

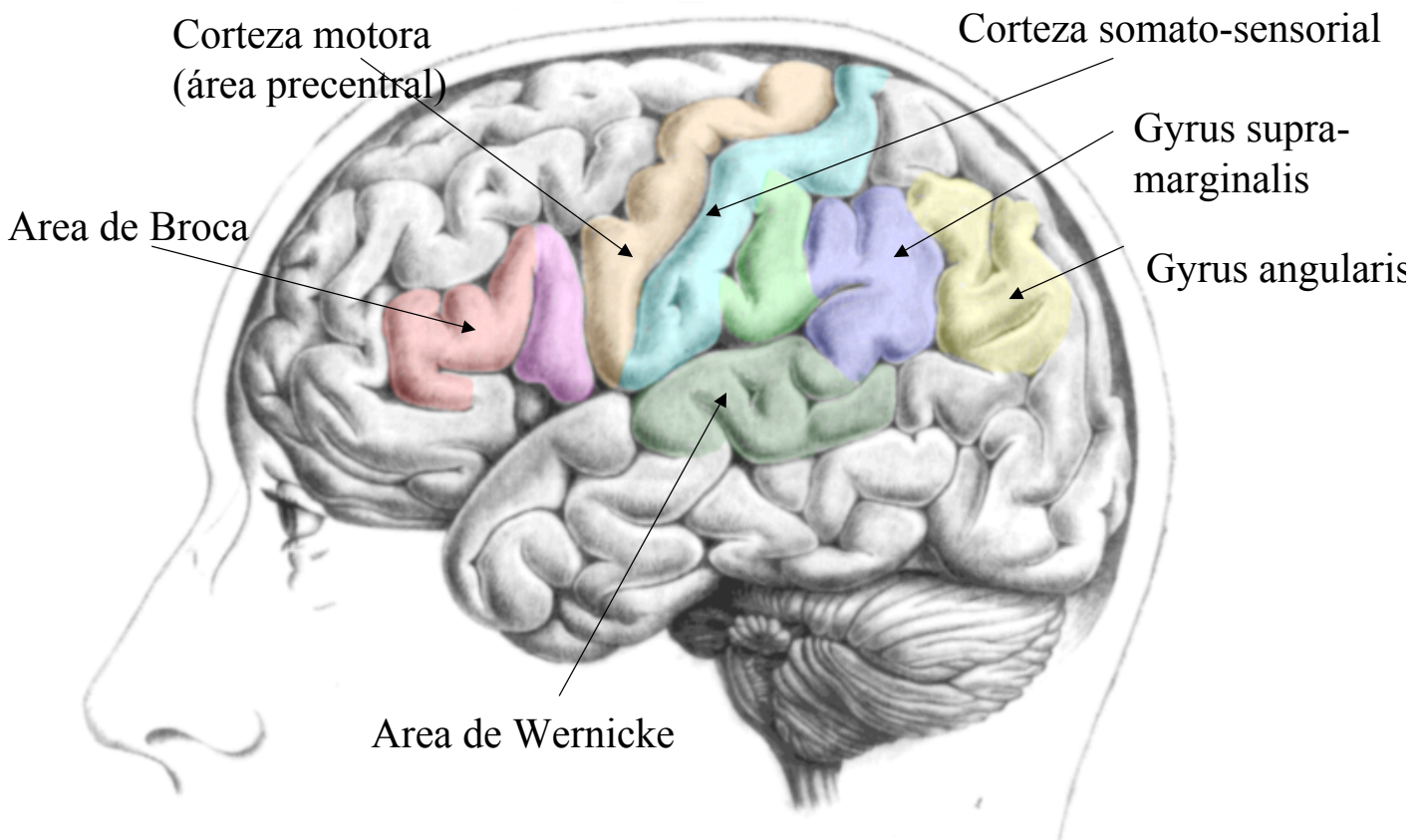
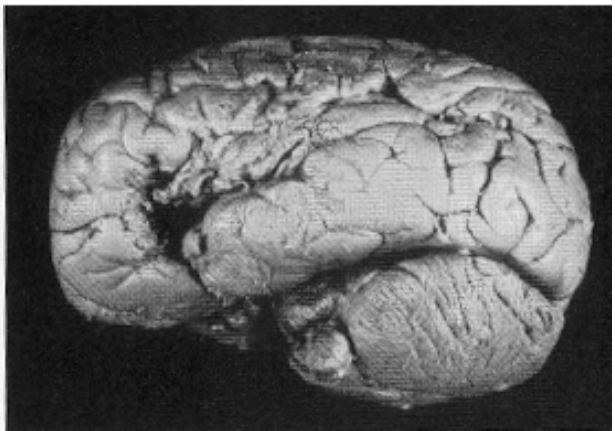
Lenguaje y asimetrías cerebrales

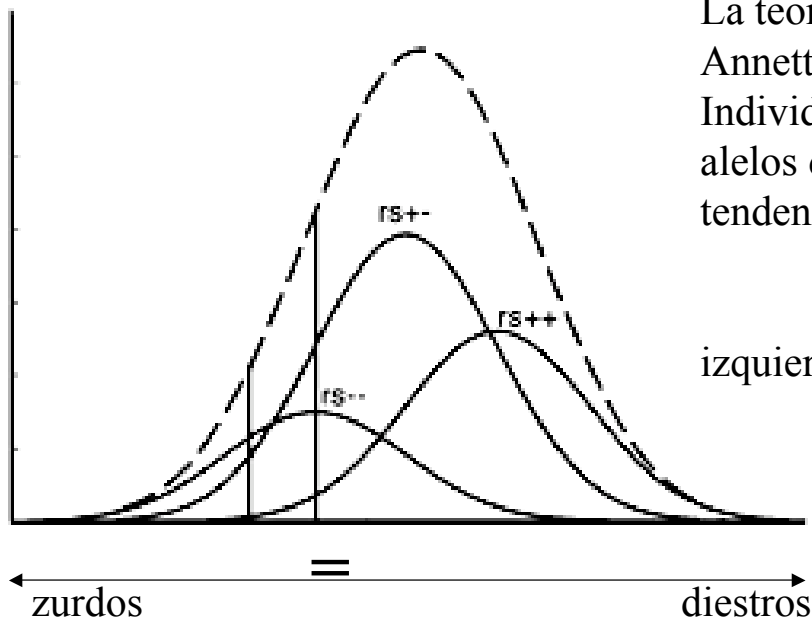
Un modelo para comprender los
mecanismos neuropsicológicos del
aprendizaje

Plan del curso

- Bases neurobiológicas de la dominancia cerebral
 - Significado de las asimetrías morfológicas
 - Orígenes de las asimetrías cerebrales
 - Ontogenia
 - Filogenia
- Conexiones interhemisféricas y lateralización cerebral
 - Cuerpo calloso : una "ventana abierta" sobre el desarrollo cerebral

Broca y el cerebro "Leborgne"

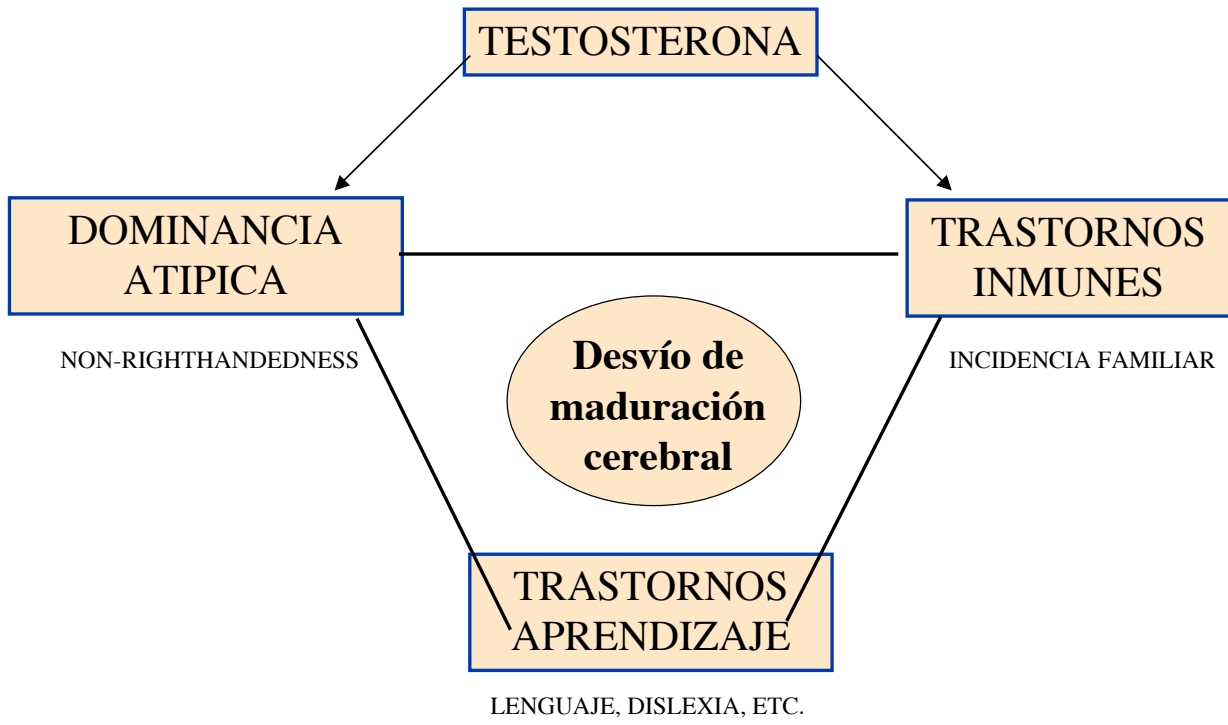




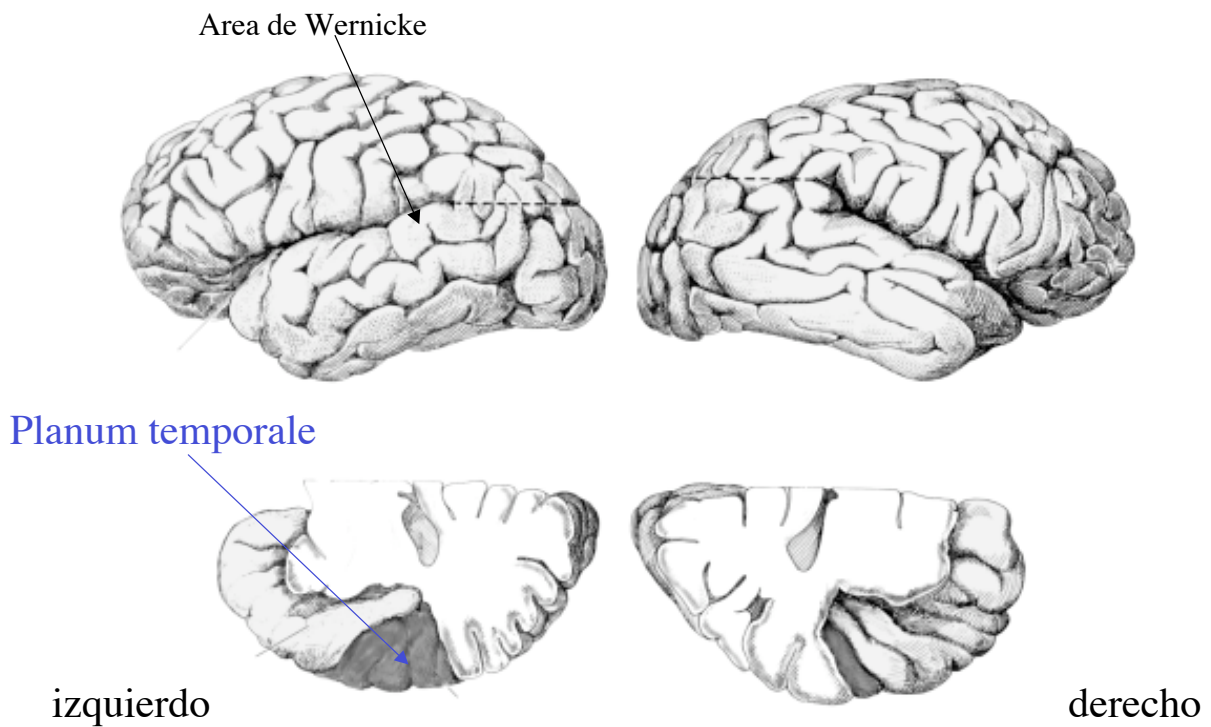
La teoría "right shift" de M. Annett
 Individuos que poseen dos alelos del gen "rs" tienen una tendencia máxima
 - a ser diestros
 - a una dominancia izquierda por el lenguaje



Norman Geschwind : 1926-1984



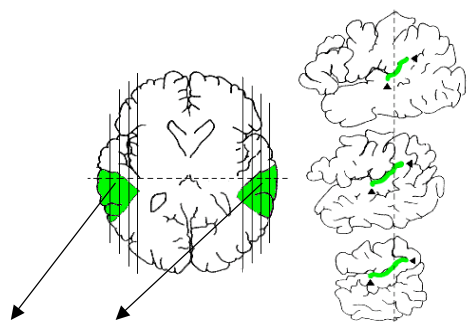
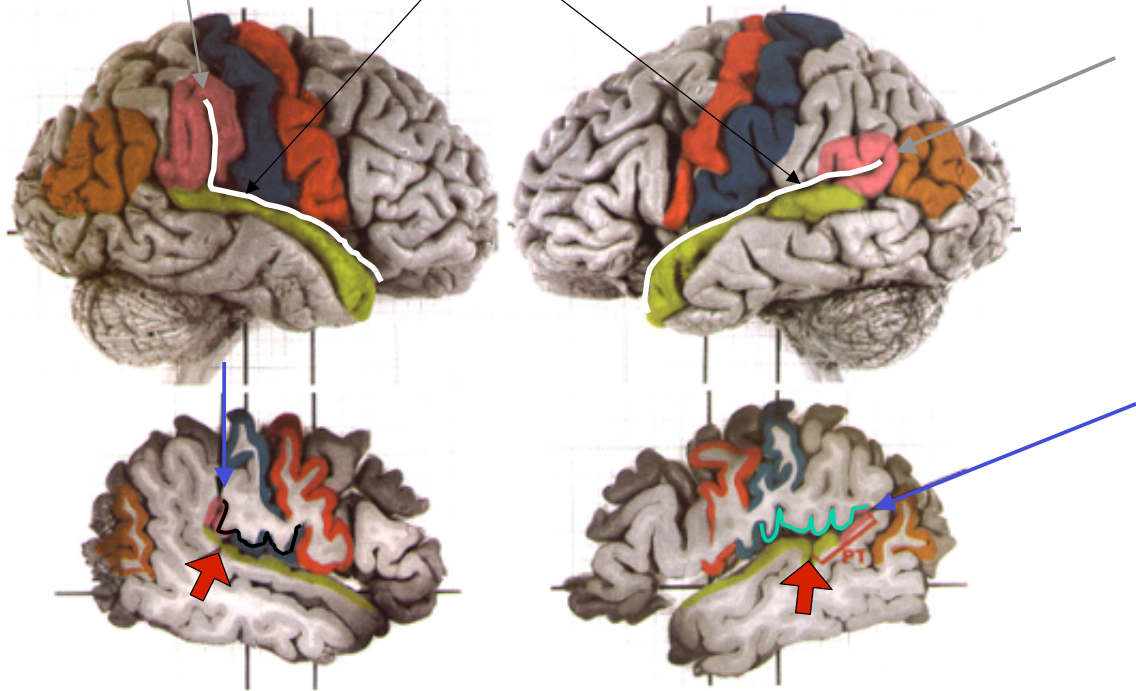
LA TEORIA DE GESCHWIND-BEHAN-GALABURDA



