# Visual Statistical Learning beyond sequential presentation: The case of Reading

Yamil Vidal
Davide Crepaldi



SISSA 40!

# From letter to word

## through bigrams


Bigram Frequencies?

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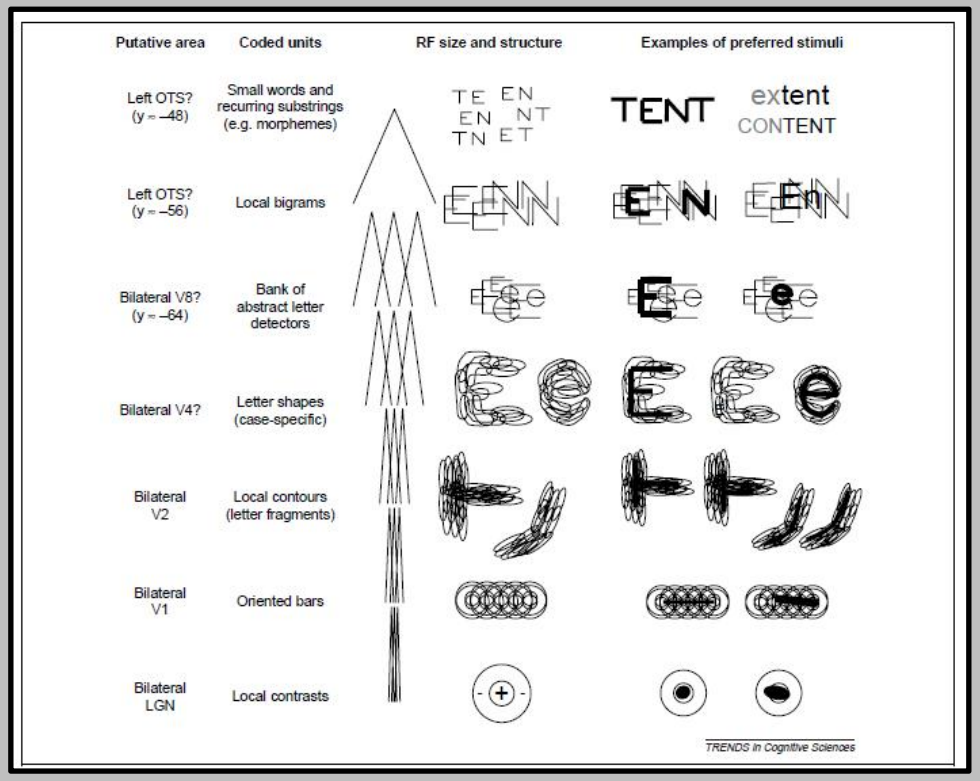
## through bigrams

Opinion TRENDS in Cognitive Sciences Vol.9 No.7 July 2005
Full text provided by www.sciencedirect.com

**The neural code for written words: a proposal**

Stanislas Dehaene, Laurent Cohen, Mariano Sigman and Fabien Vinckier

(2005)



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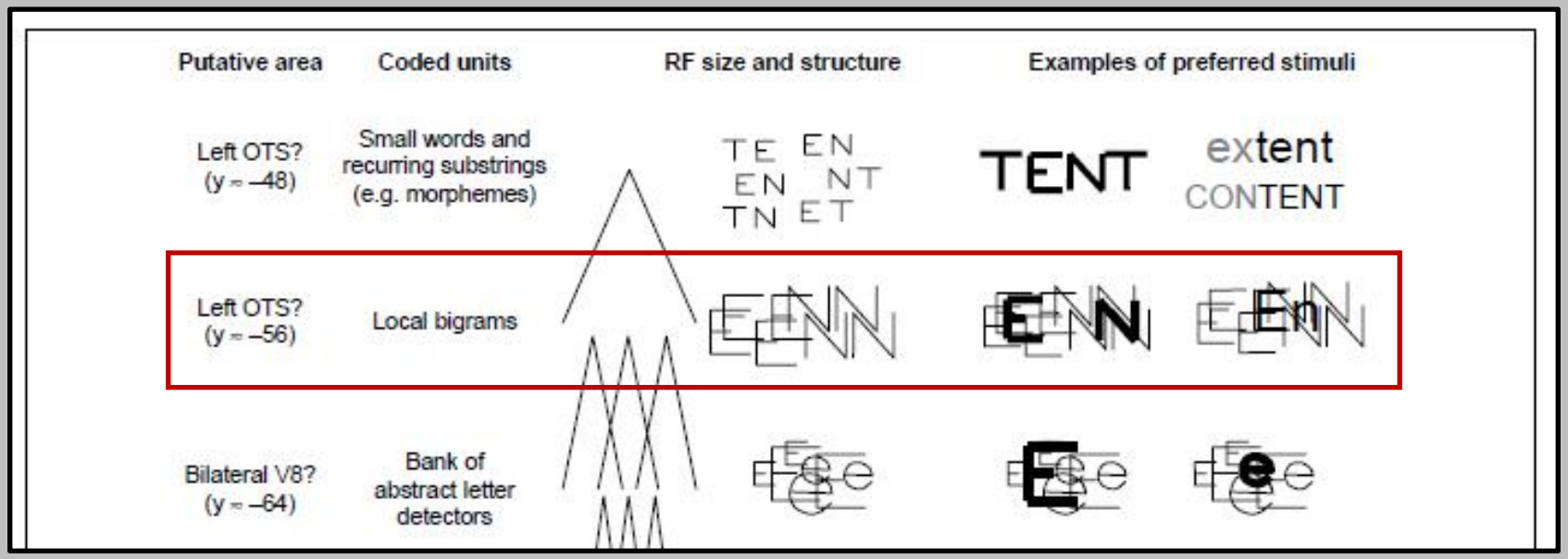

