Horizon21: Early language development in Down Syndrome

Horizonte21: Desenvolvimento da linguagem em bebés com Síndrome de Down

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PTDC/MHC-LIN/3901/2014
Mind-Brain College, University of Lisbon, December 2 2015

BACKGROUND & GOALS

My language!

Learning a language >> a stronger commitment to the native language as development proceeds
Native language neural commitment hypothesis
Prosodic bootstrapping hypothesis [1, 2]

Speech perception abilities in the 1st year [5], namely early sensitivity to **Prosody** (word stress, pitch/intonation, prosodic grouping)

Speech segmentation → Word segmentation → Word learning
Syntactic processing

DS

WHAT MARKERS? Support early intervention

Early markers of language acquisition

Preditors of later language abilities

Normal development (faster, later) | Language Impairments [3, 4]

BUT early markers of languages development in Down Syndrome are largely unknown

TD* **At-risk infants***

*EBELa project: Poster 28

Down Syndrome (DS):
The most common genetic cause of mental retardation & language is a highly affected domain of development [6,7,8]

TEAM

CLUL, ULisbon; FPCE, UPorto; CIS, ISCTE; Diferenças (APPT21)

BI
BPD

Consultants:
UC Davis Mind Inst.; Univ. Gothenburg; Diferenças

METHOD

COMPARATIVE & PROSPECTIVE STUDY – FIVE LANGUAGE DOMAINS

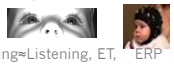
5/6 | 6/7 | 8/9 | 12 | (18) | 19/24 | (24) | (30)

Stress discrimination
Phonetic discrimination
Pitch discrimination
Phonetic discrimination
Word learning

Stress
Non-native&Native sounds
Pitch (phrasal)
Word segmentation
Word learning

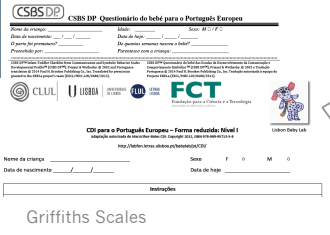
Word segmentation

Experimental tasks



Looking≈Listening, ET, ERP

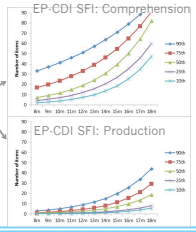
Parental reports (from 6 onwards)



CSBS DP Questionário do bebé para o Português Europeu

CDI para o Português Europeu – Forma reduzida: Nível I

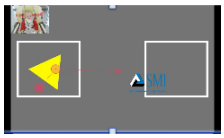
Griffiths Scales



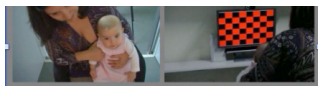
EP-CDI SFI: Comprehension

EP-CDI SFI: Production

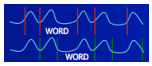
EXPERIMENTAL TASKS



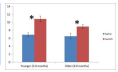
Pitch discrimination (modified version of visual habituation paradigm)



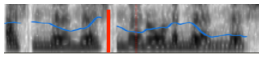
Stress discrimination (ET) – see P32, TD infants



Portuguese Infants (TD) are able to discriminate utterances on the basis of intonation, as early as 5 months [9]



Pitch discrimination – prosodic boundaries (ET)



Phonetic discrimination (ERP – MMN)

Standards: da da da da da da da da da da da da ...
Deviant: ba
Deviant: da

Native contrast

Non-native contrast

Word segmentation (modified version of visual habituation paradigm)

Os vizinhos brincam com o teu ful. Estão sempre a falar-nos do ful. Elas viajavam muito de ful. A Marta pôs o seu ful na mesa. Fizemos festas ao ful vermelho. Nunca comi ful com morangos. **// FUL //** (talk 08)

REFERENCES

[1] Kuhl et al. (2008) Phonetic learning as a pathway to language: New data and native language magnet theory expanded (NLMe). Phil. Trans. Royal Soc B: Biological Sciences 363. [2] Höhle, B. (2009). Bootstrapping mechanisms in first language acquisition. Linguistics 47(2). [3] Weber et al. (2005) Reduced stress pattern discrimination in 5 montholds as a marker of risk for later language impairment: Neurophysiological evidence. Cognitive Brain Research 25, 180-187. [4] Kuhl et al. (2013) Brain responses to words in 2 yearolds with autism predict developmental outcomes at age 6. PLOS ONE 8, e64967. [5] Gervain, J.; Mehler, J. (2010). Speech perception and language acquisition in the first year of life. Annual Review of Psychology 61, [6] Loane et al. (2013) Twenty-year trends in the prevalence of Down Syndrome and other trisomies in Europe: impact of maternal age and prenatalscreening. European Journal of Human Genetics 21. [7] Finestack et al. (2013) Discriminating Down Syndrome and Fragile X Syndrome based on language ability. Journal of Child Language 40(1). [8] McDuffie, A.; Abbeduto, A. (2009) Language disorders in children with mental retardation of genetic origin: Down Syndrome, Fragile X Syndrome, and Williams Syndrome. [9] Frota et al.. (2014). Infants' Perception of Intonation: Is It a Statement or a Question?. Infancy 19, 2: 194 - 213.

EXPECTED RESULTS

Early speech perception > PROSODY → Predict later language outcomes > vocabulary, morphology, syntax → Identity weaknesses and strengths across linguistic domains → Promote early intervention to support language development

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

2016-2018. Funding: 166.360,00 €

1º Encontro de Estudantes Mente-Cérebro da Universidade de Lisboa
Entrada Livre
Reflexões sobre a neurobiologia da consciência
Conferência - 10h30
Professor António Damásio
2 de dezembro, 2015 - 9h-18h
Aula Magna da Universidade de Lisboa

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