Priming during real-time comprehension of code-switched utterances

Malathi Thothathiri, Daniel Grodner, David Nahmias, & Mariela Puentes (Swarthmore College)
mthotha1@swarthmore.edu

Bilingualism; Syntactic priming; Eye-tracking; English; Spanish

Syntactic priming refers to facilitation in processing a syntactic structure after recent exposure to the same structure. In bilinguals, this priming occurs between sentences/phrases in one language and sentences/phrases in another, suggesting that syntactic representations (e.g., SVO structure) might be shared between languages [1, 2]. However, the full capability of the bilingual processing system remains to be explored. Can similar effects be found during bilingual comprehension as in production? Can multilingual structures, not found in either of the constituent languages, show facilitation from prior exposure? The current study addresses this question by examining the online priming of code-switched structures using the visual world paradigm.

Participants were fluent Spanish-English bilinguals (N=24). On each trial, they saw 4 objects on a computer screen. `An auditory instruction directed them to click on one of the objects. The instructions consisted of the English carrier phrase "Click on the", which continued with either an English adjective-noun phrase (E) or code-switched into a Spanish noun-adjective phrase (CS) (1a-b). On critical trials, the word following the carrier phrase was temporarily ambiguous: it was roughly phonetically compatible with either an English adjective or a Spanish noun (2). Each target trial was preceded by two prime trials. Each participant received all 4 possible combinations of primes and targets (3a-d) in a pseudorandom order. The assignment of target items to conditions was counterbalanced across 4 lists. We predicted that for each target type, processing of the instruction would be facilitated by a prime of the same type compared to when the prime was a different type (3a vs. 3b, 3d vs. 3c). Participants listened to a total of 64 instructions (16 targets, 32 primes, 16 fillers).

The dependent variable was the ratio of looking time to the correct match divided by the sum of looking time to the two possible matches, in the 200-400 ms time window following the temporarily ambiguous word. For code-switched targets (3c-d), as predicted, the ratio was larger following a code-switched prime (0.52) than an English prime (0.36) ($F1(1,23)= 11.12$, $p<.01$; $F2(1,15)=12.41$, $p<.01$). This effect appears to be driven by both a significant increase in looking to the correct match (F1 and F2 p's<.02) and a marginally significant decrease in looking to the incorrect match (one-tailed p's<.1) when the target instruction was preceded by a structurally similar prime. For English targets, there was no significant difference in ratio score between the English prime (0.5) and code-switched prime (0.55) conditions (p's>.2). This null result could be due to a ceiling effect. Our participants, all of whom reside in the United States, may have been highly proficient in processing English sentences, independent of priming. Alternatively, it could be that code-switched utterances always benefit more from priming than single language utterances. Future work can distinguish these alternatives by employing Spanish carrier phrases.

These results show that the priming of multilingual structures can influence bilingual online comprehension. They extend previous syntactic priming effects to novel structures presumably composed "on the fly" from phrases in different languages. As such, they constrain theories of the mechanisms underlying syntactic priming. Future studies could investigate the constraints on such prime-able cross-language combinations.

Example stimuli

1 (a). English (E) instruction: Click on the yellow box
1 (b). Code-switched (CS) instruction: Click on the vaso pequeño (Translation: glass small i.e., small glass)
2. "Click on the big…"
Visual display: **big** cookie (English match), small cookie (contrast),
long mustache (Spanish match: **big**ote largo), red sweater (distractor)

3 (a).	E prime	E target	Click on the yellow box;	Click on the big cookie
3 (b).	CS prime	E target	Click on the vaso pequeño;	Click on the big cookie.
3 (c).	E prime	CS target	Click on the yellow box;	Click on the bigote largo.
3 (d).	CS prime	CS targe	Click on the vaso pequeño;	Click on the bigote largo.

References

1. Schoonbaert, S., et al. (2007). *Journal of Memory and Language, 56*, 153–171.
2. Kootstra, G. J., et al. (2010). *Journal of Memory and Language, 63*, 210–231.