

Die Entwicklung der Musikalität

Univ.-Prof. Stefan Koelsch

Freie Universität Berlin

Cluster “Languages of Emotion”



32. Schwangerschaftswoche



Of Human Bonding: Newborns Prefer their Mothers' Voices

Anthony J. DeCasper; William P. Fifer

Science, New Series, Volume 208, Issue 4448 (Jun. 6, 1980), 1174-1176.

INFANT BEHAVIOR AND DEVELOPMENT **16**, 495–500 (1993)

BRIEF REPORT

Two-Day-Olds Prefer Their Native Language

CHRISTINE MOON

Pacific Lutheran University

ROBIN PANNETON COOPER

Virginia Polytechnic Institute and State University

WILLIAM P. FIFER




Columbia University

Functional specializations for music processing in the human newborn brain

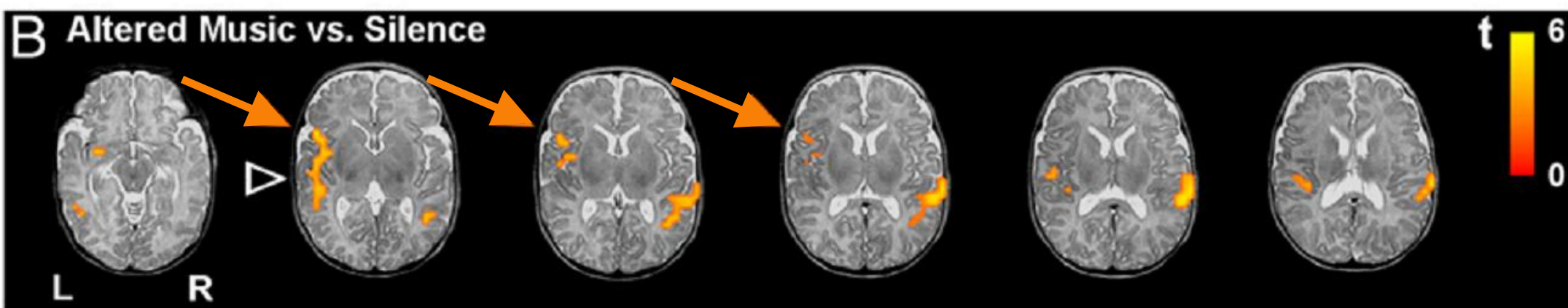
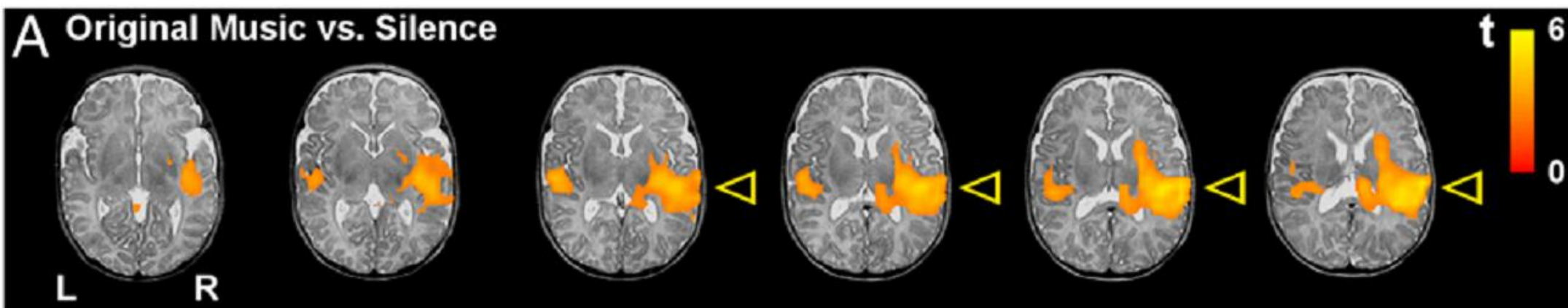
Daniela Perani^{a,b,c,d,1,2}, Maria Cristina Saccuman^{a,b,1}, Paola Scifo^{b,c,d}, Danilo Spada^e, Guido Andreolli^a, Rosanna Rovelli^f, Cristina Baldoli^{c,g}, and Stefan Koelsch^{h,i}

4758–4763 | PNAS | March 9, 2010 | vol. 107 | no. 10

www.pnas.org/cgi/doi/10.1073/pnas.0909074107

-  Original
-  Dissonant
-  Key changes

Newborns



INFANT BEHAVIOR AND DEVELOPMENT **16**, 193–211 (1993)

Adults Identify Infant-Directed Music Across Cultures

SANDRA E. TREHUB, ANNA M. UNYK,
AND LAUREL J. TRAINOR
University of Toronto

*Maternal singing modulates
infant arousal*

Psychology of Music

Psychology of Music

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Society for Education,

Music and Psychology

Research

vol 31(4): 365–375

[0305-7356 (200310)

31:4: 365–375; 035783]

TALI SHENFIELD, SANDRA E. TREHUB
AND TAKAYUKI NAKATA
UNIVERSITY OF TORONTO

Rhythmic engagement with music in infancy

Marcel Zentner^{a,1} and Tuomas Eerola^b

^aDepartment of Psychology, University of York, York YO10 5DD, United Kingdom; and ^bFinnish Centre of Excellence in Interdisciplinary Music Research, University of Jyväskylä, Jyväskylä 40014, Finland

5768–5773 | PNAS | March 30, 2010 | vol. 107 | no. 13

www.pnas.org/cgi/doi/10.1073/pnas.1000121107



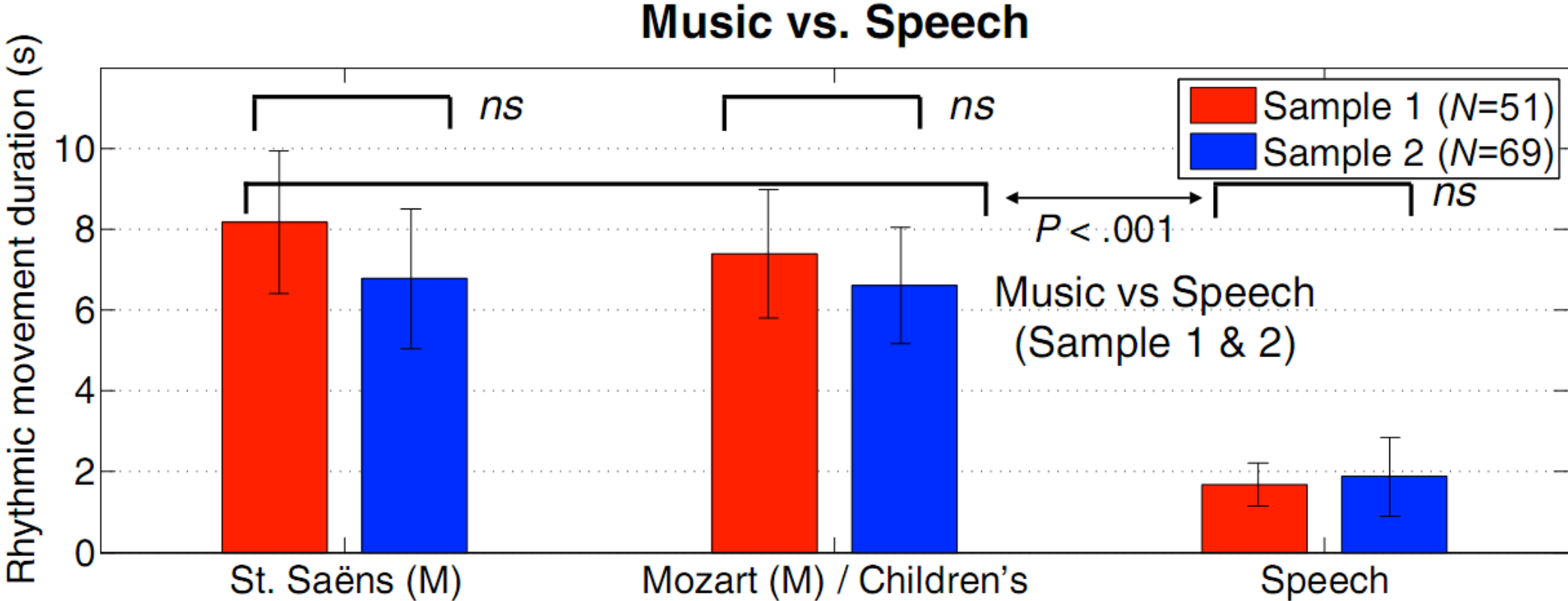
Rhythmic engagement with music in infancy

