

Form priming in bilingual sentence reading: Effects of individual differences in language proficiency, working memory, and inhibitory control.

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During single word reading, lexical selection can be slowed by the activation of form-related words (e.g., Davis & Lupker, 2006; Segui & Grainger, 1990). Sentence reading studies have also shown evidence of inhibitory priming between form-related words (Paterson et al., 2009). Interestingly, this effect is more persistent (i.e., observed across more intervening words) for good comprehenders in their L1 (Frisson et al., 2014), and for higher proficiency bilinguals reading in their L2 (Pélissier et al., 2022). The aim of the present study was to investigate the cognitive mechanism underlying the persistence of this effect in bilinguals. Two candidate skills were investigated: inhibitory control and working memory.

Sixty-two Norwegian-English bilinguals were eyetracked while reading English sentences with embedded form-related words. Experimental prime and target words overlapped in both orthography and phonology (see Table 1). The prime or control was always more frequent than the target (means prime/control: 63.05, target: 14.66). 192 sentence quadruplets were constructed, half with a short distance between prime and target word, (mean 3.1 words, 13.7 letters) and half with a long distance (mean 9.0 words, 45.5 letters). The prime/control and target words were either in the same sentence or in separate sentences (see Table 1). In addition, participants completed tests of L2 English proficiency (word attack, LexTALE, authors recognition), two working memory tests (reading span, backward digit span), and two inhibitory skills tasks (Flanker task, word naming task).

Composite scores for L2 English proficiency, working memory, and inhibitory control were calculated. The effect of relatedness (related-control) was modulated by L2 proficiency. In the short distance conditions, higher proficiency was related to decreased inhibitory priming for a number of gaze duration measures (first pass dwell time, regression path, and total dwell time, all p s < .05). In the the long distance conditions, regression path showed a marginal effect in the opposite direction; higher proficiency was related to increased inhibition ($p = .07$). Better inhibitory control skills were associated with decreased inhibitory priming in the short lag condition (first pass dwell time $p = .05$). Working memory and proficiency interacted with sentence break (see Figure 1). Better working memory was associated with increased inhibitory priming within a sentence but not across a sentence break. The opposite pattern was observed for L2 proficiency.

The data suggest that inhibitory control does not explain persistent inhibitory form-priming effects. Better working memory can be associated with more persistent inhibitory form priming, in line with a memory account (Paterson et al., 2009), but a sentence break neutralizes this effect, consistent with previous findings that readers discard low-level information at a sentence boundary (Frisson et al., 2014).

Table 1. Example experimental sentences (primes in bold, controls in brackets, targets in italics)

Distance	Structure	Example
Short	No break	The pen had left an ugly pink [blue] stain and her <i>min</i> k jacket was now ruined.
	Break	The pen had left an ugly pink [blue] stain. Her <i>min</i> k jacket was now ruined.
Long	No break	He told the children a very funny tale [joke] which involved an elf who only ate <i>kale</i> and chickpeas for breakfast.
	Break	He told the children a very funny tale [joke]. It involved an elf who only ate <i>kale</i> and chickpeas for breakfast.

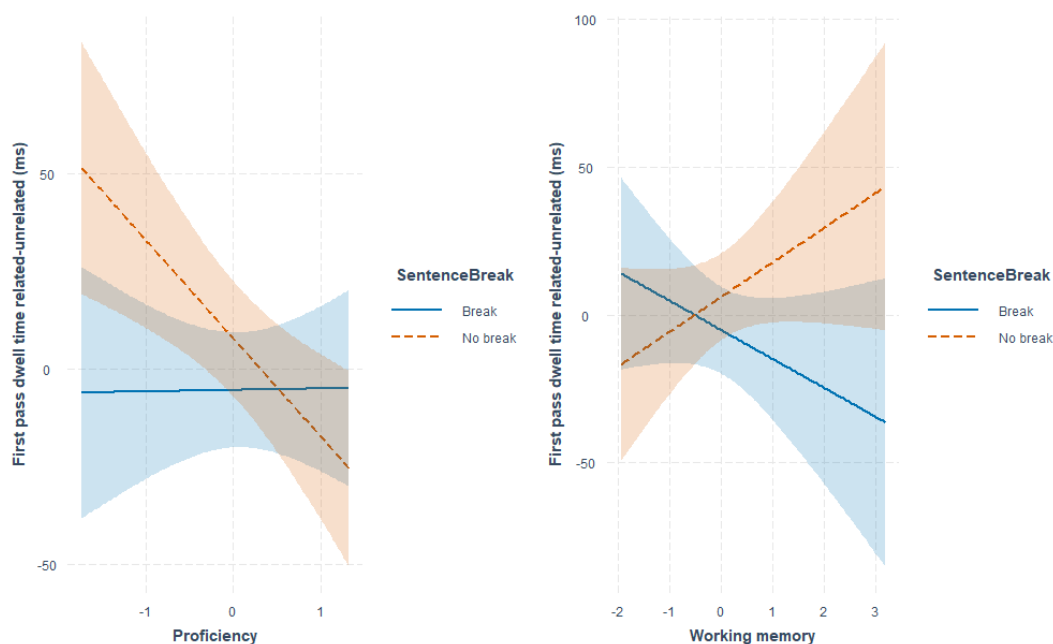


Figure 2. The effect of relatedness (related-control) for the first pass dwell time on target words in the short lag condition: Interactions for individual differences in L2 proficiency and working memory, with sentence break.

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