

Interference from Reversed Anagram Primes: Another Source of Inhibition in Word Recognition?

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Orthographic Priming and Letter-Position Coding

Masked orthographic priming studies are used to test word recognition theories including assumptions regarding letter-position coding. These studies have revealed several characteristics of orthographic priming.

1. **Prime lexicality effect:** orthographically similar nonword primes facilitate target word processing; orthographically similar word primes interfere with target word processing (Davis & Lupker, 2006).
2. **Transposition priming effects:** transposed letter nonword primes (e.g., *jugde* - *JUDGE*) facilitate target word processing (e.g., Perea & Lupker, 2003). More severe disruptions of prime letter position often fail to facilitate target processing (Guerrera & Forster, 2009).

- *Extreme transposition studies used longer stimuli, are different results obtained with shorter stimuli?
- *What effect does prime exposure duration have when using these short, anagram stimuli?

Methods

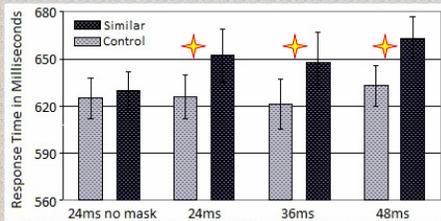
Four experiments were conducted with 70 participants in each. 280 lexical decision trials (140 four-letter word and 140 four-letter nonword targets) were used to test the effects of four types of orthographic similarity. Word targets were low (log HAL = 7.67) or high (log HAL = 11.10) frequency. All primes were nonwords and were displayed immediately before the target. Prime exposure duration (24, 36, or 48 ms) was varied across experiments and in an additional experiment (24 ms primes) no premask was used.

	Orthographically Similar	Control
Reversed Anagram	ydal – LADY	hcir – LADY
Bigram Anagram	alyd – LADY	irhc – LADY
Substitution Neighbor	laby – LADY	riph – LADY
Identity	lady – LADY	riph – LADY

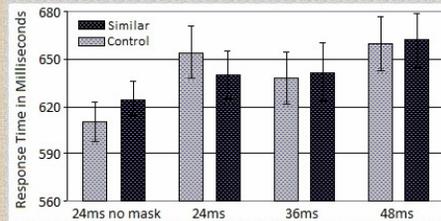
Planned comparison data from *t*-tests are presented. All results were significant in both subjects and items analyses.

Low Frequency Word Targets

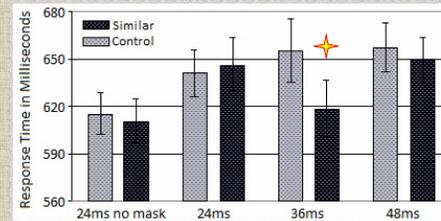
Reversed Anagrams



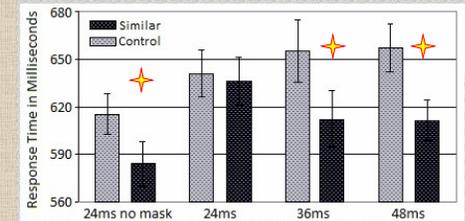
Bigram Anagrams



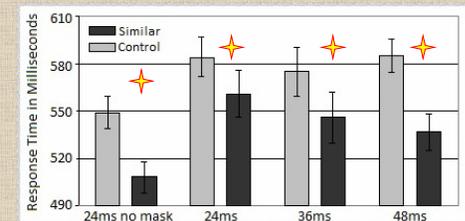
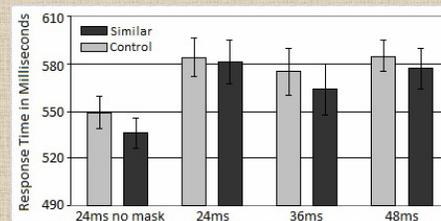
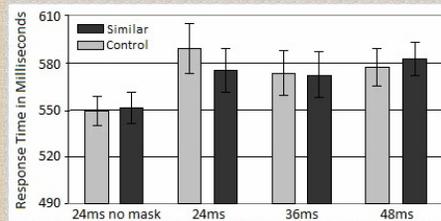
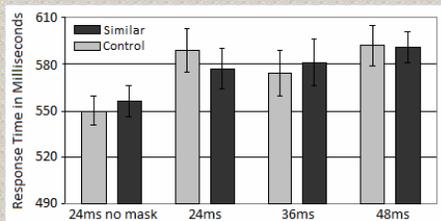
Substitution Neighbors



Identity



High Frequency Word Targets



Error Rates and Nonword Results

- Interference - increased error rate – was found for low frequency reversed anagrams with 24- (masked and unmasked) and 36-ms prime exposure durations.
- Facilitation – decreased error rate – was found for high frequency identity primes and targets with 42-ms prime exposure durations.
- No significant differences were found for nonword targets

Conclusions

- Interference for reversed anagrams was robust for low-frequency words
 - Removing the premask can increase orthographic facilitation (Grainger, et al. 2006) but did not result in facilitation for reversed anagrams.
 - It is unlikely that use of four-letter stimuli or general increases in lexical activation explain the effect.
 - Interference emerges early suggesting that it originates early during the word recognition process.
- Facilitation for substitution neighbors is difficult to obtain with short words
 - May result from too few shared letters in the same relative positions in short prime-target pairs.

Davis, C. J. & Lupker, S. J. (2006). Masked inhibitory priming in English: Evidence for lexical inhibition. *Journal of Experimental Psychology: Human Perception and Performance*, 32, 668-687.

Grainger, J., Granier, J. P., Farioli, F., Van Assche, E., & van Heuven, W. (2006). Letter position information and printed word perception: The relative-position priming constraint. *Journal of Experimental Psychology: Human Perception and Performance*, 32, 865-884.

Guerrera, C. & Forster, K. I. (2008). Masked form priming with extreme transposition. *Language and Cognitive Processes*, 23, 117-142.

Perea, M. & Lupker, S. J. (2003). Transposed-letter confusability effects in masked form priming. In S. Kinoshita & S. J. Lupker (Eds.), *Masked priming: State of the art* (pp. 97-120). Hove, UK: Psychology Press.