Orthographic Learning: One unitary system or two separate constructs (reading vs. spelling)?

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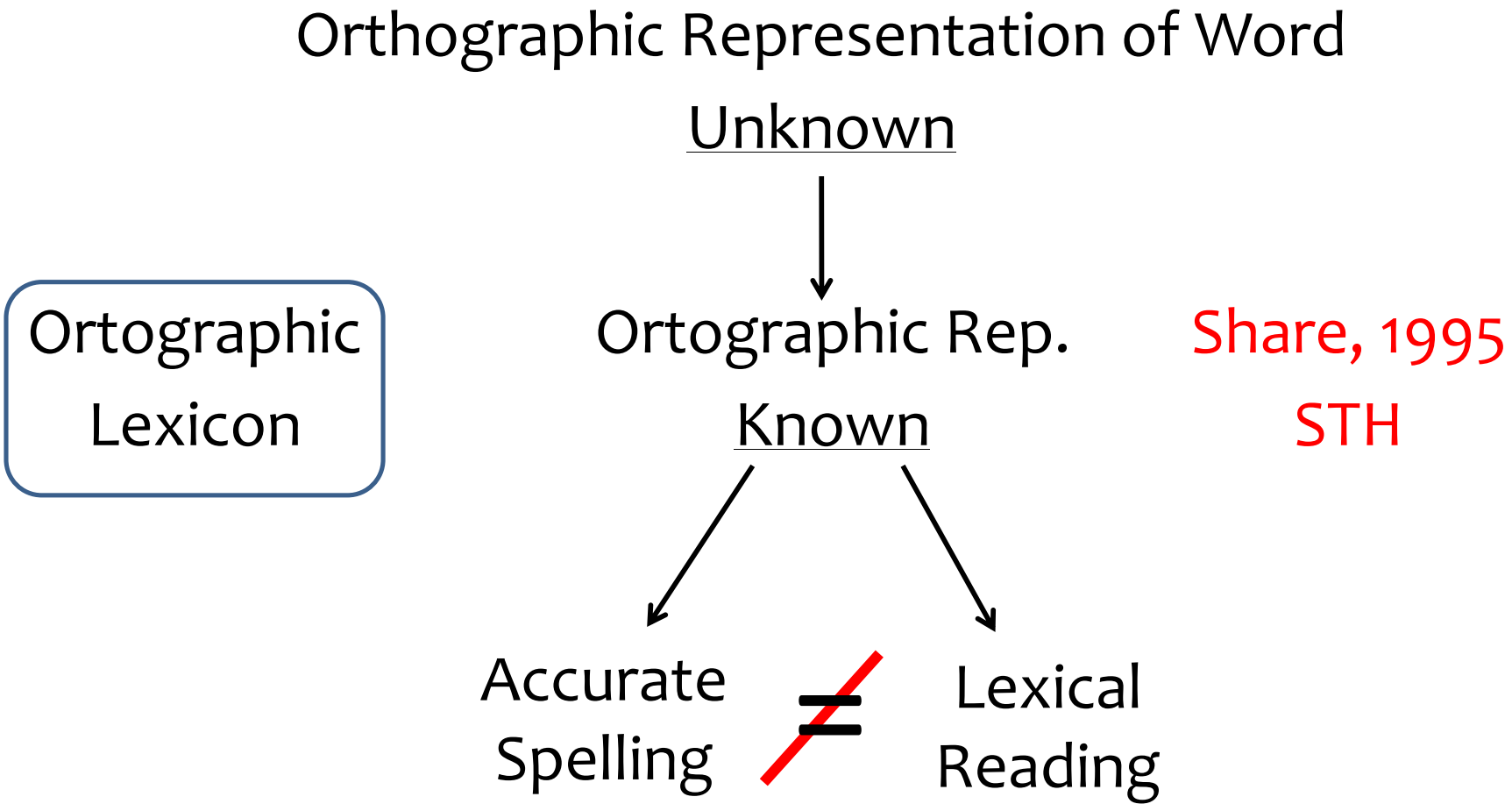
Dysfluent Reading

- Transparent orthographies (Spanish, German, etc.)
- Dyslexia = characterized by dysfluent reading
- Overreliance on decoding
- ¿Resulting from a failure to create orth reps?

