Language-specific Syntax Constrains Cross-linguistic Activation

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How a bilingual stores and activates lexical representations in their two languages has been a central interest in psycholinguistic studies of bilingualism. Two competing theories of bilingual lexical access have been put forth – the language-selective access theory and the language non-selective access theory. The former proposes that only the lexical items from the intended language are activated and available for selection during speech planning and comprehension (e.g., Costa, Santesteban, & Ivanova, 2006). The latter proposes that both languages receive activation and compete for production (e.g., Kroll, Bobb, & Wodniecka, 2006). Within the framework of the non-selective access theory, the ability to negotiate cross-linguistic competition may come from language cues that reliably signal the L1 or L2 in conjunction with an inhibitory control mechanism (e.g. Green, 1998). The purpose of this study is to investigate whether language-specific syntax – the syntactic positioning of a target word in a determiner phrase (DP) – can act as a language cue to modulate cross-linguistic activation in bilingual sentence comprehension and if competition for production is mediated by an inhibitory control mechanism.

The participants (n=23) in this study are Spanish native speakers with advanced English proficiency living in Argentina. To examine cross-linguistic activation the participants were presented English sentences containing DP's that received genitive or dative case. In English, these structures have two acceptable positions; one which is linearly congruent with Spanish syntax (see examples 1 and 3) and one which is linearly incongruent (see examples 2 and 4).

1) Congruent Dative (canonical dative construction):
   *The man gave some water to the **donkey** in the lot.* **(target: burro)**
2) Incongruent Dative (dative double object construction):
   *The worker in the street gave the **dog** a little space.* **(target: perro)**
3) Congruent Genitive (*of*-genitive):
   *The teacher drew the top of the **tree** with a marker.* **(target: árbol)**
4) Incongruent Genitive (*'s*-genitive):
   *The young girl wanted to paint the **chair**'s bottom bright green.* **(target: silla)**

In task 1, the participants completed a cross-modal priming paradigm combined with a lexical decision task (figure 1) using SuperLab software (Cedrus Corp.; Haxby, Parasuraman, Lalonde and Abboud, 1993). After reading each stimuli sentence, the participants were presented a word that was either the Spanish translation-equivalent of the target word or a control word from either Spanish or English. The participants clicked "yes" or "no" to indicate if the word was a real Spanish word. The response times were recorded in milliseconds from the onset of the lexical decision task stimulus to the button press. Occasional "yes-no" comprehension questions were included to control for participants' attention. In task 2, the participants performed the same activity as in task 1, except that they repeated the stimulus out loud prior to the lexical decision task. Again, response times were recorded in milliseconds from the onset of the lexical decision task.

The results (figure 2) of task 1 revealed that response times in the congruent conditions (*of*-genitive and canonical dative position) were significantly faster ($p < .02$) than response times in the incongruent conditions (*'s*-genitive and dative double object) lending evidence that linearly congruent syntax results in cross-linguistic activation and that language-specific syntax (linearly incongruent) can reduce such cross-linguistic activation. However, in task 2 where participants read the stimuli out loud, there were no significant differences between the response times in the congruent and incongruent conditions ($p > .05$). Such results suggest that highly activated translation-equivalents in Spanish (congruent condition) require more inhibition upon production in English than those which receive less activation initially (incongruent condition). This active inhibition involuntarily persists into the processing of the lexical decision task resulting in a delayed response time and a loss of a response time advantage over the less activated translation-equivalents as seen in task 1 when

repetition was not required. These finding are in line with the asymmetrical language-switch costs reported by Meuter and Allport (1999) and with the notion of an inhibitory control mechanism.

The results from this study further support the language non-selective access theory and provide evidence that language-specific syntax can be a language cue that modulates cross-linguistic activation. Furthermore, they suggest that any remaining cross-linguistic competition is resolved by an inhibitory control mechanism during speech production. Taken together the results from this study refine current theories of cross-linguistic activation and provide a better understanding of the role of inhibition in bilingual language comprehension and production.

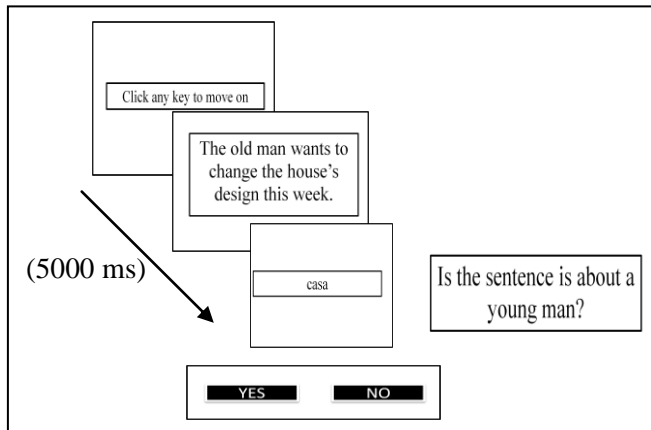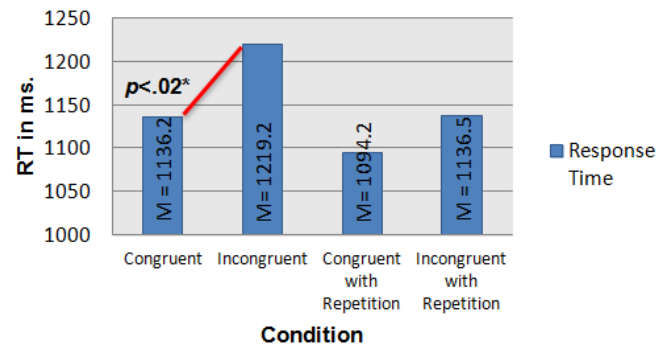Figure 1: Example of Cross-modal paradigm with a lexical decision task.

Figure 2: Results

References

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