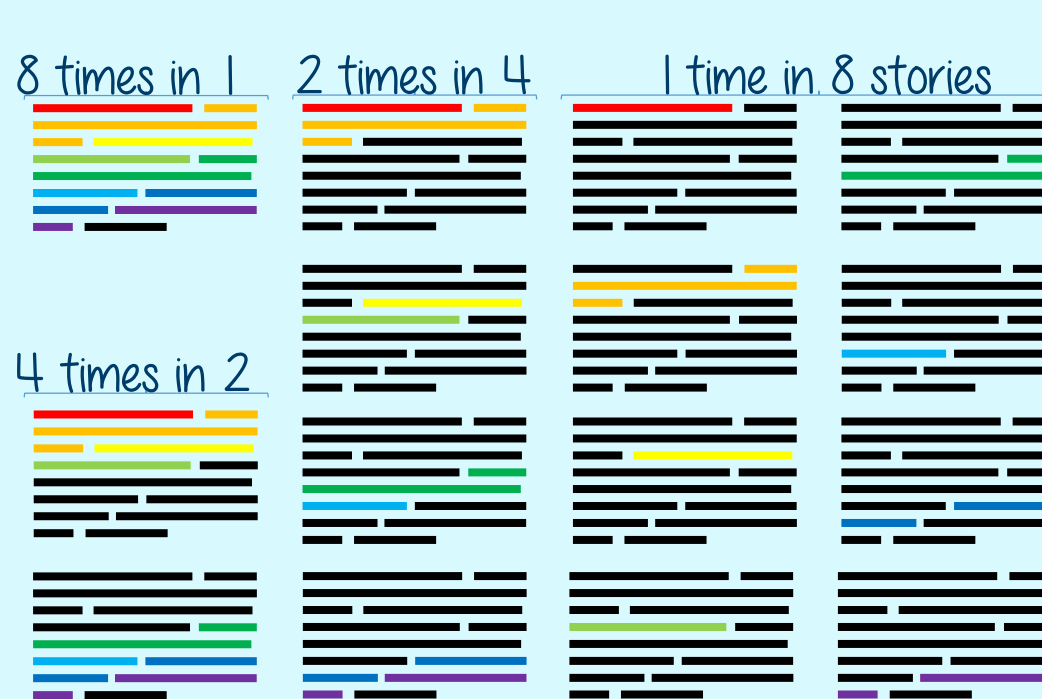|	Mufelo	Tecamer
A scientist		
An athelete		
A singer		
A politician		

Accuracy
- ○ Native > Foreign
  $F(1,70) = 26.83, p <.001, \eta^2 = .277$
- ○ Positive > Neutral
  $F(1,70) = 8.54, p=.005, \eta^2 = .109$
- ○ No interaction
  $p = .75, BF_{01}=4.09, error/=2.79$

