Do syllables matter in visual word recognition? German evidence extended and reviewed.

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Prior research

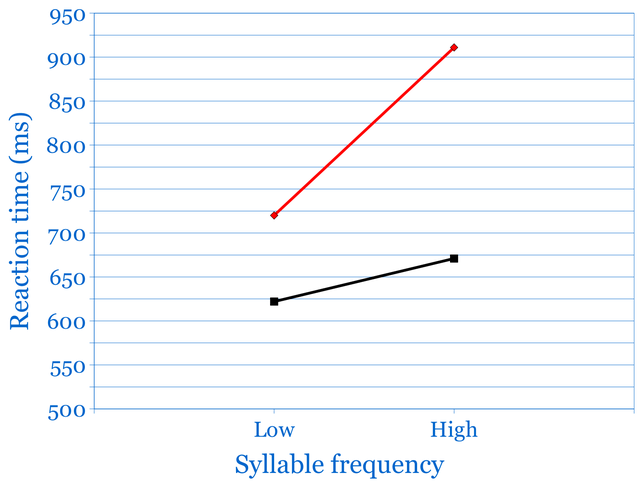
The syllable frequency effect was claimed in speech production to be facilitatory (Levelt, & Wheeldon 1994).

In contrast syllable frequency showed an inhibitory effect in a lexical decision task conducted in Spanish (Carreiras, Àlvarez, & de Vega 1993; Perea, & Carreiras, 1998). Words and nonwords starting with a high frequency syllable showed slower response times compared to words and nonwords starting with a low frequency syllable. These findings suggest that visual word recognition involves the identification of the syllables in the word and the activation of corresponding phonological units.

"What seems clear is that any model of lexical access has to incorporate a syllabic level of representation or include the syllable as a sublexical unit of processing in Spanish" (Álvarez, Carreiras, & Taft, 2001, p. 553).

Prior evidence from German

An inhibitory effect of first syllable frequency has been observed in German using a lexical decision task (Conrad, & Jacobs, 2004; Conrad, Stenneken,& Jacobs, 2006). Results from Conrad and Jacobs (2004, experiment 1) are presented here.



MEAN REACTION TIMES (MS) AS FUNCTION OF SYLLABLE FREQUENCY AND WORD FREQUENCY

	Word frequency	
Syllable frequency	Low	High
Low	720	622
High	911	671

Embedded words

The items used in the experiment showed a confound with short (2 or 3 letters) words embedded at the beginning of the stimulus word, additionally some items showed pseudomorphology.

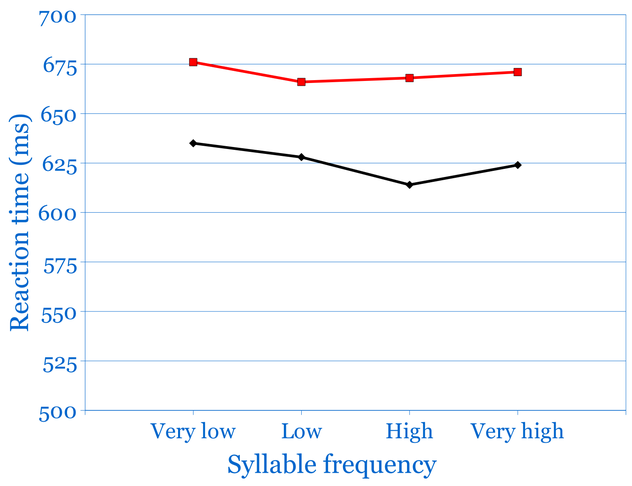
HERMIT	PREACH	ERFOLG	GENAU
YOUTH	REMIT	MITTE	BEHEND
METHANE	UNCLE	WIRKEN	UNWEIT

German examples taken from Conrad, and Jacobs (2004, experiment 1 and 2)

In a lexical decision task embedded words showed an interference effect (Davis, Perea, & Acha, in press; Davis, & Taft, 2005). This and the differences found by Pillon (1998) in pseudomorphological items compared to unequivocally monomorphemic items suggest a critical assessment of the data.

Experiment 1

The first experiment replicated Conrad and Jacobs' (2004) study with carefully chosen items to avoid the confounds spotted in that study.