# From letter to word
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**The neural code for written words: a proposal**

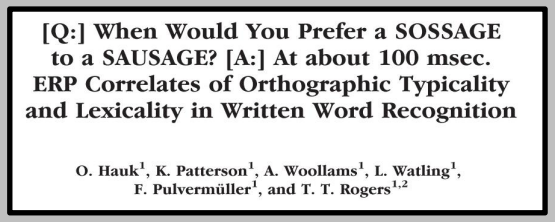
Stanislas Dehaene, Laurent Cohen, Mariano Sigman and Fabien Vinckier

(theoretical, 2005)


**Tuning of the human left fusiform gyrus to sublexical orthographic structure**

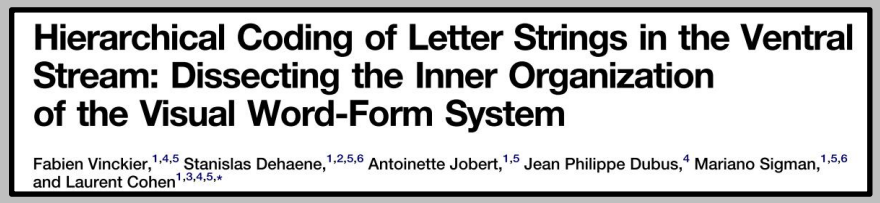
Jeffrey R. Binder,[a,*] David A. Medler,[a] Chris F. Westbury,[b] Einat Liebenthal,[a] and Lori Buchanan[c]

(2006)


**[Q:] When Would You Prefer a SOSSAGE to a SAUSAGE? [A:] At about 100 msec. ERP Correlates of Orthographic Typicality and Lexicality in Written Word Recognition**

O. Hauk[1], K. Patterson[1], A. Woollams[1], L. Watling[1], F. Pulvermüller[1], and T. T. Rogers[1,2]

(2006)


**Hierarchical Coding of Letter Strings in the Ventral Stream: Dissecting the Inner Organization of the Visual Word-Form System**

Fabien Vinckier,[1,4,5] Stanislas Dehaene,[1,2,5,6] Antoinette Jobert,[1,5] Jean Philippe Dubus,[4] Mariano Sigman,[1,5,6] and Laurent Cohen[1,3,4,5,*]

(2007)


The neurocognitive basis of reading single words as seen through early latency ERPs: A model of converging pathways

Joseph Dien *

*Department of Psychology, University of Kansas, 1415 Jayhawk Blvd., Rm 426, Lawrence, KS, United States*