Note: Three participants were removed from the Spanish condition and one from the English condition due to low performance
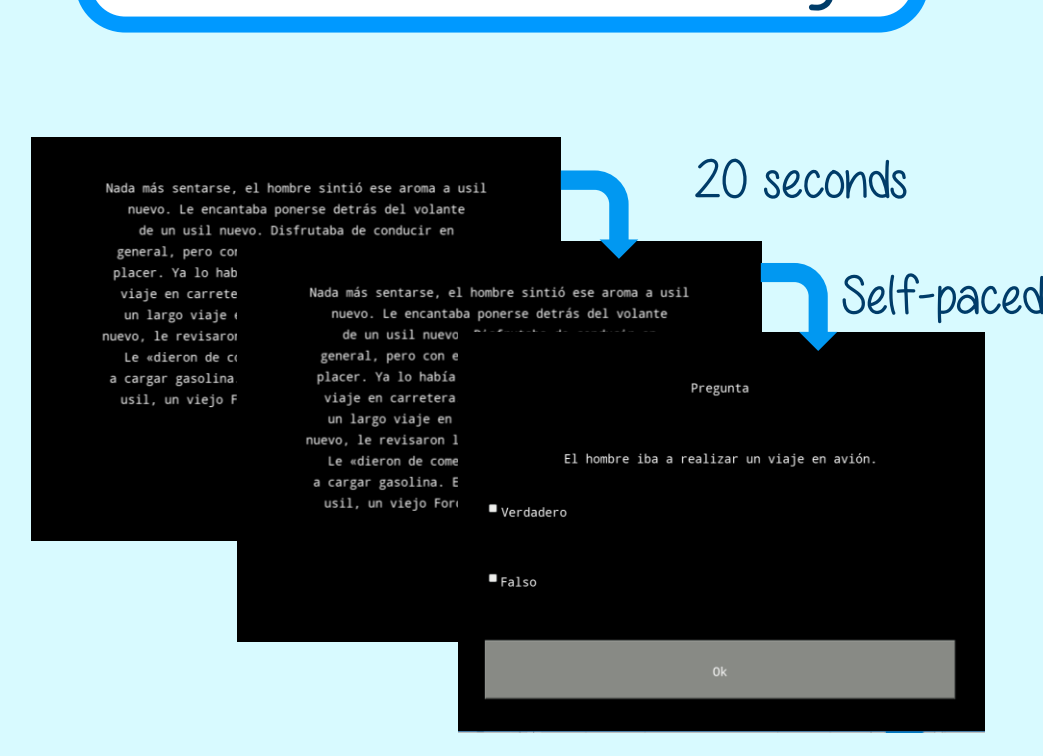

Accuracy

Note: Error bars are 95% CIs
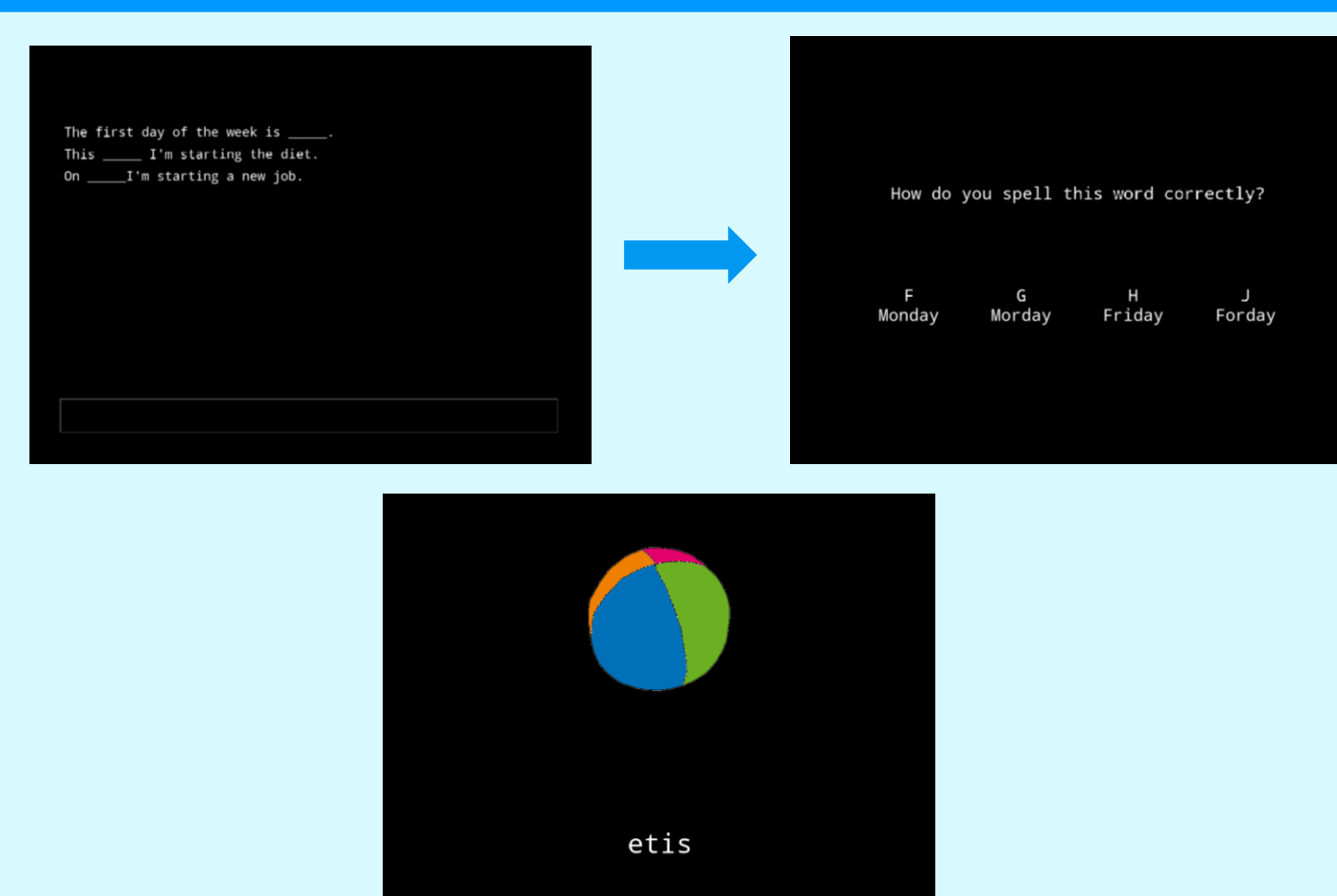
Contextual Diversity

