

Orthographic and phonological priming during normal sentence reading

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In a recent paper, Paterson, Liversedge, and Davis (2009) showed inhibitory priming effects for a word when preceded by a word's orthographic neighbour. For example, "blue" was fixated for longer when "blur" appeared in the immediate prior context compared to when it was preceded by the control word "gasp": "There was a blur [gasp] when the blue lights of the police car whizzed by." This is an important finding as it suggests that during word recognition, competition between lexical candidates (e.g., "blu_" activates the competitors "blur", "blue", "blub", etc.) is resolved by suppressing the activation of the incorrect candidates, making it harder to process one of these candidates later in the sentence.

Following Coltheart et al. (1977), and an extensive literature on single-word priming effects, Paterson et al. defined orthographic neighbours as words that differed from each other by one letter, irrespective of other attributes (e.g., phonological overlap). In Experiment 1 (N = 28), we tested whether all types of overlap lead to inhibitory priming effects. We distinguished 4 types, and constructed 32 items per type:

- (1) O+P+: Orthographic + phonological overlap (rhyming):
The birds ruffled their **wings** [tails] as the **kings** watched from their palace.
- (2) O+P+: Orthographic + phonological overlap (non-rhyming):
The captain found it a **strain** [burden] to negotiate the **strait** at the end of a long voyage.
- (3) O+P-: Orthographic-only overlap:
On noticing the giant **bear** [tree] John changed **gear** and pedalled away quickly.
- (4) O-P+: Phonological-only overlap:
The husband had a big **smile** [fight] walking down the **aisle** of the local supermarket.

Results showed that only O+P+ overlap resulted in inhibition (with the rhyming condition showing an immediate inhibition effect on the target word and the non-rhyming condition on the spillover region). No inhibitory or facilitatory priming effects were found on any eye-tracking measure for the O+P- or the O-P+ overlap conditions. The lack of an effect for the O+P- condition suggests that, if an orthographic-only neighbour gets activated during the recognition of the prime word, its suppression is much less than for O+P+ overlap neighbours. Hence, phonology seems to affect the activation and/or suppression of orthographic neighbours. A similar explanation can be put forward for the O-P+ condition, though other considerations lead us to believe that non-orthographic rhymes might not be activated during the recognition of the prime.

A second experiment (N=60) examined whether the inhibition effect reduces when the distance between the prime and target word increases, as expected in most models of word recognition (e.g., Grainger & Jacobs, 1996). This was indeed the case, with inhibition found only for the "short" condition (prime and target separated by 3 words on average) but not for the "long" conditions (prime and target separated by 9 words on average, and prime and target either in 1 or 2 separate sentences). However, a significant correlation was found for the long 1-sentence condition between the Gray Silent Reading scores, which tests the level of reading comprehension, and the inhibition difference scores, with greater inhibition for the good readers. This suggests that good readers keep orthographic neighbors active for longer, and that they discard this activation at the end of the sentence.

References

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