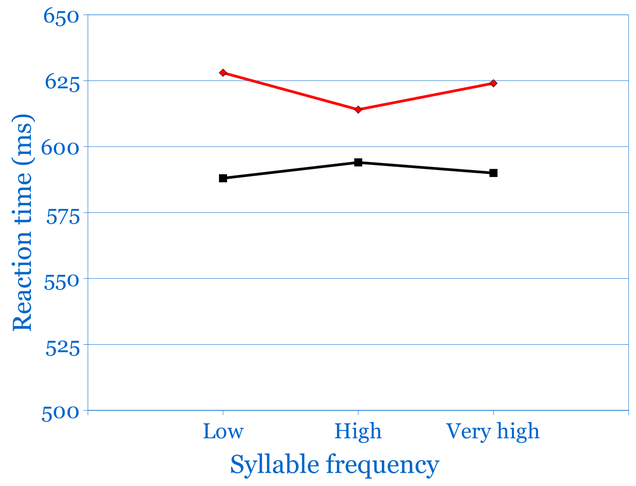


MEAN REACTION TIMES (MS) AS A FUNCTION OF SYLLABLE FREQUENCY IN NONWORDS AND LOW FREQUENCY WORDS

	Lexicality	
Syllable frequency	Nonword	Word
Very Low	676	635
Low	666	628
High	668	614
Very high	671	624

MEAN REACTION TIMES (MS) AS A FUNCTION OF SYLLABLE FREQUENCY LOW AND HIGH FREQUENCY WORDS

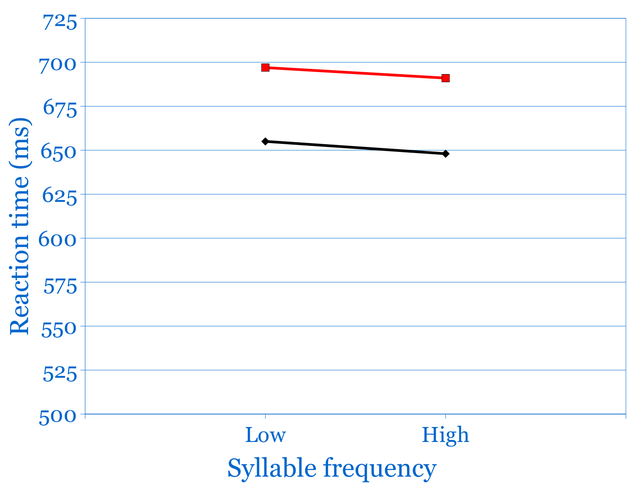
	Lexical frequency	
Syllable frequency	Low	High
Low	628	588
High	614	594
Very high	624	590



The data do not show a syllable frequency effect, either inhibitory or facilitatory, either in nonwords or words. This challenges the claim that computational models need to include a level of syllabic units. Other effects were present in the data, e.g. a length effect of about 16 ms per letter.

Experiment 2

The second experiment investigated the effect of embedded words and syllable frequency. Preliminary results are presented here.



MEAN REACTION TIMES (MS) AS A FUNCTION OF SYLLABLE FREQUENCY IN NONWORDS AND LOW FREQUENCY WORDS

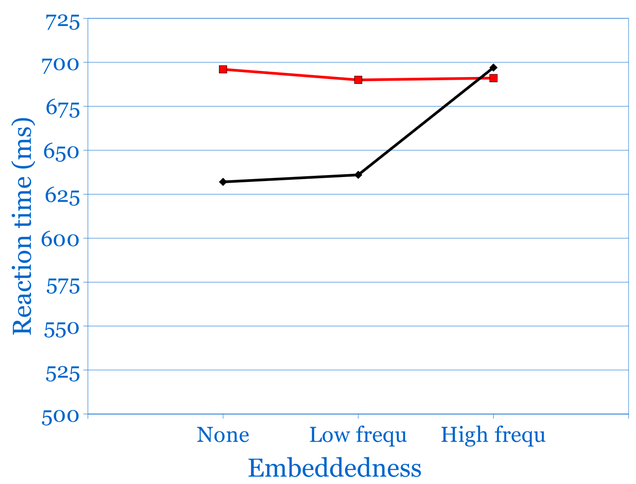
	Lexicality	
Syllable frequency	Nonword	Word
Low	697	655
High	691	648

The finding that the frequency of the first syllable does not affect reaction times was replicated with a different set of items.

Embedded words

MEAN REACTION TIMES (MS) AS A FUNCTION OF EMBEDDEDNESS IN NONWORDS AND LOW FREQUENCY WORDS

	Lexicality	
Embeddedness	Nonword	Word
No embedding	696	632
Low frequency embedding	690	636
High frequency embedding	691	697



As predicted from the above there was an inhibitory effect of short embedded high frequency words.

Conclusion

In Experiment 1 and 2 we failed to replicate an inhibitory syllable frequency effect. Instead, we found that short high frequency words embedded at the beginning of target words affect reaction times in an inhibitory fashion. We conclude that computational models do not need to incorporate a syllabic level, but instead have to account for lexical interference effects.

References

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