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^aDepartment of Psychology, University of York, York YO10 5DD, United Kingdom; and ^bFinnish Centre of Excellence in Interdisciplinary Music Research, University of Jyväskylä, Jyväskylä 40014, Finland

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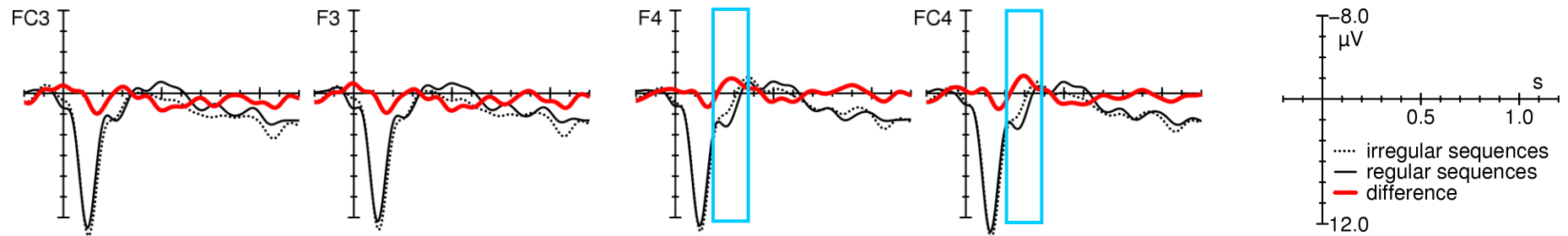


Musik / Sprache

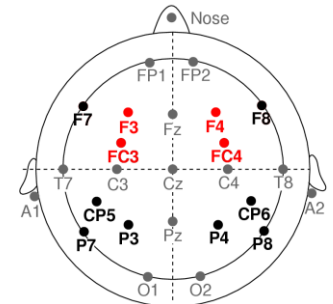
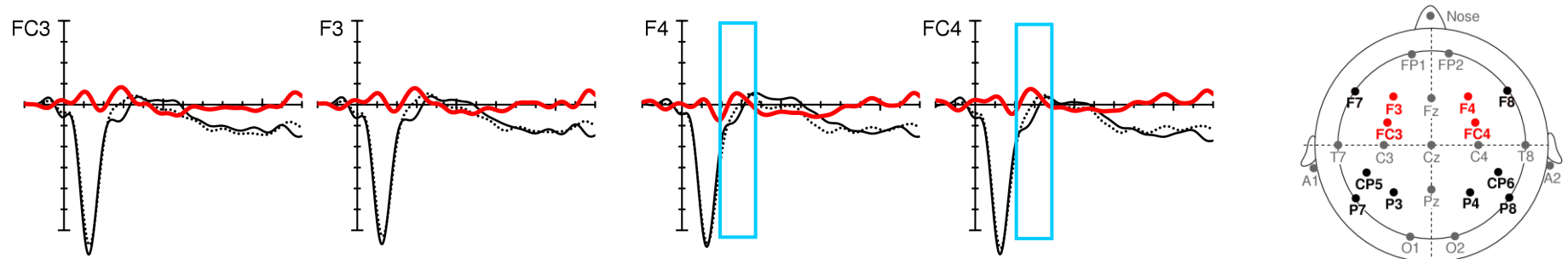


Music Experiment: 2½-Year-Olds

Experiment I (more salient musical syntax violation):

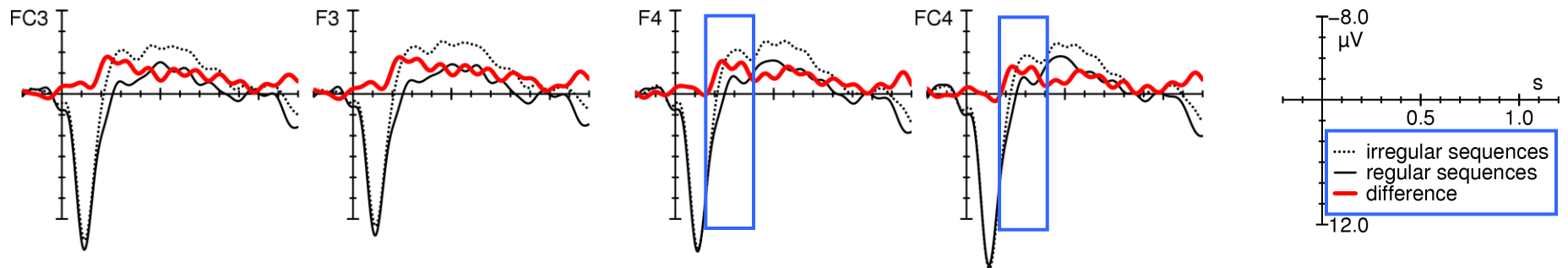


Experiment II (less salient musical syntax violation):

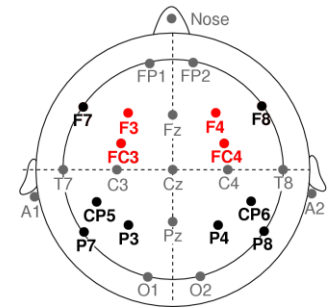
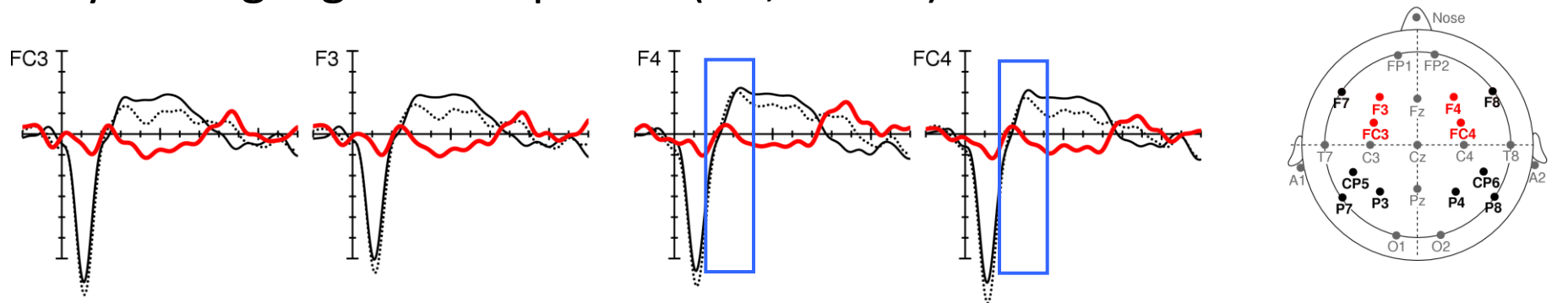


Music Experiment: five-year-olds

Typical language development:

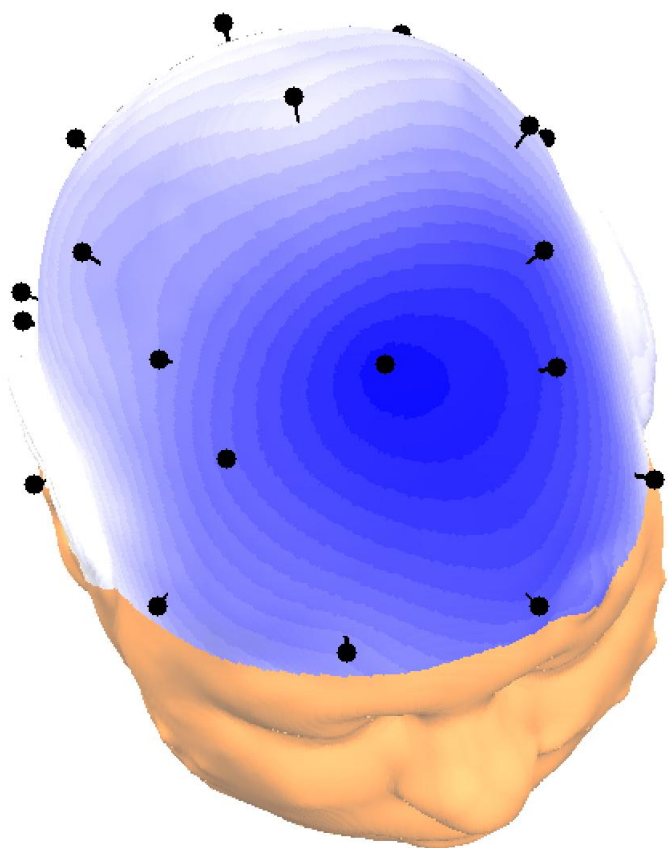


Delayed language development (SLI, $n = 15$):