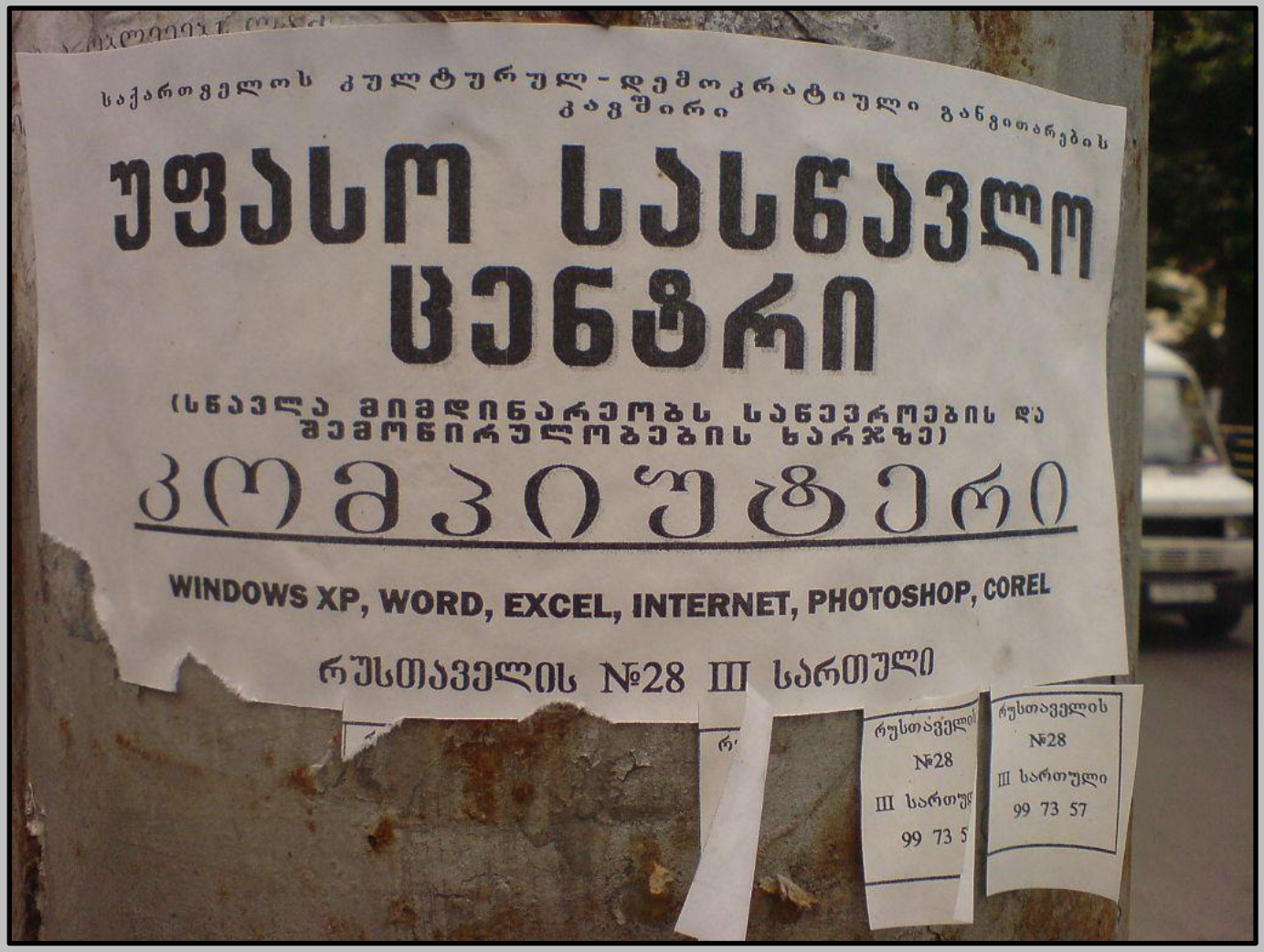
(review, 2009)


**Reconsidering the role of orthographic redundancy in visual word recognition**

*Fabienne Chetail**

(review, 20 papers from 60s, 2015)

# Do bigrams mediate visual word learning?



# Experimental design

Behav Res
DOI 10.3758/s13428-016-0844-8

CrossMark

## BACS: The Brussels Artificial Character Sets for studies in cognitive psychology and neuroscience

Camille Vidal[1] · Alain Content[1] · Fabienne Chetail[1]

(2017)

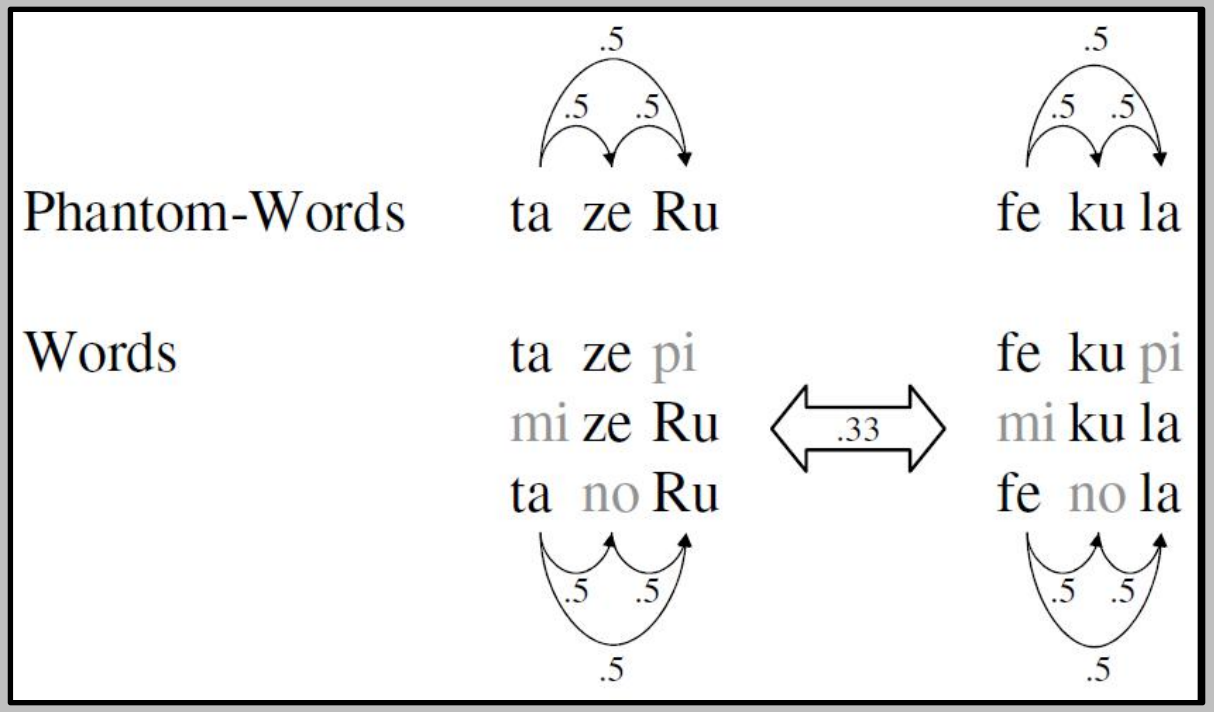
# Experimental design

# Experimental design

The surprising power of statistical learning: When fragment knowledge leads to false memories of unheard words