HEMISF. DERECHO

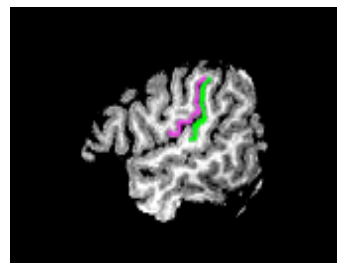
Cisura de Silvio

HEMISF. IZQUIERDO

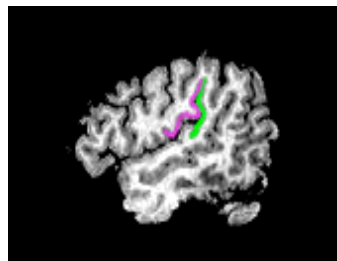


Coeficiente de asimetría :

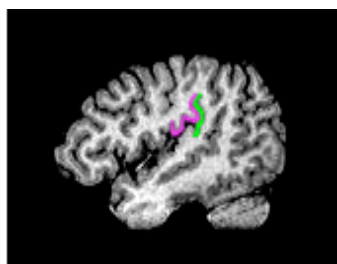
$$\frac{R-L}{2(R+L)}$$



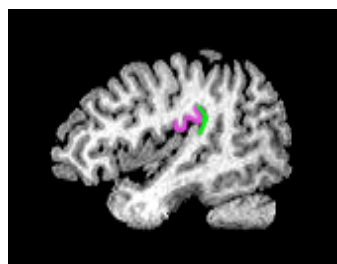
X = 65.0



X = 69.0

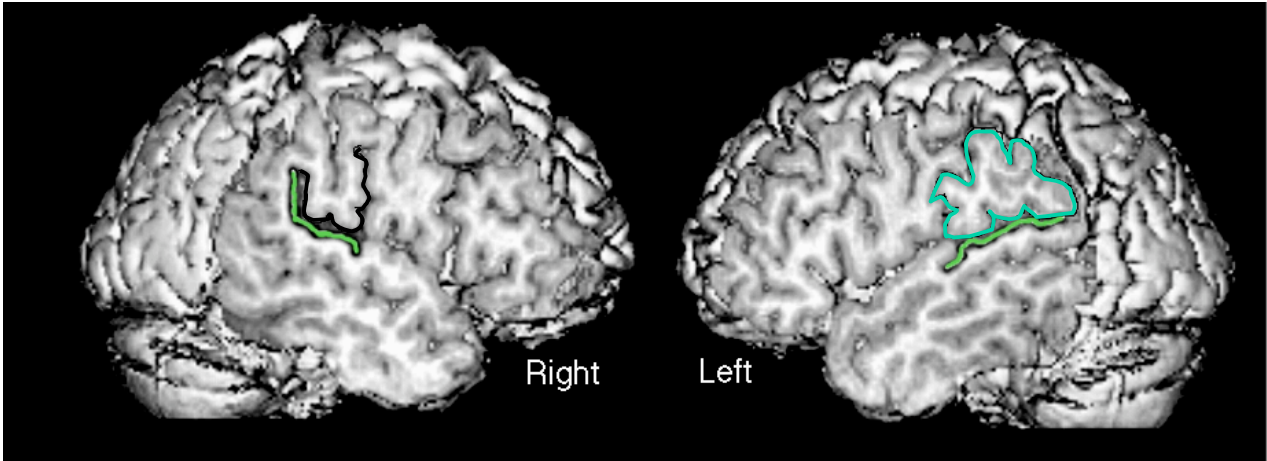


X = 74.0

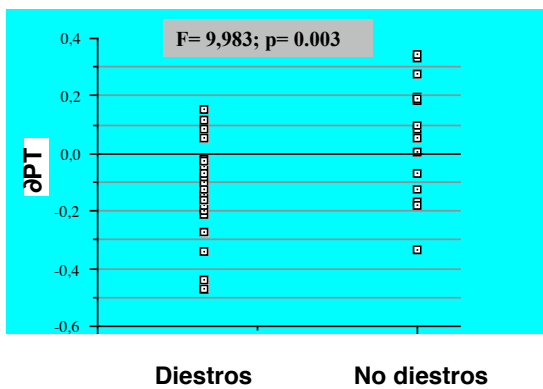


X = 77.0

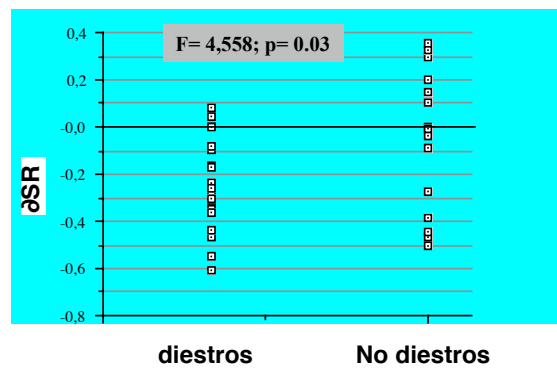
Asimetría divergente de la corteza temporal y parietal

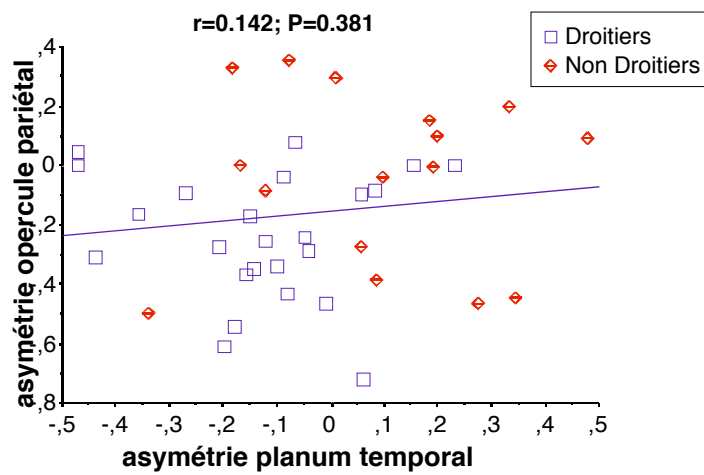


asimetría del planum

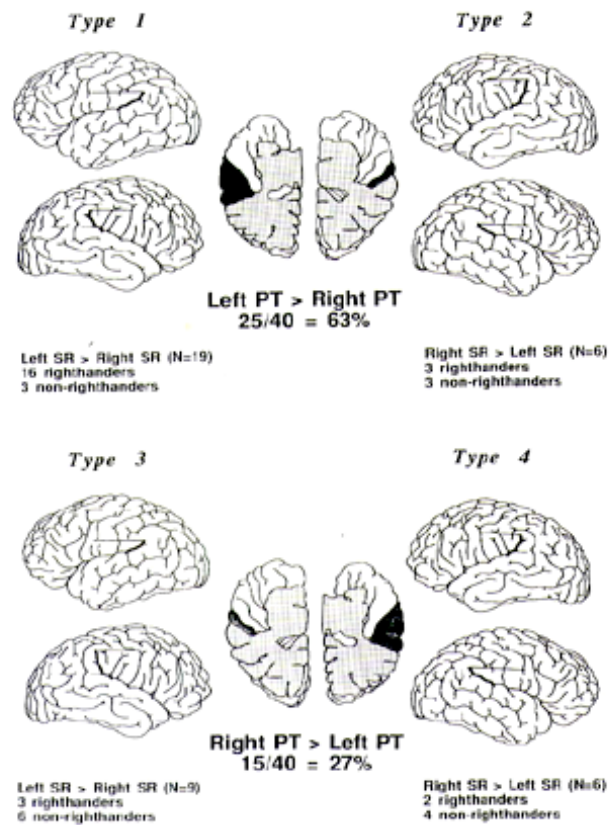


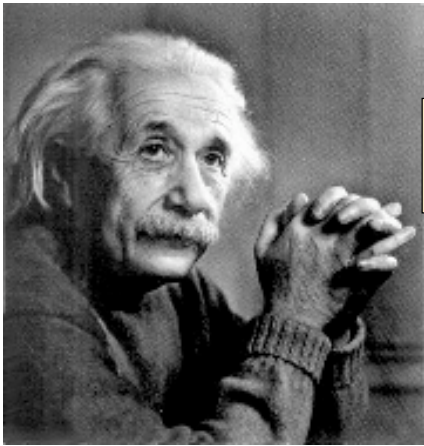
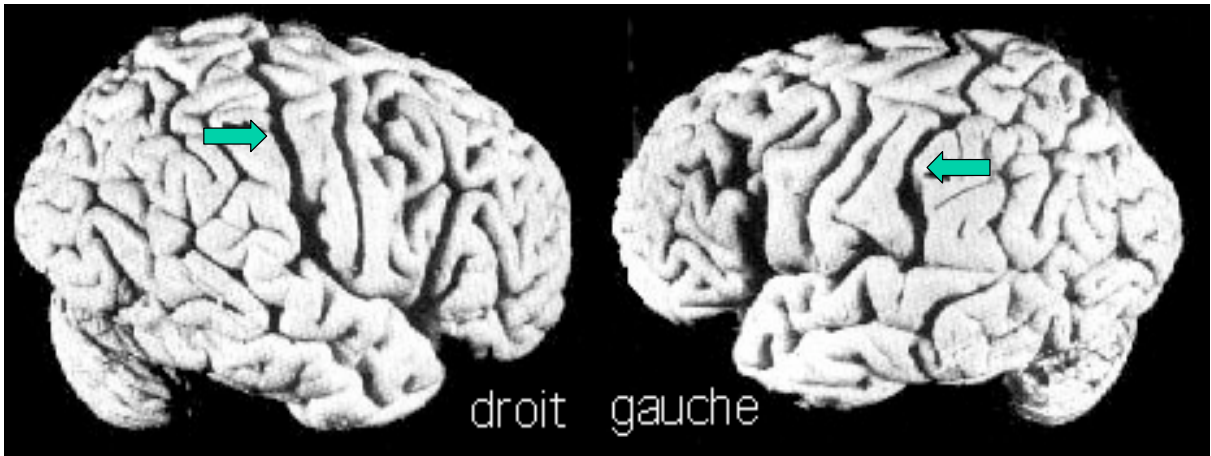
asimetría del opérculo parietal