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8 times in 1 / 2 times in 4 / 1 time in 8 stories
4 times in 2

8 real words → pseudowords
120 stories (30 per participant)

Learning Phase: Self-Paced Reading

20 seconds / Self-paced

Testing Phase

The first day of the week is ___.
Thus ___ I'm starting the day.
So ___ I'm starting a new job.

How do you spell this word correctly?
Monday / Monday / Friday / Fordey
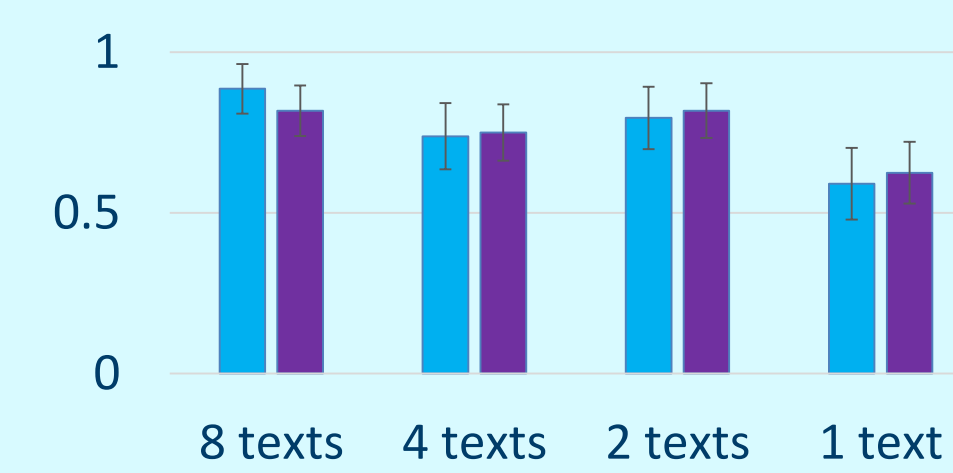
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Recognition
- ○ Native = Foreign
  $F(1,86) = 9.138 \times 10^{-3}, p = 1, \eta_p^2 < .001$
- ○ Diversity 1 < 2 = 4 = 8
  $F(3,258) = 10.302, p < .001, \eta_p^2 = .107$
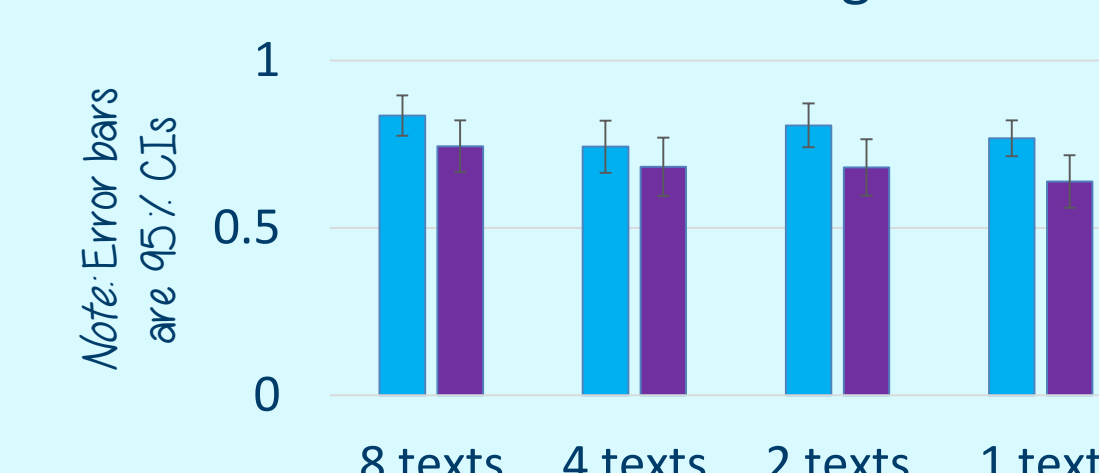- ○ No interaction
  $F(3,258) = .491, p = .689, \eta_p^2 = .006$

