

# Orthographic support for word learning in noise

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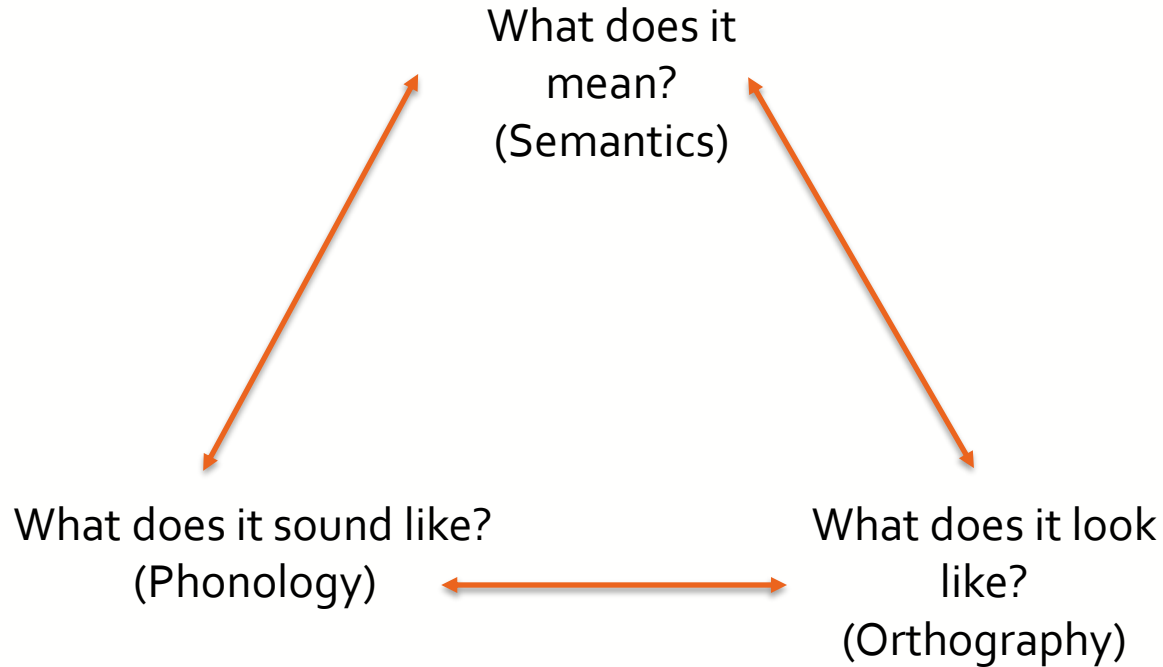
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