Hôpitaux de Lyon

RESEARCH COMMITTEE
ARISTOTLE UNIVERSITY OF THESSALONIKI

AUDITORY PROCESSING DISORDER

A specific type of hearing impairment

Vasiliki (Vivian) Iliadou
& Hung Thai-Van

PREVALENCE

- 2 – 7 % children (Bamiou, Musiek & Luxon, Archives of Diseases in Childhood, 2001)
- Up to 40% of children with learning disorders (Iliadou et al., Int J Ped ORL, 2009)
- Up to 70% of older adults (Golding et al, Blue mountain hearing study, Journal of American Academy of Audiology, 2004)

EAG= European APD Study Group

Hearing= Hearing Sensitivity + Auditory Processing

EFAS APD Working Group

Creativity

Higher order cognition

Thinking

The cognitive reservoir is more "spacious" if HS & AP are intact.

Tests of attention & memory often use the auditory modality

Cognition

Interaction with HS & AP

Speech in noise

Auditory Processing (AP)

Dichotic listening
Temporal Resolution
Pattern recognition
Frequency discrimination

Hearing Sensitivity (HS)

PTA not enough

Hearing is more than we are currently testing


International networking
5
Networking
4
1
Few APD Clinics in Europe
6
European Guidelines
2
European APD Study Group
3
European APD Consensus
International endorsement
7
8
Enhance patient rehabilitation

AUDITORY

ICD-10
ICD-11

Debate?

➤Reject AP test batteries

➤APD conclusion on APD suspected individuals

When to initiate APD diagnosis

1. Symptoms

2. Conditions

Iliadou V, Ptok M, Grech H, Pedersen ER, Brechmann A, Deggouj N, Kiese-Himmel C, Śliwińska-Kowalska M, Nickisch A, Demanez L, Veuillet E, Thai-Van H, Sirimanna T, Callimachou M, Santarelli R, Kuske S, Barajas J, Hedjever M, Konukseven O, Veraguth D, Stokkereit Mattsson T, Martins JH and Bamiou D-E (2017) A European Perspective on Auditory Processing Disorder-Current Knowledge and Future Research Focus. Front. Neurol. 8:622. doi: 10.3389/fneur.2017.00622

Taylor & Francis
Taylor & Francis Group

International Journal of Audiology

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European 17 countries consensus endorses more approaches to APD than reported in Wilson 2018

Vasiliki (Vivian) Iliadou, Martin Ptok, Helen Grech, Ellen Raben Pedersen, André Brechmann, Naïma Deggouj, Christiane Kiese-Himmel, Mariola S´liwin´ska-Kowalska, Andreas Nickisch, Laurent Demanez, Evelyne Veuillet, Hung Thai-Van, Tony Sirimanna, Marina Callimachou, Rosamaria Santarelli, Sandra Kuske, Jose Juan Barajas de Prat, Mladen Hedever, Ozlem Konukseven, Dorothy Veraguth, Tone Stokkereit Mattsson, Jorge Humberto Martins & Doris-Eva Bamiou

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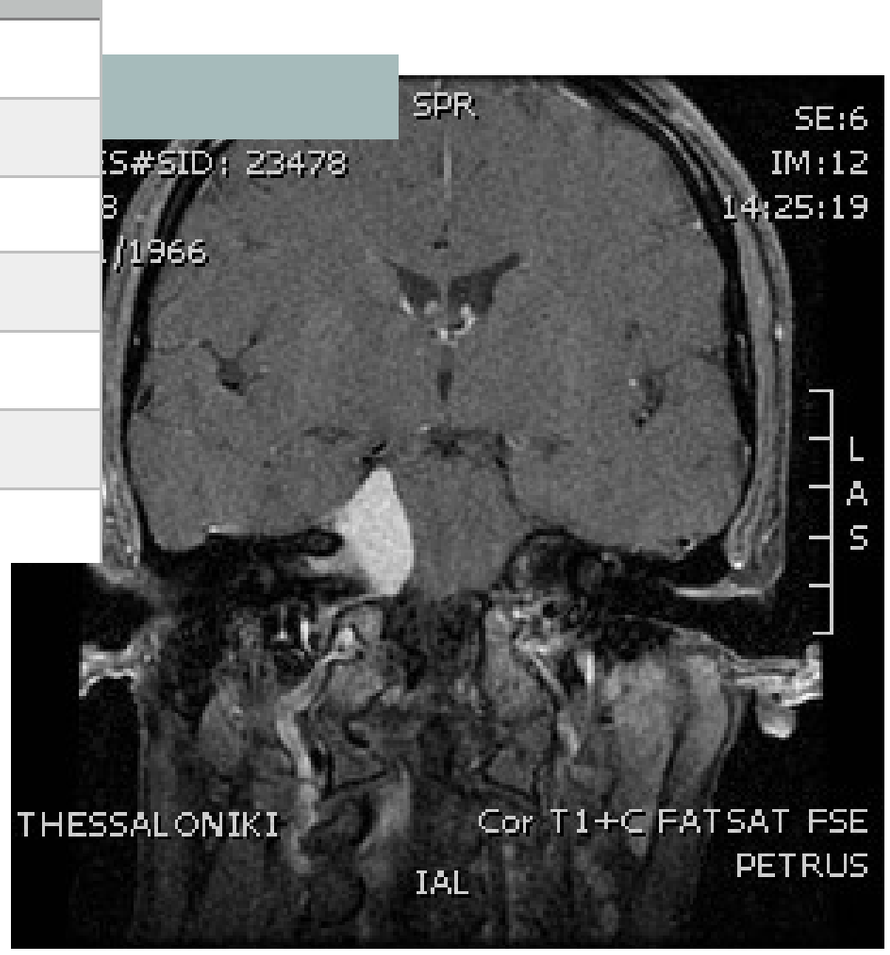
To link to this article: https://doi.org/10.1080/14992027.2018.1442937

Published online: 28 Feb 2018.

OUR AIM

- To produce specific evidence-based **guidelines for APD** screening, diagnosis and treatment/management.
- To raise awareness of the need to go beyond standard clinical audiological assessment to evaluate hearing.

	Right Ear	Left Ear	Adult Normative Data
Speech Audiometry	**92%**	100%	≥95
SinB	**2dB HL**	-0.6dB HL	-0.6 to 0.2dB HL
DD	**75%**	95%	>85%
PPS	**80%**	90%	>85%
RGDT	8.3msec		<8msec
DPS	100%	100%	>67%
GIN	**20msec**	6msec	<8msec



Auditory Processing Disorder as the Sole Manifestation of a Cerebellopontine and Internal Auditory Canal Lesion

DOI: 10.3766/jaaa.15127

Vasiliki (Vivian) Iliadou*
Nikos Eleftheriadis†

Thessaloniki meeting Jan 2018

UCL EAR INSTITUTE
GIR SHORT COURSES

UCL

Auditory Processing, Language and Cognition – Interactions Across the Age Span

6th – 8th March 2018

Course Director:
Prof Doris-Eva Bamiou & Prof Jennifer Linden

Wednesday, 7th March
Auditory Processing and Developmental Disorders

Time	Title	Speaker
09.00-09.15	Registration	
	Morning Session - Chair: TBA	
09.20-09.30	Welcome and opening remarks	
09.30-10.00	Auditory Processing Disorders: risk factors, clinical presentations, assessment and management considerations	Prof Doris-Eva Bamiou
10.00-10.30	APD - a European consensus	Prof Vivian Iliadou
10.30-11.15	The multidisciplinary approach to APD: a case study	Dr Chrysa Spyridakou
11.15-11.30	Coffee break	
11.30-12.00	The APD test battery	Dr Nehzat Koohi
12.00-12.30	The child with auditory neuropathy	Dr Hannah Cooper
12.30-13.30	Lunch break	
	Afternoon Session - Chair: TBA	
13.30-14.30	Keynote Lecture: Developmental language disorder and auditory processing disorder: same or different?	Prof Dorothy Bishop
14.30-15.00	Auditory training and learning: scientific principles	Dr Lorna Halliday
15.00-15.30	Coffee break	
15.30-16.00	Managing the child with listening difficulties: an overview	Dr Christina Murphy
16.00-16.30	Remote microphone hearing aids for APD: what is available and the evidence	Georgios Stavrinos
16.30-17.15	Managing the child with listening difficulties: case studies	Prof Doris-Eva Bamiou, Dr Christina Murphy & Prof Vivian Iliadou
17.15-17.30	Panel and audience discussion	
17.30	Soiree in the Atrium, Ear Institute	

frontiers in Neurology

PERSPECTIVE
published: 23 January 2018
doi: 10.3389/fneur.2017.00732

Common Misconceptions Regarding Pediatric Auditory Processing Disorder

Vasiliki Iliadou[1]* *and Christiane Kiese-Himmel*[2]

[1] *Neuroscience, Medical School, Aristotle University of Thessaloniki, Thessaloniki, Greece,* [2] *Phoniatric and Pediatric Audiological Psychology, University Medical Center Göttingen, Georg-August-University, Göttingen, Germany*

Pediatric hearing evaluation based on pure tone audiometry does not always reflect how a child hears in everyday life. This practice is inappropriate when evaluating the difficulties children experiencing auditory processing disorder (APD) in school or on the playground. Despite the marked increase in research on pediatric APD, there remains limited access to proper evaluation worldwide. This perspective article presents five common misconceptions of APD that contribute to inappropriate or limited management in children experiencing these deficits. The misconceptions discussed are (1) the disorder cannot be diagnosed due to the lack of a gold standard diagnostic test; (2) making generalizations based on profiles of children suspected of APD and not diagnosed with the disorder; (3) it is best to discard an APD diagnosis when another disorder is present; (4) arguing that the known link between auditory perception and higher cognition function precludes the validity of APD as a clinical entity; and (5) APD is not a clinical entity. These five misconceptions are described and rebutted using published data as well as critical thinking on current available knowledge on APD.

