Early markers of language development

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Do Olhar ao Cérebro: marcadores precoces no desenvolvimento da linguagem

Eyes and Brain: Early markers of Language development

http://labfon.letras.ulisboa.pt/babylab/EBELa/

Horizon21: Early language development in Down Syndrome

http://labfon.letras.ulisboa.pt/babylab/horizon21/

Ethics Statement: Ethical approval obtained from Comissão de Ética do Hospital de Santa Maria and from Comissão de Ética da Administração Regional de Saúde de Lisboa e Vale do Tejo; Written informed consent obtained from parents or legal guardians of all participants according to the principles explained in the Declaration of Helsinki.
Why early markers

Research on early markers of language development using both standard behavioral measures and ERP measures

Infant’s task in learning a language >> a stronger commitment to the native language as development proceeds

What the early markers for European Portuguese are
How they correlate and at which time-point with later language skills

Markers of early acquisition
Domain general/language specific?
Predictors of later abilities

Normal development (faster, later)
Language impairment (ASD, SLI, DS)
Why early markers

Research on early markers of language development

Infant’s task in learning a language >> a stronger commitment to the native language as development proceeds

Markers of early acquisition

Domain general/language specific?

Predictors of later abilities

Normal development (faster, later)

Language impairment (ASD, SLI, DS)

Typical development

WHAT MARKERS?
Support early intervention

At-risk infants (AR)

DS
 Prospective study in 5 domains (speech perception)

Eyes ET + Brain ERP

CSBS_DP Infant Toddler Checklist (adapted to EP, norming study planned)

Portuguese Communicative Development Inventory (CDI) – Short forms (8-18; 16-30)

WHY looking for early markers in these 5 domains?
Prospective study in 5 domains

- Stress discrimination
- Phonetic discrimination
- Pitch discrimination
- Phonetic discrimination
- Word learning

**CSBS-DP Infant Toddler Checklist (adapted to EP, norming study planned)** [4]

Portuguese Communicative Development Inventory (CDI) – Short forms (8-18, 16-30) [5]

**Brain ERP** + **Eyes ET**

**Why using Eye-tracking and ERPs?**

Griffiths scales
Prospective study in 5 domains

- Eyes ET + Brain ERP

CSBS_DP Infant Toddler Checklist (adapted to EP, norming study planned) [4]

Portuguese Communicative Development Inventory (CDI) – Short forms (8-18; 16-30) [5]

“Because it is noninvasive and does not require advanced motor responses or language, eye tracking is particularly important for the study of young children and infants.” [6]

“Noninvasive safe brain technologies have now been proven feasible for use with children starting at birth.” [1]
Prospective study in 5 domains

WHY looking for early markers in these 5 domains?

Speech perception abilities in the 1st year, namely early sensitivity to Prosody (word stress, pitch/intonation, prosodic grouping)

Speech segmentation
Word segmentation ➔ Word learning
Syntactic processing
Word stress as a strong cue for knowing where the **words** are in continuous speech, in some languages (e.g., English, German) > speech segmentation task

Performance predicts later language skills (e.g., expressive vocabulary)

Performance as a **marker of risk** for later language impairment (SLI)
New findings for Portuguese in TD infants at 5-6 months showing an early preference for the pattern Weak-Strong (≠ English, German, French, Spanish...)

Whether performance predicts later language skills (e.g., expressive vocabulary)

And could be a marker for (later) language impairment

STUDY IN PROGRESS
Prospective study in 5 domains: Pitch

Pitch cues sentence types (statements and questions): distinguishing them is crucial for syntax, social interaction, communication.

Portuguese Infants (TD) are able to discriminate utterances that differ only in the prosodic features that cue statements and questions, as early as 5 months.
Intonation Phrase boundaries are crucial for both lexical and syntactic segmentation.

Given infants’ early sensitivity to pitch, this field suggests promising results as predictive markers.

Word segmentation next to boundaries + phrasing

Às meninas] deram bonecas]
As meninas deram bonecas]
Prospective study in 5 domains: Word segmentation

Intonation Phrase boundaries are crucial for both lexical and syntactic segmentation

TD infants: Word segmentation next to boundaries >> other

DS: preliminary individual data

Infants exposed to passages with target words in different positions in the utterance: end (boundary), middle (no boundary)

TD infants: Word segmentation next to boundaries >> other

DS: preliminary individual data
Prospective study in 5 domains: Parental reports

<table>
<thead>
<tr>
<th>5/6</th>
<th>6/7</th>
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- Emotion and Eye Gaze
- Communication
- Gestures
- Sounds
- Words
- Understanding
- Object use

CSBS_DP Infant Toddler Checklist (adapted to EP, norming study planned)

DS: preliminary individual data: variability
**Prospective study in 5 domains: Parental reports**

http://labfon.letras.ulisboa.pt/babylab/pt/CDI/

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<th>Eyes</th>
<th>ET</th>
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<th>ERP</th>
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| age | 5/6 | 6/7 | 8/9 | 12 | (18) | 19/20 | (24) | (30) |

**Comprehension**

Words understood/produced as a function of age and percentile level (fitted scores): EP-CDI SFI (8-18 months)

**Production**

Portuguese Communicative Development Inventory (CDI) – Short forms (8-18; 16-30)
### Instruções

Para palavras que a criança compreende mas ainda não diz, assinale a primeira coluna (Compreende). Para palavras que a criança compreende mas também diz, assinale a segunda coluna (Compreende e diz). Se a criança usa uma forma diferente de dizer a palavra, assinale-o na mesma (ex: "meia" para banho). No caso de palavras que podem ter uma forma masculina e feminina, ou singular e plural (ex: bone, bone, bonete, bonés, bonés), responda considerando qualquer uma das formas, bem como as formas com -inho/a (ex: bonitinhas, bonitinhas, bonitinhos, bonitinhos). Considere também as várias formas do mesmo verbo (ex: dar, dá, deu).

### Tabelas

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### Observações

As crianças compreendem mais palavras do que dizem. Neste questionário, estamos interessados em saber as palavras que a criança compreende, mesmo que não as use. No caso de palavras que podem ter uma forma feminina ou masculina, ou singular e plural (ex: bone, bone, bonete, bonés, bonés), responda considerando qualquer uma das formas, bem como as formas com -inho/a (ex: bonitinhas, bonitinhos, bonitinhas, bonitinhos). Considere também as várias formas do mesmo verbo (ex: dar, dá, deu).
Prospective study in 5 domains: Parental reports

http://labfon.letras.ulisboa.pt/babylab/pt/CDI/

Words produced as a function of age and percentile level (fitted scores): EP-CDI SFI (8-18 months) and EP-CDI SFII (16-30 months)

Portuguese Communicative Development Inventory (CDI) – Short forms

DS: preliminary individual data: variability Comp 11% at 5th Prod 56% at 5th
Goal: Early markers

Early speech perception > PROSODY

Predict later language outcomes > vocabulary, morphology, syntax

Identify weaknesses and strengths across linguistic domains

Promote early intervention to support language development

COLABOREM!
Obrigada

All infants and parents. All collaborating institutions (associations, hospitals, schools). The baby lab team: HSM-CHLN, FPCE-UP, LAPSO-CIS-ISCTE

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