

Predictions abilities in bilingual children with developmental dyslexia



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Introduction

Developmental Dyslexia (DD): A specific learning disorder manifested by persistent problems in reading accuracy, fluency, and/or comprehension, despite sound learning opportunities (American Psychiatric Association, 2013)

Background

- DD children have difficulties with rhythmic anticipation (non language-specific) (Muneaux & al, 2004 ; Pagliani, 2015)
- Some DD children also have morphosyntactic (MS) difficulties (language-specific) (Arosio & al., 2016 ; Arosio & al., 2017 ; Cantiani & al., 2015)
- Correlation found between MS abilities and rhythmic abilities (Pagliani & al., in prep)

Research questions

- Prediction abilities (linguistic and non-linguistic) = clinical marker of DD in bilinguals ?
 - DD bilinguals vs DD monolinguals
 - DD bilinguals vs TD bilinguals
 - TD bilinguals vs TD monolinguals

Hypotheses & predictions

- Reading involves anticipation/prediction abilities
- DD children have impaired rhythmic abilities

Predictions

- In both language-specific (MS) and non language-specific (rhythm) prediction tasks:
 - DD bilinguals = DD monolinguals
 - DD bilinguals < TD bilinguals
- In the language-specific task:
 - TD bilinguals < TD monolinguals (might vary depending on L2 exposure)
- Reading abilities should correlate with the performance on both tasks

Methods

Participants

Children 8-12 years old, Italian speakers

- At least 3 years of exposure to Italian for bilinguals
- Medium SES
- 4 groups :
 - DD bilinguals (L2 = Italian, whatever L1) - experimental (n = 25)
 - DD monolinguals (Italian) - control (n = 25)
 - TD monolinguals (Italian) - control (n = 25)
 - TD bilinguals (L2 = Italian, whatever L1) - control (n = 25)
- Recruitment in Carlo Besta Neurological institute (DD) and in schools (TD)

Control measures

- Non-verbal skills
- Non-verbal IQ (Raven's Colored Progressive Matrices – Raven, 1976)
- Auditive reaction time
- Go-NoGo

Reading skills

- Word and non-word reading (DDE-2 - Sartori, Jo & Tressoldi, 2017)
- Text reading (DD only)

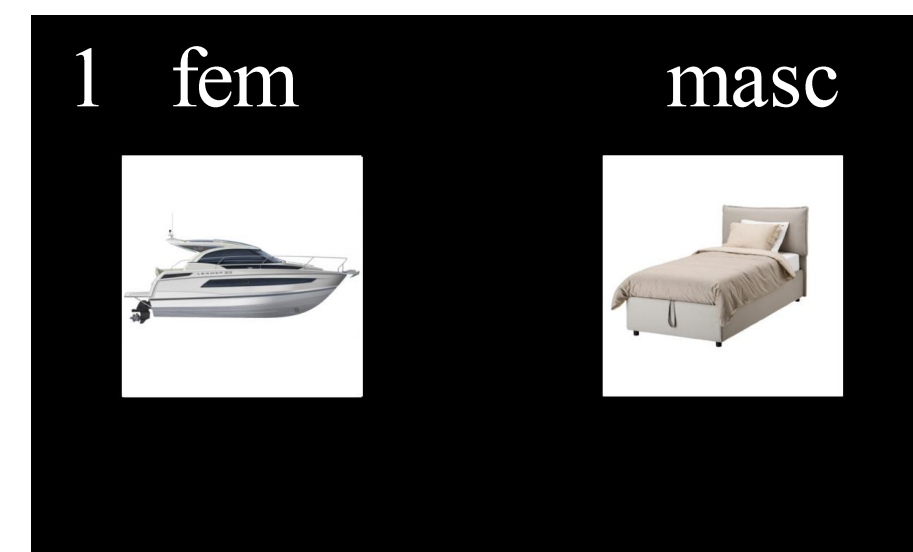
Morphosyntax and phonology

- Sentence Repetition
- Phonological awareness (DD only) (From Angeletti & al., 2004)
- Non-Word Repetition (DD only) (MeLF-Bertelli & Bilancia, 2006)