Keywords: auditory processing disorder, children, hearing, central auditory processing disorder, hearing evaluation, auditory processing disorder management, hearing management

OPEN ACCESS

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Specialty section:

Hearing acuity may be difficult to assess in children and does not always reflect how a child "hears" in everyday life. The audiological test battery must be built around the pure tone audiogram and may include tympanometry, stapedial reflexes, auditory brainstem responses, and otoacoustic emissions. However, relying on such a test battery to measure auditory function in the setting of school or playground in children referred for auditory processing deficits is incomplete (1).

COGNITION & HEARING

Psychiatry and Clinical Neurosciences 2018

Letter to the Editor

Over-diagnosis of cognitive deficits in psychiatric patients may be the result of not controlling for hearing sensitivity and auditory processing

doi:10.1111/pcn.12768

Why?
Cognition is mostly evaluated through the auditory modality!

This applies to other patient populations as well.
Especially those with communication difficulties and possible low self-awareness.

EAR and HEARING
The Official Journal of the American Auditory Society

Most Emailed Articles

Letter to the Editor: Auditory Processing Disorder, *Ear Hear*, *39*, 617–620

Iliadou, Vasiliki (Vivian); Chermak, Gail D.; Bamiou, Doris-Eva; More

Ear and Hearing. ., Post Author Corrections: August 13, 2018

THE 31ST ANNUAL CONFERENCE OF THE AMERICAN ACADEMY OF AUDIOLOGY

AAA 2019
Columbus, OH
March 27-30

The Best of Audiology

Third Global Conference on Central Auditory Processing Disorder: Synergies Between Lab and Clinic

March 30, 2019

7:30am – 3:45pm

Greater Columbus Convention Center
Columbus, Ohio

Program Co-Chairs:

Gail D. Chermak, PhD

Professor and Chair, Department of Speech and Hearing Sciences
Elson S. Floyd College of Medicine
Washington State University
Spokane, WA

Frank E. Musiek, PhD, CCC-A

Professor, Department of Speech, Language and Hearing Sciences
University of Arizona
Phoenix, AZ

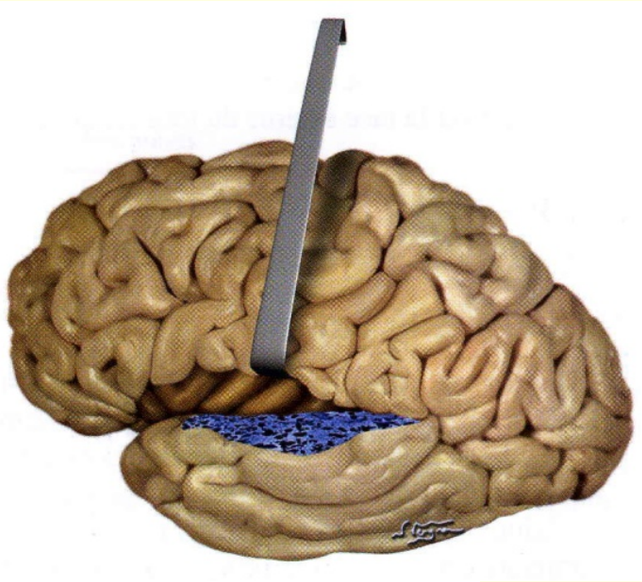
Diagnostic criteria for APD

Criterion	Explained
Pure Tone Audiometry	≦15dB HL for each frequency between 250Hz-8000Hz in both ears
Abnormal auditory processing results	performance at or below 2 SD below the mean in at least 2 validated auditory processing tests
Symptoms & risk factors	Reported by the affected individual/their family/educational environment AND/OR presence of risk factors
Non-Verbal intelligence coefficient (IQ)	>80
Ability to follow instructions in ideal conditions	Patient can understand and reliably follow instructions for the AP tests and reliably perform the pre-testing training

Symptoms	
Speech understanding difficulties	In background noise, acoustically challenging/complex acoustic environments, when speech quality is degraded
Speech discrimination difficulties	difficulties to repeat or recall similar sounding words
Auditory memory/attention difficulties	Difficulties recalling instructions; difficulties concentrating in noise
Sound localisation/streaming difficulties	Difficulties identifying the source of a sound; with separation of auditory foreground from auditory background
Relies on multisensory cues	Eg seeking visual / facial cues to better understand
Hyperacusis	With or without a diagnosis of autism spectrum disorder
Disproportionate educational/cognitive/language difficulties	1. In the presence of normal audiometry and no other developmental disorders OR 2. in the presence of normal audiometry and other diagnosed developmental disorders (specific language impairment; attention deficit disorder; autism; dyslexia) and a. DESPITE implementation of appropriate interventions or b. when other specialists or the educational environment seek further advice/assessment on management of the auditory aspect of this presentation
Risk factors	
Ear related	Intermittent middle ear pathologies, eg Chronic otitis with effusion (glue ear), recurrent upper respiratory tract infections
Brain related	Genetic or acquired neurological syndromes (eg brain tumours; traumatic brain injury; stroke;demyelination etc)
Development related	Attention Deficit Disorder; dyslexia; Specific Language Impairment; phonological disorder; autism spectrum disorders
Age related	Central presbyacusis

Individualised management decided upon	
Client considerations	clinical characteristics, test results, overall needs and preferences
Evidence	best available evidence; of relevance to the particular client
Environment & resources	Availability of local resources; client's environment context; related health/educational/ workplace organizational context
Key pillars of management	
Listening strategies	optimisation of the listening environment (eg minimise noise); teacher/speaker based adaptations; other related strategies
Listening devices/systems	frequency modulated systems; sound field systems; hearing aid fitting with directional microphone to enhance SNR (Signal-to-Noise-Ratio)
Auditory training	Formal and/or informal; chosen on the basis of patient's AP test deficits/other symptoms and needs
Other means of management	Broader management of the client's specific needs (eg reading deficiency; memory deficits; educational needs) by other agencies whenever needed and wherever possible

Auditory Pathways



Auditory Cortex

Inferior Colliculus

Lateral lemniscus

Superior Olive

Cochlear Nuclei

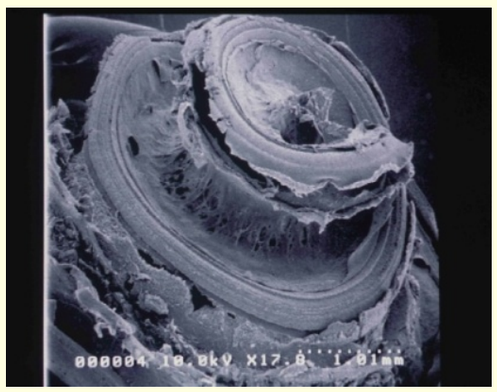
Internal External

Hair Cells

Cochlea

→**Ascending pathway** (afferent system)

→**Descending pathway** (efferent system)