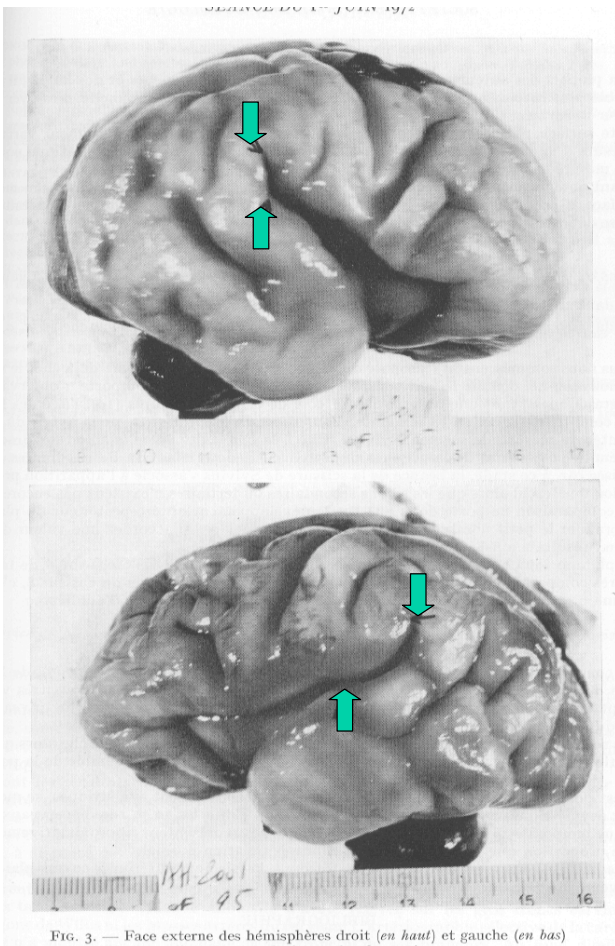


Ausencia de correlación entre los dos tipos de asimetrías





**El cerebro de Einstein: falta de opérculo parietal
(de Witelson et al., 1999)**

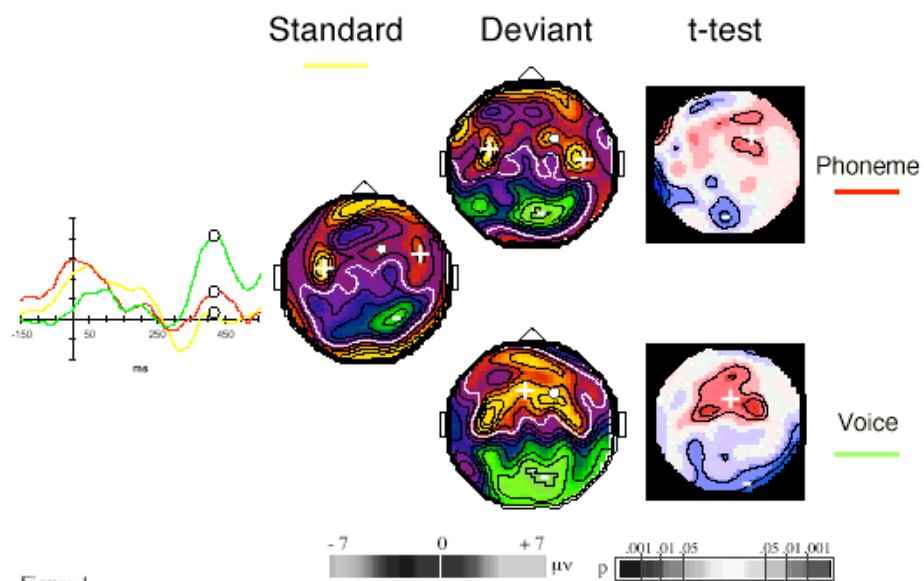
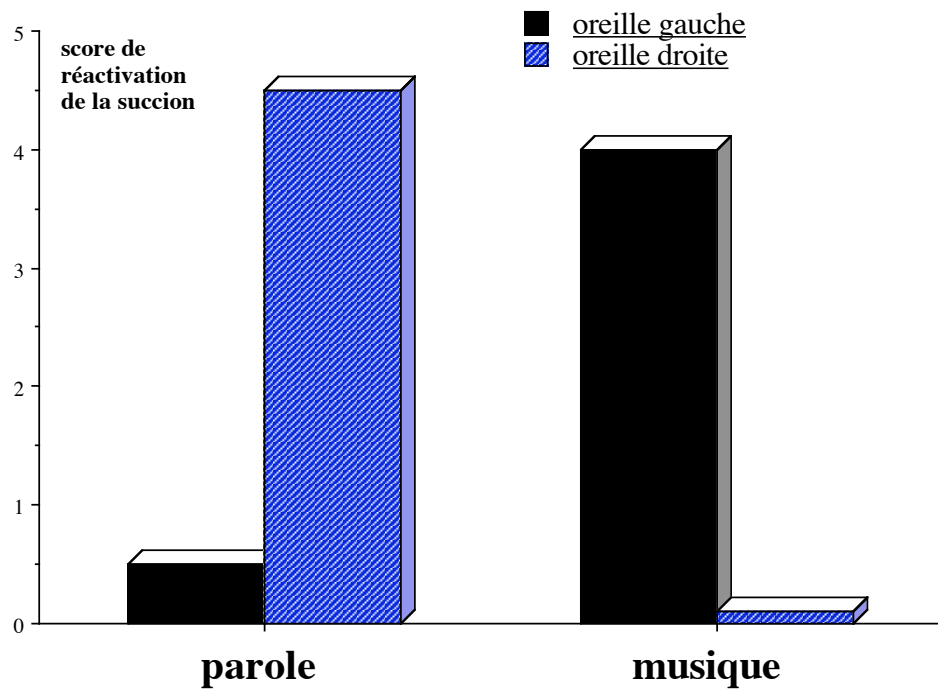


**Teszner et al., 1972 :
asimetría del planum en un
cerebro de feto a los 9 meses**

FIG. 3. — Face externe des hémisphères droit (*en haut*) et gauche (*en bas*)



Experiencias de succión no nutritiva : con habituación a un estímulo repetido, el ritmo de succión disminuye. Ante el cambio de estímulo, se observa una reactivación que significa que el niño ha percibido la diferencia.

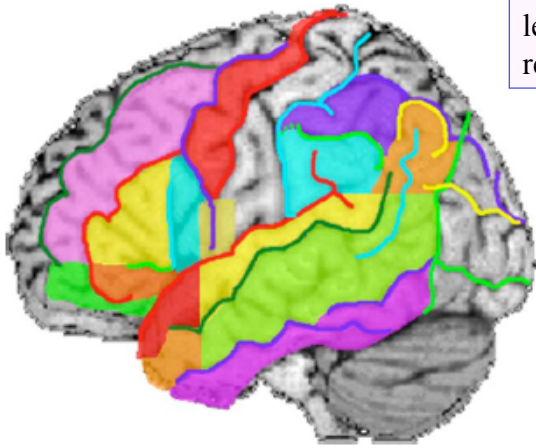


Research report

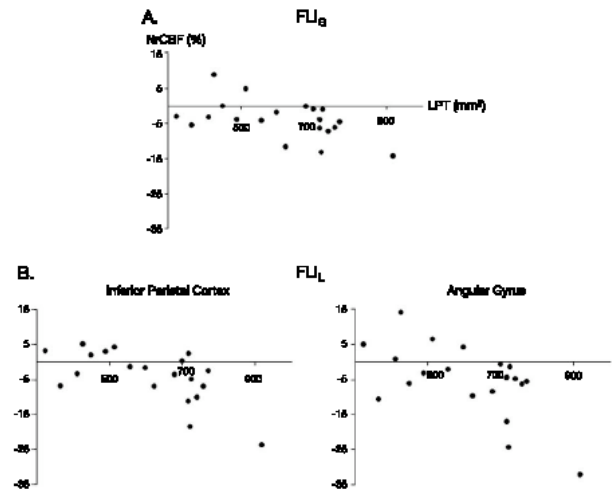
Left planum temporale: an anatomical marker of left hemispheric specialization for language comprehension[☆]

Goulven Josse^a, Bernard Mazoyer^{a,b,c}, Fabrice Crivello^a, Nathalie Tzourio-Mazoyer^{a,*}

Functional laterality index (PET) during story listening : left PT, but not PT asymmetry predicts global and regional (only parietal) functional asymmetry



No correlación anatómico/funcional en las áreas temporales y frontales



Asymmetry of Chimpanzee Planum Temporale: Humanlike Pattern of Wernicke's Brain Language Area Homolog

Patrick J. Gannon,* Ralph L. Holloway, Douglas C. Broadfield, Allen R. Braun

SCIENCE • VOL. 279 • 9 JANUARY 1998 • www.sciencemag.org

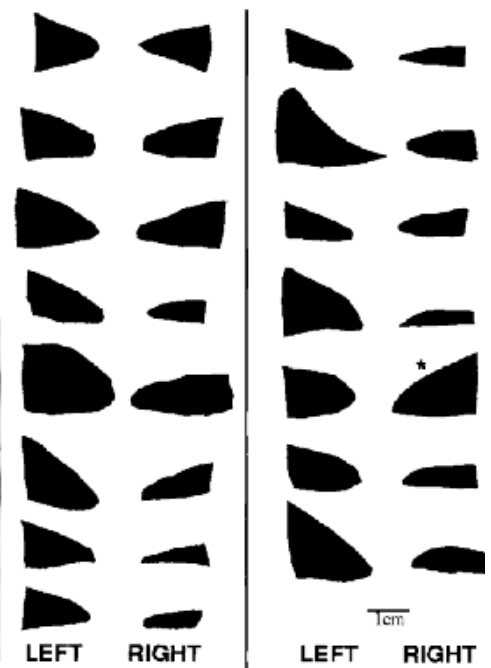
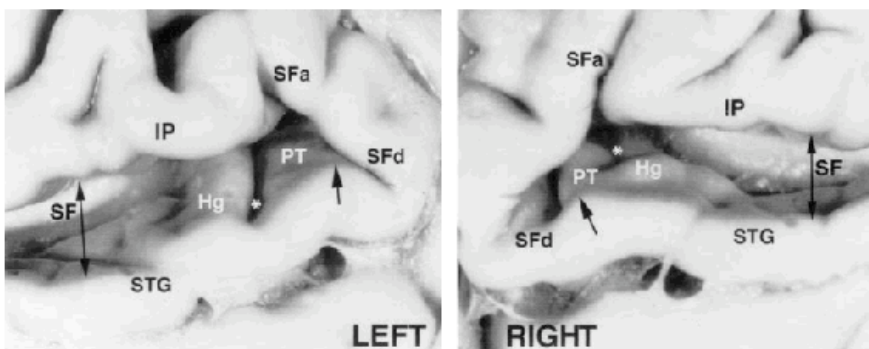


Fig. 2. Cortical surface area of the PT in left and right hemispheres of 15 chimpanzee brains, as measured by black plastic templates (19). Asterisk indicates right greater than left.

Sylvian fissure asymmetries in nonhuman primates revisited: A comparative MRI study

William D Hopkins, Dawn L Pilcher, Leslie MacGregor. *Brain, Behavior and Evolution*. Basel: Dec 2000. Vol.56, Iss. 6; pg. 293, 7 pgs

LATERAL INSULAR MEDIAL

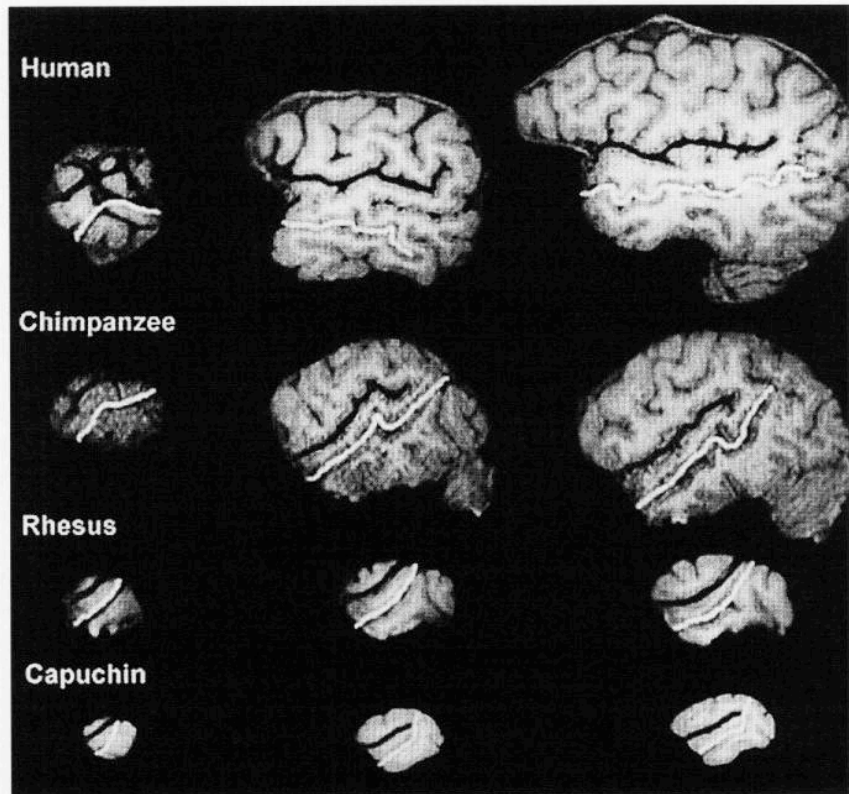


Fig. 1. MRI images from the sagittal plane of a human, common chimpanzee, rhesus macaque and capuchin monkey demonstrate the scans that were identified as the lateral, insular and medial regions for measurements of the SF (black tracing) and STS (white tracing). The human data are only presented in the figure for the purposes of comparison and were not included as part of the data analysis.

Table 1. The mean asymmetry quotient (AQ) and standard error (s.e.) is shown for each section of the sylvian fissure (SF) and superior temporal sulcus (STS) across taxonomic family

	Sylvian fissure			Superior temporal sulcus		
	LSF (s.e.)	MSF (s.e.)	ISF (s.e.)	LSTS (s.e.)	MSTS (s.e.)	ISTS (s.e.)
Great apes	-0.011 (0.042)	-0.324 (0.034)	-0.082 (0.023)	-0.001 (0.049)	-0.006 (0.034)	-0.013 (0.022)
Old World monkeys	0.218 (0.058)	-0.370 (0.041)	-0.003 (0.021)	0.133 (0.042)	0.036 (0.024)	0.017 (0.020)
New World monkeys	-0.000 (0.107)	-0.268 (0.045)	-0.007 (0.023)	0.043 (0.118)	0.037 (0.055)	-0.009 (0.026)

The mean AQ values that are boldfaced indicate significant asymmetries ($p < 0.05$).

Table 2. The frequency of leftward, rightward, or absence of asymmetry according to the asymmetry quotient values (AQ) for each region of the sylvian fissure (SF) and superior temporal sulcus (STS) across taxonomic family. The binomial z score is also presented based on the probability of a leftward asymmetry

	Lateral				Medial				Insular			
	L > R	R > L	R = L	z	L > R	R > L	R = L	z	L > R	R > L	R = L	z
SF												
Great apes (n = 28)	11	16	1	-1.13	28	0	0	5.29	22	4	2	3.02
Old World monkeys (n = 16)	4	12	0	-2.00	16	0	0	4.00	9	5	2	0.50
New World monkeys* (n = 8)	4	4	0	0.00	6	0	0	2.45	4	4	0	0.00
STS												
Great apes (n = 28)	12	13	3	-0.76	11	12	5	-1.13	12	12	4	-0.76
Old World monkeys (n = 16)	2	13	1	-3.00	1	9	6	-3.50	4	8	4	-2.00
New World monkeys* (n = 8)	4	4	0	0.00	2	3	1	-0.82	3	3	2	-0.71

* Two New World monkeys had only one scan before the opening of the insula, therefore only a lateral and insular measure of the SF and STS were possible. Numbers highlighted in bold indicate significant z-scores.