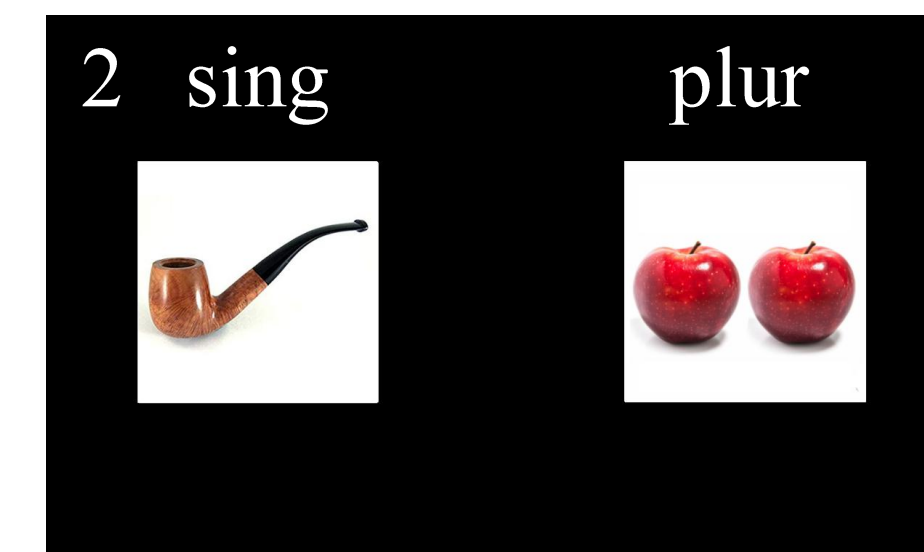
Methods

Experimental tasks

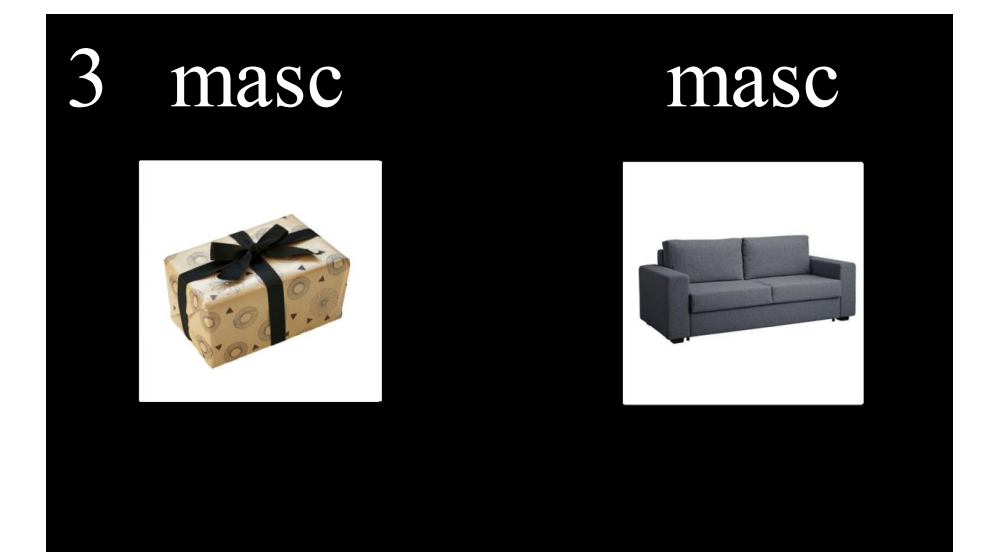
- **Language-specific task: predictions abilities based on MS cues (eye-tracking experiment)**
 - Prediction based on the article
 - 3 conditions : gender (1), number (2), no prediction (3)
 - Measure : proportion of looks to target at the onset of the article (should increase if prediction)