How is it that we build orthographic representations?

Orthographic Learning (OL)
Self Teaching Hypothesis



OL-Spelling vs. OL-Reading

Self-Teaching Paradigm

No Naming Speed OL

- Share (1999)
- Share (2004)
- Share & Shalev (2004)
- Kyte & Johnson (2006)

NS *r* between OLS & OLR

- de Jong et al. (2009)
- Staels & vd Broeck (2015)

Isolated Deficits

Bergmann & Wimmer (2008)

- dyslexic children slower than controls at reading even words they are orthographically familiar with (ortho decision test)

Isolated Reading & Spelling Deficits

- Moll & Landerl (2009)
- Bakos et al. (2020)
- Banfi et al. (2021)

Our Study

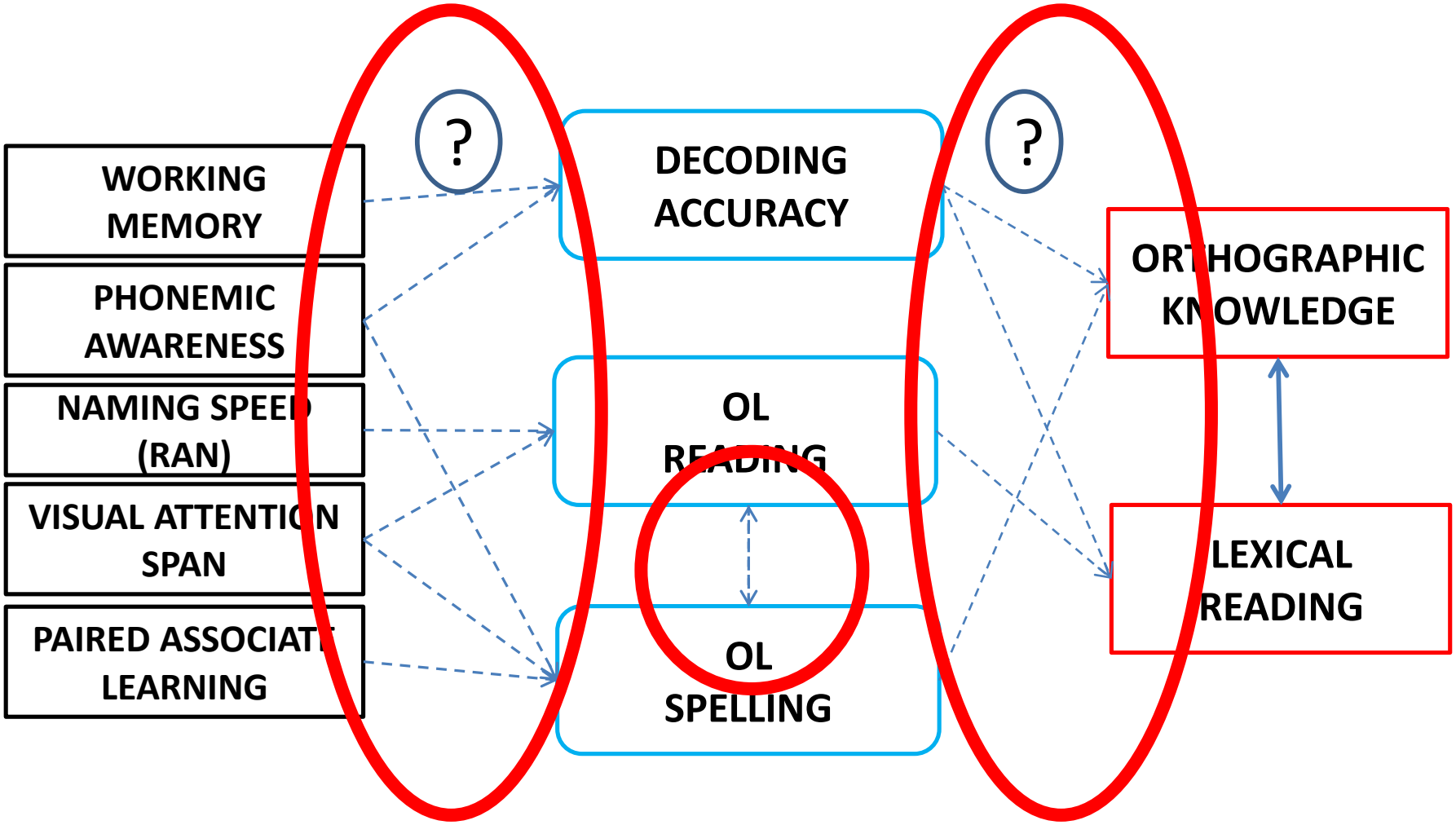
SOL: The Study of Orthographic Learning

Core Objective of the Study:

To clarify whether there is one or two OL systems

OL-Reading (OLR) vs. OL-Spelling (OLS)

Relationships to Observe



Methods

- Participants: 93 Spanish Grade 3 Children
- Tasks:
  - ✓ Orthographic Learning
    - Learning Phase (repeated exposure of novel words)
    - Testing Phase:
      - ❖ OLR – Reading Speed Improvement (Homophone / Length Effect)
      - ❖ OLS – Orthographic Choice
  - ✓ Cognitive Skills: RAN, Visual Skill, PAL, Phonemic Awareness, etc.
  - ✓ Literacy Skills
    - Reading: Lexical Reading & Decoding (Speed & Accuracy)
    - Spelling (Orthographic Knowledge)

Learning Phase & OLR: 3 NW Lists

List A - Target Items:

- badiheto
- hojivo
- muvalla
- regehan
- vuetai

10 exposures to the targets

