Bilingual morphological processing in L2 reading before explicit attention: A gaze-contingent boundary paradigm study

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experiment GitHub & poster

Introduction

Maximally efficient reading

- **goal**: identify lexical items as quickly as possible
- **foveal reading** - conscious locus of reading
- **parafoveal reading** - unconscious pre-processing of information
- studies have found that **orthography**[1] is processed parafoveally
  - the evidence is much less clear for **semantics**[2 3] and **morphology**[4]

An illustration of normal reading behaviour: while the fovea (represented by the eye icon) moves over a sentence, the parafovea is able to start pre-processing the next few characters (represented by the white oval). The length of this "moving window" is influenced by the reader's proficiency.

How useful are orthography, semantics, and morphology in second language preprocessing?

Methods

The gaze-contingent boundary paradigm[5]

is a naturalistic masked priming paradigm

1. participants read sentences
2. before their fovea arrives at a target word, a preview word is presented in its place

3. once the fovea passes the pre-target word, the preview switches to the target

shorter target fixations = parafoveal information more helpful

PREVIEW TYPES

Identical = identical to the target

Orthography = nonword orthographically similar to target

Baseline = random letter string

Cognate = cross-language cognate of target

in this experiment, **Italian** cognates in **English** sentences for L1 Italian, L2 English participants

By changing the type of information in common between preview and target, researchers can infer how helpful each preview type is.

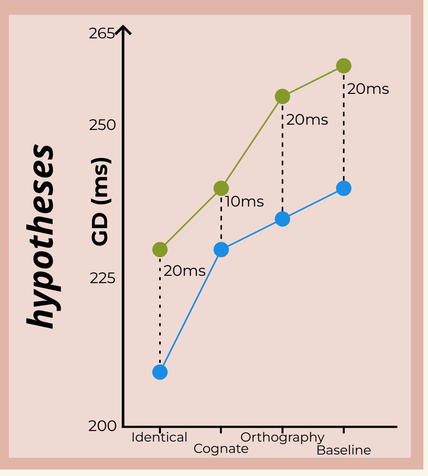
the experimental stimuli

	morphology condition	PREVIEW	TARGET	orthography	semantics	morphology
Identical	simple	surprise	surprise	✓	✓	
Cognate	simple	sorpresa	surprise	✓	✓	
Orthography	simple	sartrine	surprise	✓		
Baseline	simple	vbqjyzch	surprise			
Identical	complex	firmness	firmness	✓	✓	✓
Cognate	complex	fermezza	firmness	✓	✓	✓
Orthography	complex	filodesa	firmness	✓		
Baseline	complex	btjwqdyl	firmness			

gaze metrics collected

EARLY MEASURES	FoM - first-of-many duration
	FFD - first fixation duration
LATE MEASURES	GPD - go-past duration
	GD - gaze duration
	SR - skip rate

by comparing gaze data across conditions, we can determine the effect of each information type

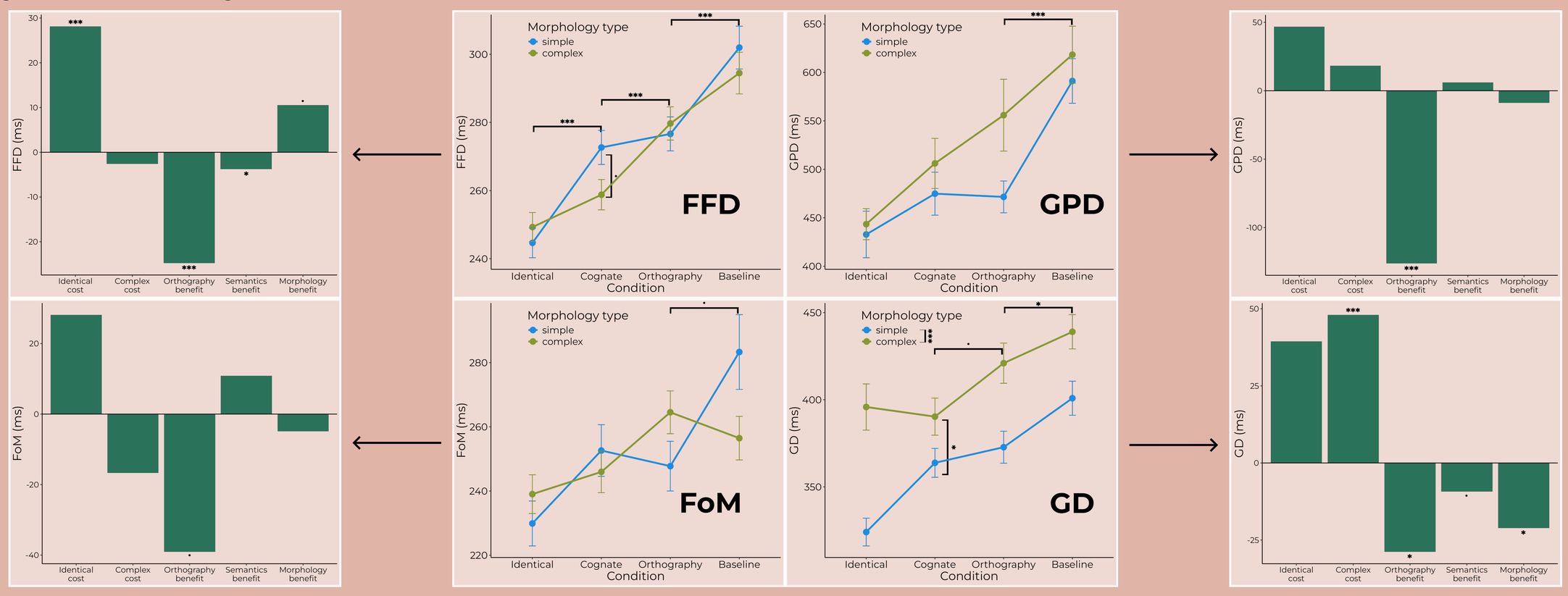


Results

n already tested = 32
total n = 50

Figures 1-4: **Means and error bars for each metric, in each preview condition, for morphologically simple (in blue) and complex (in green) targets.**

Figures 5-8: **Means for each cost and benefit type, with asterisks for significant linear modelling of the effects.**



Discussion

Complex morphology has a **large** effect on **late** processing

Semantics offer a **small early** benefit

Orthography is the main driving factor, contributing a large effect across all stages of processing

Morphology has a **medium** effect on **late** processing

References

1. Tiffin-Richards (2024) *Journal of Experimental Psychology*

2. Voga (2020) *The Learnability of Complex Constructions*

3. Fernandez, Scheepers, Allen (2024) *Bilingualism*

4. Jouravlev et al. (2023) *Journal of Experimental Psychology*

5. McConkie & Rayner (1975) *Perception & Psychophysics*