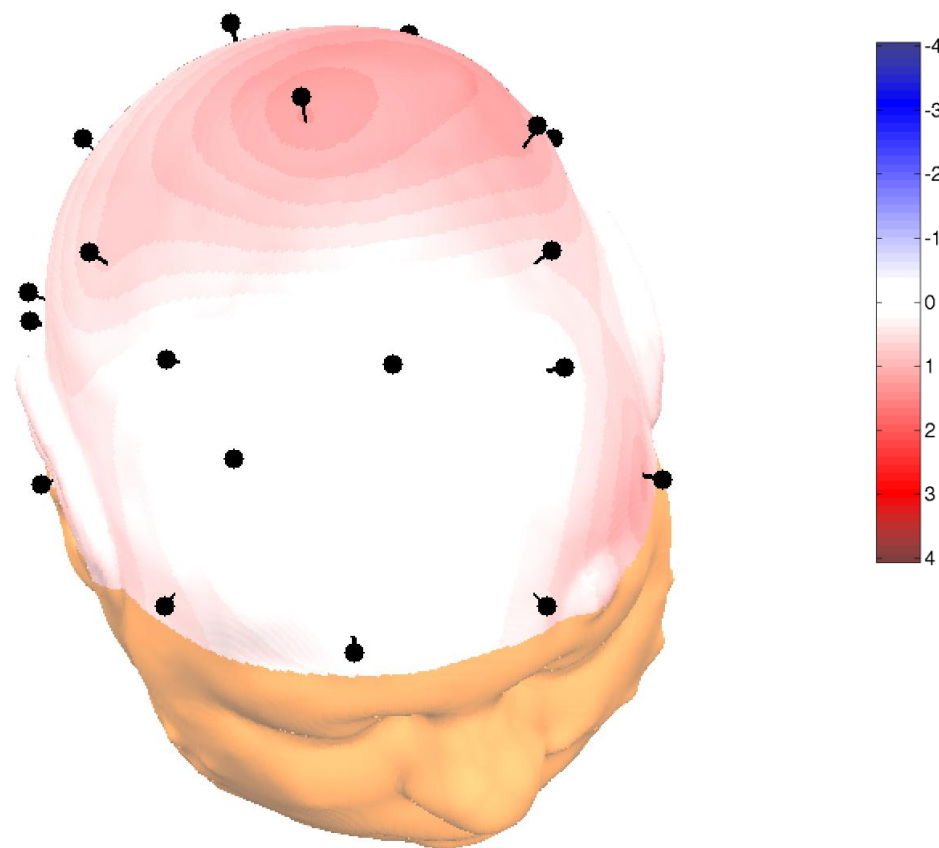


Music Experiment: five-year-olds

Typical lang. development



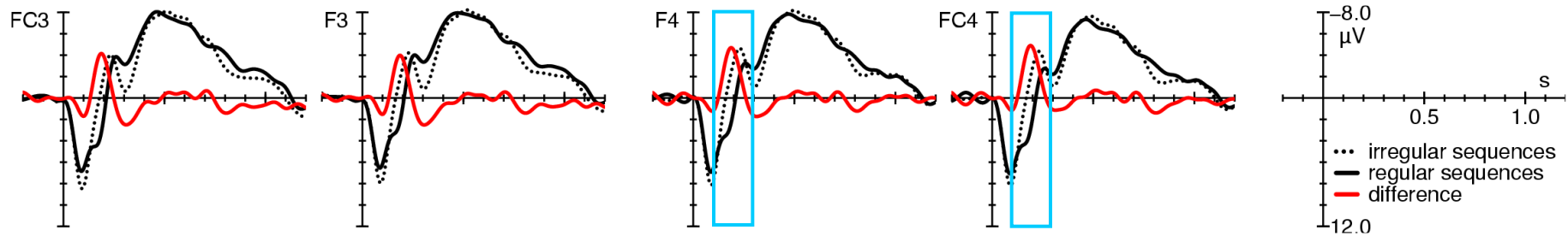
Delayed lang. development



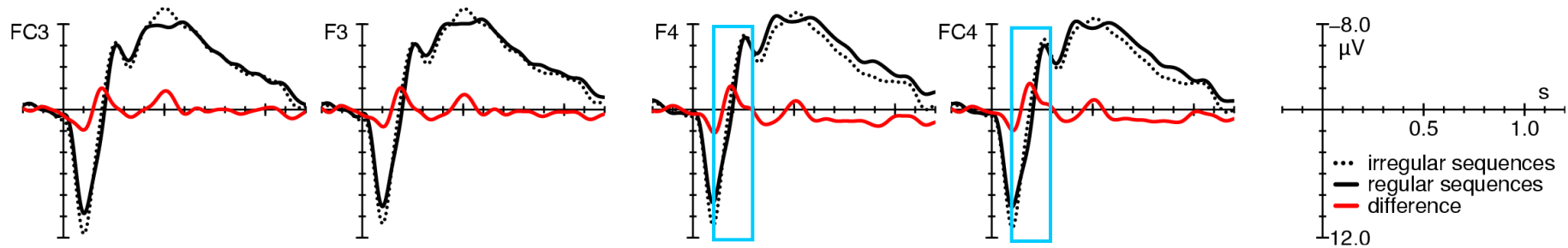
Music Experiment: 11-year-olds



Musical training

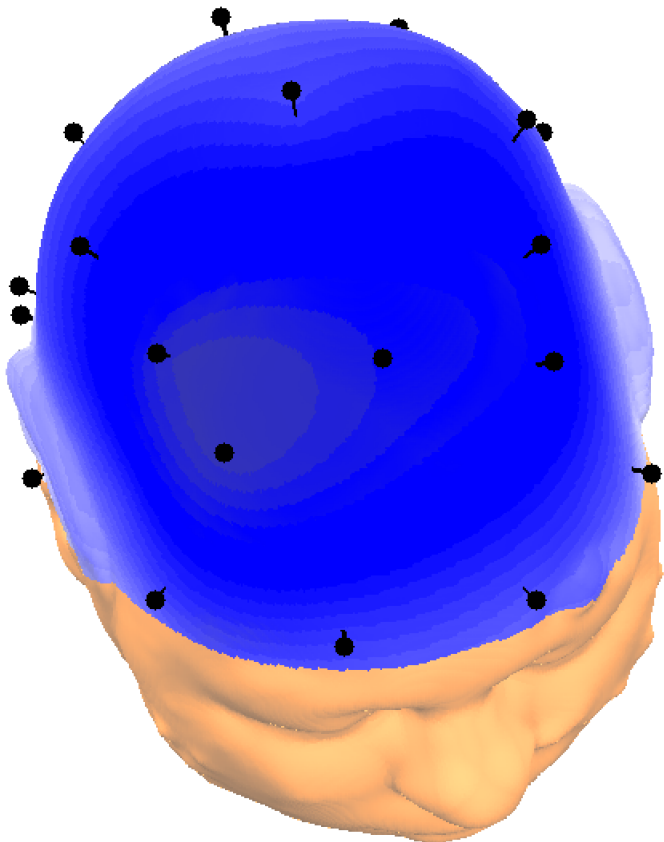


No musical training

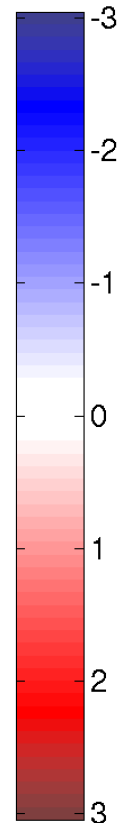
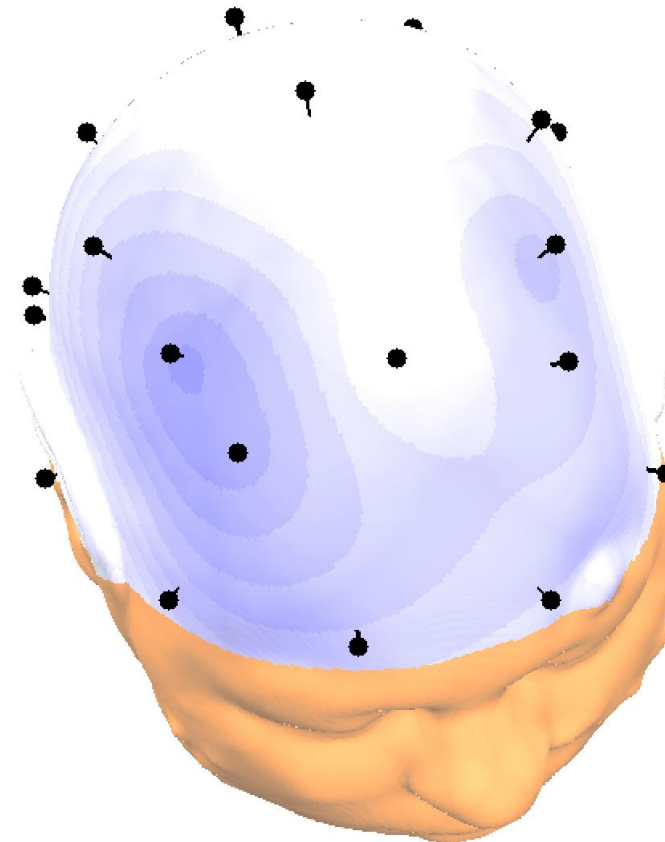


Music Experiment: 11-year-olds

Musical training



No musical training



Language experiment: Stimuli

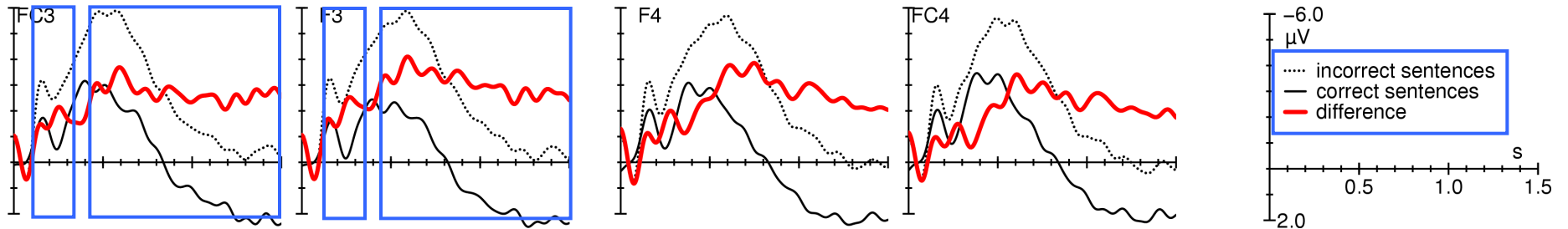
<u>correct:</u>	Die Tante	wurde		geärgert.
	<i>(The aunt was angered.)</i>			