Ansgar D. Endress [a,*], Jacques Mehler [b]

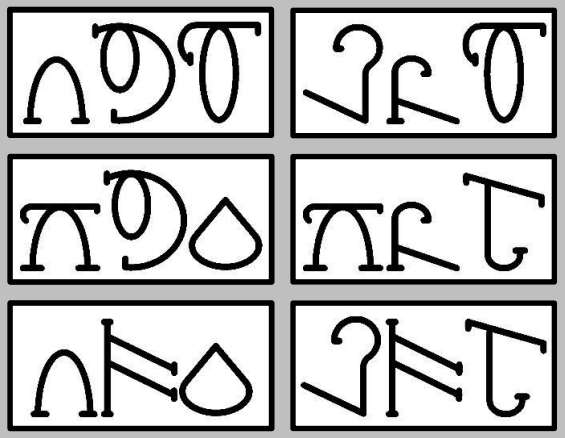
(2009)



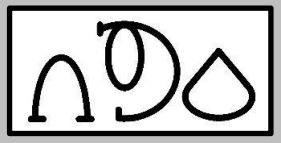
# Exp 01
# 03 character words

# Experimental design

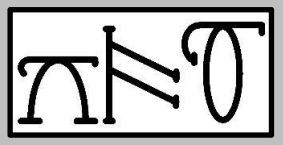