Adesso trova la... barca
Now find the [+fem] boat



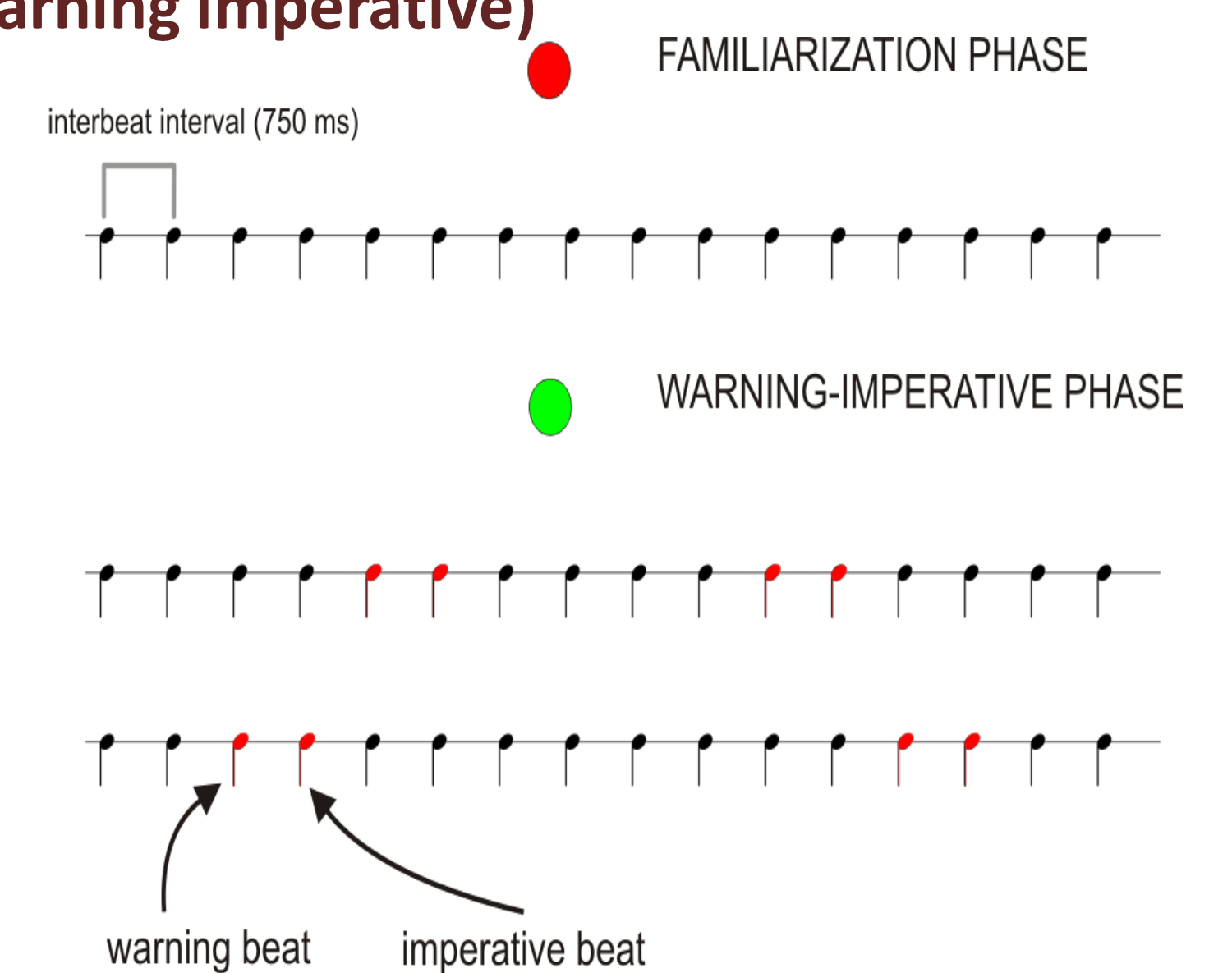
Adesso trova le... mele
Now find the [+plur] apples