incorrect:	Die Mutter	wurde	im	geärgert.
.....	<i>(The mother was angered in.)</i>			
filler:	Der Onkel	wurde	im Bett	geärgert.
	<i>(The uncle was angered in the bed.)</i>			
	<i>noun phrase</i>	<i>auxilliary</i>	<i>prep. noun</i>	<i>participle</i>



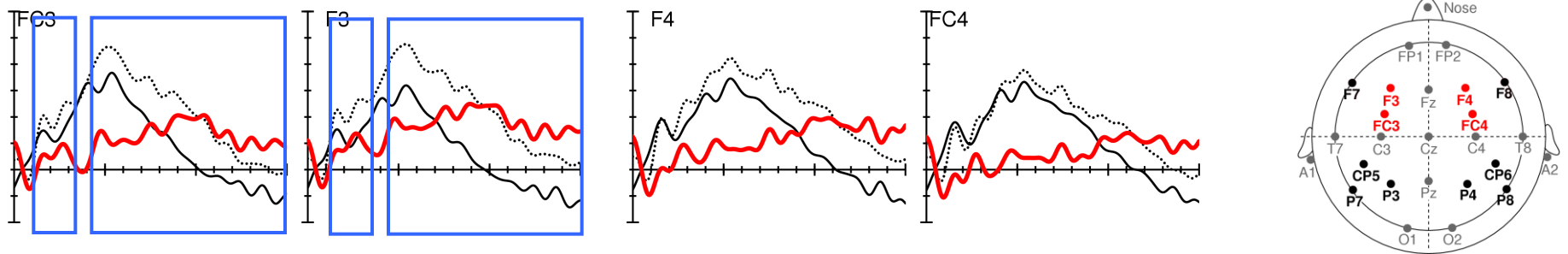
Sentences, in which the timbre of the speaker changes (from female to male), these sentences were task relevant

Language Experiment: 11-year-olds

Musical training

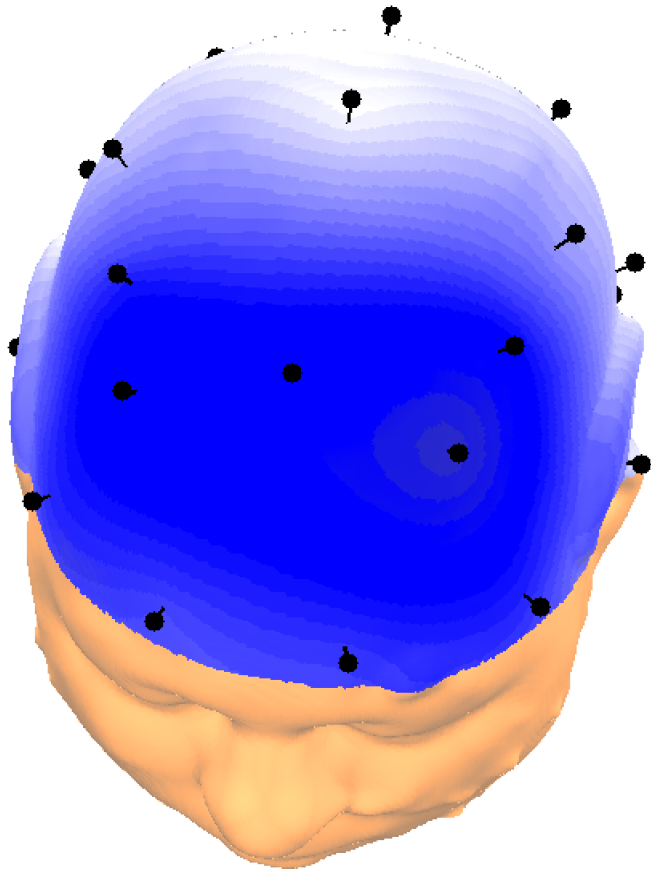


No musical training

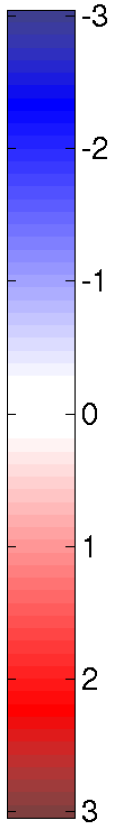
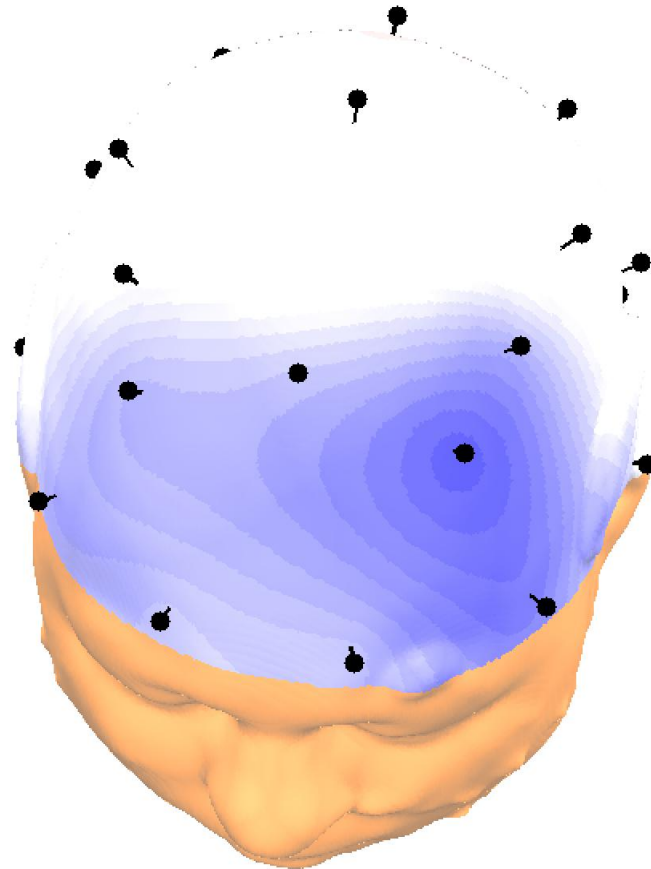