**Standard (STD)**



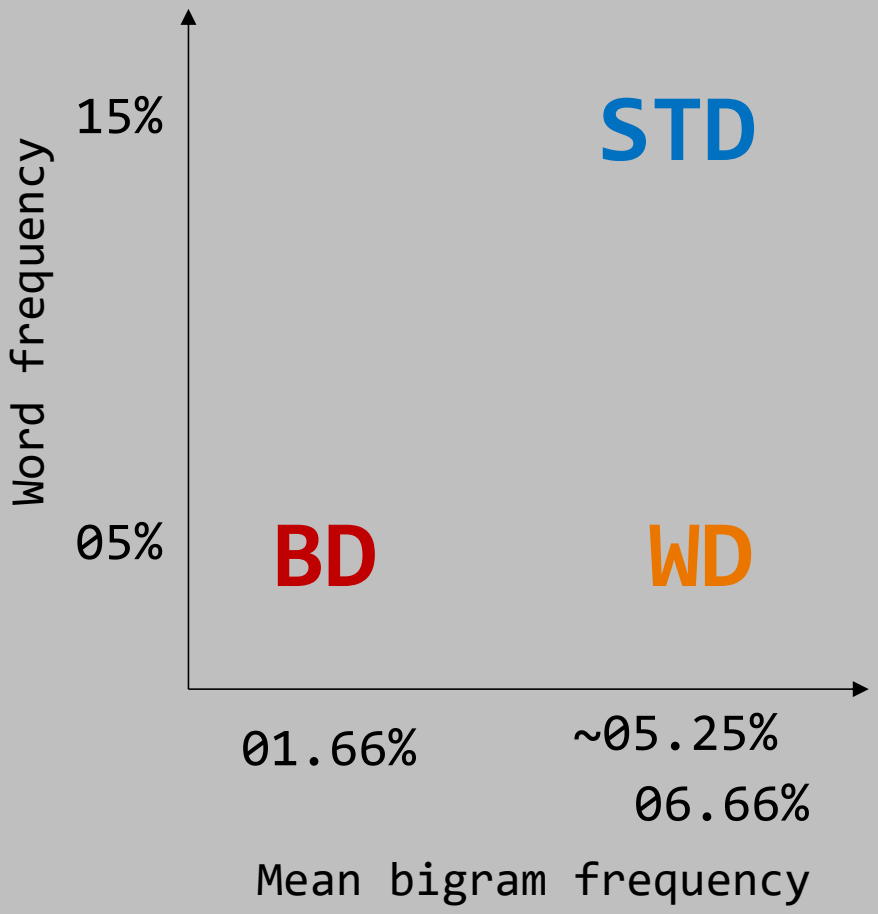
**Word Deviant (WD)**



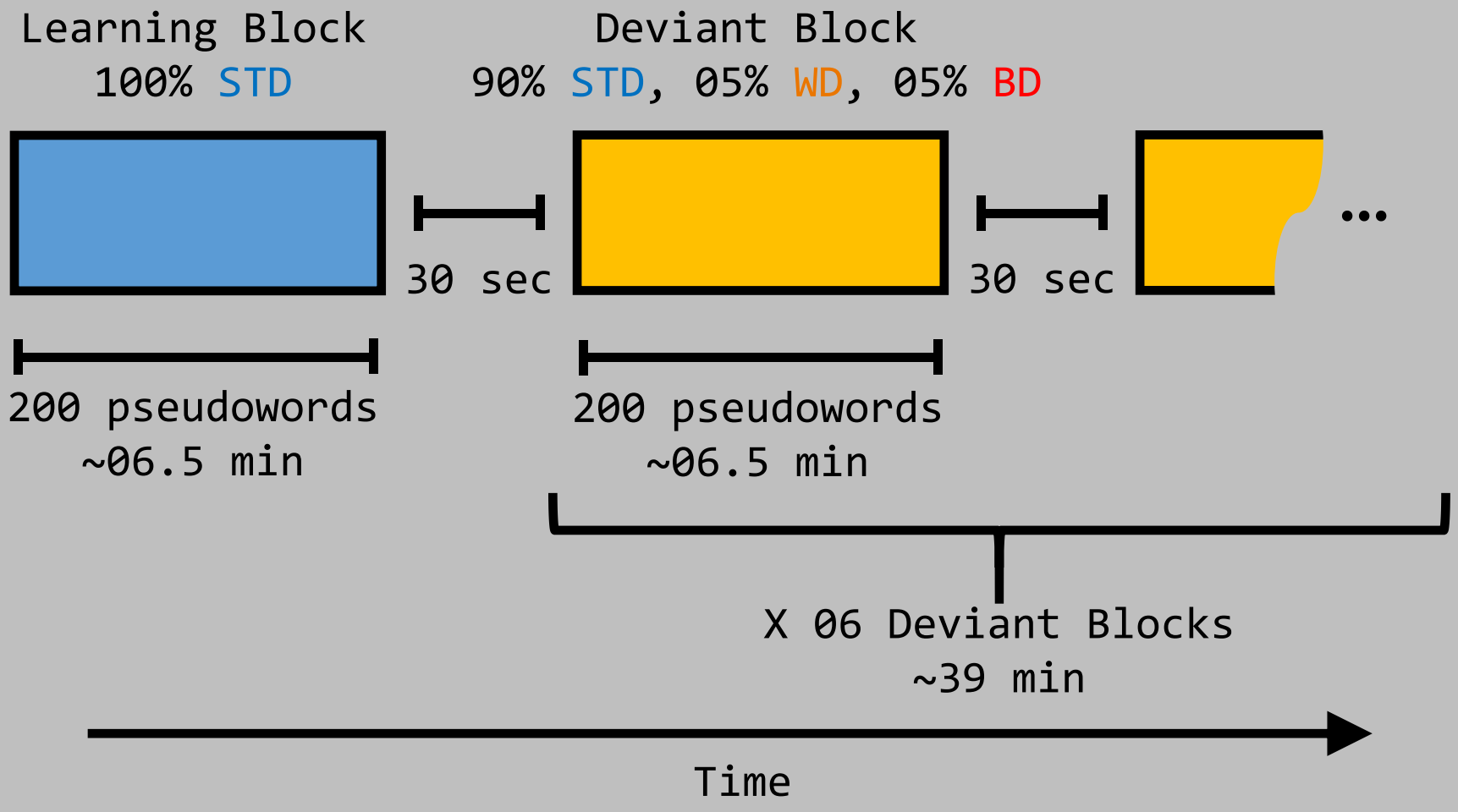
**Bigram Deviant (BD)**



# Experimental design