Are planum temporale and sylvian fissure asymmetries directly related?
A MRI study in great apes

Claudio Cantalupo^{a,b}, Dawn L. Pilcher^b, William D. Hopkins^{a,b,c,*}

Asimetría independiente a izquierda del PT y del largo de la cisura de Sylvio

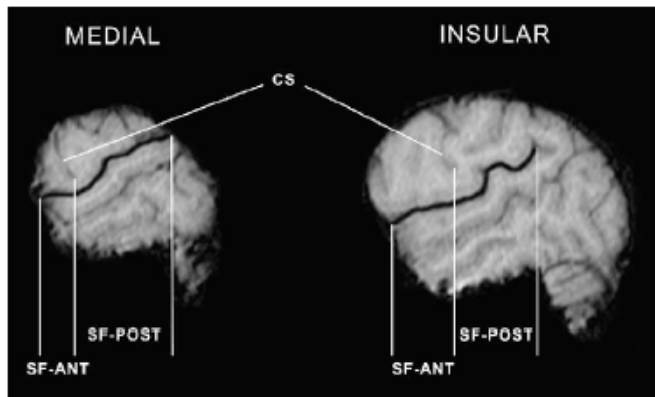
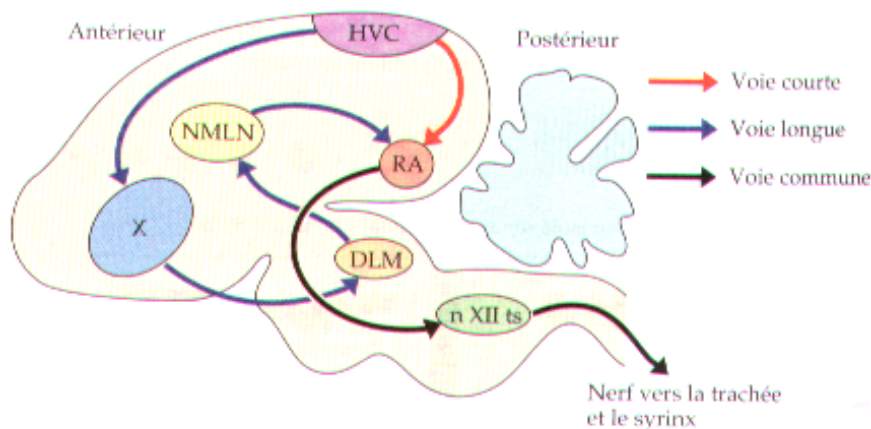


Table 1
Individual asymmetry quotients (AQ) for PT surface area and post-ce SF length

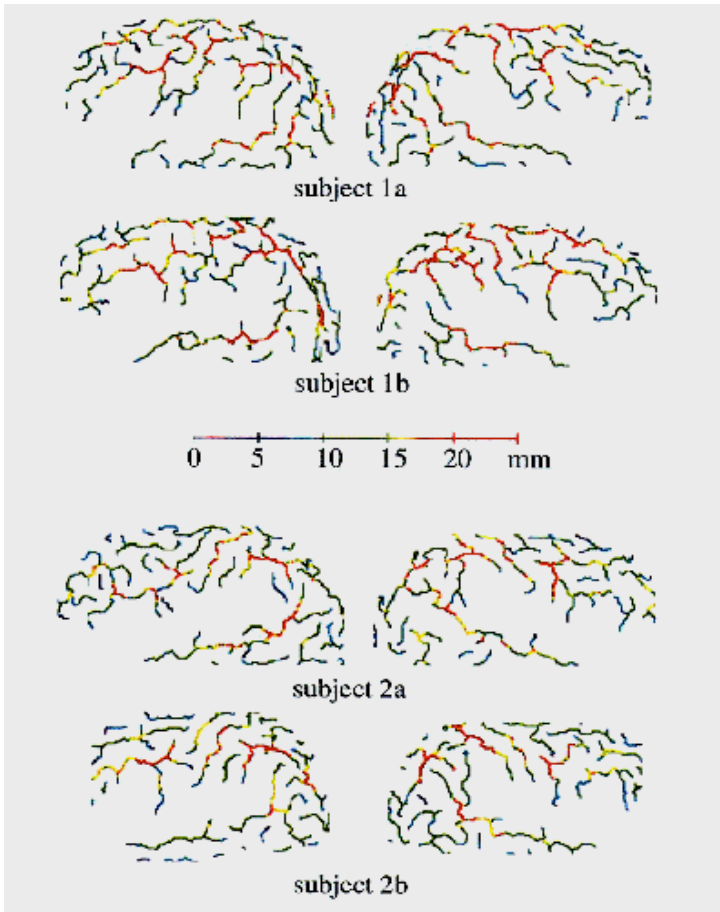
	Sex	PT-AREA		SF-POST	1
		AQ	Bias	AQ	
Chimpanzee					
Austin	M	-0.011	N	-0.178	1
Carmichael	M	-0.032	L	-0.221	1
Chuck	M	-1.186	L	-0.271	1
Donald	M	-0.255	L	-0.143	1
Hoboh	M	-0.329	L	0.080	1
Jimmy Carter	M	-0.327	L	0.071	1
Lazarus	M	-0.065	L	0.145	1
Merv	M	0.043	R	0.005	1
Storer	M	0.019	N	-0.303	1
Ada	F	-0.195	L	-0.007	1
Anna	F	0.016	N	-0.190	1
Chen	F	-0.072	L	-0.080	1
Jeannie	F	-0.061	L	0.101	1
Kengee	F	-0.215	L	0.017	1
Lana	F			-0.074	1
Lulu	F	-0.115	L	0.073	1
Mary	F	-0.090	L	0.087	1
Panzee	F	0.021	N	-0.048	1
Bonobo					
Bosondjo	M			-0.518	1
Brian	M	0.115	R	-0.031	1
Jill	F	-0.138	L	-0.156	1
Loel	F	-0.314	L	-0.358	1
Gorilla					
Kekla	F	-0.189	L	-0.064	1
Kinyani	F	-0.044	L	-0.141	1
Orangutan					
Mentubar	M	0.083	R	-0.151	1
Minyak	M	-0.057	L	-0.127	1
Molek	M	-0.261	L	-0.094	1
Hati	F	-0.227	L	-0.229	1

Sex: M: male, F: female. Bias: L: left hemisphere, R: right hemispl
N: no bias.



Sistema de control vocal de los pájaros cantores (canarios)

Sistema lateralizado (supresión del canto por sección del nervio hipoglosio izquierdo y por lesión de los núcleos).
Dimorfismo sexual (asimetrías en los machos, reversible luego de manipulación hormonal)

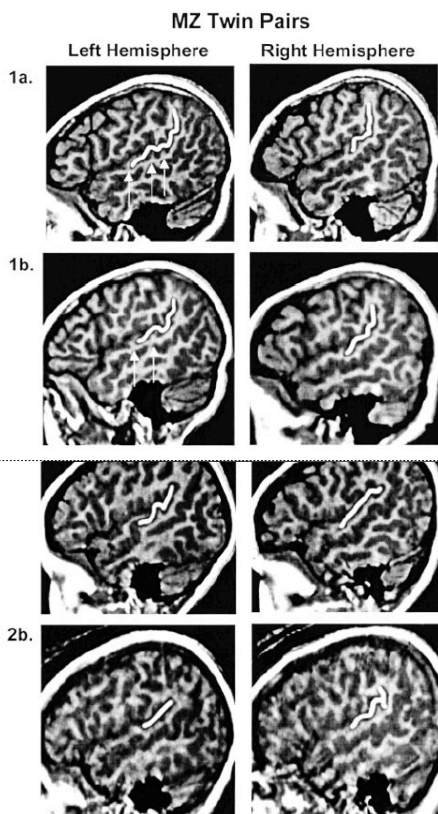


Diferencia de anatomía surcal entre gemelos

- más similitud entre gemelos
- más marcada por los surcos más profundos (tempranos)

The Epigenesis of Planum Temporale Asymmetry in Twins

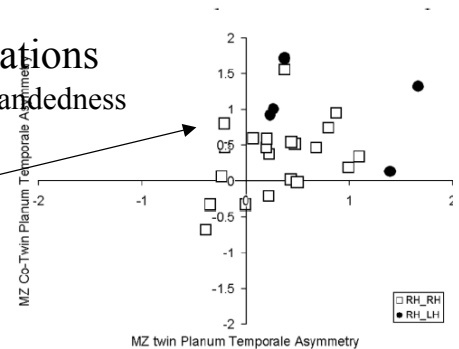
Mark A. Eckert, Christiana M. Leonard, Elizabeth A. Molloy¹, Jonathan Blumenthal¹, Alex Zijdenbos² and Jay N. Giedd



Co-twins correlations

Effect of handedness

Pares de gemelos monocigotos pueden tener asimetrías divergentes



Effect of birth weight

Diferencia en el peso del nacimiento explica parte de la varianza

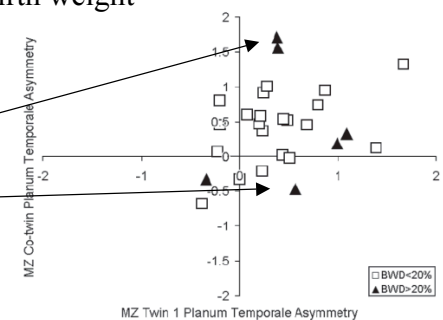


Figure 3. PTA relation between MZ twins by writing birth weight differences greater than 20% (BWD > 20%).

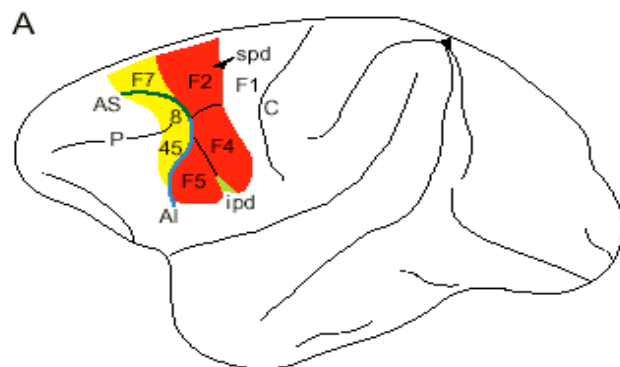
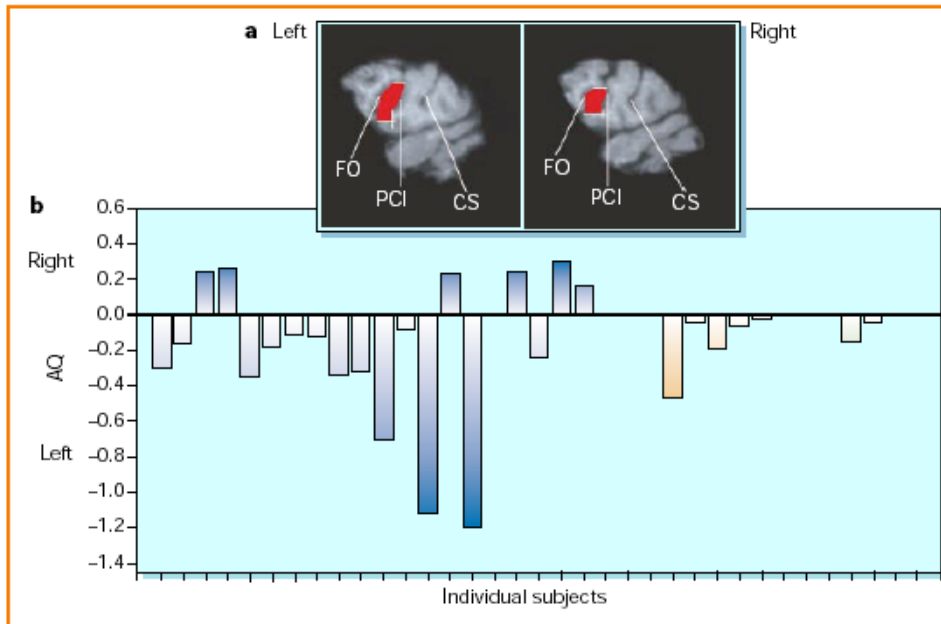
Asymmetric Broca's area in great apes

A region of the ape brain is uncannily similar to one linked with speech in humans.

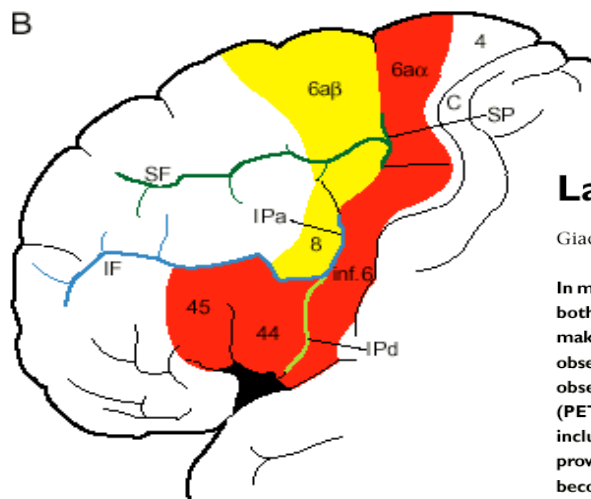
Rodman's area 44 delineates part of Broca's area within the inferior frontal gyrus. From magnetic resonance images (MRI) obtained from 20 chimpanzees (*P. troglodytes*), we found that this system may have been specialized initially for grasping and manipulation, and this neural system may have been specialized initially for grasping and manipulation, and this neural system may have been specialized initially

Claudio Cantalupo*†, William D. Hopkins*†‡
*Division of Psychobiology and Living Links Center, Yerkes Regional Primate Research Center, Emory University, Atlanta, Georgia 30322, USA

NATURE | VOL 414 | 29 NOVEMBER 2001 | www.nature.com



segments. Thus, we suggest that the human homolog of the monkey arcuate sulcus is formed by SF plus SP (c green) and by the IF plus IPa (blue). The descend branch of inferior precentral sulcus (IPd, pale grey) corresponds, in this view, to the inferior precentral sulcus of the monkey. In humans it abuts IF. The proposed sulcal equivalence fits well the available data on the anatomical and functional organization of the premotor cortices in the two species. The equivalence between human IPd and monkey ipd is well supported by the fact that this sulcus marks the border between F4; F5 in monkey and the border between inferior area 4 (inf. 4) and area 44 in humans. Abbreviations: 4, cortical area 4; C, central sulcus; F1, cortical area F1; P, principal sulcus; spd, superior precentral dimple.