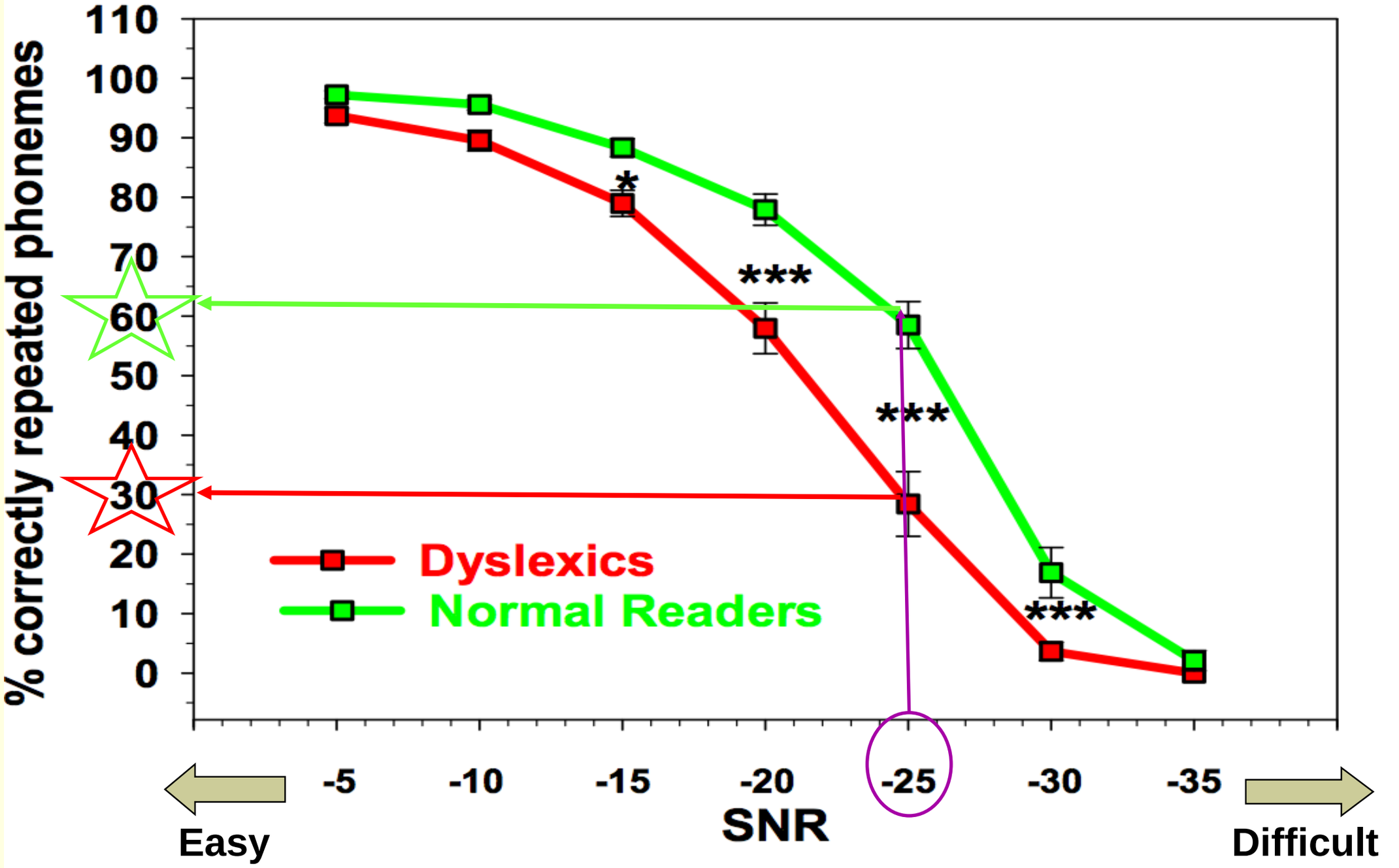


DIAGNOSIS OF CENTRAL AUDITORY PROCESSING DISORDERS (Clinical approach)

CENTRAL AUDITORY PROCESSING ASSESSMENT

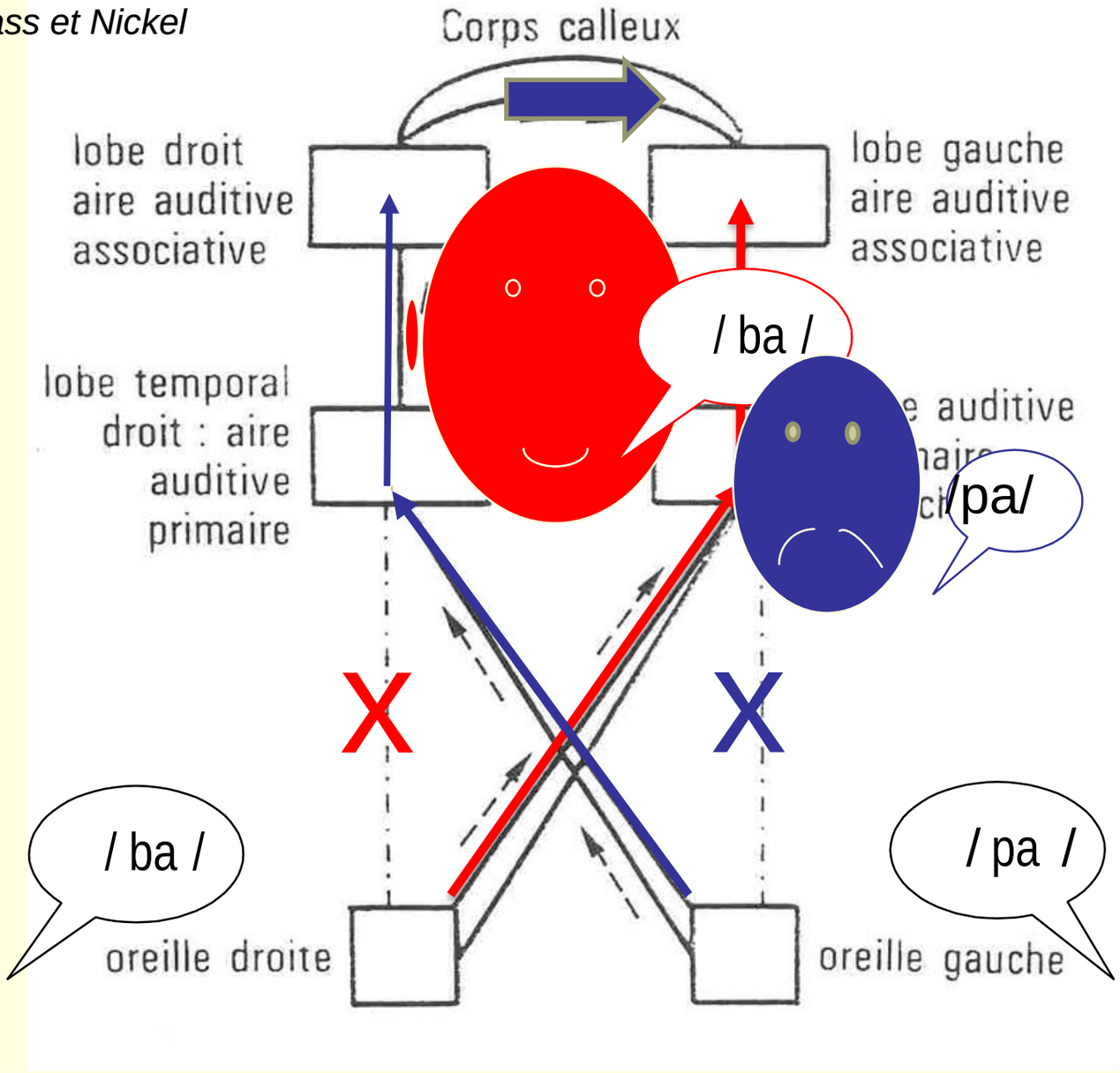
- Listening in Noise (1)
- Dichotic listening (2)
- Phonemic categorization (3)
- Descending auditory pathway functioning (4)
- Temporal resolution
- Pattern recognition (pitch & duration)

LISTENING IN NOISE (1/4)



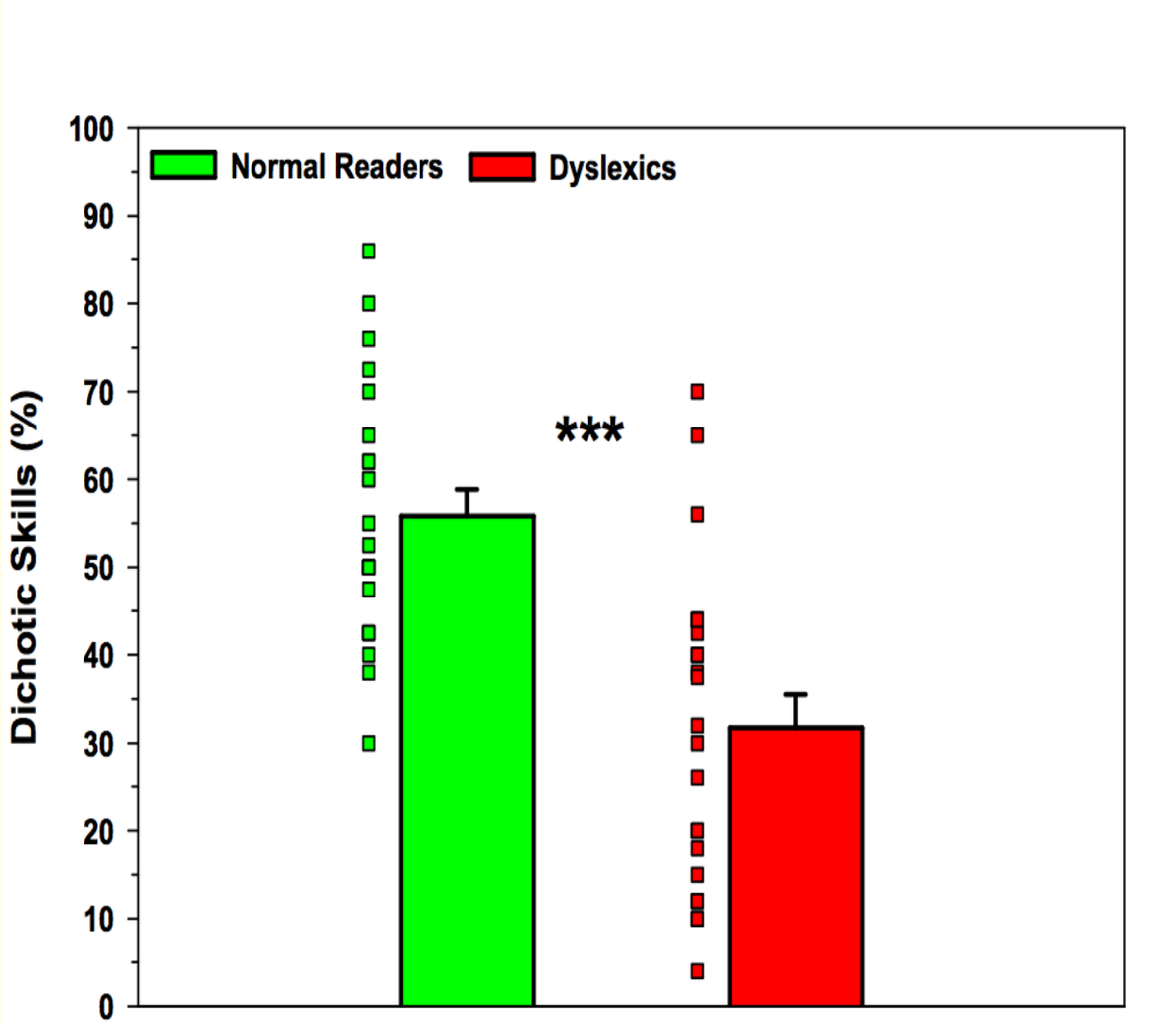
DICHOTIC TEST (2/4)