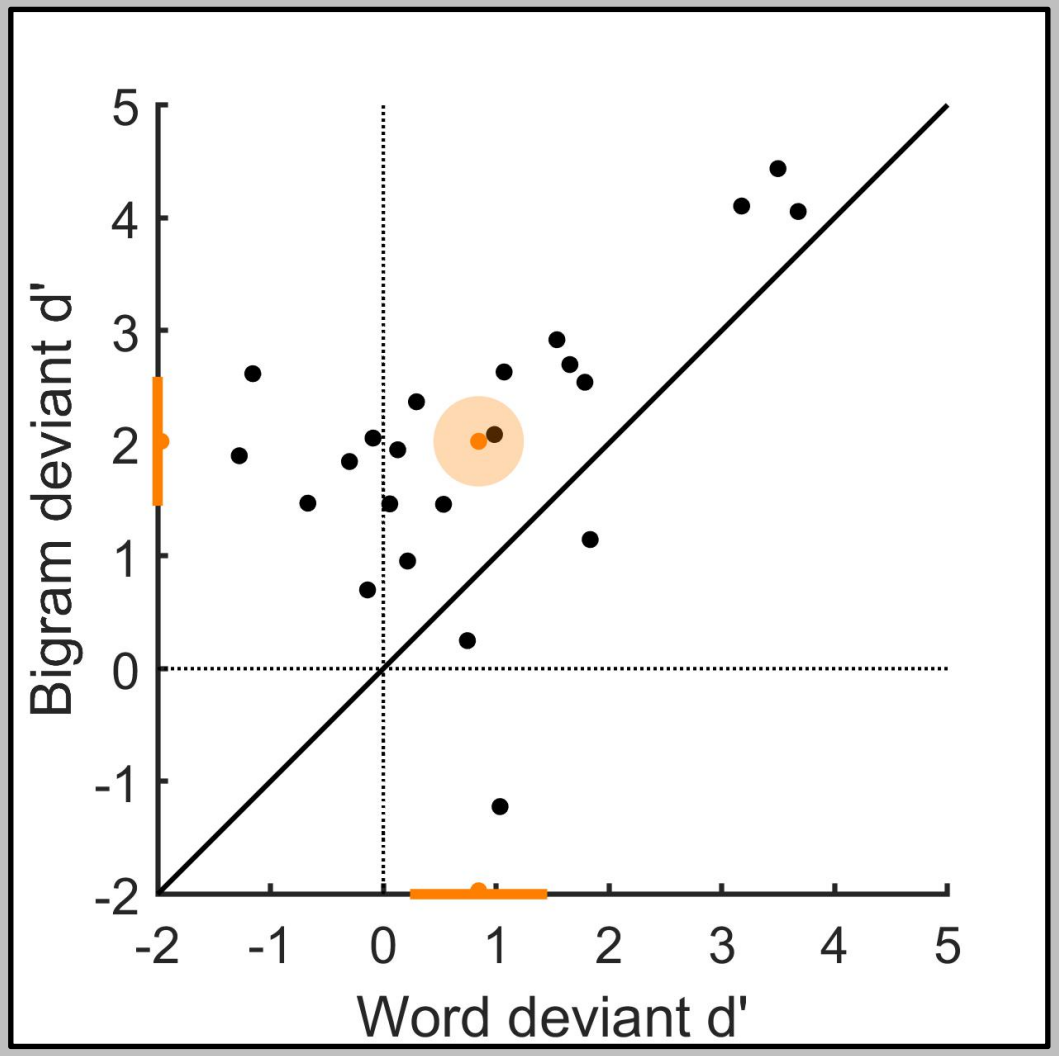


# Experimental design



# Exp 01
# Results

# Results




Mean Δ dPrime:
1.17

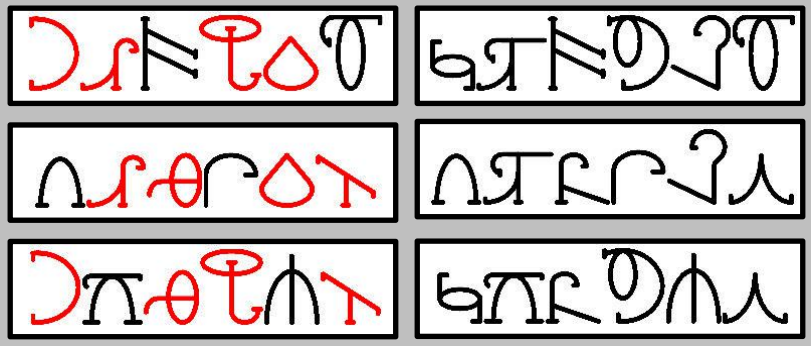
Effect size (Hedges g):
0.86 (0.35 – 1.36)