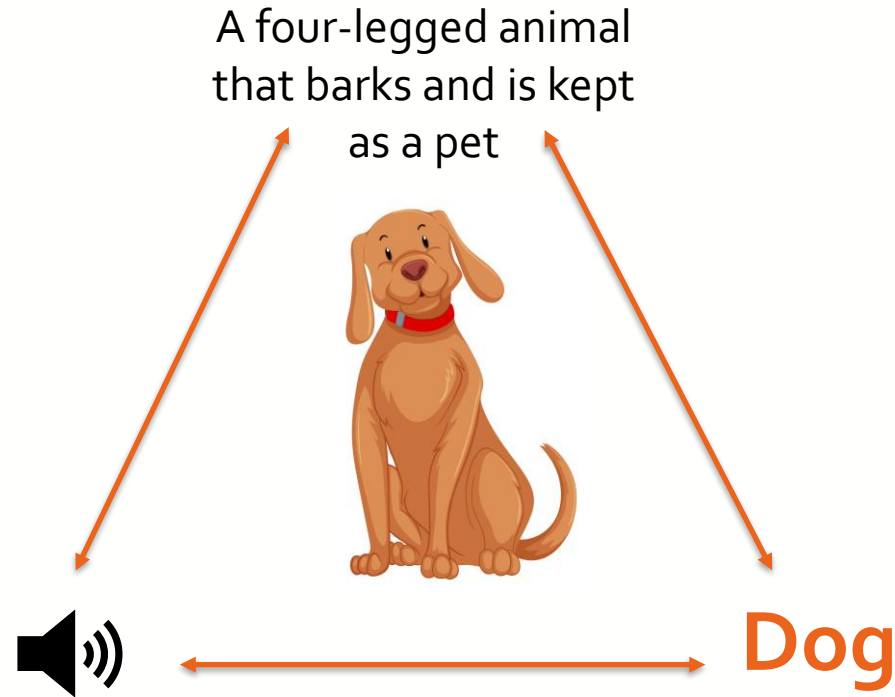
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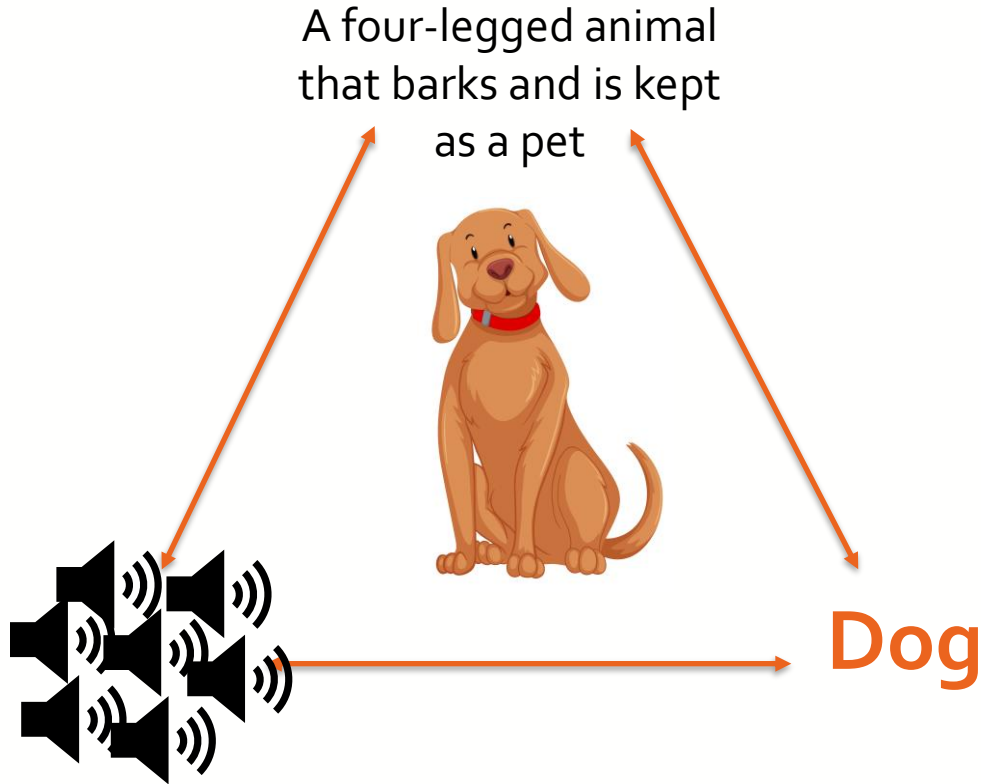
# What does it mean to know a word?



