Interplay between task demands and language mode in bilingual word recognition: Evidence from ERPs

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Introduction

- *Partial selectivity:* The degree of accessibility of each language depends on the current context
- Bilinguals quickly identify the language to which a word belongs & can use this information to suppress a task-irrelevant language[1]
1. **At what representational level (e.g., lexical, semantic) is the task-irrelevant language suppressed?**
- Language mode influences the global activation of each language[2]
2. **Does the proportion of each language presented influence nontarget language suppression?**

Methods

- 24 Spanish-Basque bilinguals (half of planned N=48)
- EEG recording
- 576 nouns displayed RSVP
  - Basque/Spanish; living/non-living
  - Matched on frequency, concreteness, length, orthographic neighborhood
  - Orthogonally manipulated frequency and concreteness to assess lexical and semantic processing, respectively
- Simultaneous language & semantic categorization tasks on each word
  - Go/No-Go decision based on language membership (Spanish/Basque)
  - Left/Right hand decision based on animacy (living/non-living)
- Proportion of words in each language
  - 50:50 block
  - 75:25 block (target fillers added)

Hoversten et al. (2015)
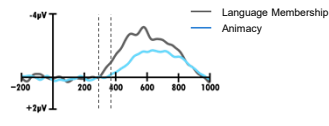
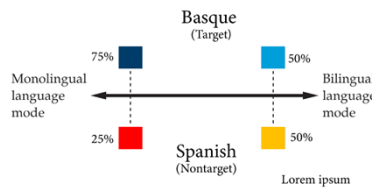→ Language membership information available ~100 ms prior to animacy
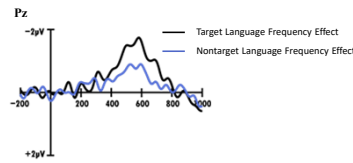
→ Reduced depth of processing of nontarget language vs. target language

Task Demands

	LEFT HAND Living	RIGHT HAND Non-living
GO Basque	ZALDI (horse)	HERRI (town)
NO-GO Spanish	PERRO (dog)	JAULA (cage)

Orthogonally manipulated word **frequency** and **concreteness**

Language Mode

75:25 block

herri (town)	R
perro (dog)	
ahuntz (goat)	L
mutil (boy)	L
tiempo (time)	
kutxa (box)	R
ehiztari (hunter)	L
mahai (table)	R

50:50 block

L	zaldi (horse)
	jaula (cage)
L	lagun (friend)
R	hondartza (beach)
	festival (festival)
	cobarde (coward)
R	gosari (breakfast)
	rival (rival)

Lexical Processing

75:25

Target **Nontarget**

50:50

Target **Nontarget**

- - - - Low Frequency
——— High Frequency

Semantic Processing

75:25

Target **Nontarget**
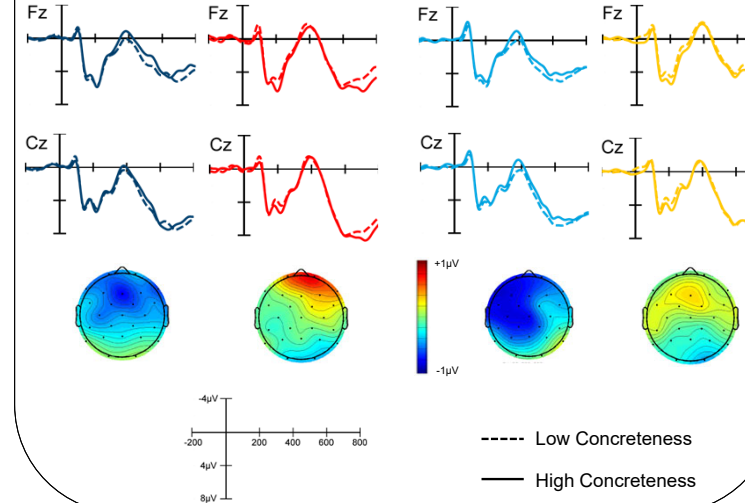
50:50

Target **Nontarget**

- - - - Low Concreteness
——— High Concreteness
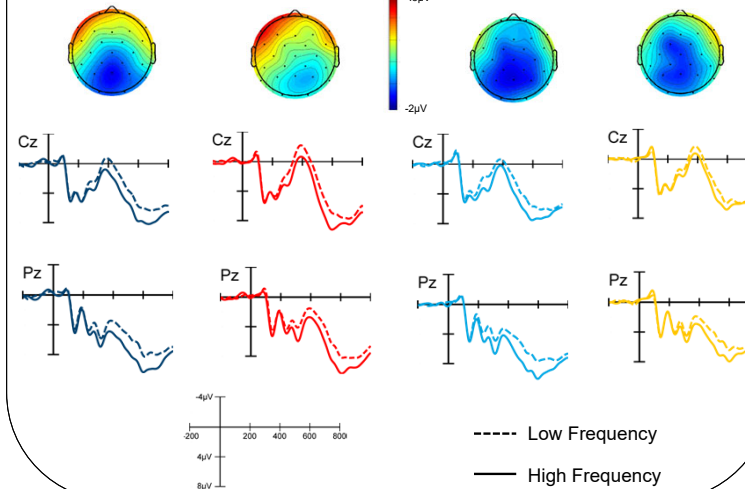
Results

Lexical Processing
- High & low frequency words differed in all conditions
- Smaller difference between high & low frequency words for nontarget language in 50:50 block only

Semantic Processing
- Concrete & abstract words differed in the target language
- Concrete & abstract words did not differ in the nontarget language
- Similar concreteness effects in 50:50 and 75:25 blocks

Discussion

Replicated the restricted depth of lexical processing in the nontarget language in the 50:50 block (condition comparable to the prior study[1])

→ **Partial suppression of the nontarget language at the lexical level**

No evidence of semantic processing in the nontarget language in either block

→ **Full suppression of the nontarget language at the semantic level**

Increasing the proportion of target language words did not increase suppression of the nontarget language

→ **Language mode does not appear to affect language activations in the same way as task demands**

References

Hoversten, L. J., Brothers, T., Swaab, T. Y., & Traxler, M. J. (2015). Language membership identification precedes semantic access: Suppression during bilingual word recognition. *Journal of Cognitive Neuroscience, 27,* 2108-2116.

Grosjean, F. (2012). Bilingual and monolingual language modes. In Chapelle, C. (ed.). *The encyclopedia of applied linguistics.* John Wiley and Sons, Inc.