$t_{(21)} = 4.29$, $p = 0.00031$

# Exp 02
# 06 character words

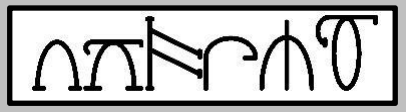
# Experimental design

**Standard (STD)**

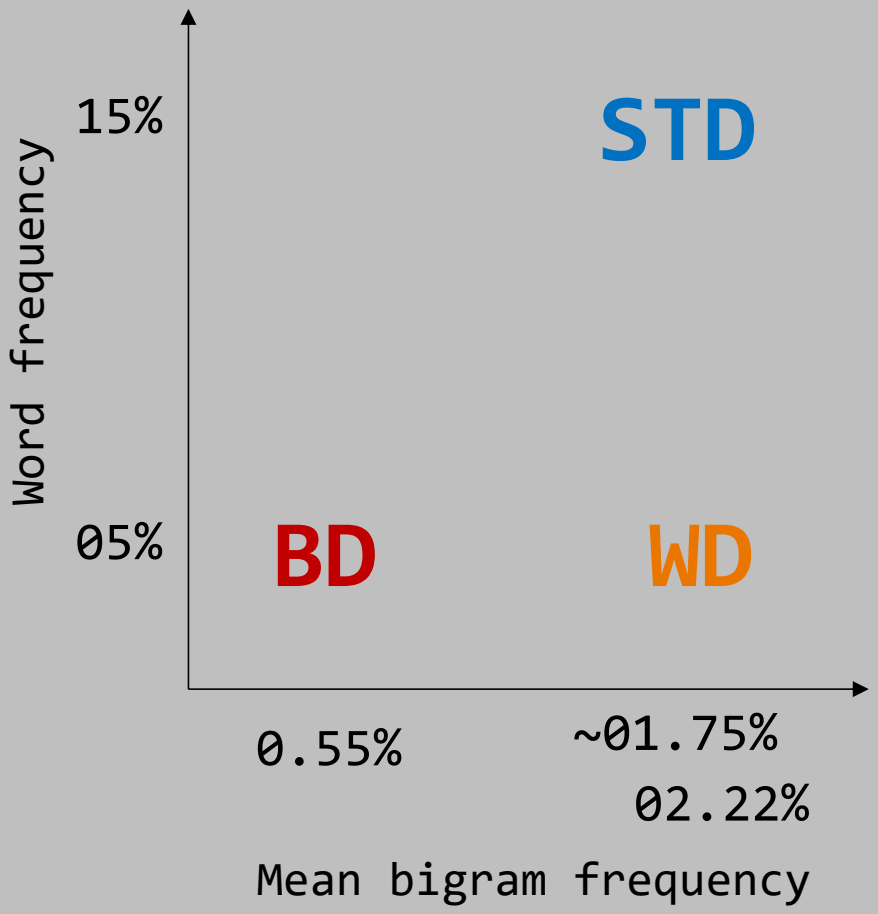


**Word Deviant (WD)**

**Bigram Deviant (BD)**

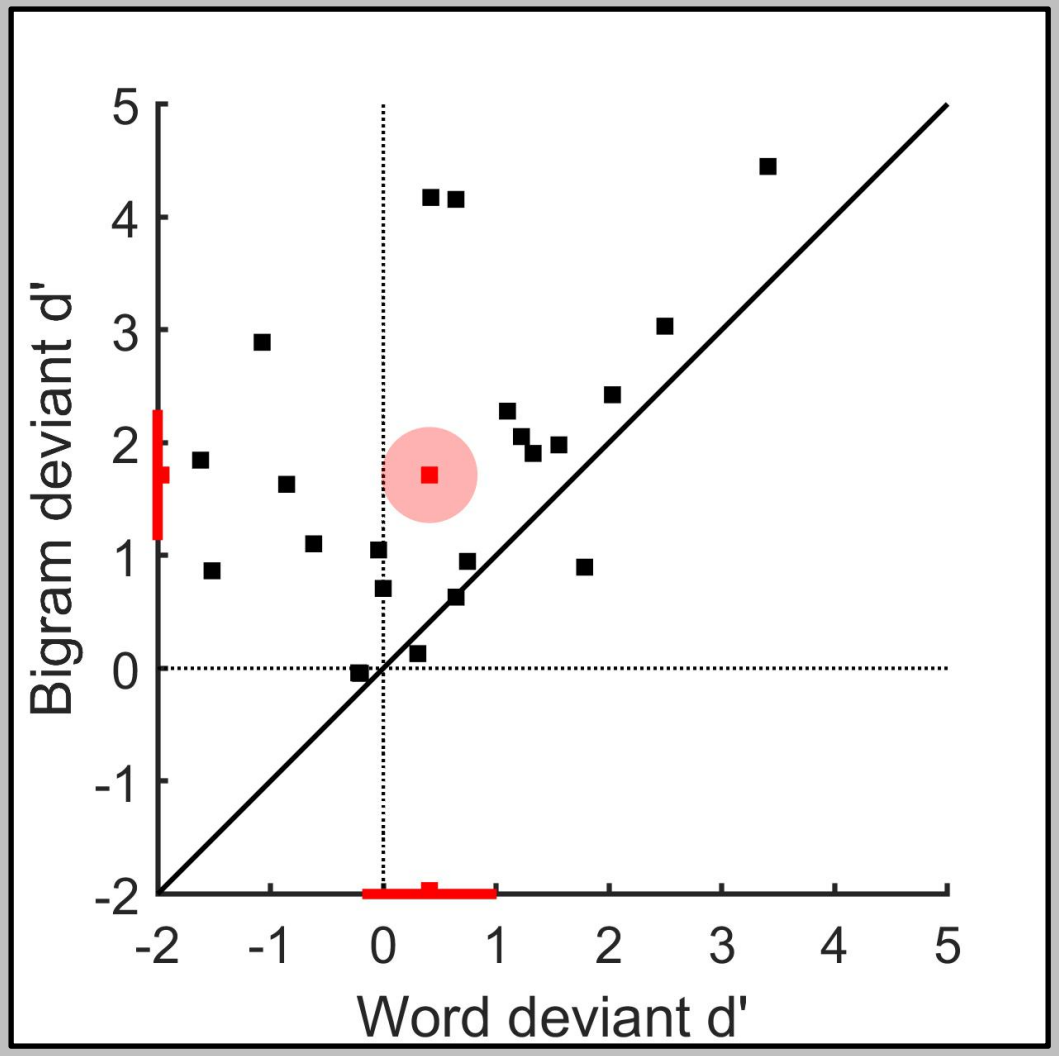


# Experimental design



# Exp 02
# Results

# Results



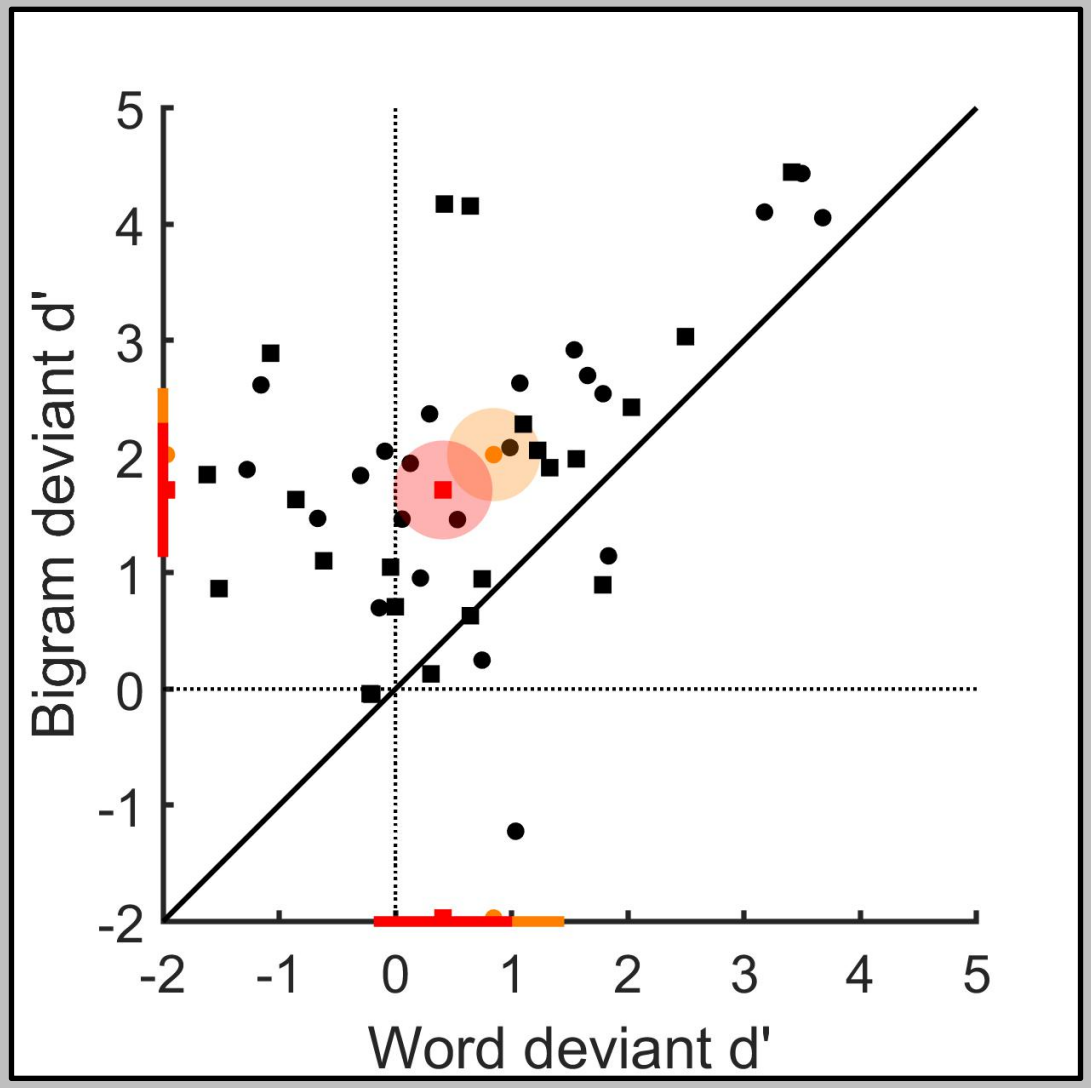

Mean Δ dPrime:
1.30

Effect size (Hedges g):