Adesso trova il... regalo
Now find the [+masc] present

- **Non language-specific task: rhythmic prediction (warning imperative)**

- Ability to predict the upcoming beat
 - press the key in synchrony with the imperative beat

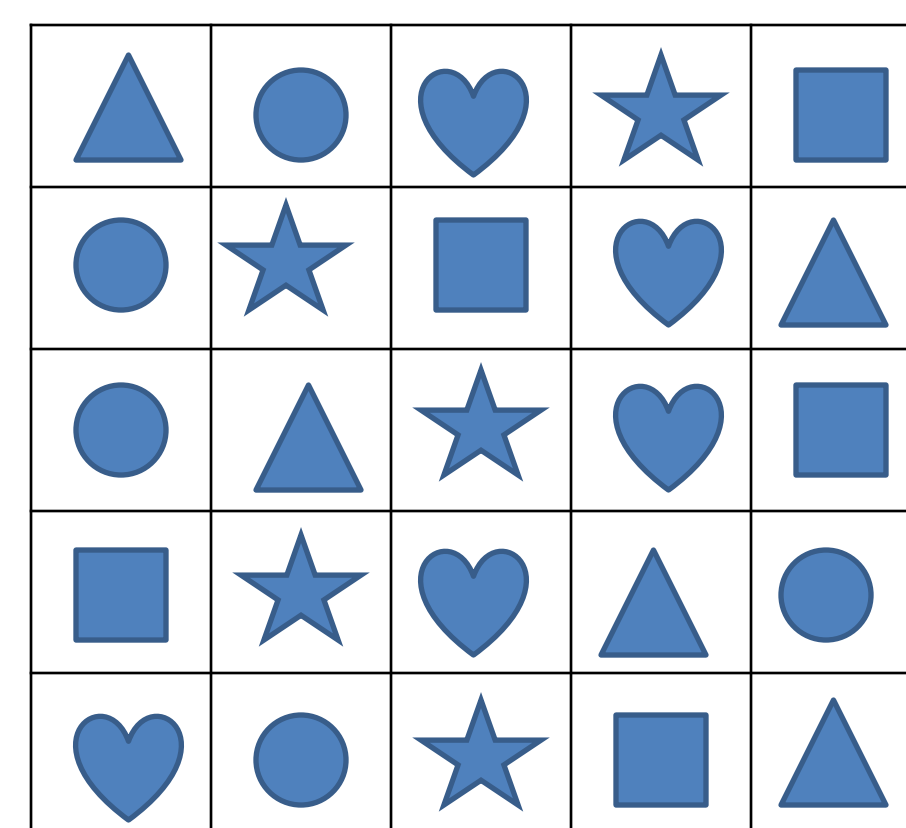


Parallel studies

- Same DD population

1. Prediction abilities in the Rapid Automatised Naming task

- RAN = predictive of reading abilities in monolinguals, sensitive for DD diagnosis
Is the RAN predictive of reading abilities in bilinguals ? Sensitive to DD ?
- Hypothesis: Performance to the RAN relies on anticipation/predictive abilities
- Experimental tasks: RAN (figures), warning Imperative, Tapping in rhythm (extraction of rule)
- Predictions: DD bilinguals = DD monolinguals ; DD bilinguals < TD bilinguals



2. Screening study: Non-Word Repetition (NWR) and Sentence Repetition (SR) as tools for diagnosing DD

- Studies suggest an overlap between SLI and DD
- NWR and SR are used to assess respectively phonology and (morpho)syntactic skills in monolinguals and bilinguals and are sensitive to SLI
NWR & SR, tools for DD diagnosis ?
- Predictions: DD bilinguals = DD monolinguals ; DD bilinguals < TD bilinguals ; TD bilinguals < TD monolinguals

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