Language Experiment: 11-year-olds

Musical training

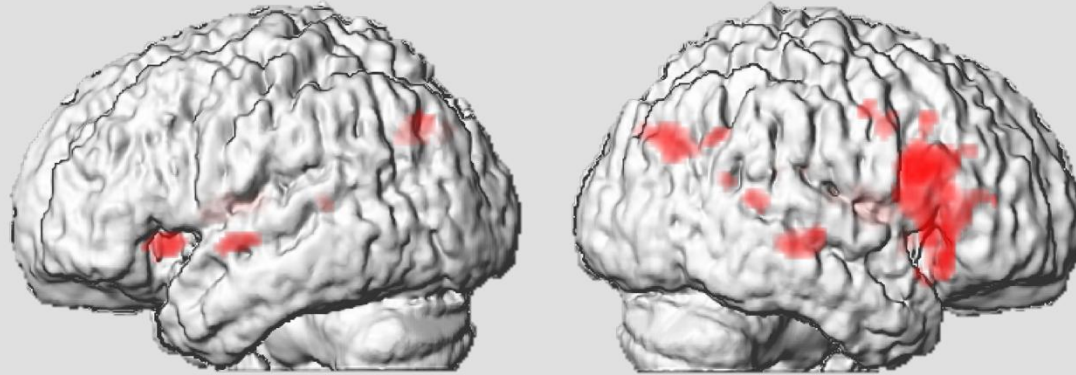


No musical training

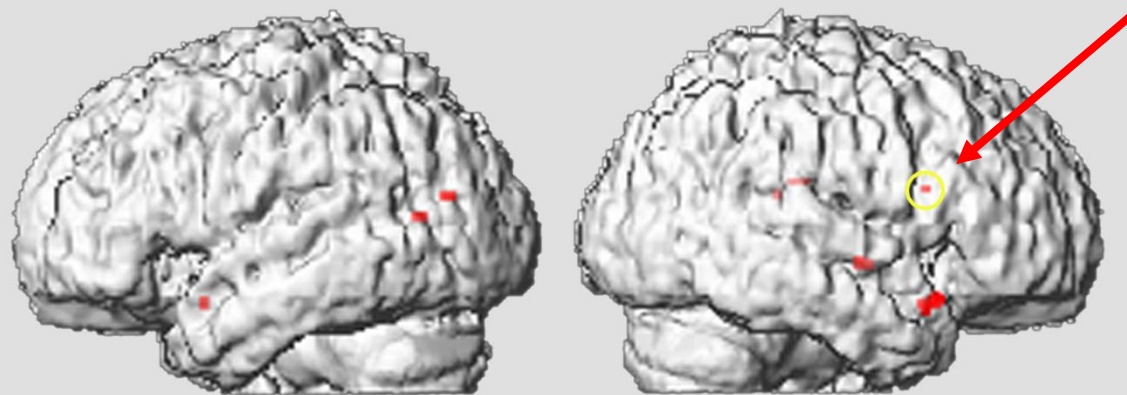


10-year-olds: Effects of musical training

A Children (n = 10)



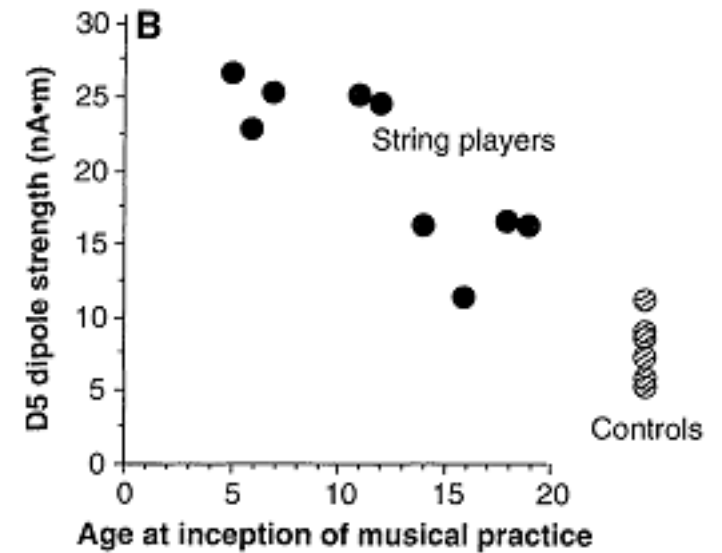
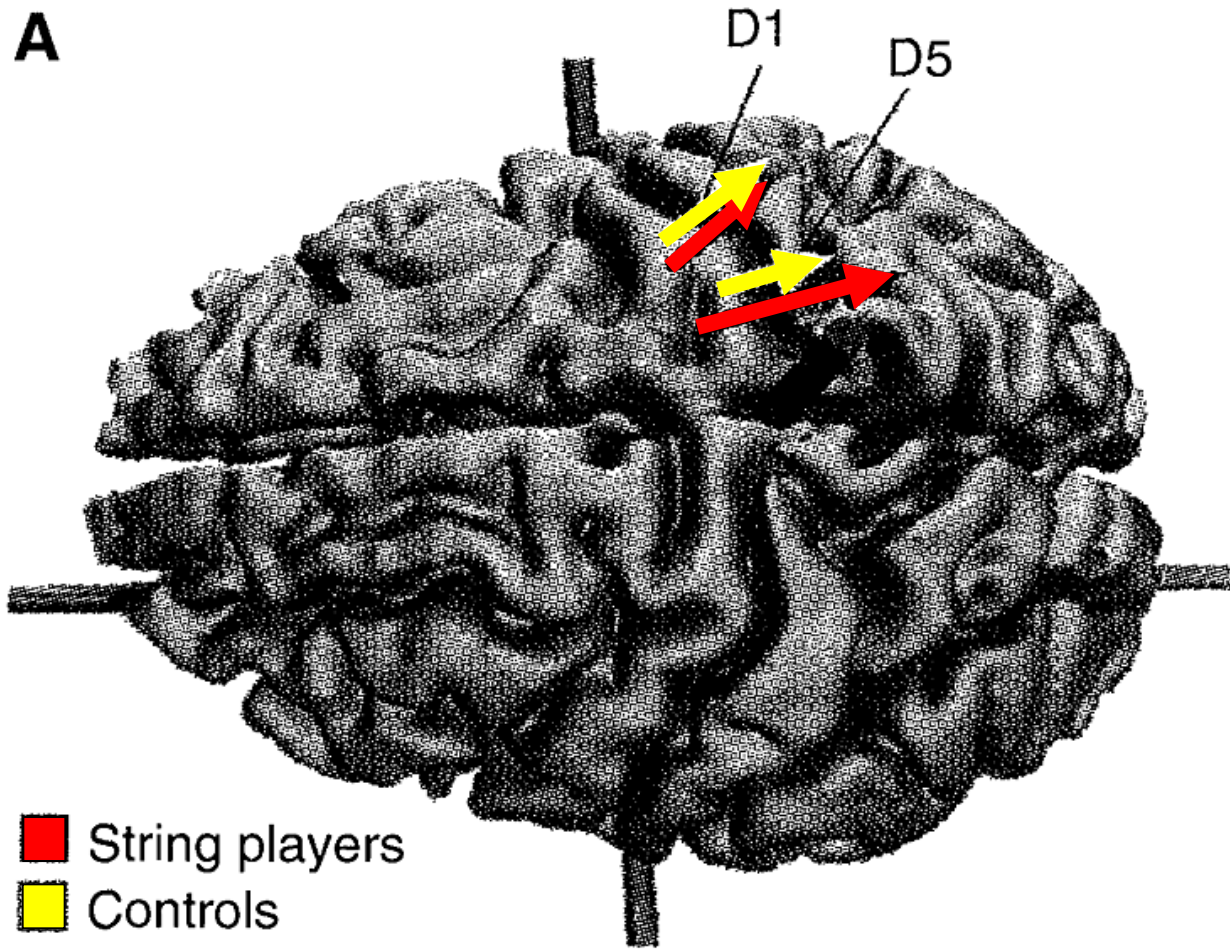
B Effects of musical training



