

Hyphenation to Facilitate Stem Detection in Inflected and Orthographic Primes: Morphology Matters for Both L1 and L2 Speakers

Vera Heyer¹

¹ Department of Linguistics, TU Braunschweig, Germany

Although orthography does not give any indication about morphological structure per se, readers still segment stems and affixes during reading, as has been shown with masked priming effects for compounds (e.g., *teacup* – *cup*), derived (*surfer* – *surf*) and inflected (*surf*ed – *surf*) words [1]. In Grainger and Beyersmann’s (2017) edge-aligned ‘stem detection’ mechanism, such segmentation is initiated by scanning an orthographic word from beginning and end (defined by the surrounding spaces) simultaneously. Although there are also embedded stems in simplex words (e.g., *surf* in *surface*), such pairs do not elicit priming effects in native (L1) readers because of inhibition between the activated *surf* and *surface* on the lexical level [2]. In contrast, non-native (L2) readers do show priming for such purely orthographically related pairs, suggesting a stronger reliance on orthographic information in L2 readers [3, 4].

To test the scope of orthography in segmentation, the present study uses hyphenation (e.g., *surf*-*ed*) as an orthographic cue for the detection of embedded stems to investigate if priming effects increase when embedded stems are accentuated with visual cues. Further, we ask whether morpheme status of the second component affects priming (i.e., inflectional suffix *-ed* vs. orthographic ending *-ace*). We test both L1 and L2 readers because the latter typically demonstrate stronger reliance on orthography.

In a masked priming experiment, 96 German L2 learners of English and 53 English native speakers made lexical decisions on verbs (*SURF*) preceded by morphologically and orthographically related primes, each spelt normally or with a hyphen: (1) inflected normal (*surf*ed), (2) inflected hyphenated (*surf*-*ed*), (3) orthographic normal (*surface*), (4) orthographic hyphenated (*surf*-*ace*) and (5) unrelated (*therapy*).

LMER analyses revealed different priming patterns for the two groups (Table 1): For the L2 group, there was priming following all four prime types compared to unrelated primes ($t > 2.96$). Compared to inflected normal primes, neither inflected hyphenated ($t = 0.13$) nor orthographic normal ($t = 1.82$) primes led to significantly more or less priming, while a hyphen in orthographic primes facilitated target recognition significantly less than an inflected normal prime ($t = 2.77$). For the L1 group, only morphologically related primes ($t > 4.86$) but not purely orthographically related primes ($t < 1.55$) facilitated target recognition. Furthermore, reaction times following normal and hyphenated inflected primes were not significantly different ($t = 0.83$).

These results indicate that visual accentuation of the embedded stems leads to comparable facilitation for morphologically but not for purely orthographically related words. Moreover, hyphenation in orthographically related words reduced orthographic priming for L2 speakers, indicating that it may be disruptive if the pre-segmented element following the stem is non-morphemic. Similarly, L1 speakers were not influenced by the initial pre-segmented embedded word in orthographic primes, highlighting that both initial and final elements need to be meaningful for priming to occur. In sum, hyphenation reduces reliance on orthography in L2 speakers, suggesting that orthography has limited scope in priming and that segmentation relies on morphological structure, even for L2 readers. Within the L2 group, we will further explore effects of proficiency.

	L2 GROUP		L1 GROUP	
	RTs	Priming	RTs	Priming
INFLECTED				
normal	589	41*	535	36*
hyphenated	590	40*	539	32*
ORTHOGRAPHIC				
normal	600	30*	559	12
hyphenated	607	23*	567	4
UNRELATED	630		571	

Table 1: Mean reaction times (in ms, backtransformed from inverse) following the five different prime types as well as priming effect (in relation to unrelated prime; significance marked with asterisk) for L1 vs. L2 speakers.

References

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