List B - Homophones:

- vadieto
- ogibo
- mubaya
- rejean
- buhetay

single exposure to homophones

+ List C: 1 list of short nonwords (calculate the length effect - 10 exps)

OLS: Orthographic Choice

☐ badiheto	☐ badieto	☐ vadieto	☐ vadiheto
☐ mubaya	☐ muvaya	☐ muvalla	☐ muballa
☐ hogivo	☐ ojibo	☐ ogibo	☐ hojivo

1 Target spelling vs. 3 homophone foils (raging from 1 to 3 incon.)

Correct spelling position counterbalanced

Each half of the sample aimed for different target spelling

Results

- OL-Reading
  - ❖ Length Effect:
    - 2-way rep. measures ANOV
    - Interac. $F(1,91) = 33.16$, $p < .001$
  - ❖ Target vs. Homophone: t-test $t(90) = -2.66$, $p < .01$
- OL-Spelling
  - ❖ Mean Score: 7.5 (SD 2.51) range 3 – 14 (max 20)

List	M (SD)
Long 1st Exp.	19.27 (5.42)
Long 10th Exp.	14.52 (5.54)
Short 1st Exp.	8.91 (2.84)
Short 10th Exp.	7.16 (2.37)
Homop. 1st Exp.	15.05 (3.87)

Correlations (OL vs. Cognitive Skills)

- OL-Spelling = Orthographic Choice
- OL-Reading = Reading Speed of Target Spelling (10th exp.)
- **Homophone Reading Speed (1st exp.) Partialed Out**
- **OLS Results, with a pinch of salt (skewed distribution, items too hard)**

	OLS	RAN	PA	VPS	PAL
OLR	.02	.28**	-.12	.02	-.02
OLS		-.22*	.11	.27**	.23*

* $p < .05$
** $p < .01$

OLS = Orthographic Learning in Spelling; OLR = Orthographic Learning in Reading
RAN = Rapid Automatized Naming; PA = Phonemic Awareness; VPS = Visual Processing Skills
PAL = Paired-Associated Learning