FDR ($p < .05$)

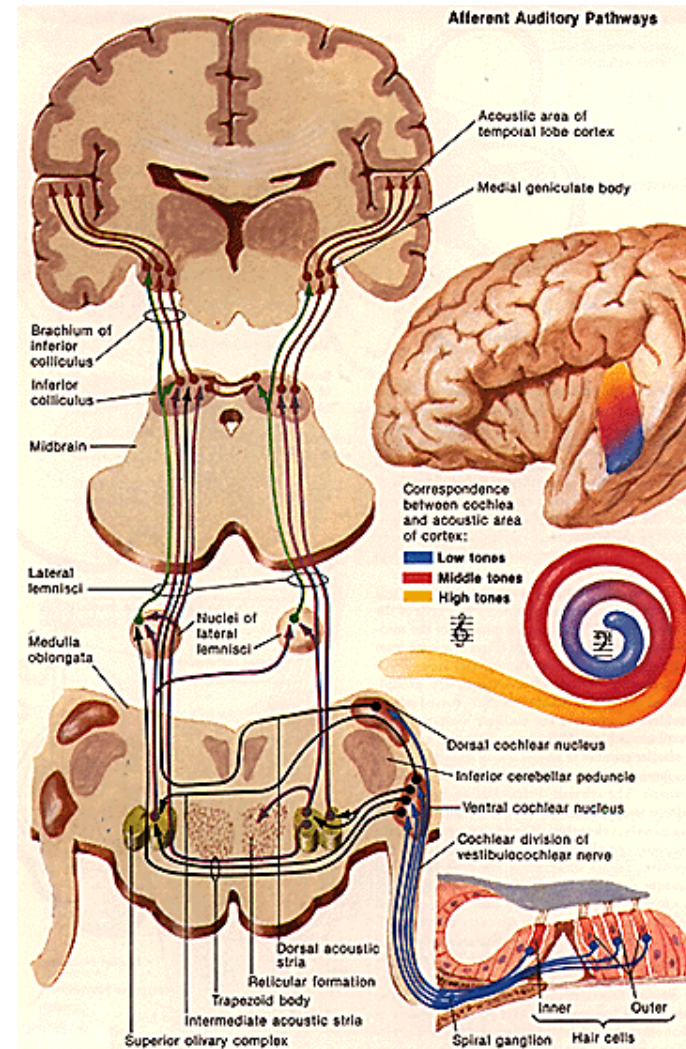
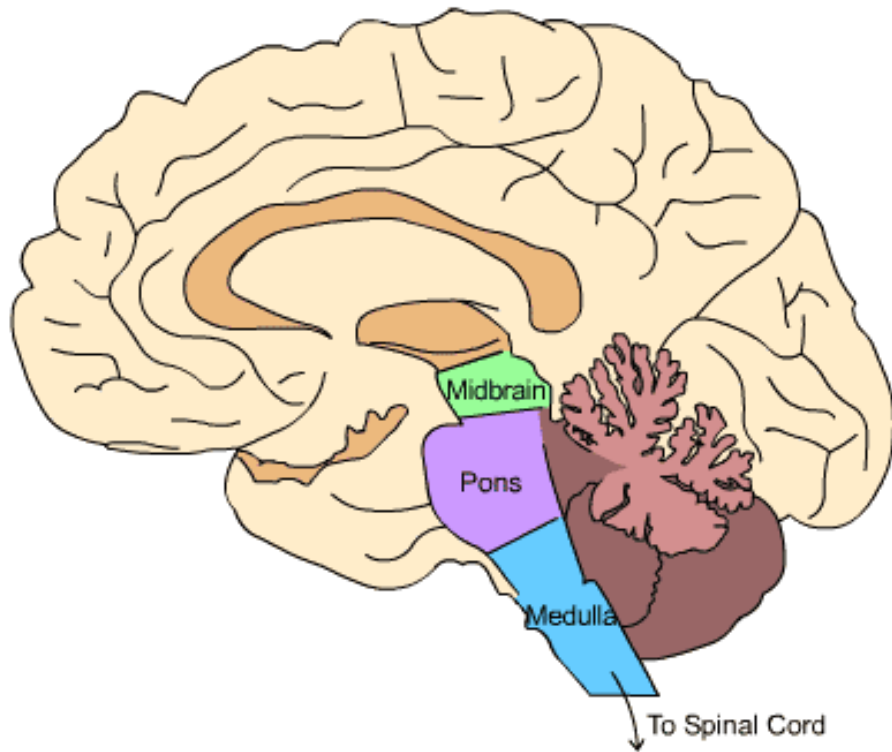
Koelsch et al.,
NeuroImage, 2005