Schéma
Sparks,Goodglass et Nickel

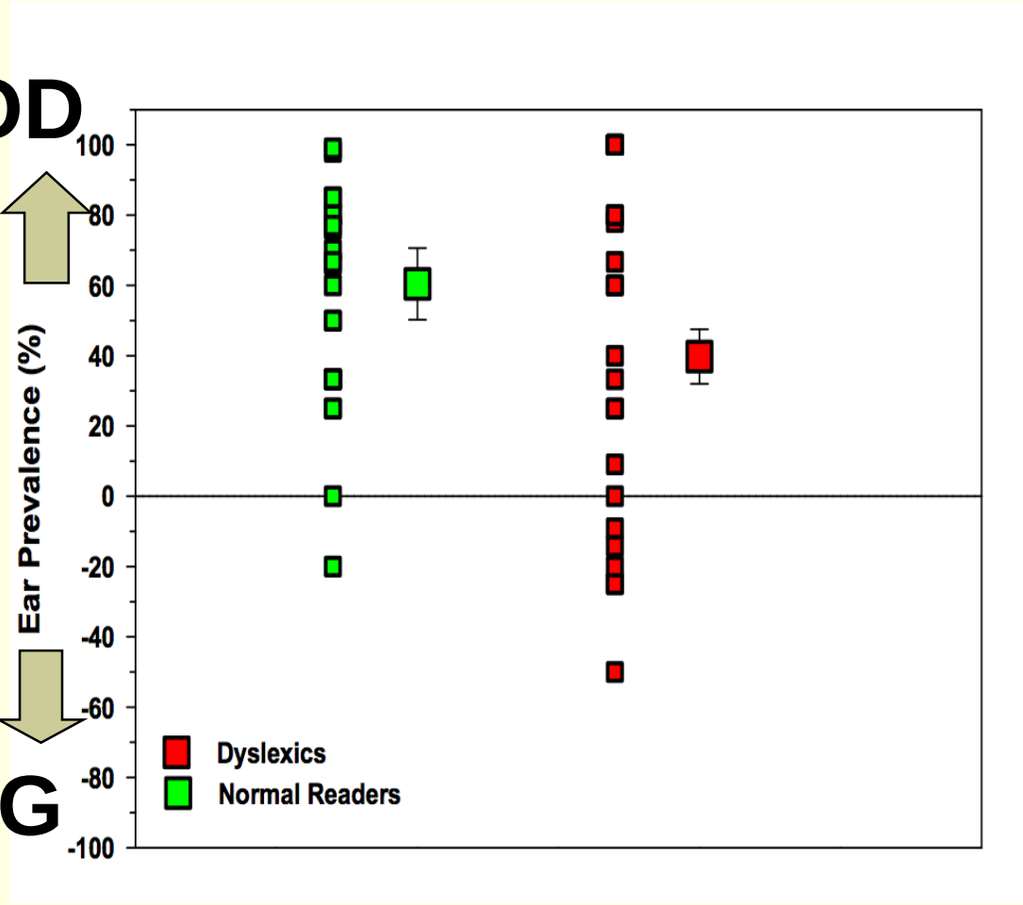


DICHOTIC LISTENING (2/4)