Correlations (OL vs. Literacy Skills)

- OLR related to Lexical Reading
- OLS related to Lexical Reading and Orthographic Knowledge (again, pinch of salt)
- Multiple Linear Regressions corroborate same pattern

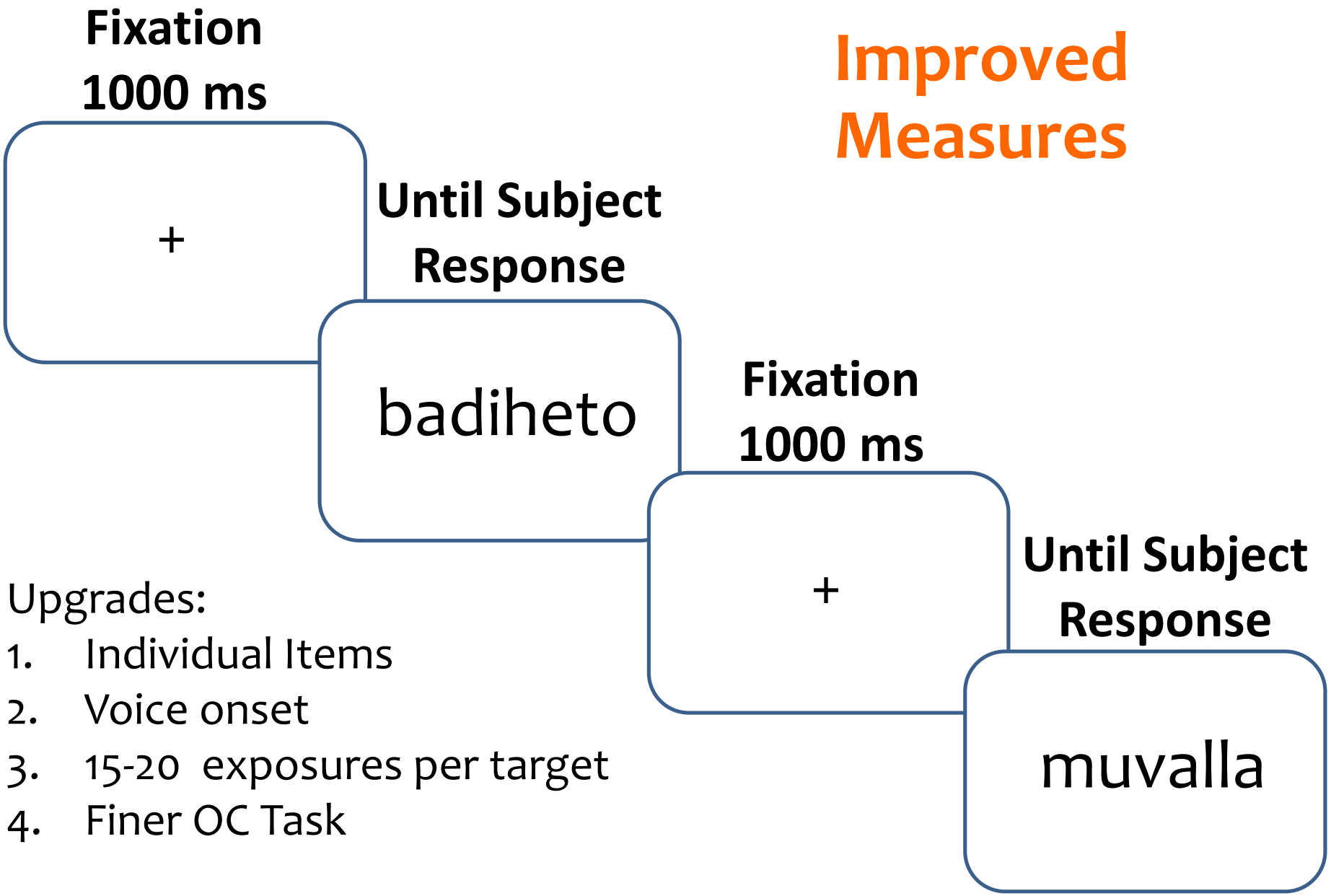
	Ortho Learning Spelling	HF Word Reading Speed	LF Word Reding Speed	NW Reading Speed	NW Reading Accuracy	Orthographic Knowledge
OLR	-.02	-.35**	-.41***	-.24*	-.12	.09
OLS		-.33**	-.25*	-.1	.02	.40***

