Categorical Expectation in Bilingualism

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Do bilinguals generate cross-language predictions?

- Bilinguals produce and interpret sentences in two different language systems, and many routinely code-switch from one language to another.
- Readers and listeners generate probabilistic expectations as they process language (e.g. Hale, 2001; Levy, 2008)
- Code-switching often obeys the surface order of both languages at the switch point (e.g. Poplack, 1980)
- Our question: Are (categorical) expectations language-specific on the word-level?

Key conditions

	Grammatical (Det-N)	Ungrammatical (Adv-N)
Same Language	more cars aquella cama	ideally forest antiguamente igualdad
Mixed Language	our alianza cada height	plenamente pride bitterly deuda

Fillers included Det-Prep, Adv-V and many others: grammaticality not predictable from first word.

Key prediction: Nouns in mixed language phrasal constituents read faster than nouns in non-constituents

Manipulation check 1: Det-N faster than Adv-N within-language
Manipulation check 2: language switch cost overall (Macnamara & Kushnir, 1971)

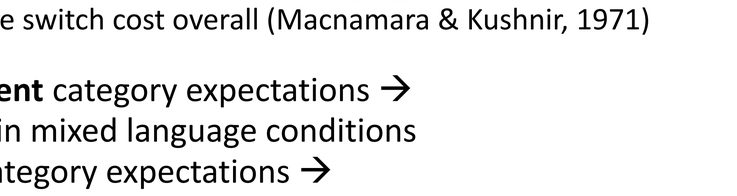
- **H_1: Language-independent** category expectations → **Det-N < Adv-N** in mixed language conditions
- **H_0: Language-specific** category expectations → **Det-N = Adv-N** in mixed language conditions

Methods: List lexical decision task, eyetracking

- Bilingual two-word list lexical decision task (Meyer et al, 1974): 2 words, 1 response
- SR-Research EyeLink 1000 eyetracker

800 Trials (per participant)
400 'yes', 400 'no'
400 same language, 400 mixed language
60 Det-N, 60 Adv-N
680 fillers (42 bigram filler types)

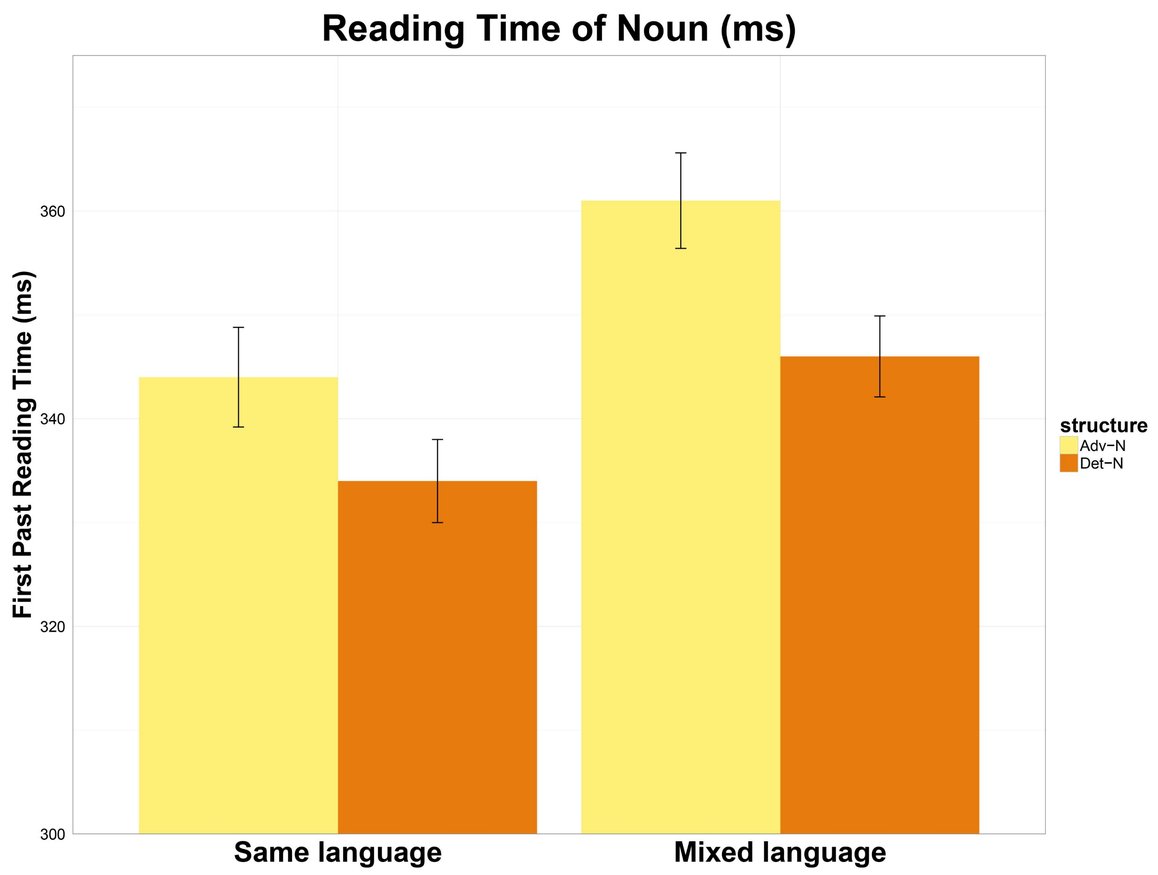
Det-N mixed-language 'yes' (all-words) trial



Same-language (phonotactic) 'no' (nonword) trial

40 Spanish-English bilinguals (16 M, 24 F)	Self Identified Language-Dominance:		
	Balanced	Sp	Eng
Heritage Speakers (exposed to both languages since birth)	15	5	8
Spanish L1, learned English before age 12	2	3	0
Spanish L1, learned English past age 12	3	3	0
English L1, learned Spanish past age 12	1	0	0

Results



We performed a linear effects mixed model on the first pass reading time of the noun in critical trials:

```
lmer(FPRT ~ trialNumber + block + session +
     language + wordLength + logFrequency +
       languageCongruence * previousWordLogFrequency +
         languageCongruence * logConditionalProbability +
           languageCongruence * previousWordLength +
             languageCongruence * dn.or.an +
               (languageCongruence | item) +
                 (languageCongruence * dn.or.an | subject))
```

- Nouns were read faster following determiners, relative to nouns after adverbs, independent of whether or not there was a language switch
- Language congruence (switch cost) effects were marginal

Summary

Our data support the hypothesis that bilinguals form language-independent categorical expectations.

Future directions

- If word order is different across languages, as in Adj-N pairs in English as compared to N-Adj pairs in Spanish, will language-independent categorical expectations form?
- In a non-balanced bilingual, are cross-language predictions different depending on the direction of the language switch?

References

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