Functional & Structural Plasticity



Brainstem

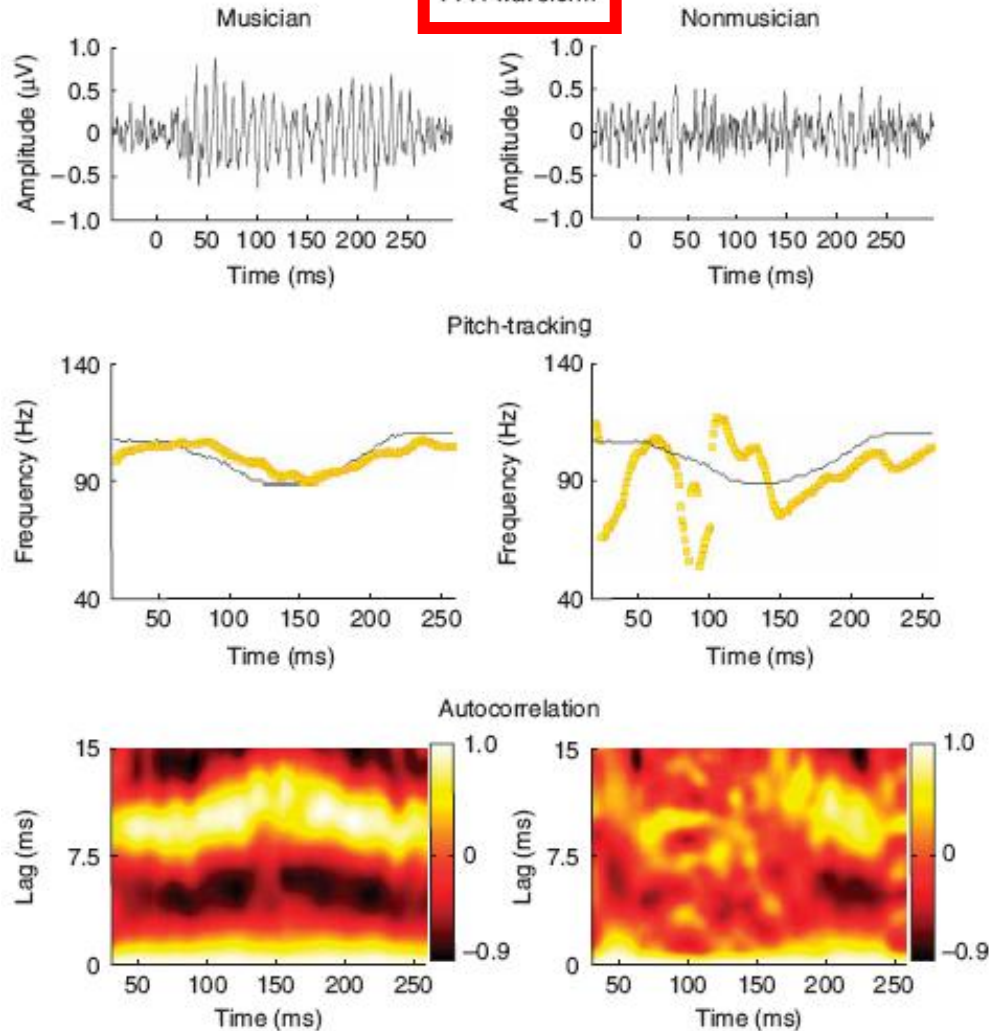
Figure AB-25: Brainstem



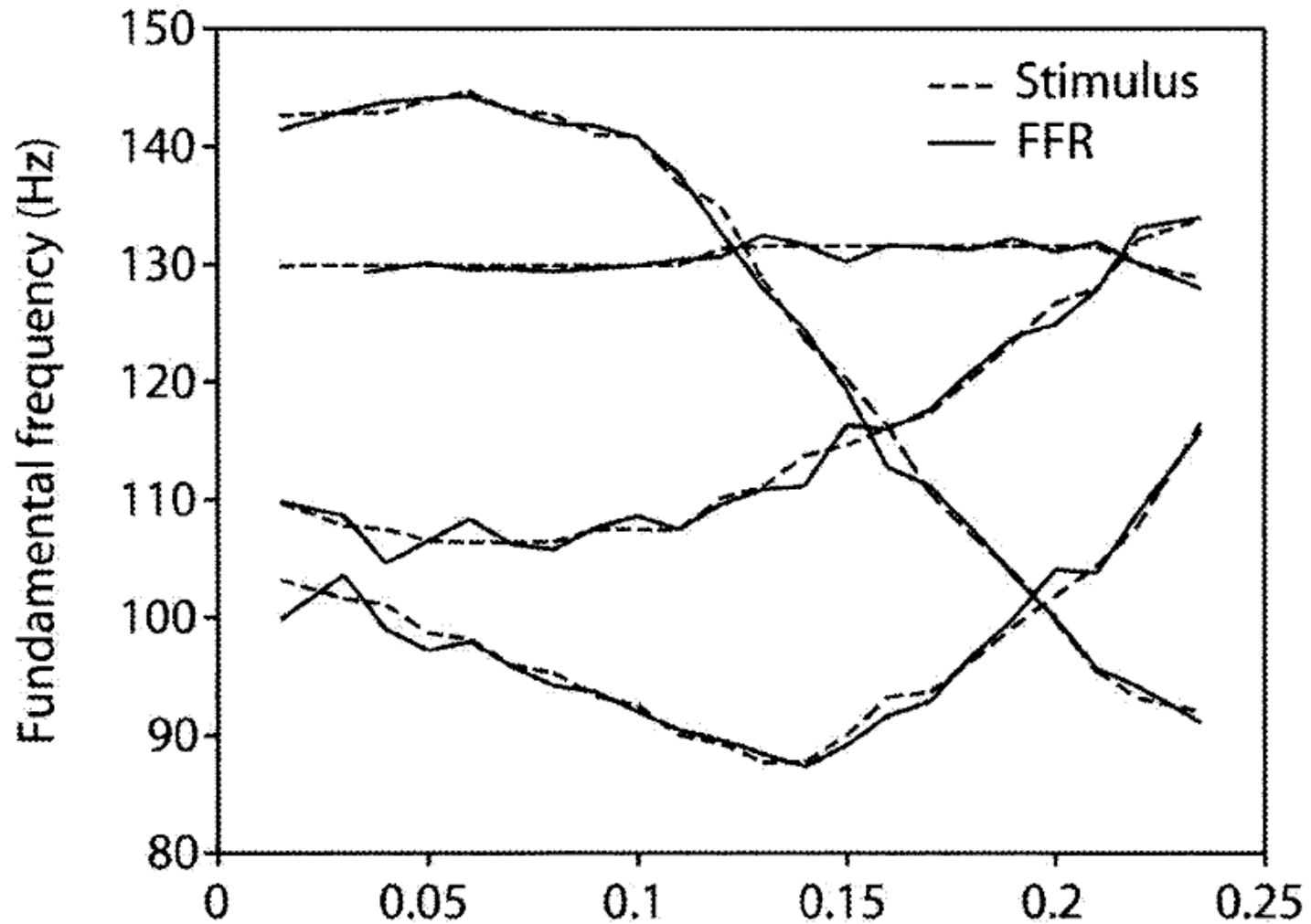
Musical training and auditory skills

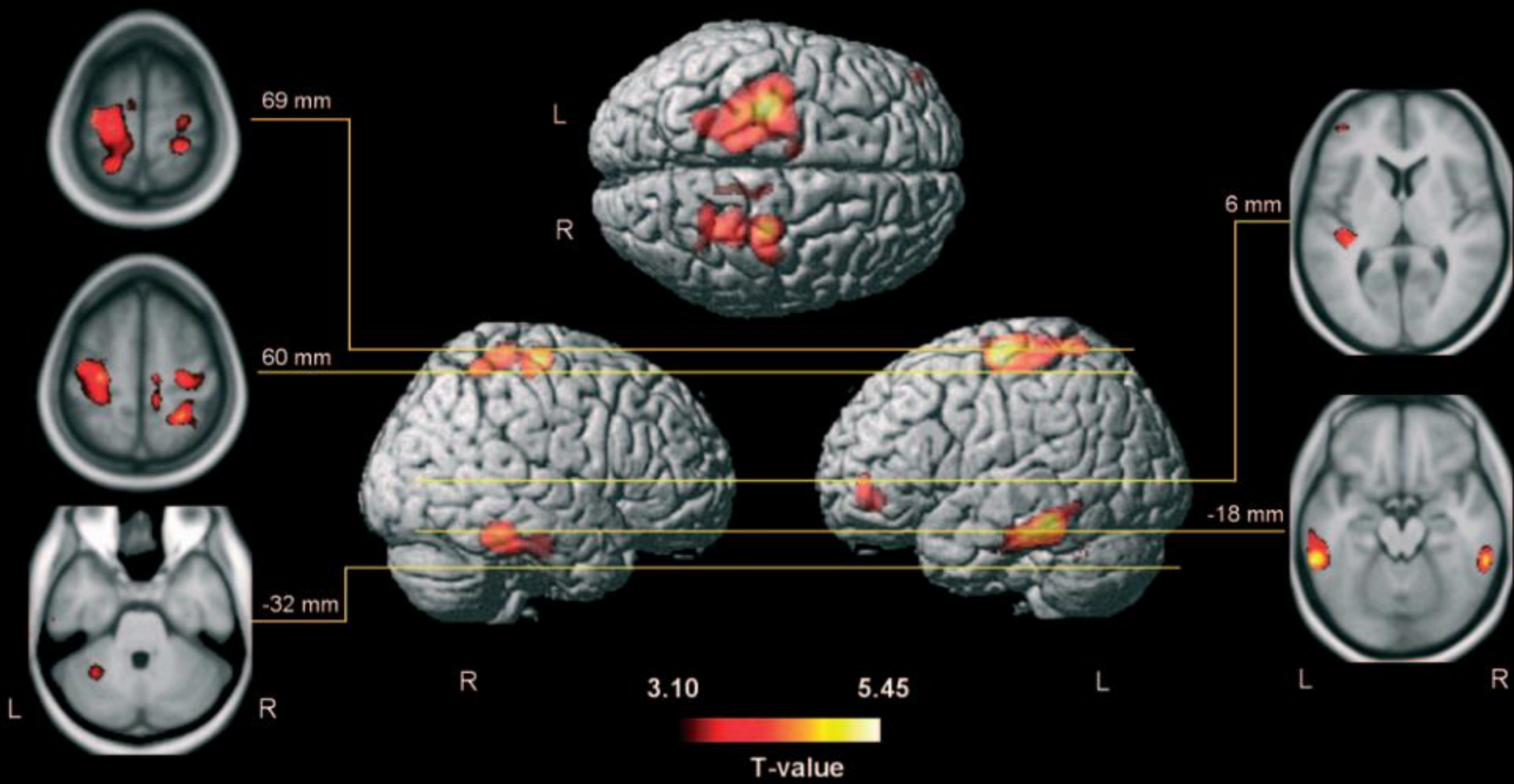
„Frequency Following Response (FFR)“

FFR waveform



Perception of Chinese tones in Mandarin speakers





Musical training and brain plasticity in children

Primary motor area

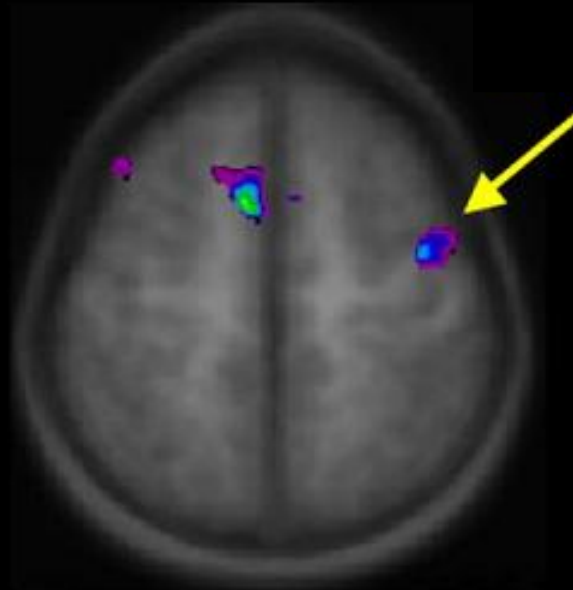
