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# The benefits of using the NAO robot in the lexical acquisition of children with ASD : a study of four students in an Autism Elementary Teaching Unit in France

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## BACKGROUND

Autism can be characterised by a deficit in the processing of sensory information from the environment and a delay in social communication.

- Difficulty in understanding and responding to a verbal message.
- Acquisition of lexicon may be disrupted.

Oral reception & effectiveness of proposed interventions } Complex to evaluate

New technologies offer many possibilities for people with ASD and for professionals.

- NAO robot :
  - ✓ constant vocal intonation
  - ✓ controllable sensory stimulation
  - ✓ the most used with children with ASD

**Could the NAO robot improve the child's receptive lexicon, and more broadly his communication ?**

## METHODS OF RESEARCH

### Exploratory research

#### Objectives

To propose a reflexion on the mediation of NAO to develop the oral reception.  
To question the evaluation of speech language therapy interventions.  
To promote the link between SLT and other professionals.

#### Population

4 children with ASD aged 7 to 9 in an elementary autism teaching unit led by Association JB Thiery in France.  
Low to very low level of oral reception/Oral and non oral communication mode.

#### Measured data

Expected response ; response time ; number of gazes ; initiated communication signs (verbal or non verbal).

### Measurement of children's initial level of oral reception

Observations of the communication  
Passation of the DPL-3 test

### Comparison of 2 "groups" of 2 children

GH : group receiving intervention with a human  
GR : group receiving intervention with NAO robot

### Definition of the experimental protocol

Task : image designation  
Evaluating the effectiveness of the intervention :  
Evidence-based practice methodology ("l'ligne de base")

### Terms of experimentation

Visual cues for children : pictograms  
Filmed sessions and observation grid

### The "ligne de base" methodology

- Training and evaluation of effects
- Two equivalent lists of items
- One is trained (list A) and the other controls the placebo and developmental effects (list B).



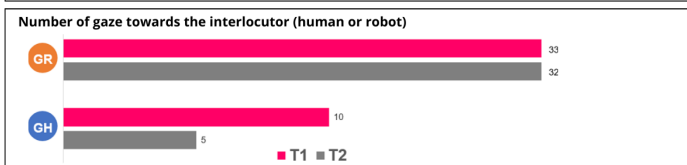
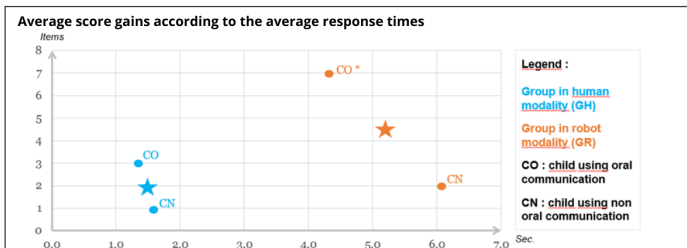
### Construction of item lists

- 12 items per list
- Equivalent items in terms of syllabic length and frequency in the French language
- Criteria from the Manulex database
- Words unknown by children

### Construction of the training

- 4 sessions
- Activities based on theoretical models
- Programming the robot with the Zora software

## MAIN RESULTS



**In post-test, GR responses to robot requests were faster than GH responses to human requests.**

**The number of correct responses from the GR oralizer child significantly increased.**

**The group trained with human (GH) improved much less.**

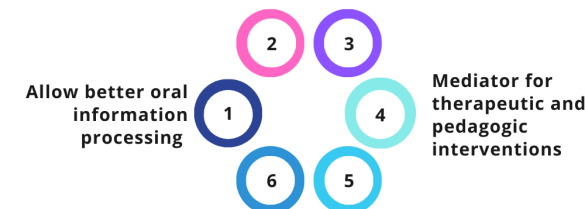
**The GR produced more looks towards the robot, and maintained them over time.**

**The GH produced fewer looks and the number of looks decreased in the post-test.**



## DISCUSSIONS

Decrease sensory disturbances  
High interest for oral lexical reception training



Necessity to develop a longitudinal and larger sample size study

Relevance and difficulty of clinical methodology due to high profile variability