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# How can noise affect word learning?



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1. Noise can mask phonological information in the auditory stream (Klatte et al., 2013)
2. Noise can act as a distractor that must be suppressed when attending to the auditory signal of interest (i.e., words) (e.g., Howard et al., 2010; Kahneman, 1973)

# Why is this important?



- Vocabulary learning often occurs in noisy environments
- The American Speech Language Hearing Association recommends a SNR of +15dB or greater for adequate speech perception in children
  - Substantial evidence to suggest that classrooms regularly fail to meet these recommended listening conditions (Grempe & Easterbrooks, 2018; Shield, 2015; Wang & Brill, 2021)

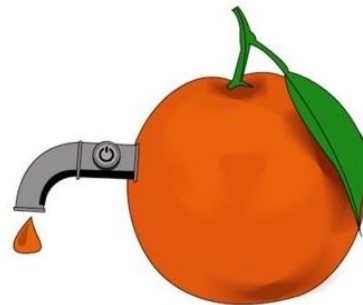


# What can we do to mitigate the effect of noise?



- Orthographic facilitation (Ricketts et al., 2009; Rosenthal & Ehri., 2008)
  - Presenting and/or emphasising the written word when teaching new words leads to better word learning
- Can help in two ways (Salins et al, 2021):
  - Provide a way of specifying impoverished phonological input
  - Reduce the cognitive load and free up resources

- Wanted to assess whether orthographic facilitation was still effective in supporting word learning in noisy environments
- Methods:
  - Adults (children later)
    - 125 participants aged 19-35 (M age= 28.37; SD= 4.37)
    - Completed online
  - 16 “inventions” (Wang et al., 2011; Salins et al., in prep)
  - Spelling presence manipulated between participants
  - Noise manipulated within participants



Valtem

“Diana put the best orange on the valtem to juice it”



# Our study



## Background measures

Background  
measures

TOWRE-2

BPVS-3

Sentence  
verification  
task

## Training block 1

Repetition

See image  
and given  
sentence

Repeat  
word

"Diana put the  
best orange on  
the valtem to  
juice it"

"Say valtem"

Production

See image  
and asked  
what it is

Repeat  
for  
blocks 2  
and 3

Picture  
naming

See picture  
and asked  
to recall  
name

## Post-tests

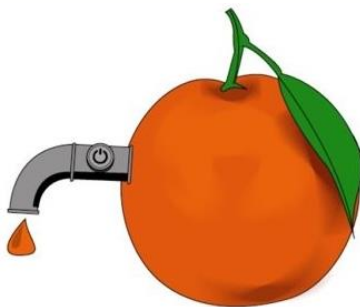
Meaning  
recall

Hear word  
and recall  
what they  
remember  
about  
invention

"Tell me all  
you can  
remember  
about  
valtem"

Spelling

Asked to  
spell word



# Measuring learning



Post-tests

Picture  
naming

See picture  
and asked  
to recall  
name

Meaning  
recall

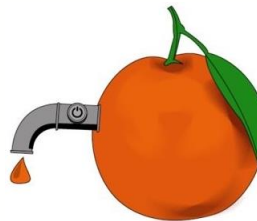
Hear word  
and recall  
what they  
remember  
about  
invention

"Tell me all  
you can  
remember  
about  
valtem"