Corpus callosum

Primary auditory area

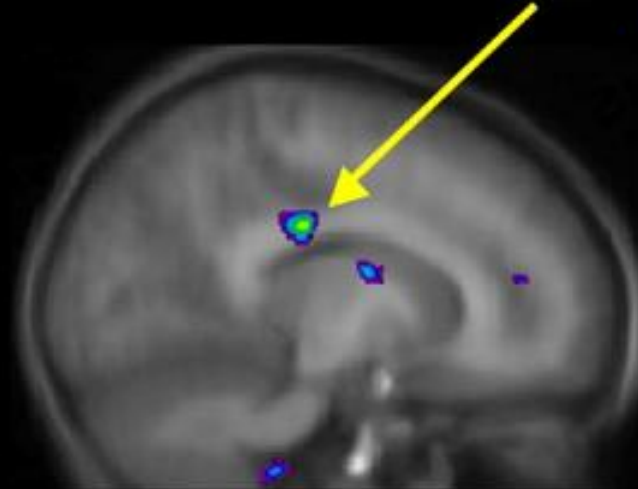
Right precentral gyrus

Corpus callosum

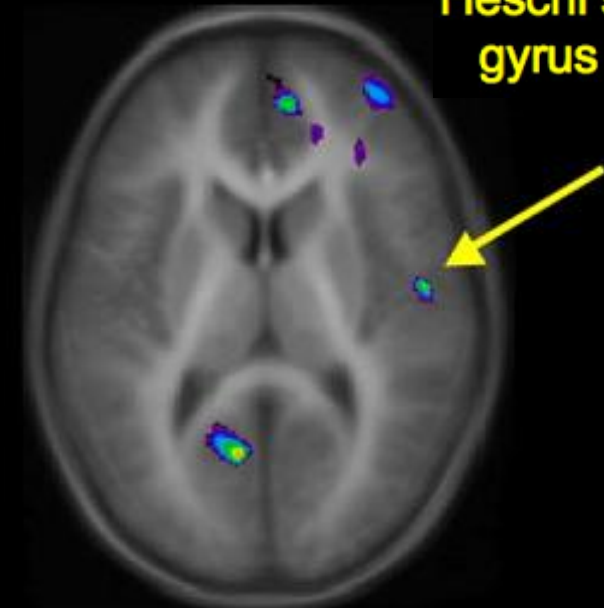
Right Heschl's gyrus



x = 40



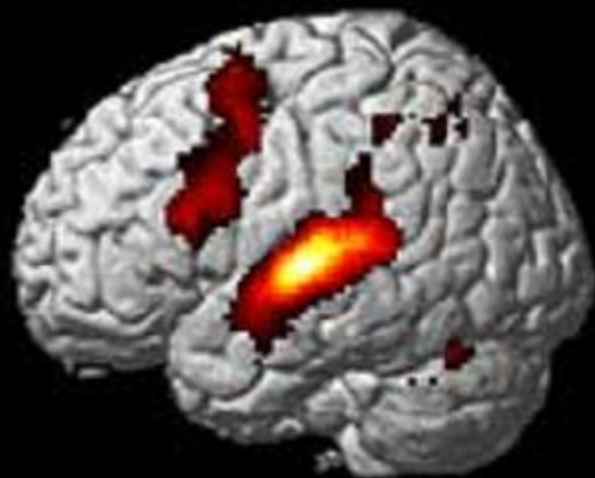
x = 14



z = 10

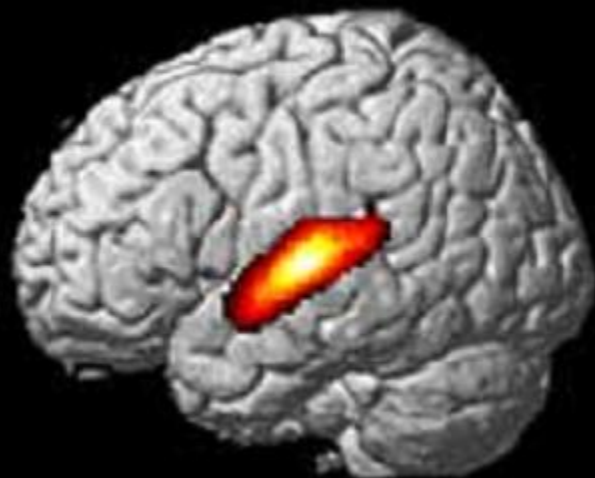
A

Trained-Music

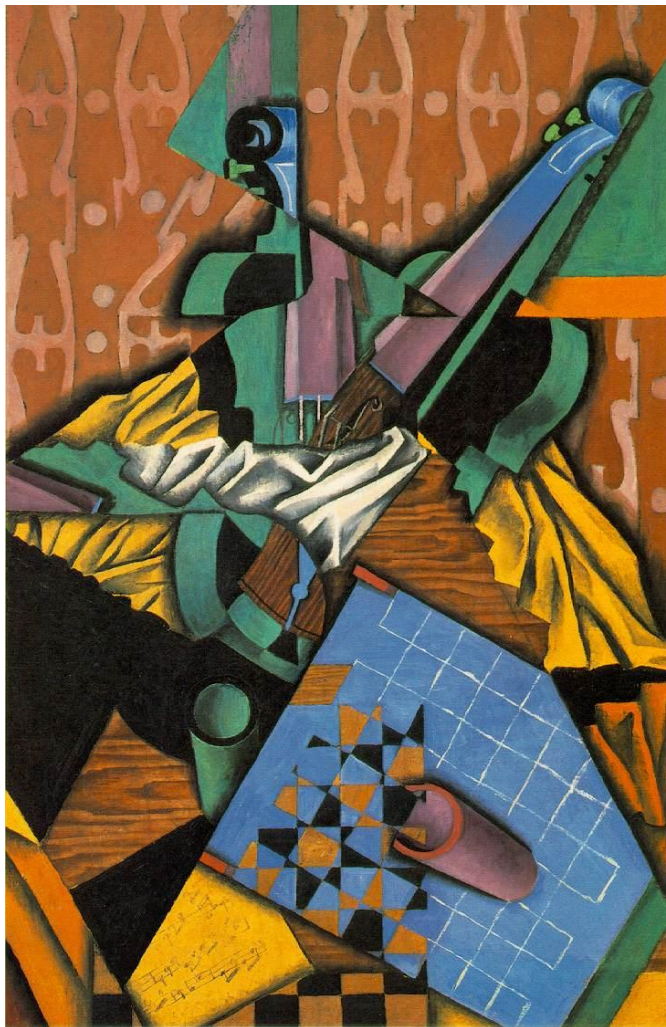


B

Untrained-Different-Notes-Music



Thank you for listening!



Juan Gris, *Violin and Checkerboard*