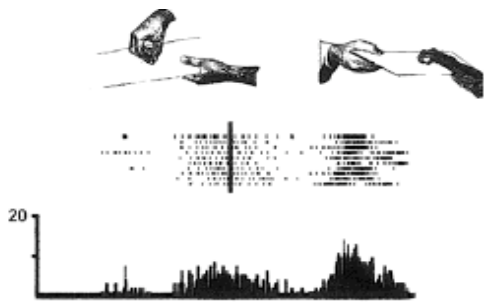
Language within our grasp

Giacomo Rizzolatti and Michael A. Arbib

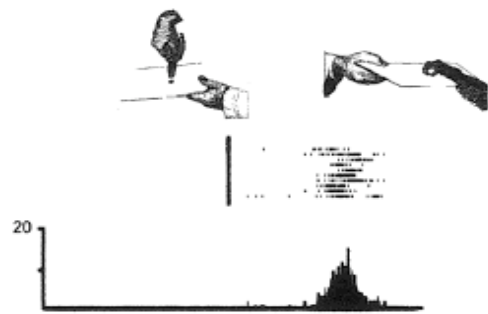
In monkeys, the rostral part of ventral premotor cortex (area F5) contains neurons that discharge both when the monkey grasps or manipulates objects and when it observes the experiment making similar actions. These neurons (mirror neurons) appear to represent a system that match observed events to similar, internally generated actions, and in this way forms a link between the observer and the actor. Transcranial magnetic stimulation and positron emission tomography (PET) experiments suggest that a mirror system for gesture recognition also exists in humans and includes Broca's area. We propose here that such an observation/execution matching system provides a necessary bridge from 'doing' to 'communicating', as the link between actor and observer becomes a link between the sender and the receiver of each message.

Trends Neurosci. (1998) 21, 188-194

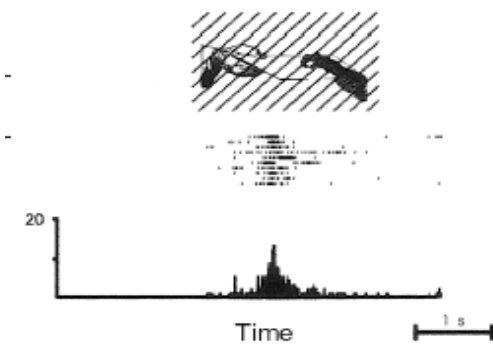
Actividad de un neurona espejo en la área M5 del mono



El simio observa, después actúa

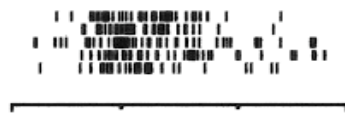


El experimentador toma el objeto con una pinza

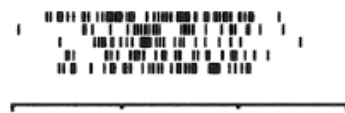


El mono lo toma en la oscuridad

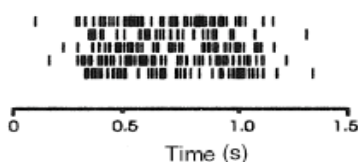
Tres situaciones provocando la actuación de los neuronas espejo



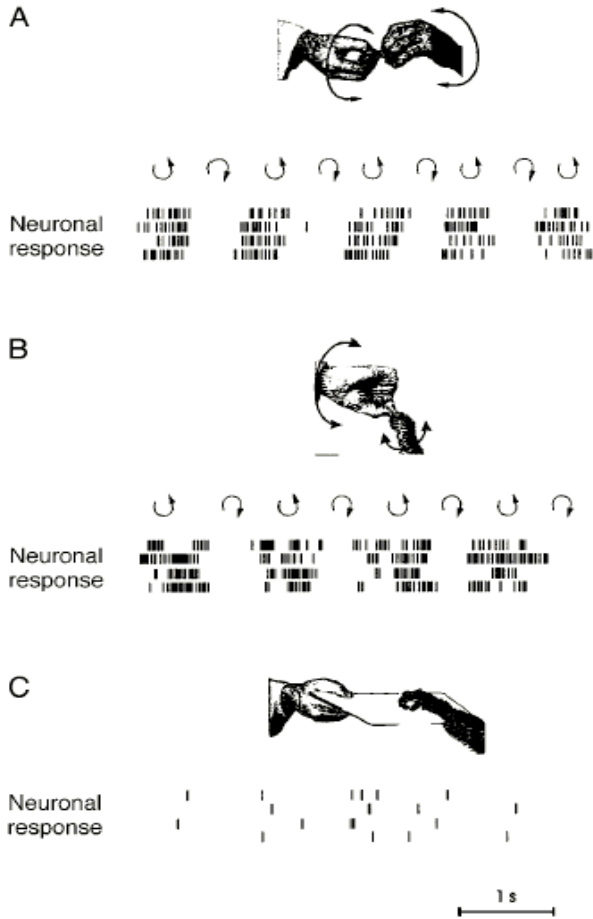
a) Observar otro simio agarrando alimento



b) Observar un humano



c) Agarrar por sí mismo



Especificidad de las neuronas espejo

a) El mono observa al experimentador rompiendo un objeto por doble rotación de las manos : la neurona descarga solo por el movimiento anti-horario

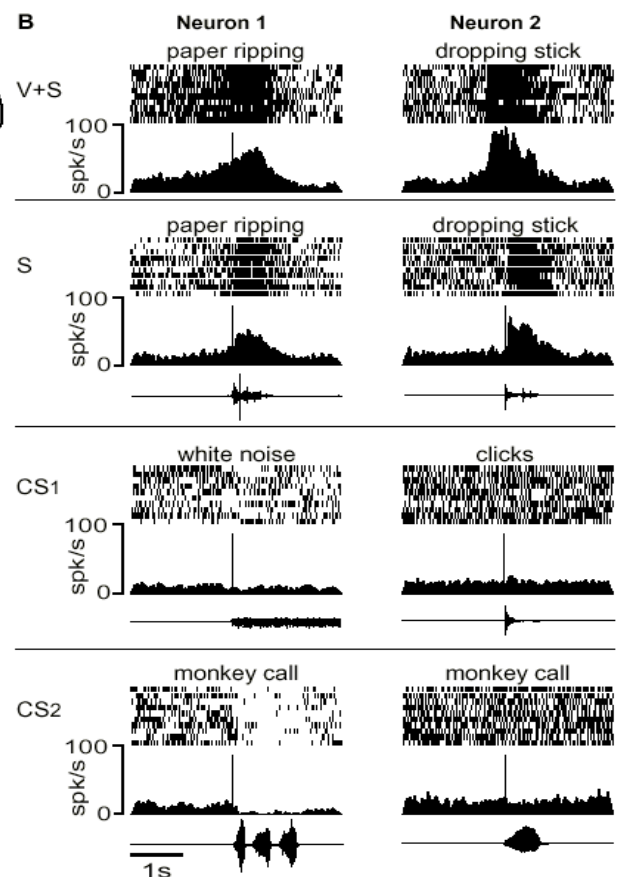
b) Lo mismo se observa si el mono tiene el objeto, solo cuando la rotación se hace en sentido anti-horario

c) La neurona no tiene ninguna actividad en otra acción

2 AUGUST 2002 VOL 297 SCIENCE www.sciencemag.org

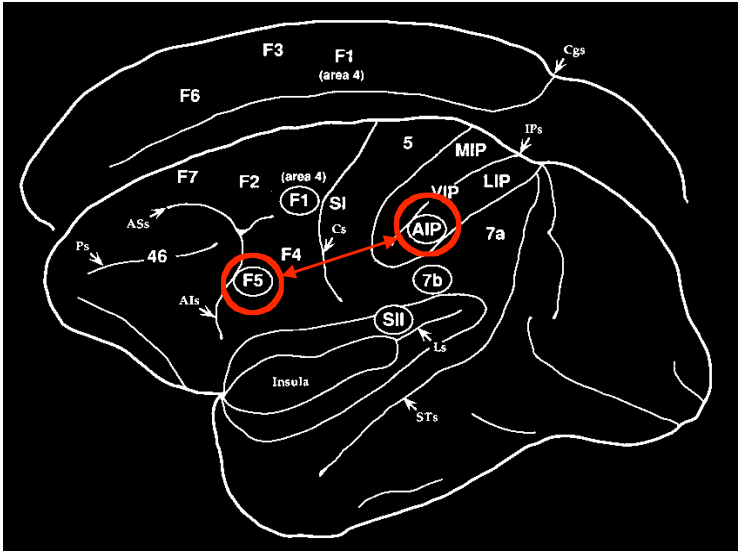


Fig. 1. (A) Lateral view of macaque brain with the location of area F5, shaded in gray. Major sulci: a, arcuate; c, central; ip, intraparietal; s, sylvian sulcus. (B) Two examples of neurons responding to the sound of actions. Rastergrams are shown together with spike density functions. Text above each rastergram describes the sound or action used to test the neuron. Vertical lines indicate the time when the sound occurred. Traces under the spike density functions in S and in CS conditions are oscillograms of the sounds used to test the neurons. Only 1 of the 10 different instances of the sounds is shown.



Hearing Sounds, Understanding Actions: Action Representation in Mirror Neurons

Evelyne Kohler,¹ Christian Keysers,¹ M. Alessandra Umiltà,¹ Leonardo Fogassi,² Vittorio Gallese,¹ Giacomo Rizzolatti^{1*}



Beyond the Mirror System:
From Monkey-like Action Recognition to Human Language

Michael Arbib
 Computer Science Department, Neuroscience Program, and USC Brain Project
 University of Southern California
 Los Angeles, CA 90089-2520
 arbib@pollux.usc.edu; <http://www-hbp.usc.edu/>

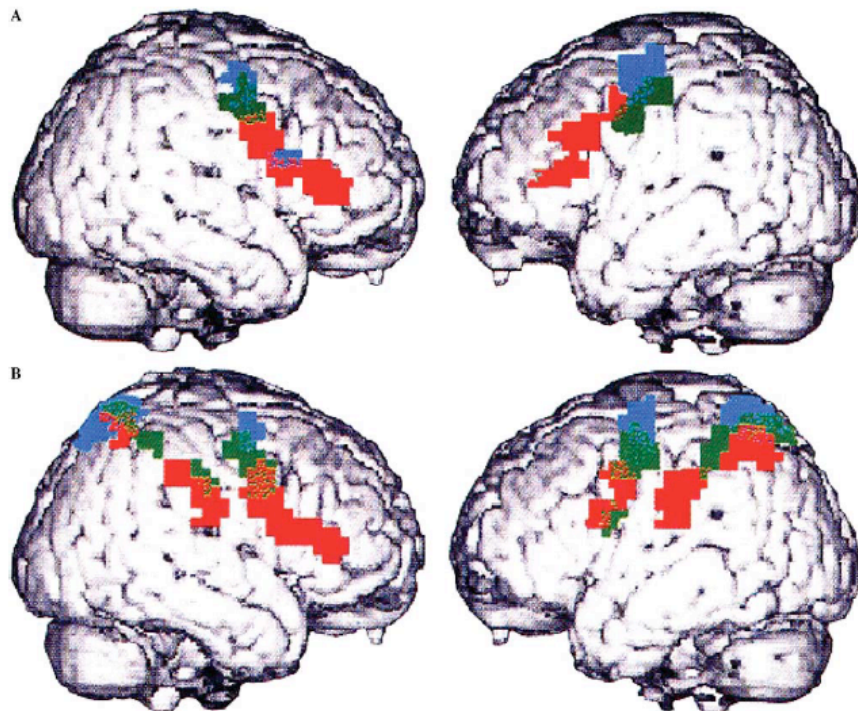


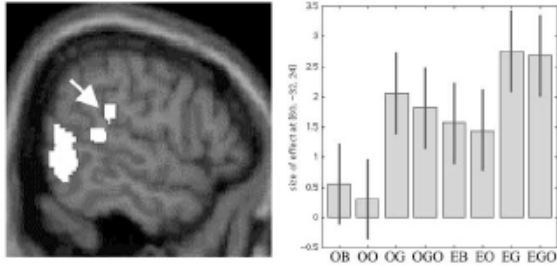
Fig. 1. Somatotopically organized activations in premotor and parietal cortices during action observation, projected on the lateral surface of Montreal Neurological Institute (MNI) standard brain. (A) Observation of intransitive actions. (B) Observation of transitive actions. Red: activation found during observation of mouth actions; green: activation found during observation of hand actions; blue: activation found during observation of foot actions. From Buccino et al. (2001).