Spelling

Asked to  
spell word

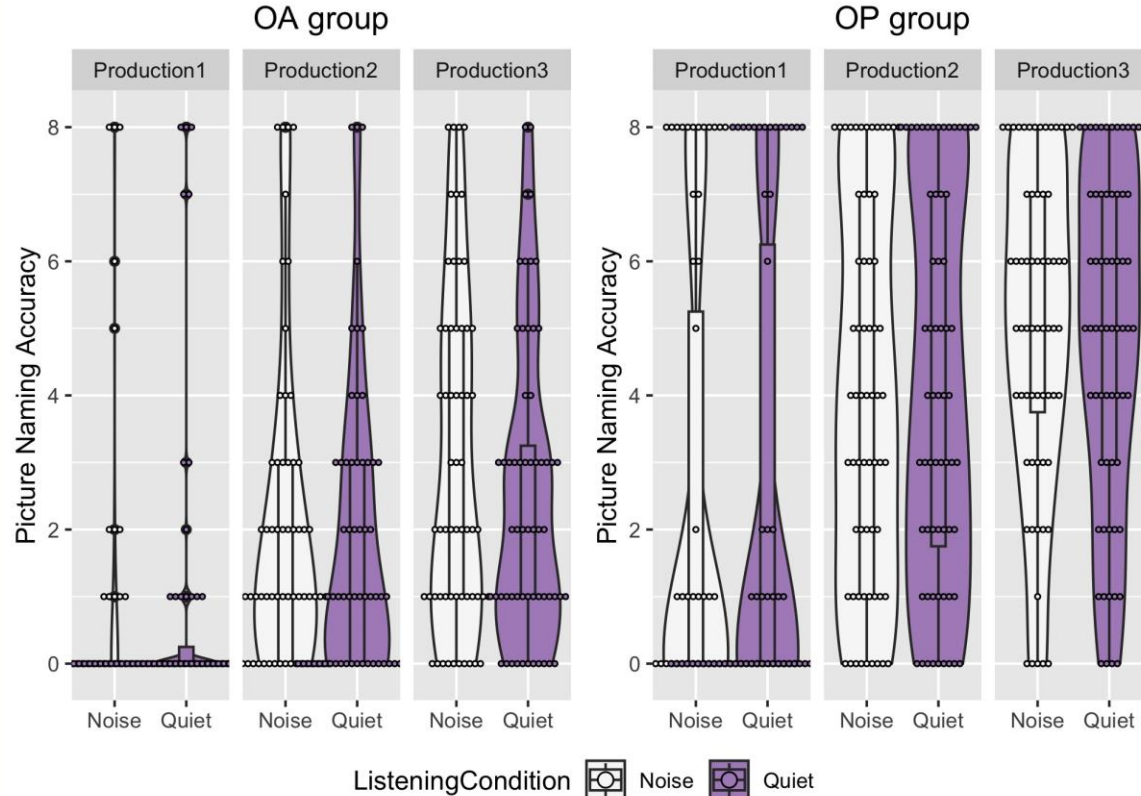
A machine to  
juice oranges



"Valtem"

