

# Word learning and Statistical Inference in Children with Developmental Language Disorder

## Introduction

- **Bayesian theories of cognition** assume human beings are equipped with a strong mechanism of probabilistic inference which allows the learning processes to take place. A particularity of these models is the special status given to individuals' prior knowledge. Prior knowledge is a central part in the learning process as it would be taken into account in making inferences and updated by environmental information (Perfors, Tenenbaum, Griffiths & Xu, 2011).
- **Developmental Language Disorder (DLD)** is characterized among others by difficulties in word learning (Kan & Windsor, 2010). Children with DLD also seem to exhibit a larger panel of cognitive difficulties which we still fail to fully understand. Bayesian theories of cognition can be applied to word learning with the case of category learning and inductive generalization (Perfors, Tenenbaum, Griffiths & Xu, 2011).

## Aim

Does children with DLD behave as expected by Bayesian theories of cognition when achieving a novel word learning task ?

## Methods

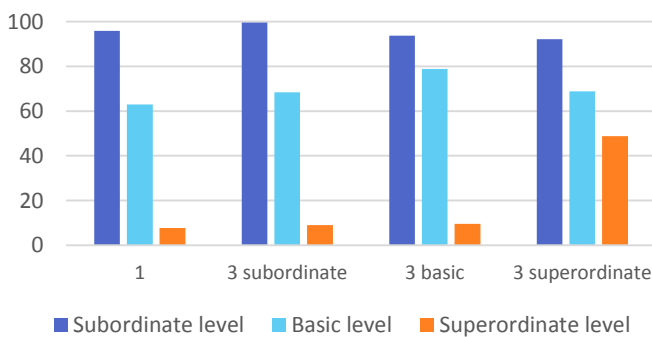
- **Participants**
  - 20 children with DLD (French speaking)
- **Non-word learning task** (inspired by Tenenbaum & Xu, 2007)
  - 2 x 3 familiar semantic categories
  - 3 levels of taxonomy
  - 4 conditions :
    - 1 vs 3 exemplars
    - 3 exemplars : subordinate, base, superordinate
  - Choice among 24 images

	Age	NVIQ	ELDP	EVIP	ECOSSE
<b>Mean</b>	120.4	96.2	-2.115	86.00	-1.67
<b>SD</b>	22.6	13.34	0.87	12.81	0.98



Look here are « baté ». Could you check if there are others « baté » and click on it?  
Remember that we don't want anything that is not « baté », only « baté ».

Distributional pattern of responses across categories and levels of taxonomy



\*The greater the magnitude of Bayes Factor (BF), the stronger the evidence.  $BF < 3$  is considered as anecdotal evidence (Lee & Wagenmakers, 2013).

## Results

Model	$BF_{10}^*$
<b>Category+Level+Category*Level</b>	$5.810^e+42$
Effects	$Bf_{inclusion}^*$
<b>Category</b>	$1.571^e+6$
<b>Level</b>	$\rightarrow +\infty$
<b>Category*Level</b>	$3.044^e+6$

## Conclusions

- Children with DLD's choices depend on **level of taxonomy**.
- Children with DLD's choices differ when **3 exemplars from the superordinate level** compared to 1 exemplar or 3 exemplars from subordinate or basic level.
  - ➔ An adaptation of their choices is possible when given more information but not for all cases.
- Do children with DLD behave as their typically developing pairs or
  - do they need **more/less information to adapt** their choices when superordinate/subordinate exemplars are given?
  - do they have similar **a priori knowledge**?