Observing video-sequences of intransitive (A) and transitive (B) actions :
 somatotopy but no asymmetry

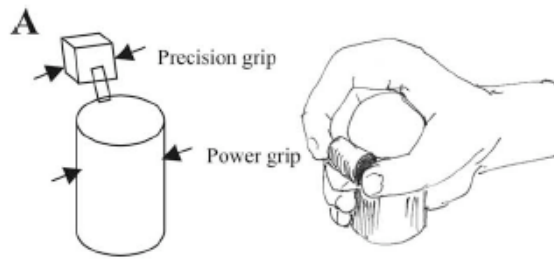
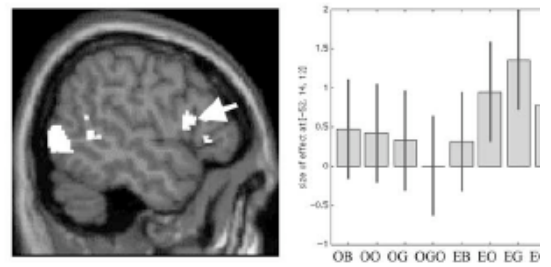
Activations related to “mirror” and “canonical” neurones in the human brain: an fMRI study

J. Grèzes,^{a,*} J.L. Armony,^{a,b} J. Rowe,^a and R.E. Passingham^{a,c}

D Right Parietal Operculum



E Left Inferior Frontal Gyrus, pars opercularis (BA 4)

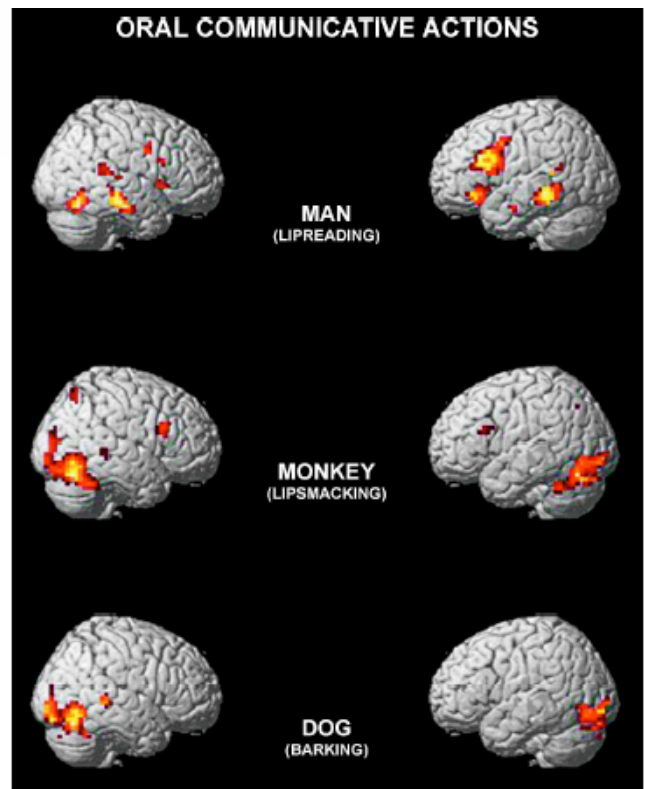


Regiones activadas en común durante la ejecución y observación del gesto

Neural Circuits Involved in the Recognition of Actions Performed by Nonconspecifics: An fMRI Study

Giovanni Buccino¹, Fausta Lui², Nicola Canessa¹, Ilaria Patteri¹,
Giovanna Lagravinese¹, Francesca Benuzzi², Carlo A. Porro³, and
Giacomo Rizzolatti¹

Specific activation of left Broca Area by observing human silent speech



Abnormal Imitation-Related Cortical Activation Sequences in Asperger's Syndrome

Nobuyuki Nishitani, MD, PhD,^{1,2} Sari Avikainen, MD,¹ and Riitta Hari, MD, PhD^{1,3}



Fig 1. Still pictures of three orofacial gestures: (A) lip protrusion, (B) lip opening, and (C) contraction of both sides of mouth.

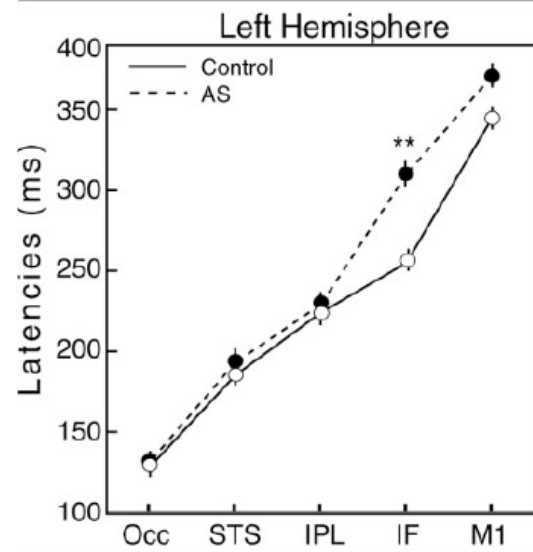
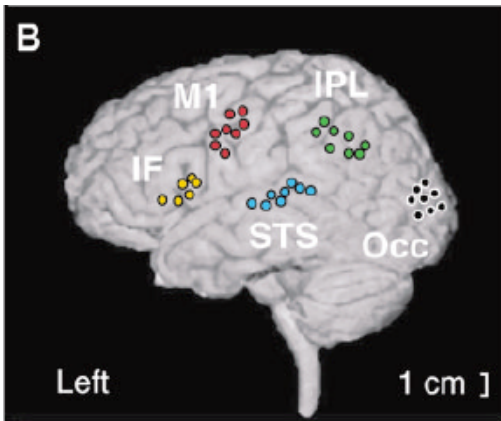
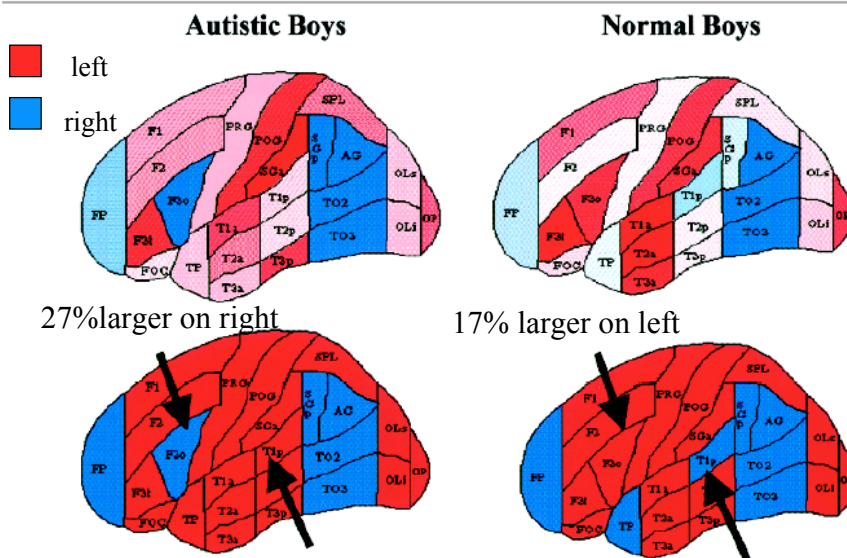


Fig 3. Peak latencies (mean \pm SEM) at the left hemisphere Occ, STS, IPL, IF, and M1 regions across all subjects. ** $p < 0.01$. AS = Asperger's syndrome; Occ = occipital; STS = superior temporal sulcus; IPL = inferior parietal lobule; IF = inferior frontal, M1 = primary motor cortex.

Abnormal Asymmetry in Language Association Cortex in Autism

Martha R. Herbert, MD, PhD,¹ Gordon J. Harris, PhD,² Kristen T. Adrien, BA,¹ David A. Ziegler, BS,¹ Nikos Makris, MD, PhD,¹ Dave N. Kennedy, PhD,¹ Nicholas T. Lange, PhD,³ Chris F. Chabris, PhD,² Anna Bakardjiev, MD,⁵ James Hodgson, PhD,⁶ Masanori Takeoka, MD,⁷ Helen Tager-Flusberg, PhD,⁴ and Verne S. Caviness, Jr., MD¹



Asymmetry of regional cortical volumes

- 1) Proportional
- 2) Binary

Asimetrías corticales : conclusiones (1)

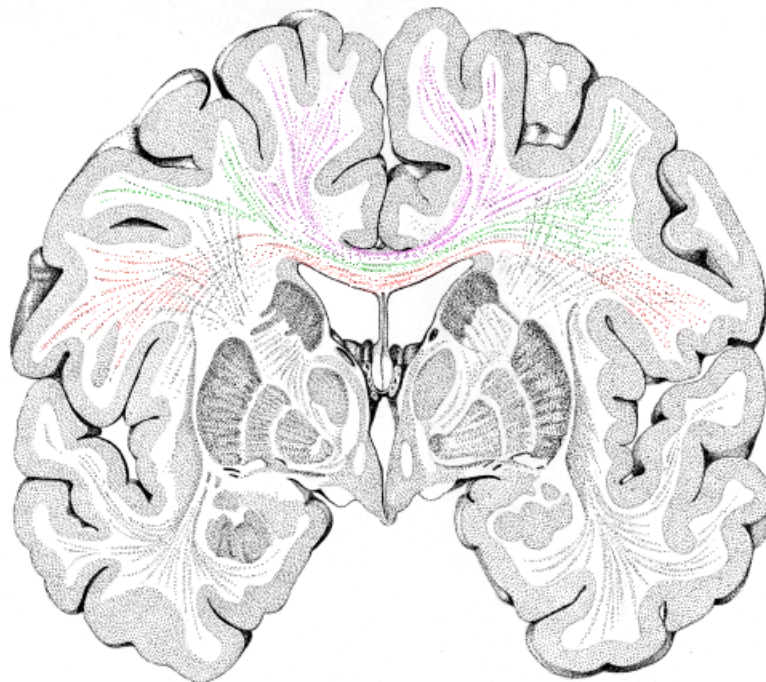
- Las áreas del lenguaje son generalmente de mayor tamaño en el hemisferio izquierdo, especialmente en su parte peri-silviana posterior, sobre todo en diestros
- La asimetría del plano temporal, que recibió mucho énfasis, tendría menos pertinencia que la del opérculo parietal
- Estas asimetrías se muestran independientes unas de otras, sugiriendo mecanismos separados interviniendo en momentos diferentes del desarrollo cerebral

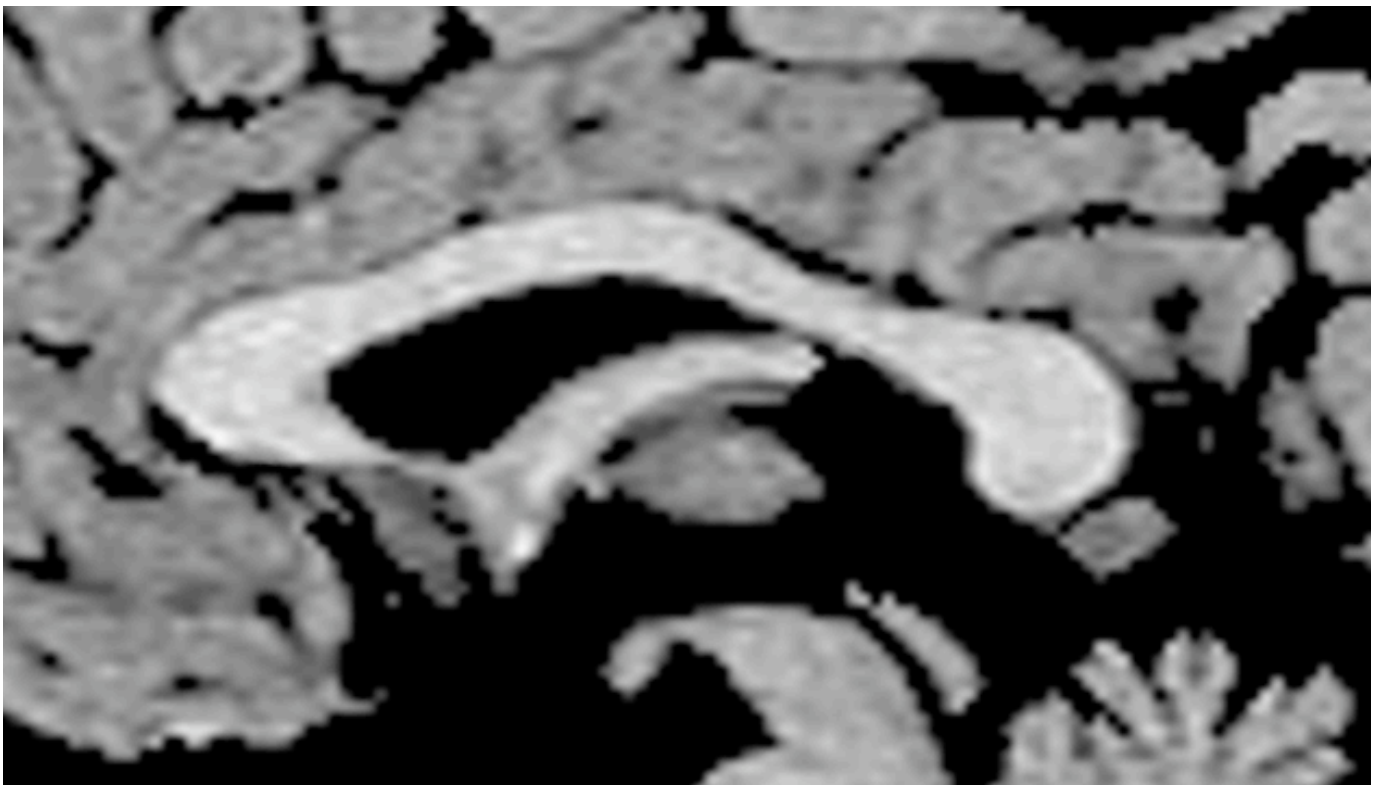
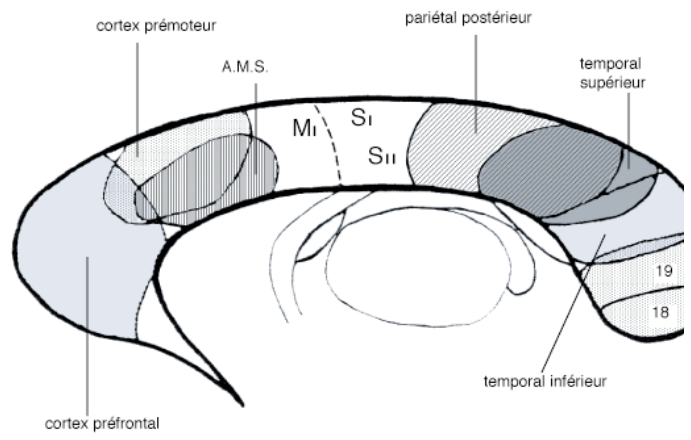
Asimetrías corticales : conclusiones (2)