DICHOTIC SKILLS



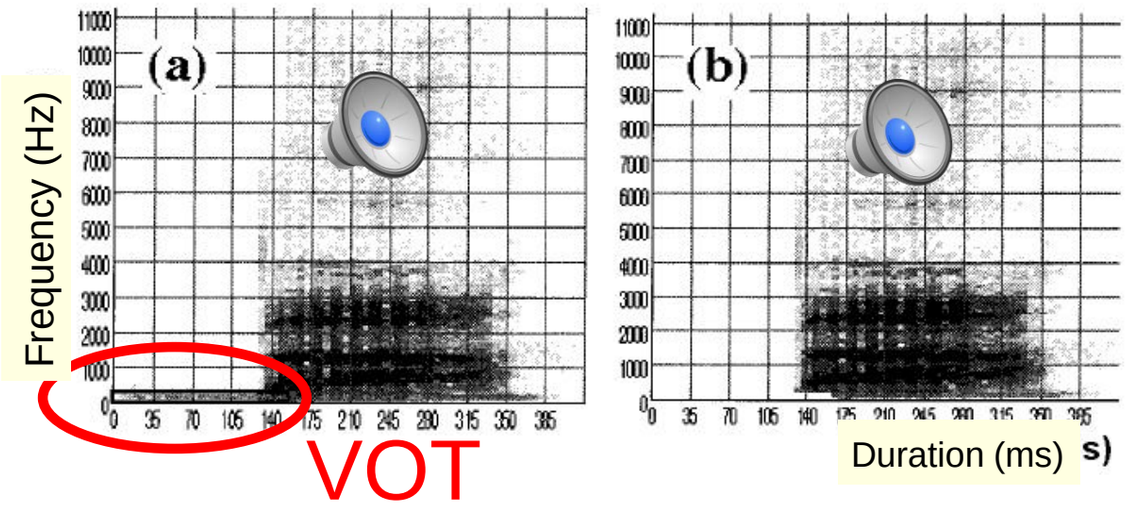
EAR PREVALENCE

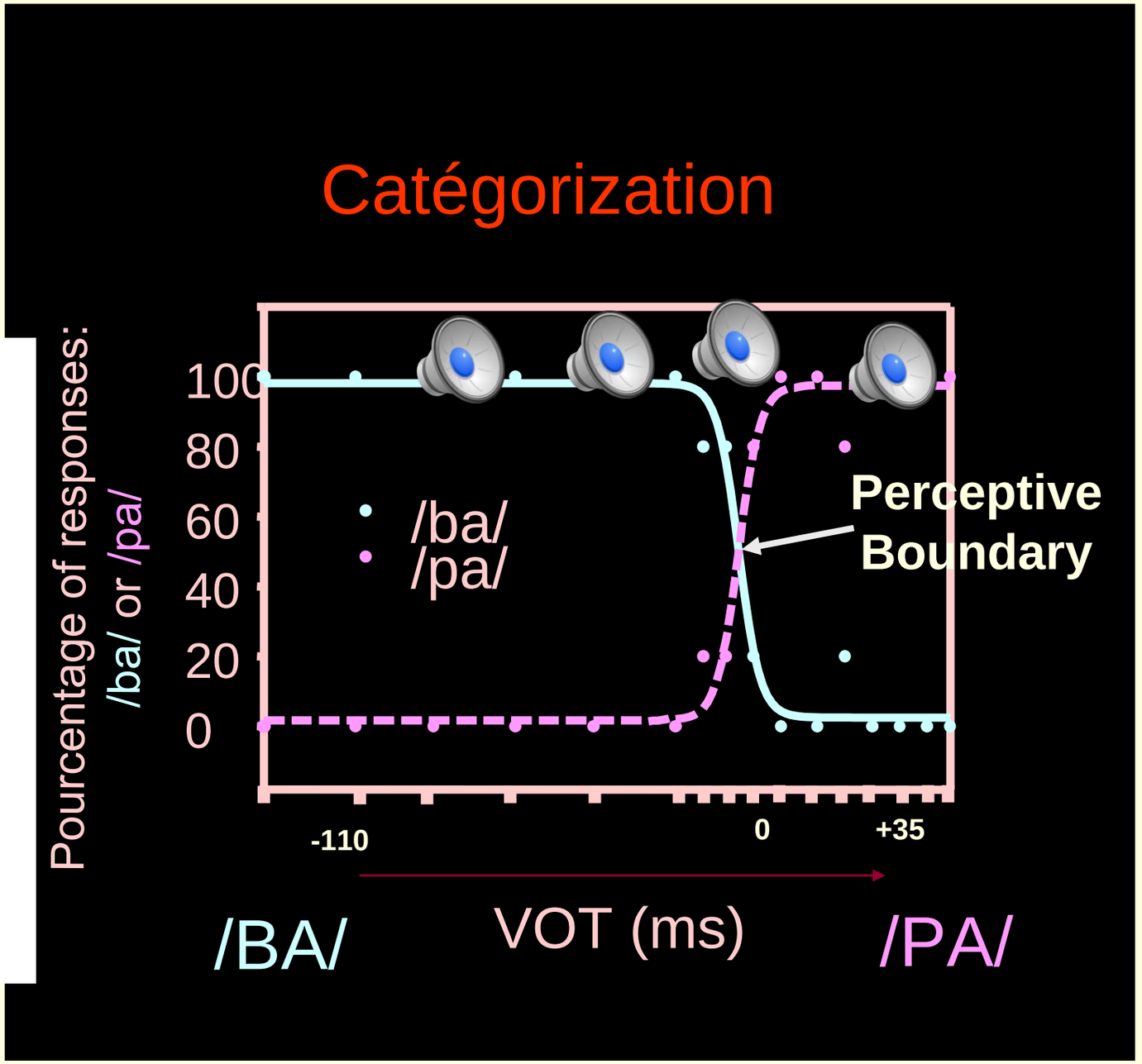


PHONEMIC CATEGORIZATION (3/4)

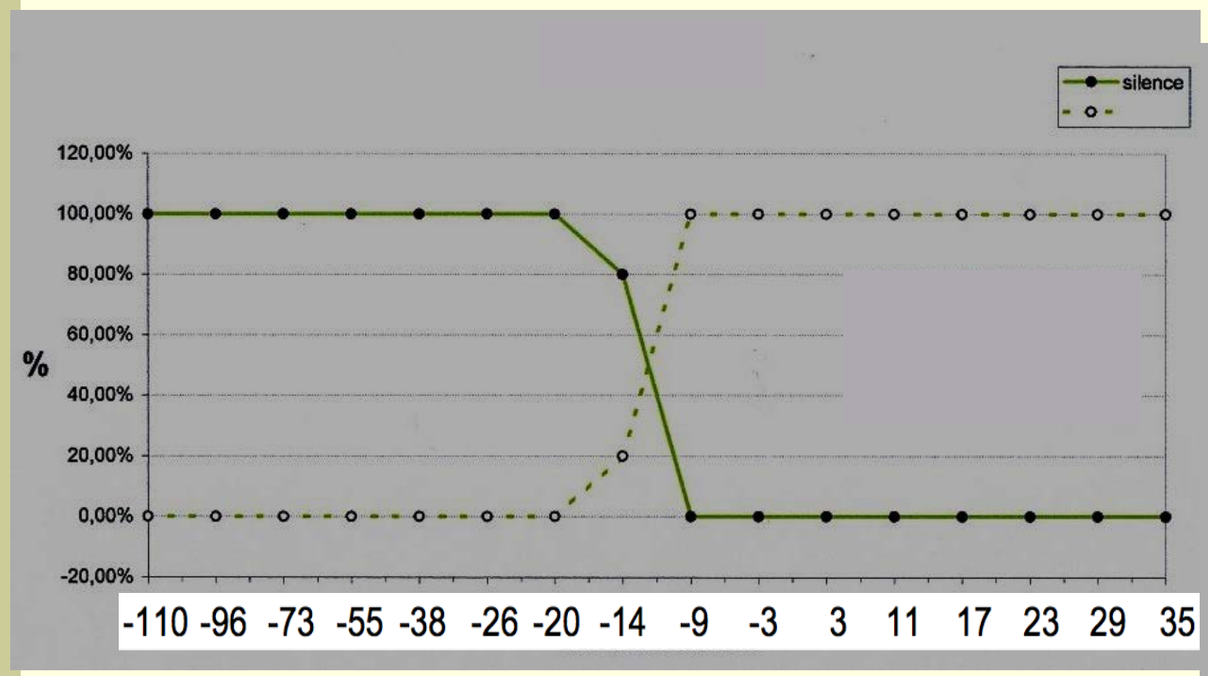
Procédure

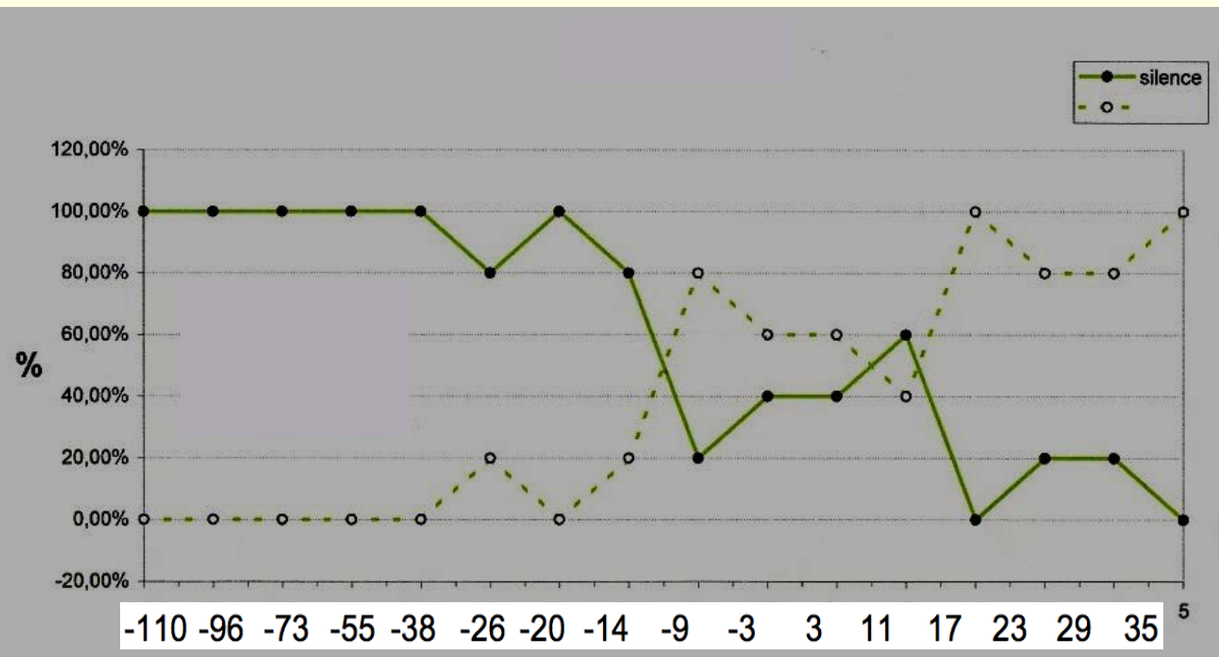
‘ BA ’ ⟶ ‘ PA ’

