The effects of orthographic consistency at different levels of speech processing in Spanish beginning readers



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The orthographic consistency effect (OCE)

Spoken words with **consistent** grapheme-to-phoneme mappings are processed and recognized faster than words with **inconsistent** grapheme-to-phoneme mappings (Ziegler & Ferrand, 1998).

globe	VS	name		
/əʊb/		/eim/		
<obe></obe>	<	ame>	<aim></aim>	
	f	ame	claim	

These effects have been shown across different opaque orthographies, such as French and Portuguese (Ventura et al., 2004). However, consistency effects have almost exclusively been studied at the word level - *lexical decision and word reading tasks* - and in adult participants (Pattamadilok et al., 2007).

Aims of the present study

- Investigate the OCE in a highly consistent orthography such as Spanish
- Move from the word to a more fine-grained level phonemic level
- Test the OCE effect in early readers 60 Spanish second-graders (7 years; 5 months)

WORD LEVEL

Word-Pseudoword reading task

CONSISTENT		INCONSISTENT	
W	PW	W	PW
planta	duanta	balcón	calbon
/p/ /l/ /a/ /n/ /t/ /a/	/d/ /w/ /a/ /n/ /t/ /a/	/b/ /a/ /l/ /k/ /o/ /n/	/k/ /a/ /l/ /b/ /o/ /n/

PHONEMIC LEVEL

Phoneme monitoring task (Oddball paradigm)

Consistent vs Inconsistent phonemes as deviants

Version 1: G -> P inconsistency

/k/ /k/ /k/ /k/ /e/
Version 2: P -> G inconsistency
/f/ /f/ /t/ /f/ /f/ /f/ /k/





/f/ /f/ **/k/** /f/

Results Word-Pseudoword reading task Consistency SOT Consistent main effect of lexicality $(\beta = 0.506, SE = 0.015, t = 14.1, p < .001)$ **Inconsistent** consistency * lexicality $(\beta = 0.054, SE = 0.017, t = 3.012, p < .01)$ main effect of consistency $(\beta = -0.278, SE = 0.137, z = -2.025, p < .05)$ **Pseudoword Pseudoword** Lexicality Lexicality Phoneme monitoring task p < .001p < .001(ms) R Phoneme Phoneme p < .001(%) Accuracy (%)

Discussion

- The OCE is present even in a language with few grapheme-to-phoneme inconsistencies such as Spanish
- Reading task consistency influences reading performance both in lexical reading and decoding
- Phoneme monitoring task consistency effects arise even when no orthographic information is presented
- Overall these findings prove that orthography affects language beyond reading

Phoneme /8/

- Future research will focus on the developmental trajectory of this effect through a longitudinal study starting from kindergarten – **prereaders** - and going up to fourth grade - **advanced readers**

Reference

Ziegler, J.C., Ferrand, L. (1998). Orthography shapes the perception of speech: The consistency effect in auditory word recognition. *Psychonomic Bulletin & Review, 5,* 683-689.

Ventura, P., Morais, J., & Kolinsky, R. (2007). The development of the orthographic consistency effect in speech recognition: From sublexical to lexical involvement. *Cognition, 105, 547-576*.

Pattamadilok, C., Morais, J., Ventura, P., & Kolinsky, R. (2007). The locus of the orthographic consistency effect in auditory word recognition: Further evidence from French. *Language and Cognitive Processes, 22, 700-726*