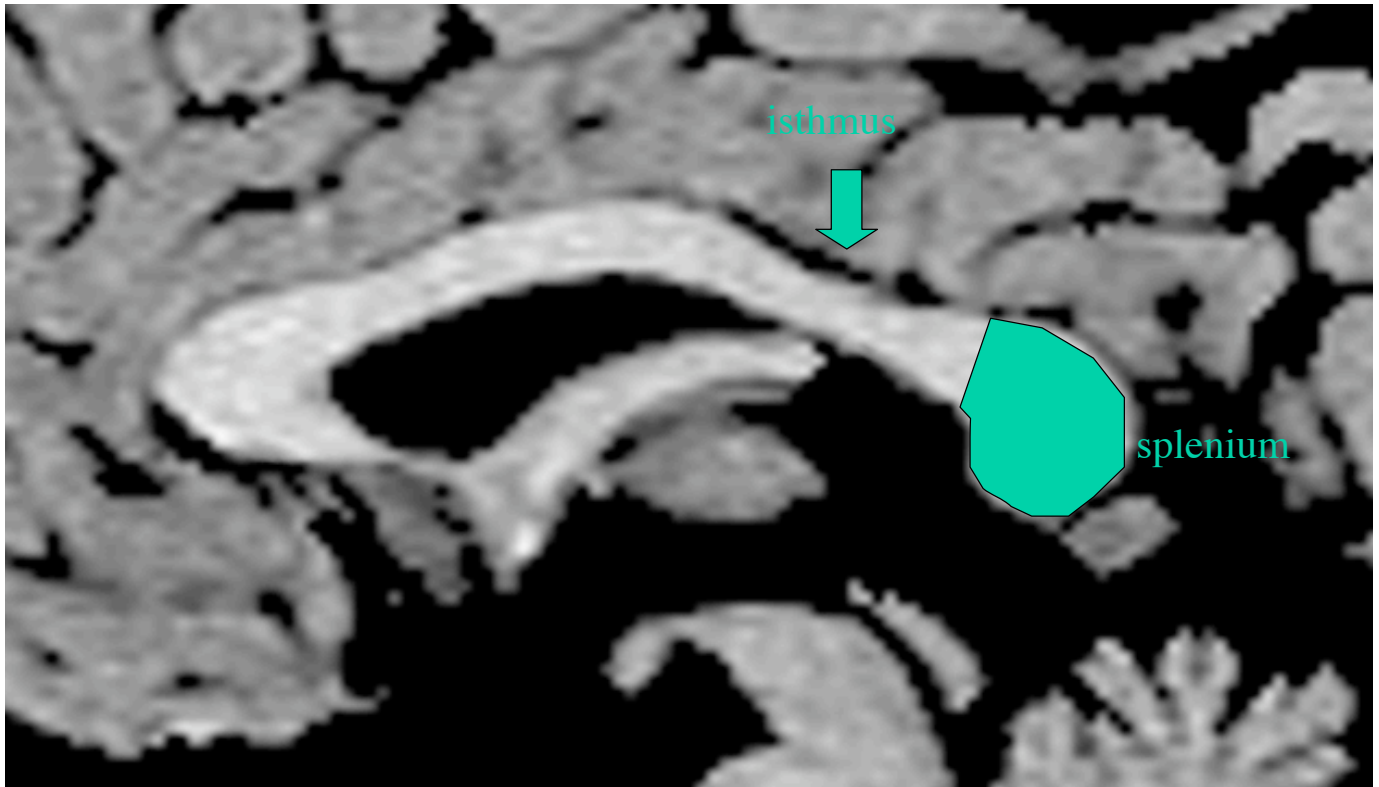
- La presencia de esas asimetrías en el cerebro de primates no humanos sugiere fuertemente una predeterminación genética de los aspectos humanos de asimetría silviana posterior
- Sin embargo, cada vez más evidencias demuestran el papel de factores ambientales, por ej. trabajos en gemelos

Asimetrías corticales : conclusiones (3)

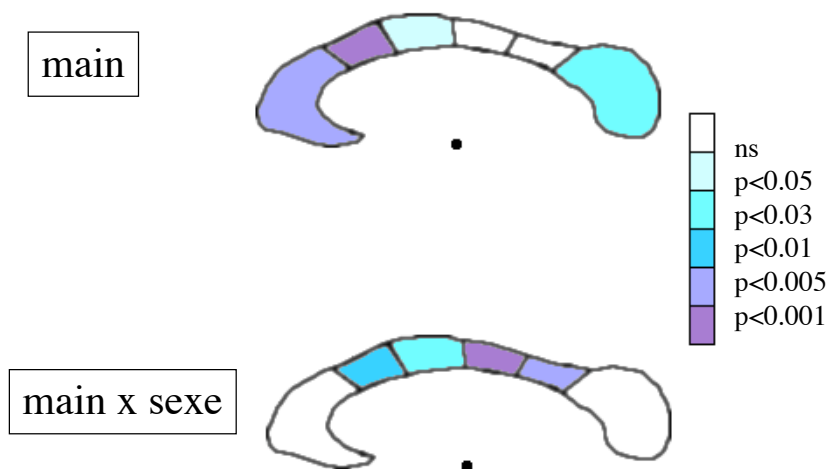
- Asimetrías del área de Broca se apoyan en menos evidencias pero podrían tener mayor importancia, especialmente respecto a la noción de neuronas espejo
- Una anomalía de instalación del "sistema espejo" podría ser subyacente a varias condiciones patológicas, incluyendo algunas formas de autismo.



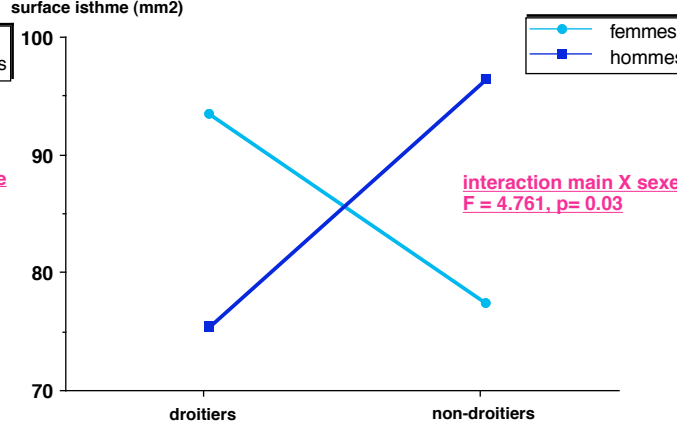
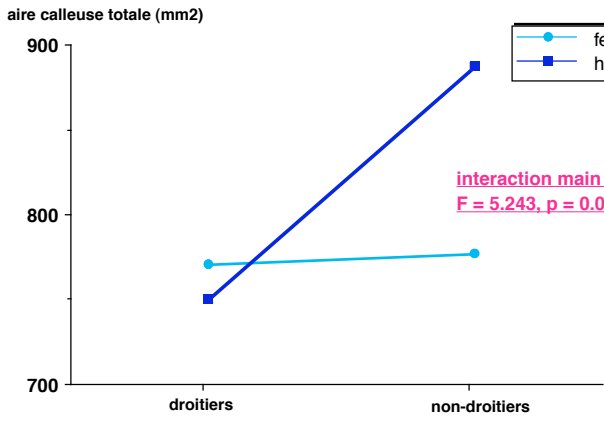




effet de la manualité et du sexe sur
la taille du corps calleux



Habib et al., 1991



Neuroscience and Biobehavioral Reviews, Vol. 21, No. 5, pp. 581-601, 1997
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PII: S0149-7634(96)00049-8

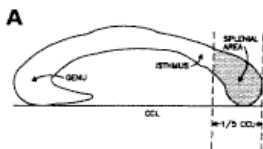
Sex Differences in the Human Corpus Callosum: Myth or Reality?

KATHERINE M. BISHOP¹ AND DOUGLAS WAHLSTEN^{2,*}

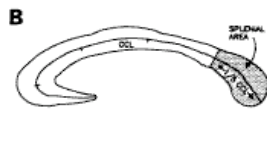
¹Department of Psychology, University of Alberta, Edmonton, Alberta, Canada

SEX DIFFERENCES

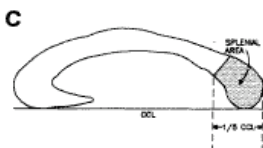
583



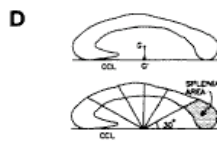
Straight-line Method: a line is drawn perpendicular to the straight-line length of the CC.



Curved-line Method: a line is drawn perpendicular to the curved-line bisector of the CC.

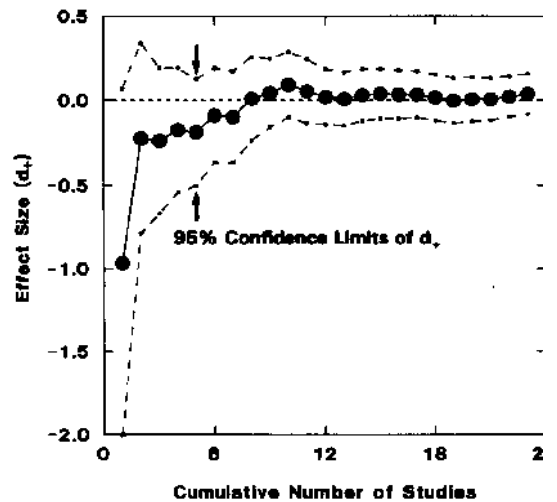


Bent-line Method: a line is drawn perpendicular to the straight-line length of the CC. Where it meets the wall of the CC the line is extended perpendicular to the tangent of the wall.



Radial Gravity Method: the center of gravity of the CC is calculated and projected onto the baseline of the CC. From this point five lines are drawn to cross the CC at 30° intervals. The splenium is the posterior portion.

Sex Difference in Splenium Size



Sex differences in corpus callosum size: relationship to age and intracranial size

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Received 27 October 2000; received in revised form 1 February 2001; accepted 6 February 2001

Abstract

This quantitative MRI study reports measurement of corpus callosum area taken from midsagittal brain images in 51 healthy men and 41 healthy women, spanning the adult age range (22 to 71 years). Men had larger brains and corpora callosa than women, but callosal size did not correlate with age in either sex. Intracranial (i.e.) volume (ICV) and midsagittal i.e. area (ICA) of brain were used in covariate, regression, and ratio analyses to determine whether sex differences in the corpus callosum endured with statistical adjustment for sex differences in maximally attained brain size. With the exception of one ratio measure, the different statistical adjustments for the contribution of sex differences in brain size all indicated that men had larger corpora callosa than women for their brain size.

A subsample of men and women selected to be matched on i.e. volume and age confirmed this statistical observation. Sexual dimorphism in the corpus callosum is not a simple artifact of sex differences in brain size and may reflect differences in connectivity necessitated by differences in brain size. © 2001 Elsevier Science Inc. All rights reserved.

Gender differences in the corpus callosum of neonates

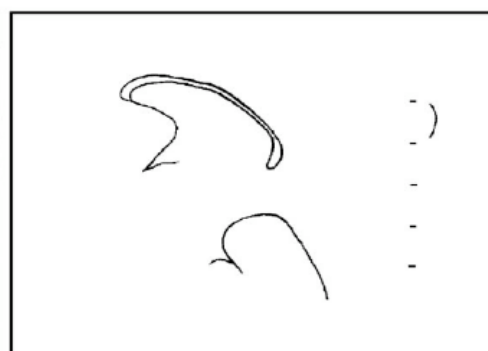
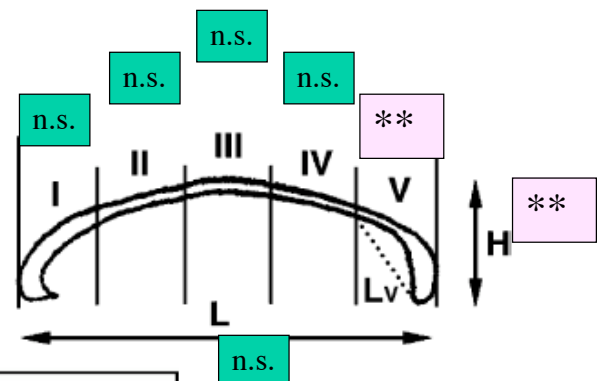
Seung Jun Hwang, Eun-Kyung Ji,¹ Eun-Kyung Lee,² Yong Min Kim,³ Da Young Shin, Young Hyuck Cheon⁴ and Im Joo Rhyu^{4,CA}

Department of Anatomy and Cell biology, College of Medicine, Ulsan University, Seoul; Department of ¹Diagnostic Radiology; ²Pediatrics; ³Obstetrics and Gynecology, CHA General Hospital, College of Medicine, Pochon CHA University, Seoul; ⁴Department of Anatomy, College of Medicine, Korea University, 126-1 Anam dong 5 ka SungBuk Ku, Seoul 136-705, Korea

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Received 5 December 2003; accepted 13 February 2004

Trans-fontanelle ultrasonography in 100 male and 100 female full-term neo-nates



Splenial area F>M
Total height M>F

Sex-related differences in the development of the human fetal corpus callosum: *in utero* ultrasonographic study

Reuwen Achiron^{1*}, Shlomo Lipitz¹ and Anat Achiron²

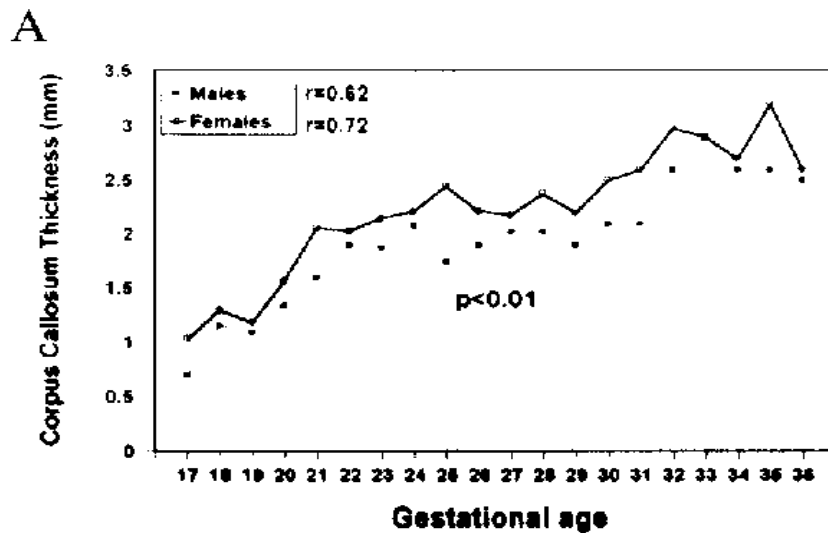
¹*Diagnostic Ultrasound Unit, Department of Obstetrics and Gynecology, The Chaim Sheba Medical Center, Tel Hashomer, and Faculty of Medicine, Tel Aviv University, Israel*

²*Neuroimmunology Unit, The Chaim Sheba Medical Center, Tel Hashomer, and Faculty of Medicine, Tel Aviv University, Israel*

