

Top-down cross-language activation in bimodal bilingual word recognition (ENGLISH)

Research with bilinguals in two spoken languages, i.e., unimodal bilinguals, has revealed that both languages show some level of co-activation during listening, even in monolingual contexts. Such cross-language activation is often taken to result from bottom-up activation of phonological representations when participants hear words that sound similar in their two languages. This raises the question whether cross-language activation would occur for languages with non-overlapping phonological systems, i.e., a spoken language and a sign language. Morford et al. (2011) recently showed cross-language activation between written words and signs for *deaf* ASL-English bilinguals, and findings by Shook and Marian (2012) suggest that *hearing* ASL-English bilinguals experience cross-language activation of ASL during spoken word recognition in a visual world paradigm. This paper reports two experiments that further investigated cross-language activation in hearing bimodal bilinguals. Experiment 1 aimed to replicate the results of Shook and Marian (2012) and to relate the degree and time course of cross-language competition to non-linguistic cognitive control abilities. Experiment 2 examined whether phonological facilitation or semantic interference are observed when bilinguals name pictures in ASL while English words are presented as auditory distractors.

For Experiment 1, participants listened to English words (e.g., “chair”) while looking at displays with four pictures that included the target picture, a cross-language phonological competitor (e.g., *train*, which is phonologically related to the ASL sign CHAIR), and two unrelated pictures. Fluent ASL-English bilinguals ($N = 20$) fixated more on pictures of cross-language competitors than on unrelated pictures, suggesting parallel language activation and replicating Shook and Marian (2012) with a larger sample and stimulus set. In a recent study with unimodal bilinguals, Blumenfeld and Marian (under review) found significant correlations between cross-language competitor activation and inhibition performance on a non-linguistic cognitive control task, suggesting a direct link between linguistic competition and non-linguistic competition resolution abilities. We are currently investigating whether bimodal bilinguals exhibit a similar relationship, using the data from Experiment 1 and several cognitive control tasks.

Experiment 2 was a picture-word interference task in which participants named pictures in ASL (e.g., signing CHAIR) while English distractor words were presented over headphones that were either 1) phonologically related to the target sign through the ASL translation (e.g., “train”), 2) semantically related to the target sign (e.g., “bed”), 3) translations of the target sign, or 4) unrelated to the target sign. The same 20 hearing signers from Experiment 1 participated. Similar to studies with unimodal bilinguals, naming latencies showed facilitation for translation distractors and interference for semantically related distractors. Most importantly, facilitation was observed for phonologically related distractors, showing that ASL production was speeded by hearing English words whose translations were phonologically related to the target signs.

Together, these results provide converging evidence for robust cross-language activation between a spoken and a signed language. The findings are not predicted by theories of bilingual word recognition that emphasize bottom-up activation through a shared phonology as the main source of cross-language activation and instead suggest an important role for top-down activation from the conceptual and/or lexical levels.

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