0.94 (0.41 – 1.47)

$t_{(22)} = 4.48$, $p = 0.00018$

# Overall Results

# Results



# Discussion

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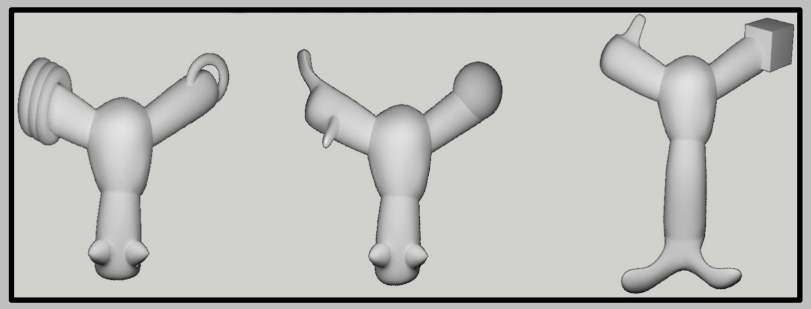
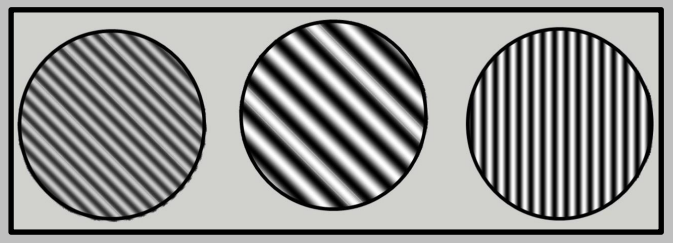
Open issue of Bigram Frequencies

Bigram Frequency effects in visual word identification





Eva Viviani

ⵜⵜⴰⵏⴽⵓ

thanks


European Research Council

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