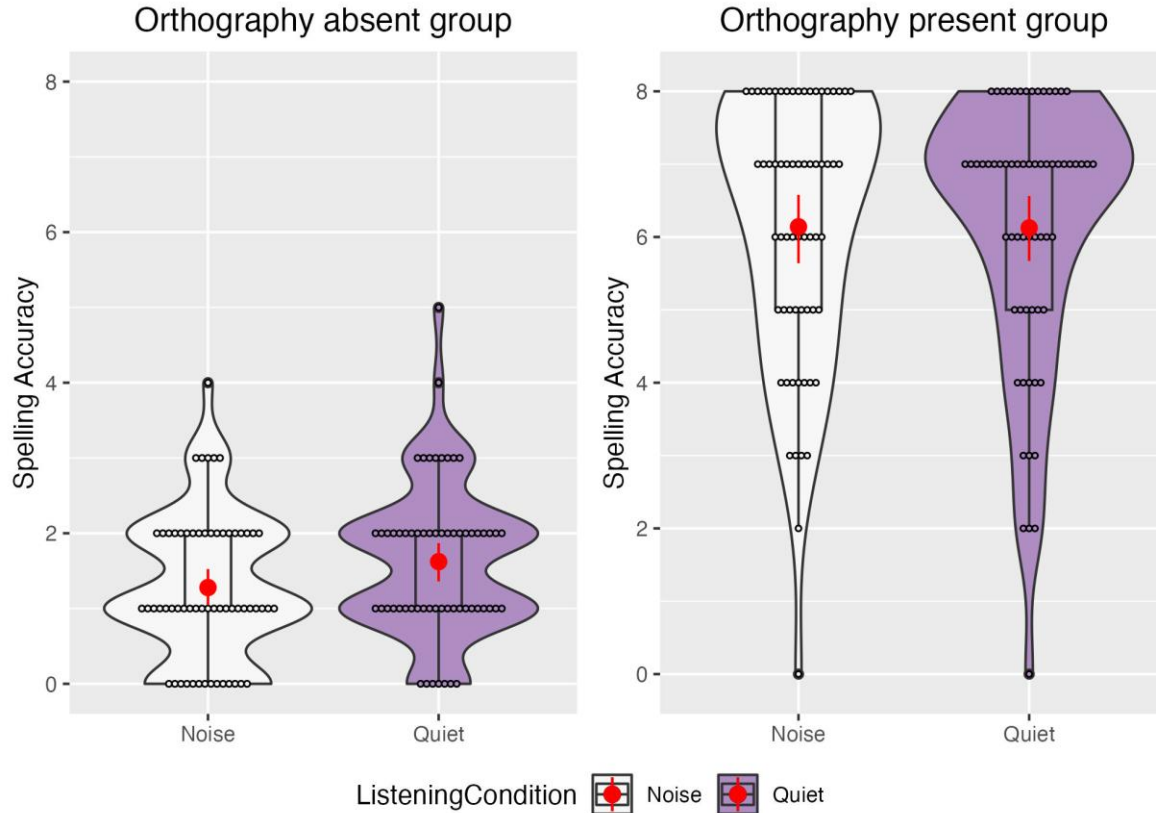
*valtem*

# Results: picture naming (training)



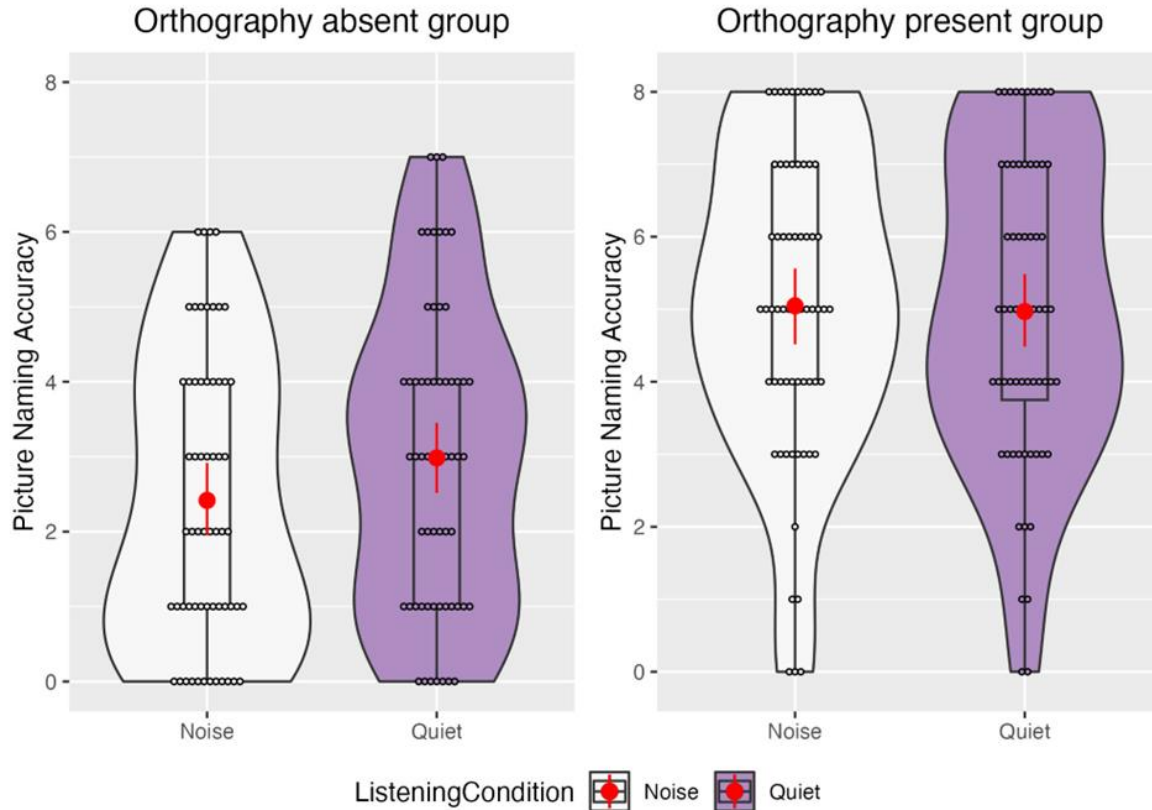
- Significant effect of orthography (OP>OA)
- No effect of noise
- No interaction between noise and orthography