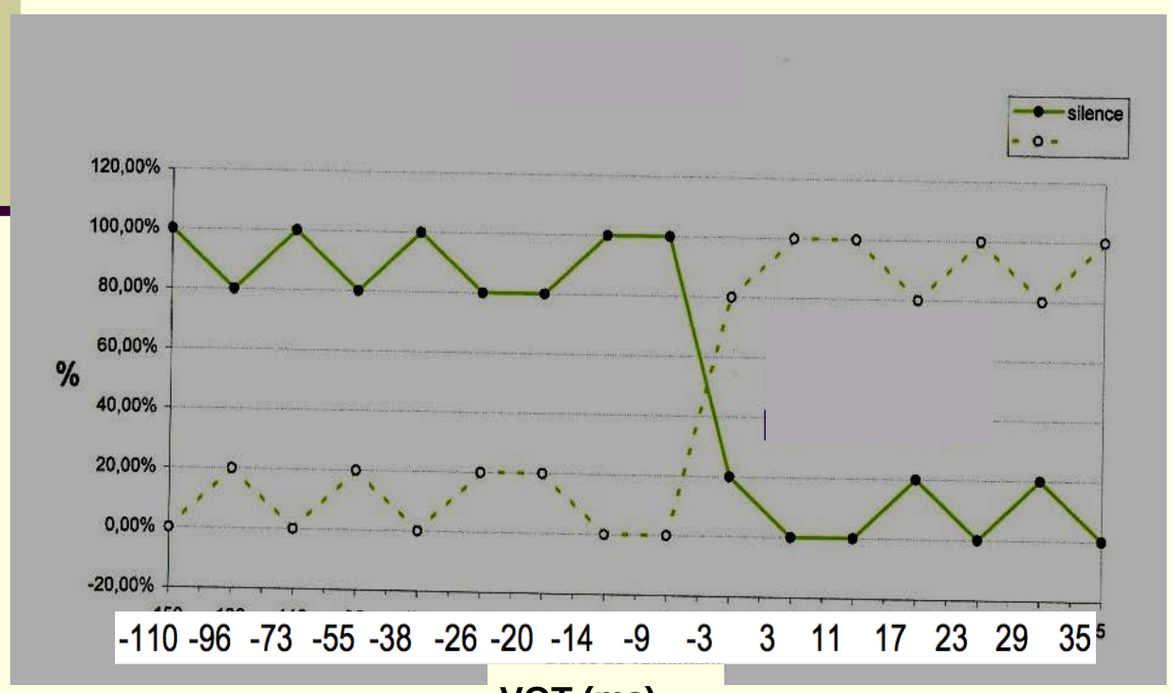


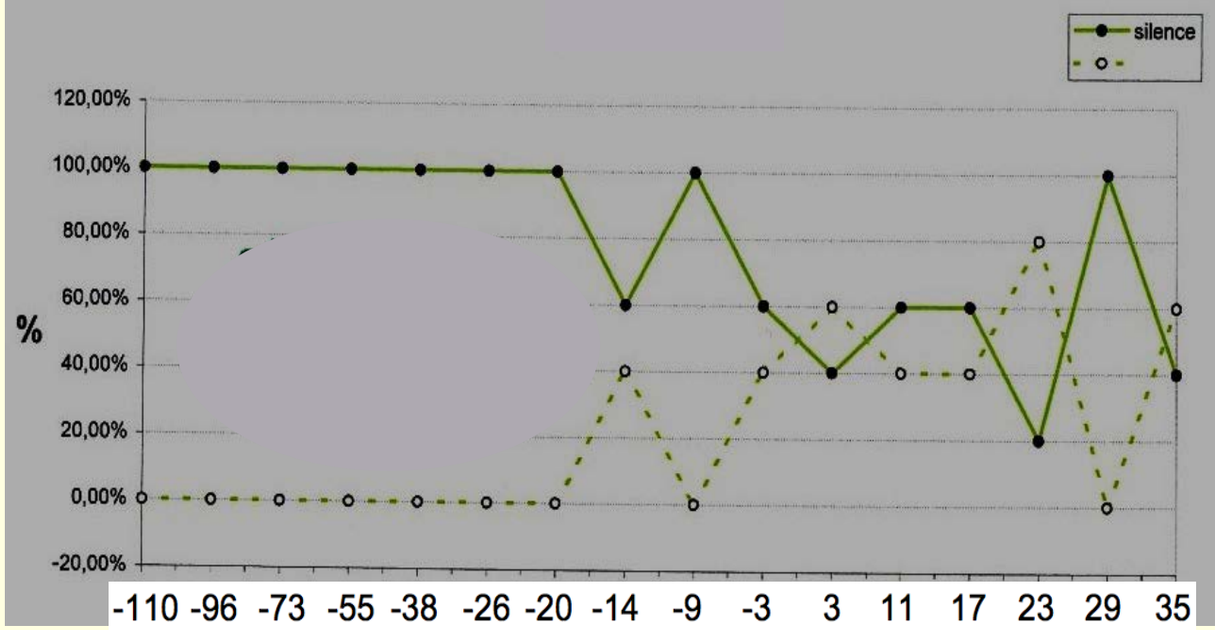


PHONEMIC IDENTIFICATION (3/4)









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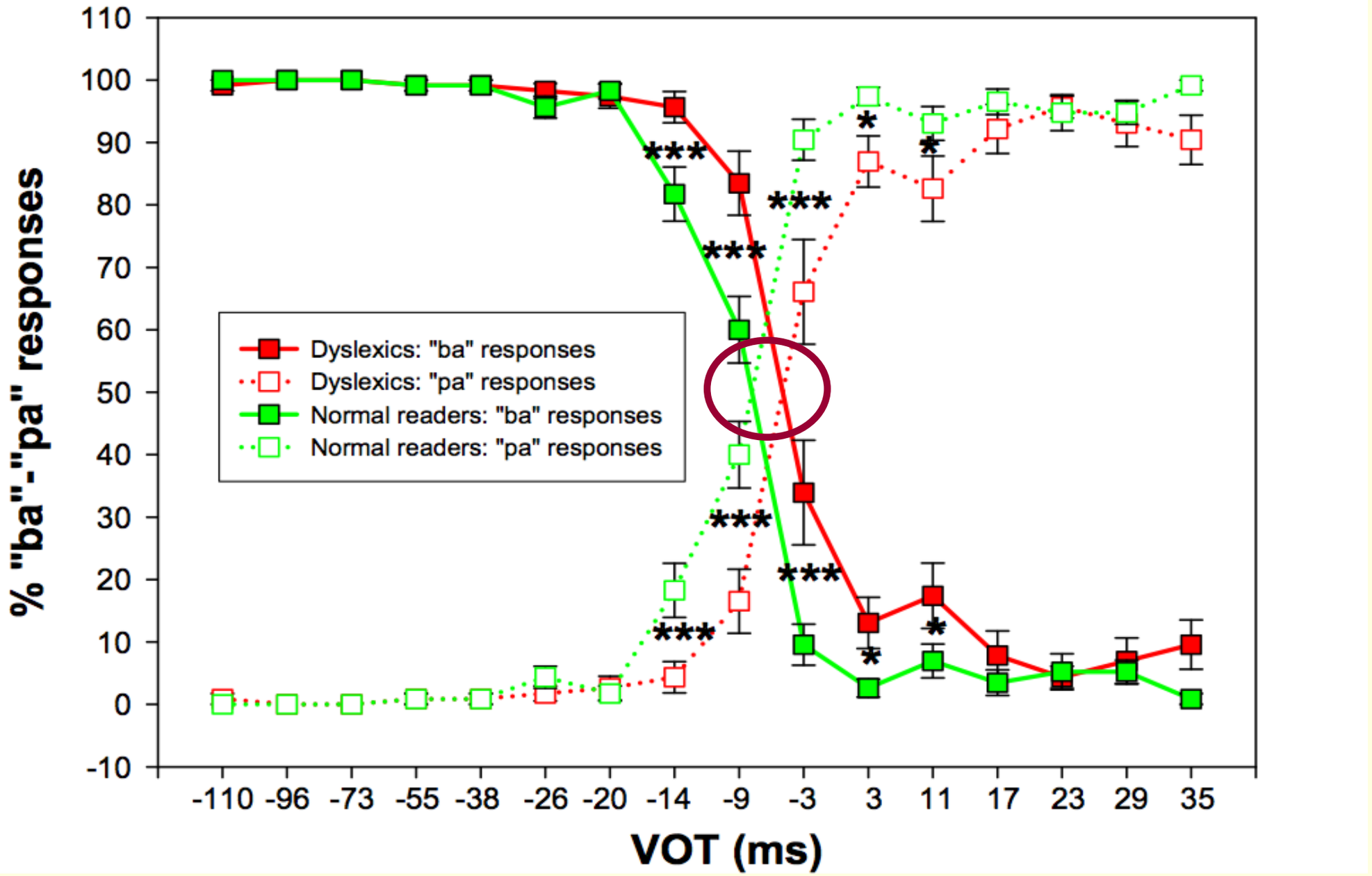