Matching
- ○ Native > Foreign
  $F(1,86) = 6.754, p = .011, \eta_p^2 = .073$
- ○ Diversity 1 < 8, 4 < 8
  $F(3,258) = 3.507, p = .016, \eta_p^2 = .039$
- ○ No interaction
  $F(3,258) = .629, p = .597, \eta_p^2 = .007$

Accuracy for Recognition — 8 texts / 4 texts / 2 texts / 1 text

A' for the Matching Task — 8 texts / 4 texts / 2 texts / 1 text

Note Error bars are 95% CIs

Discussion

- Studies 1 & 2: by surrounding the to-be-learned information—words in the first case, facts in the second—with emotionally loaded words, we attract attention to the information and improve accuracy (and response time) for this information.
- Study 3: distributing repetitions of a word helps people remember it.
- Overall effect of language (participants do better in their NL than their FL) → somewhat small and does not interact with other factors.
- Future directions: applying these in the classroom as well as understanding the exact mechanisms that drive these effects.

What does this mean?

- While there are times when using an FL can be more difficult, the differences between our NL and our FL are subtle and quantitative rather than qualitative
- We can use both emotionality and contextual diversity to boost learning and memory for new words.

References

(1)Hamann, S (2001) Cognitive and neural mechanisms of emotional memory. Trends in Cognitive Sciences, 5(9), 394–400.
(2)Erk, S, Kiefer, M., Grothe, J., Wunderlich, A. P., Spitzer, M., & Walter, H. (2003) Emotional context modulates subsequent memory effect. NeuroImage, 18(2), 439–447.
(3)Costa, A, Foucart, A., Arnon, I., Aparici, M., & Apesteguia, J. (2014) "Piensa" twice: on the foreign language effect in decision making. Cognition, 130(2), 236–254.
(4)Dewaele, J-M. (2004) The Emotional Force of Swearwords and Taboo Words in the Speech of Multilinguals. Journal of Multilingual and Multicultural Development, 25(2,3), 204–222.
(5)Keysar, B, Hayakawa, S L., & An, S G. (2012) The foreign-language effect: Thinking in a foreign tongue reduces decision biases. Psychological science, 23(6), 661-668.
(6)Hulme, R. C., Barsky, D, & Rodd, J. M. (2018) Incidental learning and long-term retention of new word meanings from stories. The effect of number of exposures Incidental L1 Vocabulary Acquisition from Reading, 1–24.
(7)Pellicer-Sánchez, Ana (2016) Incidental L2 vocabulary acquisition from and while reading. An Eye-Tracking Study. Studies in Second Language Acquisition, 38(1), 97–130.