* $p < .05$
** $p < .01$
*** $p < .01$

OLS = Orthographic Learning in Spelling; OLR = Orthographic Learning in Reading;
HF = High Frequency (>100 in 1 million); LF = Low Frequency (between 1 and 5 in 1 million);
NW = Non-word

Our Coming Cross-Linguistic Study

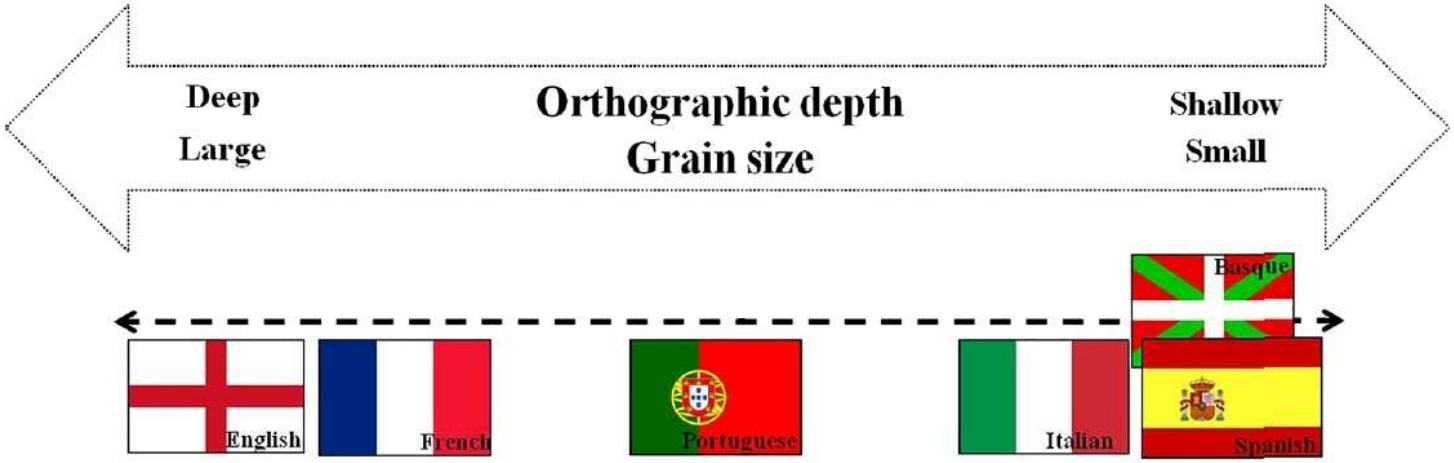
Improved Measures



Upgrades:

1. Individual Items
2. Voice onset
3. 15-20 exposures per target
4. Finer OC Task

Orthographic Depth Effect



- Orthographic-Depth Hypothesis (Frost, Katz, & Bentin, 1987)
- Psycholinguistic Grain Size Theory (Ziegler & Goswami, 2005)
- Grain Size Accommodation Hypothesis (Lallier & Carreiras, 2017)

Straight of Gibraltar

In search of the cross-linguistic data

In Closing…

- Initial Evidence that **OLR & OLS** are **unrelated**
  - **¿Two OL Systems?**
  - **Other** Potential **Explanations**:
    - ¿More exposures needed?
    - ¿General Visual-to-Verbal Speed Impairment (RAN)?
- New Study:
  - Improved Measures
  - Cross-linguistic Data = Effect of Orthographic Depth

Ezkerrik asko

Muchas gracias

Thank you

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