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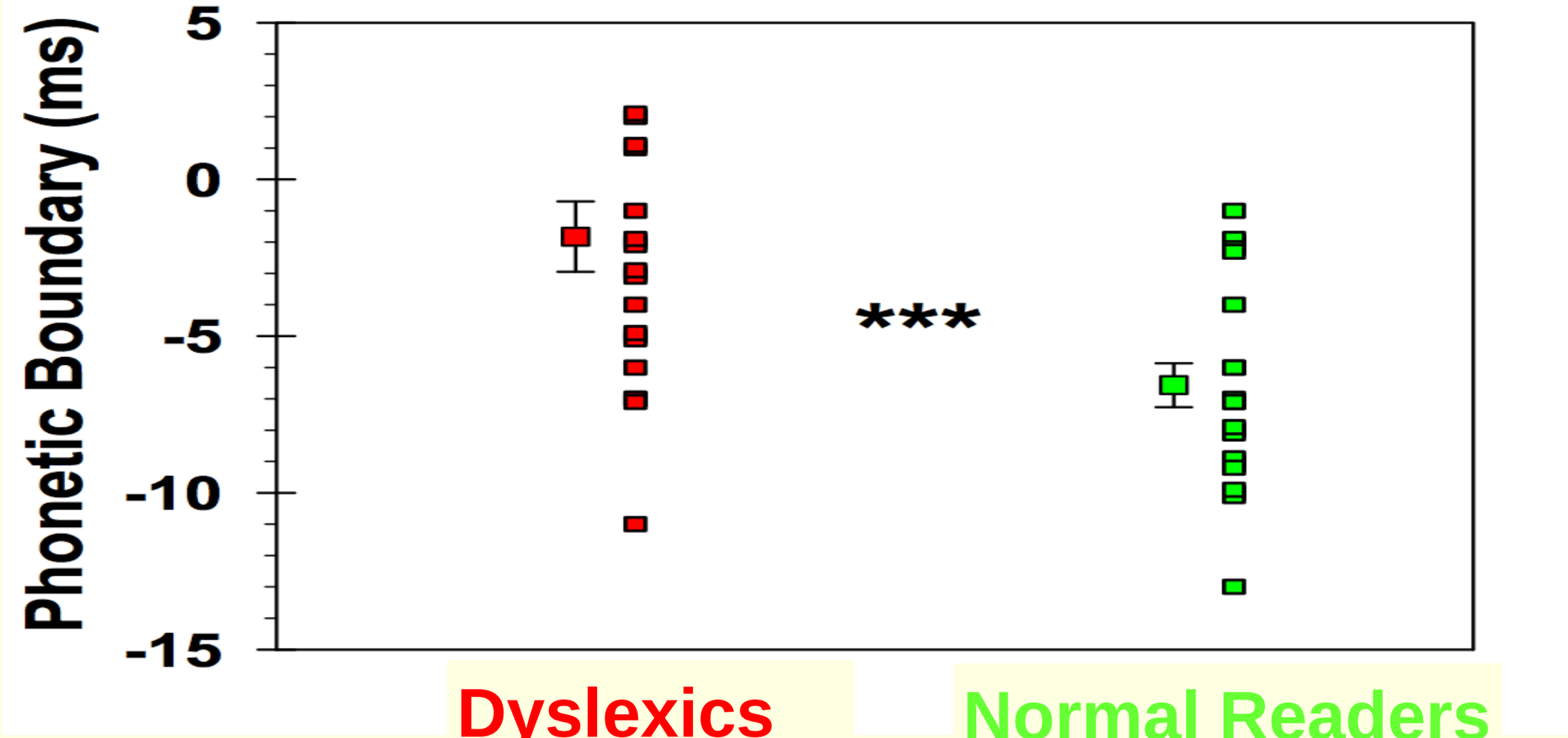
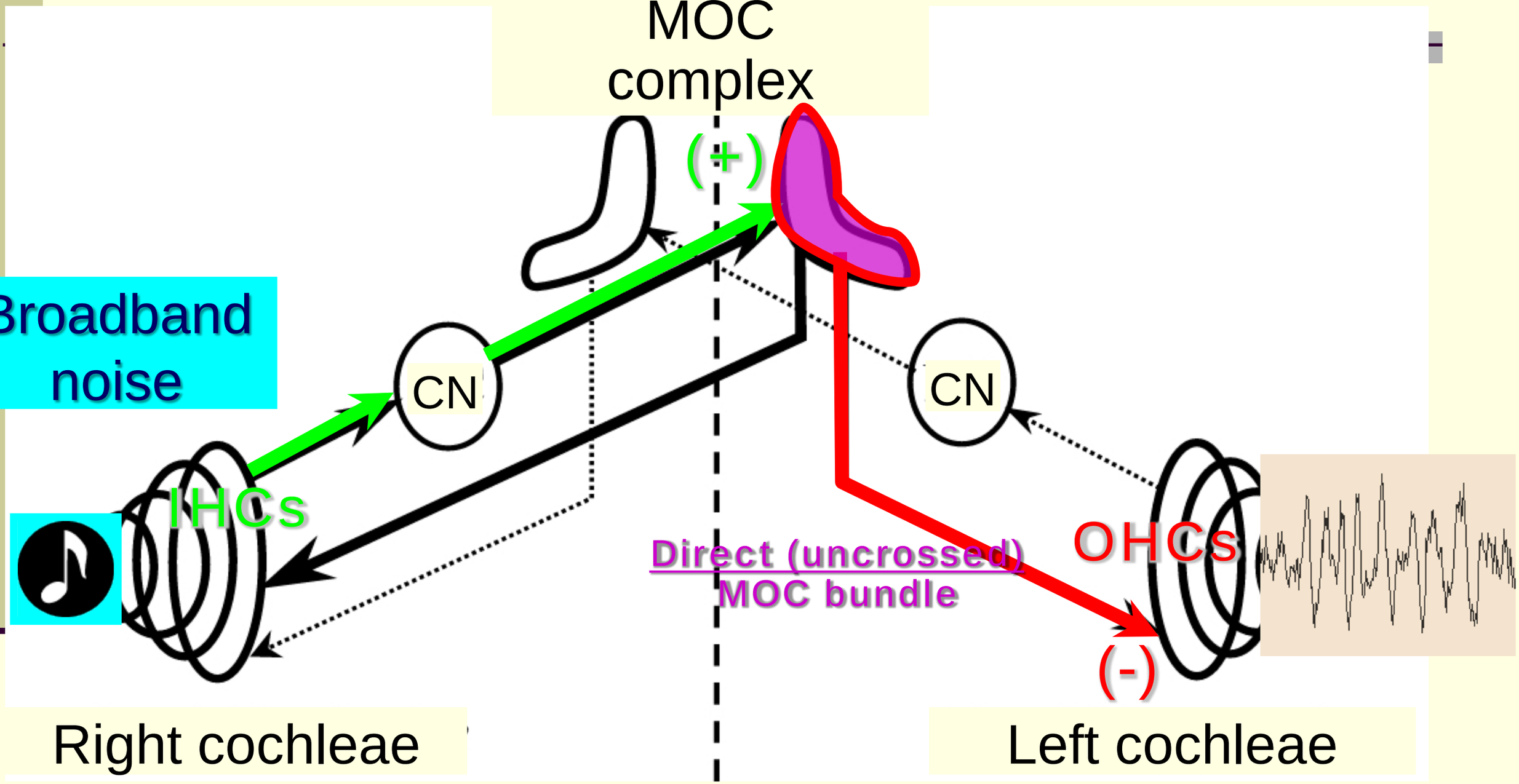
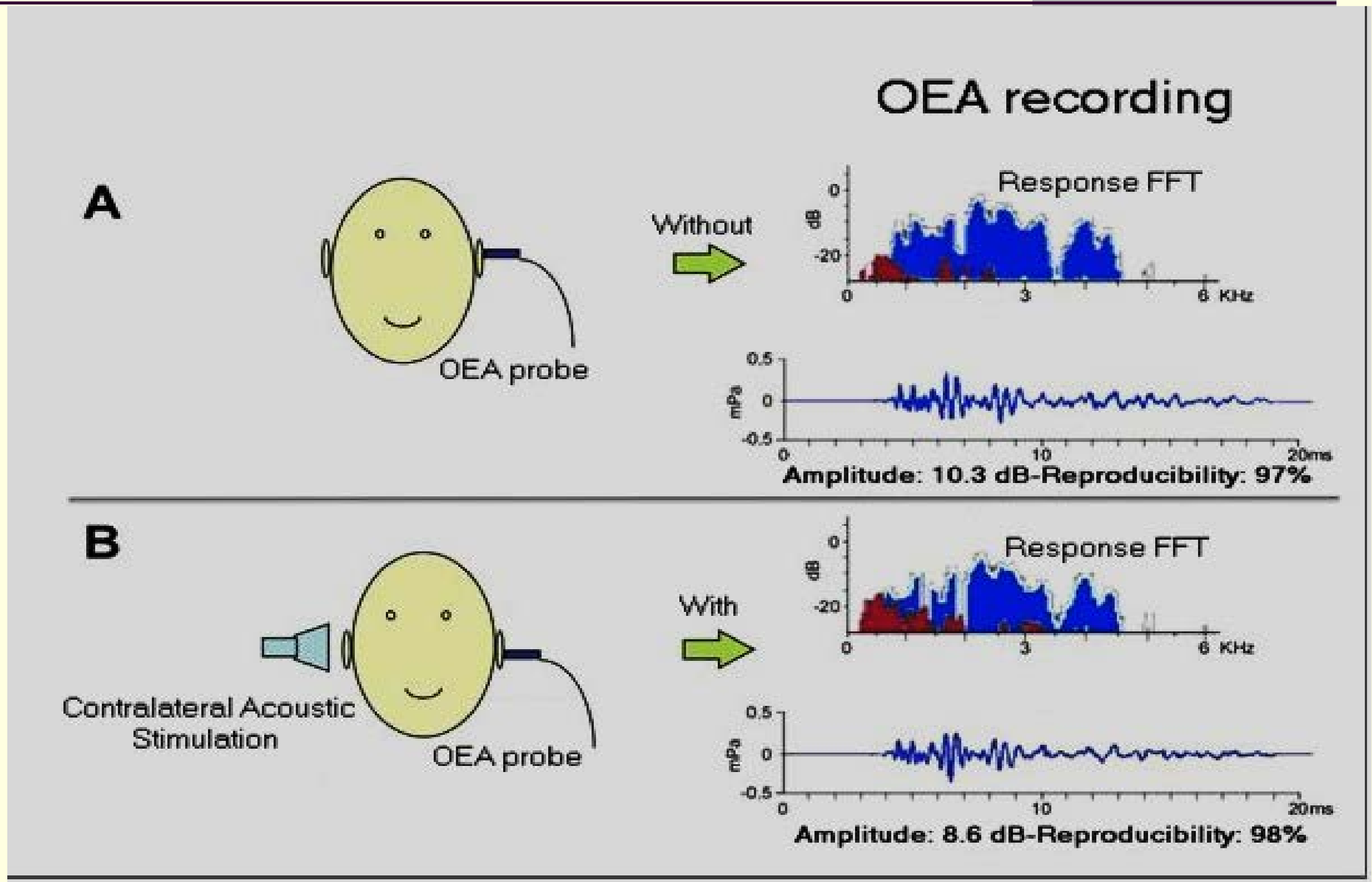