# Results: spelling



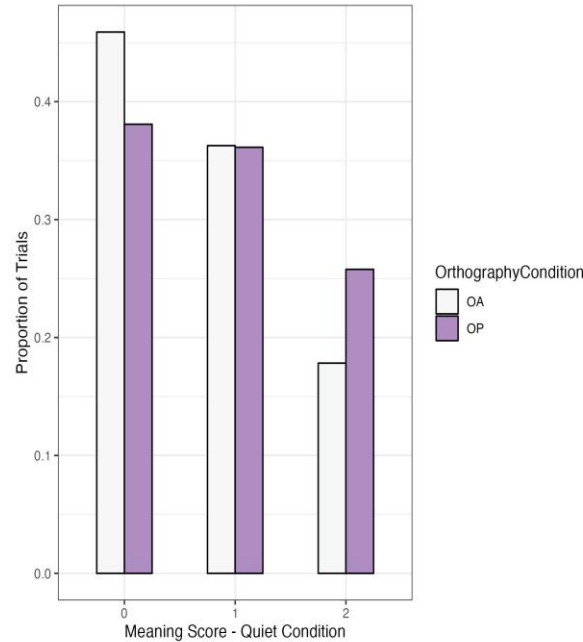
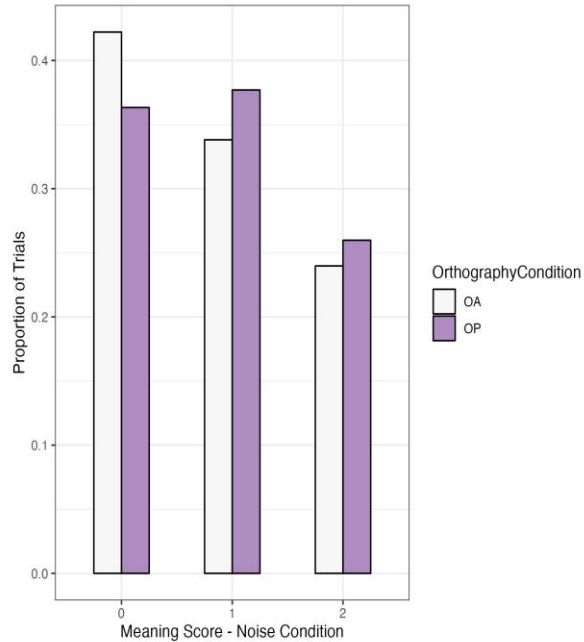
- Significant effect of orthography (OP>OA)
- No effect of noise
- No interaction between noise and orthography

# Results: picture naming (post-test)



- Significant effect of orthography (OP>OA)
- No effect of noise
- Significant interaction between orthography and noise (quiet> noise only for OA, no difference for OP)

# Results: meaning recall



- No effect of orthography
- Significant effect of noise (noise < quiet)
- No interaction between orthography and noise



- Theoretically:
  - Orthography beneficial for phonological and orthographic learning but not semantic (consistent with more mixed findings for semantics; Colenbrander et al, 2019)
  - Orthography beneficial for word learning *in noise* for phonological learning but not seen in orthographic or semantic learning
    - May be that this level of noise doesn't disrupt vocabulary learning?
    - Further research to disentangle this

- Practically:
  - Presenting orthography supports learning of new words (form learning)
- This level of noise may not impact word learning, BUT:
  - How does this relate to classroom levels of noise?
  - Does this replicate in children?





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Thank you!



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# Any questions?

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