DESCENDING AUDITORY PATHWAY (4/4)



DESCENDING AUDITORY PATHWAY (4/4)



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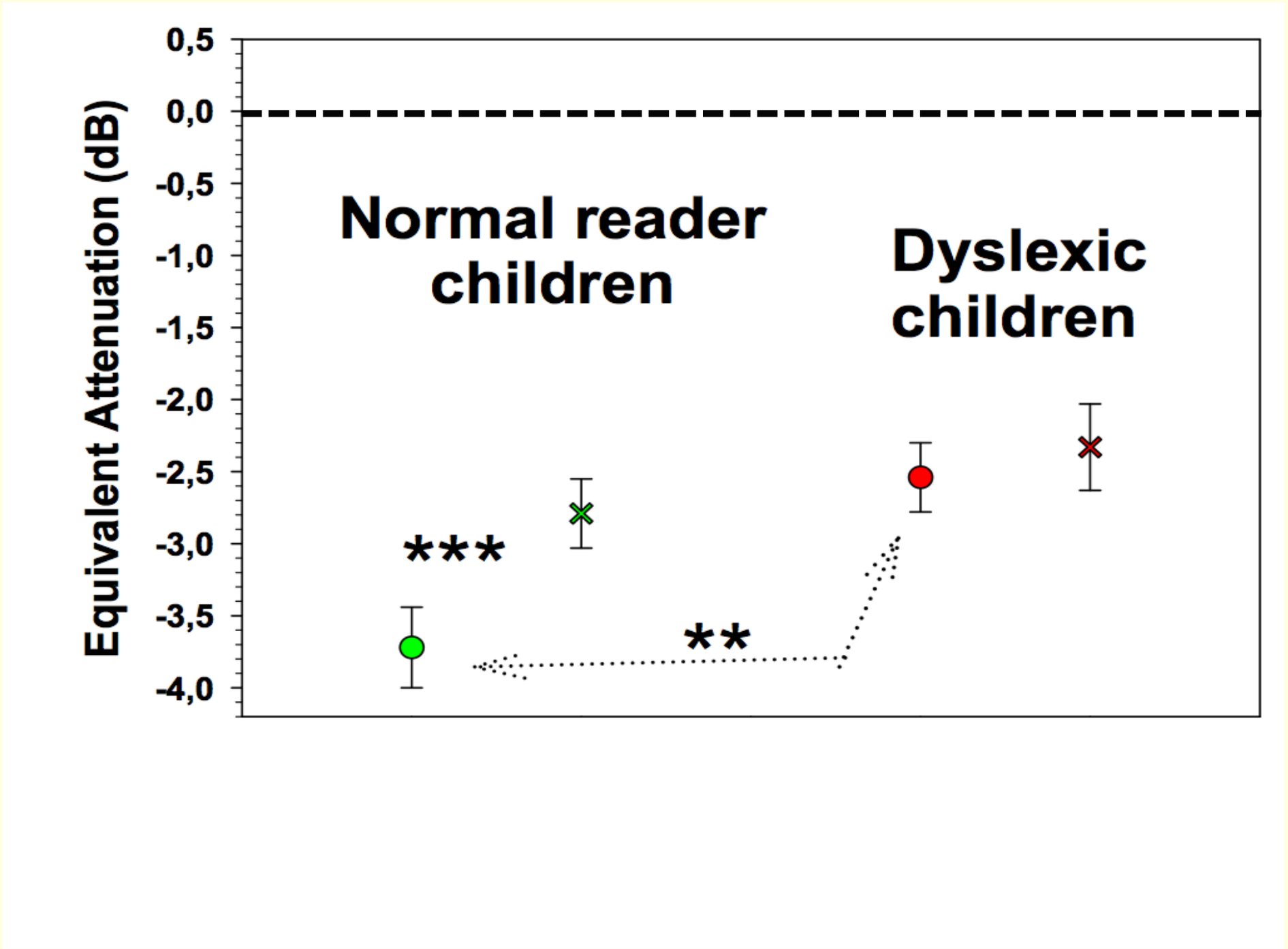

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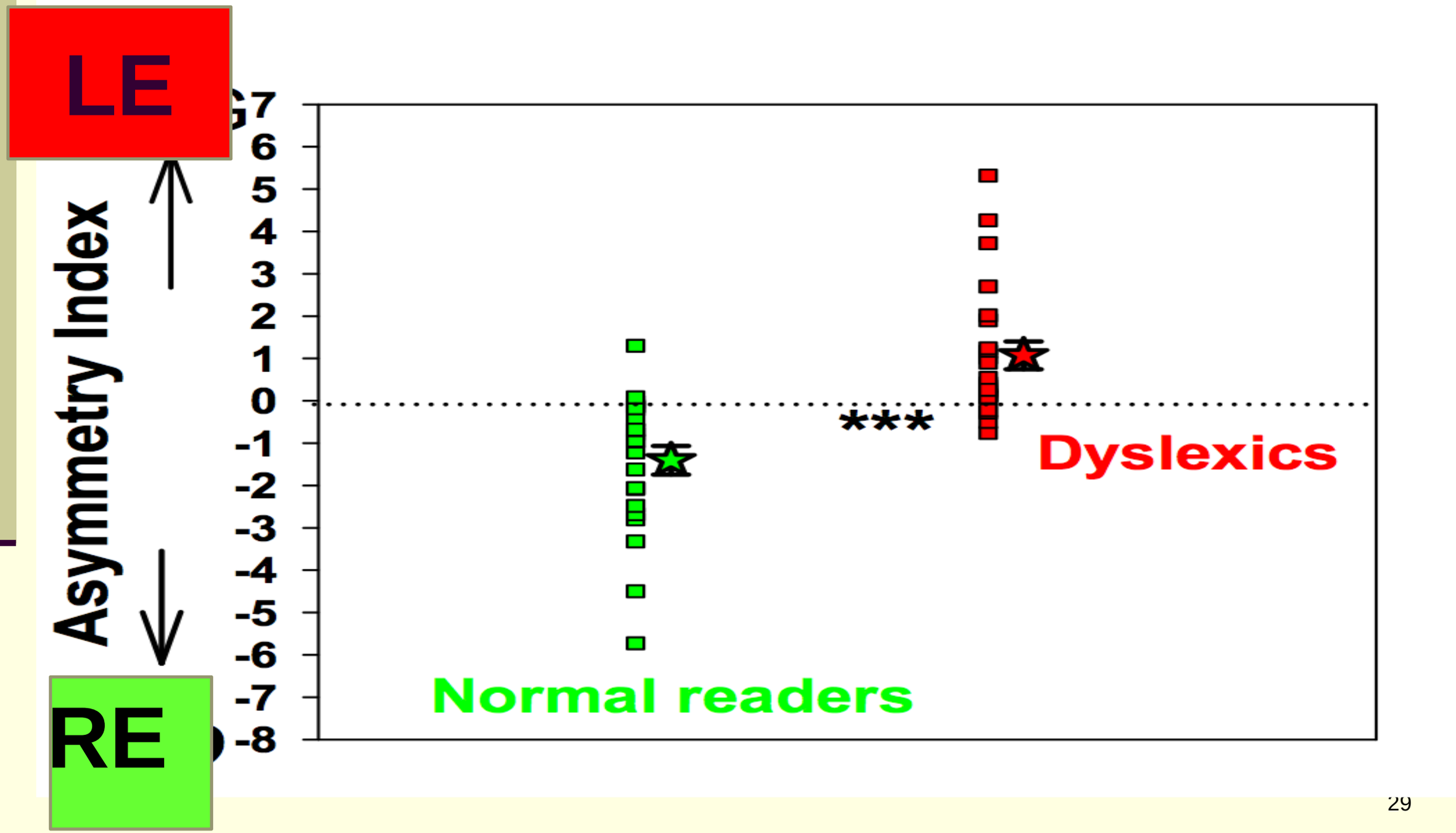

European APD Study Group & EFAS APD Working

To produce specific evidence-based guidelines for APD screening, diagnosis and treatment/management.

To raise awareness of the need to go beyond standard clinical audiological assessment to evaluate hearing.