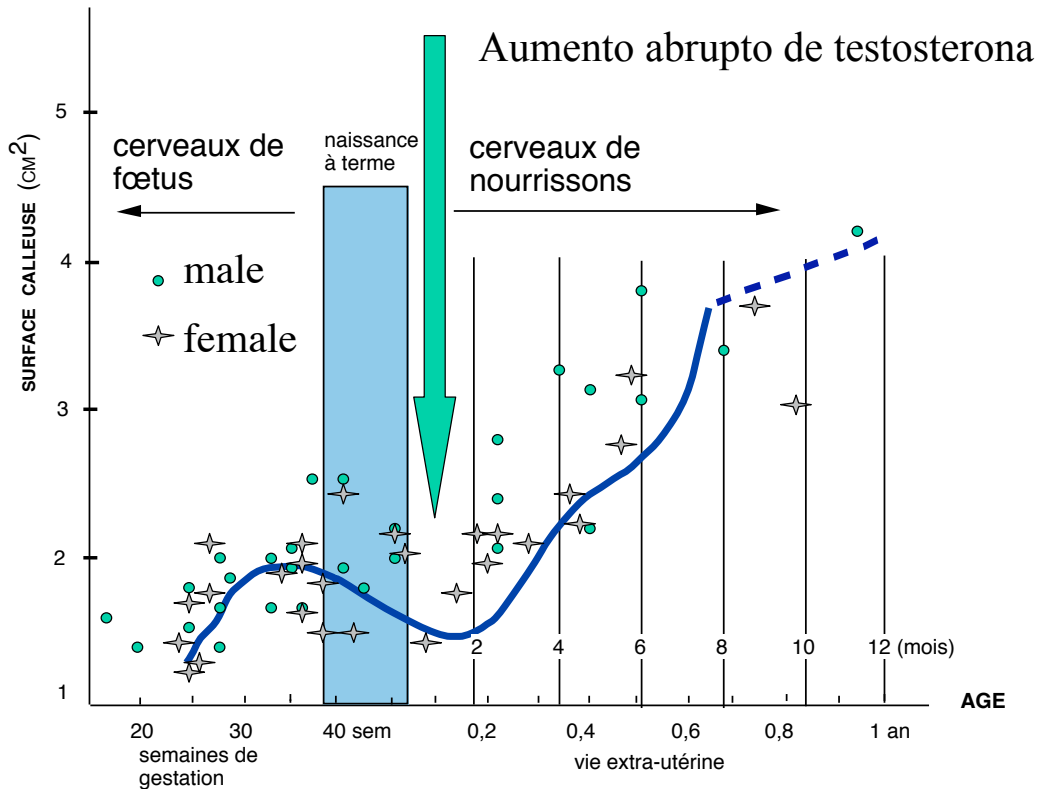


Table 1—Distribution of the number of male and female fetuses according to gestational age

Gestational age (weeks)	Number of examined fetuses	
	Male	Female
16–18	5	14
19–20	21	20
21–22	21	21
23–24	20	20
25–26	19	19
27–28	10	9
29–30	11	11
31–32	8	8
33–34	5	4
35–36	5	4
Totals	125	130



Cuerpo calloso globalmente de mayor espesor en el cerebro femenino



Segun Clarke y Innocenti, 1989



Brain Research 767 (1997) 297–304

BRAIN RESEARCH

Research report

Testosterone is correlated with regional morphology of the human corpus callosum

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Accepted 30 April 1997

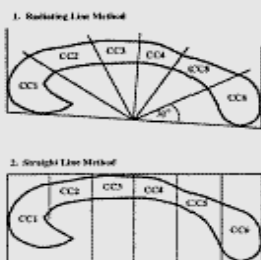


Fig. 1. Callosal measurement techniques. Schematic diagram illustrating the radiating line (top) and straight line (bottom) methods of measurement. See Section 2.2.3 for full description of the measurement techniques.

Table 2

Correlations between testosterone concentrations and regional morphology of the corpus callosum ($n = 68$)

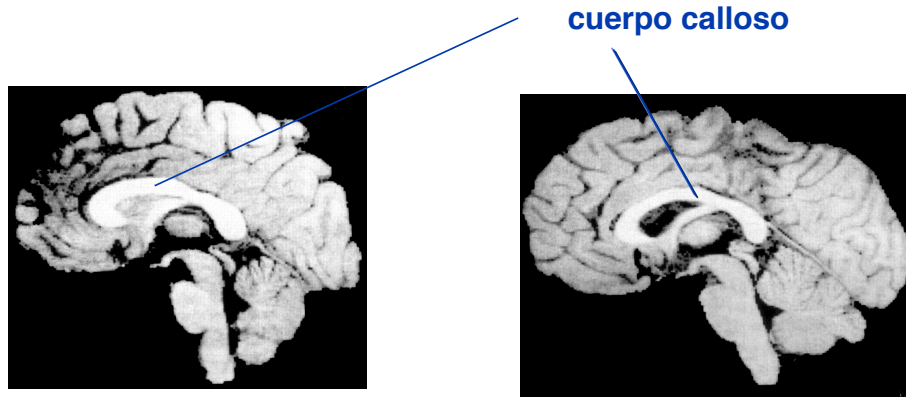
	CC1	CC2	CC3	CC4	CC5	CC6
<i>Radiating line method</i>						
Testosterone (pg/ml)	-0.118	0.073	0.066	0.245 ^c	0.302 ^a	0.197
<i>Straight line method</i>						
Testosterone (pg/ml)	-0.003	0.006	0.010	0.259 ^b	0.261 ^b	0.182

^a $P = 0.01$.

^b $P = 0.03$.

^c $P = 0.04$.

La parte anterior del cuerpo calloso es más amplia en músicos entrenados tempranamente



MÚSICOS

NO - MÚSICOS

(Schlaug et al., 1995)

Corpus callosum: musician and gender effects

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²Faculty of Arts and Sciences, Harvard College, Harvard University, Cambridge, MA 02138, USA

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Received 5 September 2002; accepted 11 December 2002

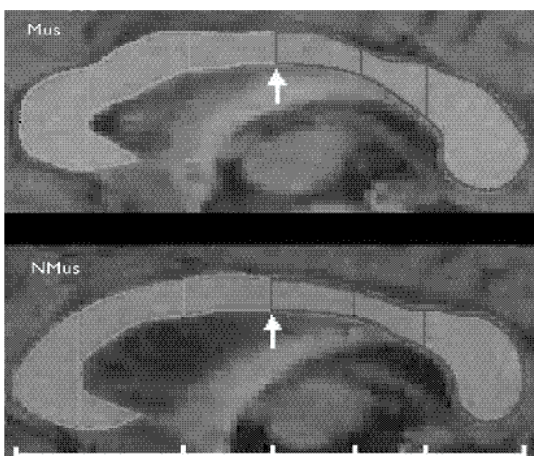


Table 2. Group morphometric data.

Group	Absolute CC area (mm ²)		
	Total	Anterior	Posterior
Male musicians (<i>n</i> = 28)	665 ± 91	342 ± 44 ^a	323 ± 50 ^b
Male non-musicians (<i>n</i> = 28)	619 ± 70	323 ± 40 ^a	296 ± 37 ^b
Female musicians (<i>n</i> = 28)	591 ± 55	304 ± 30	286 ± 31
Female non-musicians (<i>n</i> = 28)	624 ± 75	322 ± 42	302 ± 39

^aSignificant difference between male musicians and male non-musicians, *p* < 0.05.

^bTrend for difference between male musicians and male non-musicians, 0.05 < *p* < 0.10.

Efecto del sexo sobre morfología callosa : conclusiones

- Diferencias morfológicas cuantitativas o cualitativas ("bulbosity", splenio más voluminoso) en mujeres : hallazgos controversiales
- Constatación general de un cuerpo calloso globalmente más grande, más largo y de mayor espesor en el sexo masculino
- El efecto más robusto : interacción sexo x manualidad, sobre todo la parte posterior, sugiriendo un cuerpo calloso más amplio en hombres zurdos (o ambidiestros)
- La testosterona podría desempeñar un papel en la constitución de estas diferencias, actuando sobre el desarrollo mismo de la fibras callosas.

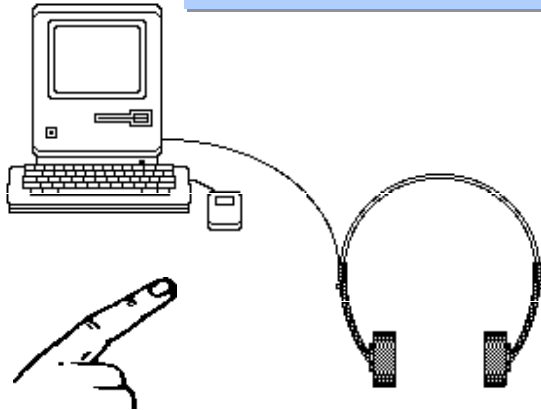


¿CUANDO?

Grimshaw, Bryden & Finegan (1994)

- 53 niños de 10 años (25_, 28_) cuya madre le habían realizado un examen del líquido amniótico durante el embarazo con dosificación de testosterona (16a semana de gestación)
- Medida de índices de lateralización
 - Lateralidad manual
 - Test de escucha dicótica verbal y emocional
- Resultados
 - Correlación **positiva** entre tasas de testosterona en las 16 semanas y lateralidad manual en las niñas
 - Correlación **positiva** entre tasas de T y nivel de respuestas correctas con oreja izquierda en verbal
 - En los niños : solamente correlación **positiva** entre nivel de respuestas correctas con oreja derecha en emocional y tasas de T

Méthode expérimentale



- 4 non-mots (/baʏ//gaʏ//taʏ//kaʏ/)
- 4 émotions (colère, peur, dégoût, tristesse)
- différent dans chaque oreille

réponse : "cliquez" sur la souris, quand vous entendez:

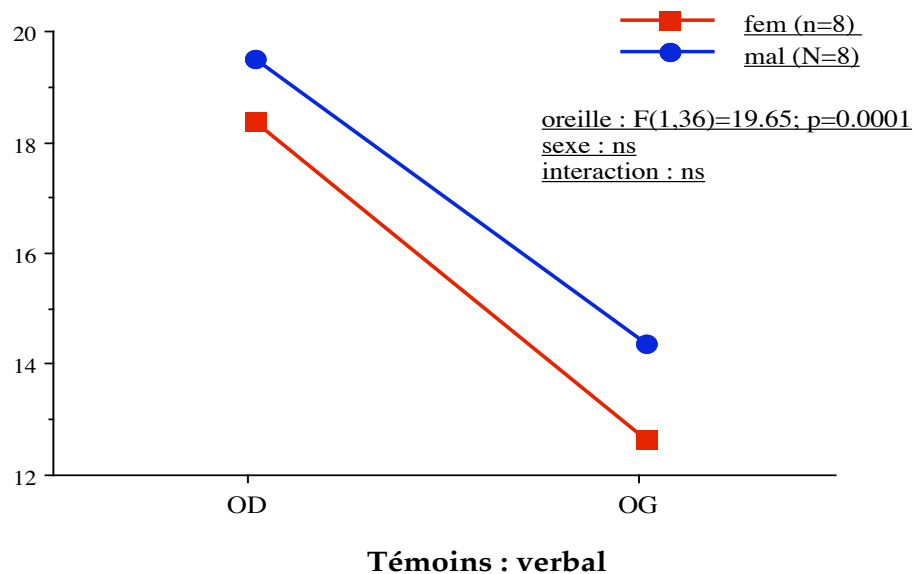
- /b/, /c/, /g/ or /t/
(condition verbale)

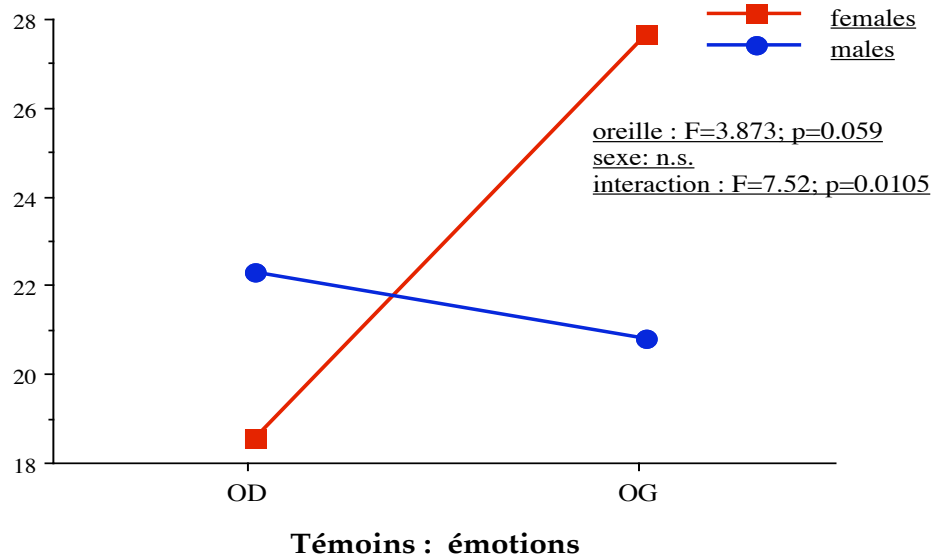
- une émotion donnée
(condition émotionnelle)

72 paires

x 2 (inversion des oreilles)

144 essais





Assessment of emotion and language processing in psychopathic offenders: results from a dichotic listening task

Kristina D. Hiatt*, Amanda R. Lorenz, Joseph P. Newman

Department of Psychology, 1202 West Johnson Street, University of Wisconsin—Madison, Madison, Wisconsin 53706-1611, USA

Table 1
Demographic characteristics^a

Measure	Psychopaths			Controls		
	Low-anxious (<i>n</i> = 10)	High-anxious (<i>n</i> = 11)	Total (<i>n</i> = 21)	Low-anxious (<i>n</i> = 19)	High-anxious (<i>n</i> = 15)	Total (<i>n</i> = 34)
	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)
Age	29.60 (6.11)	28.80 (4.32)	29.20 (5.17)	28.89 (6.24)	28.27 (5.30)	28.62 (5.77)
Education	10.70 (1.49)	9.80 (2.20)	10.25 (1.89)	11.53 (1.50)	10.80 (1.52)	11.21 (1.53)
SILS-estimated IQ	99.38 (11.21)	94.28 (13.35)	96.83 (12.28)	98.47 (11.42)	97.60 (10.62)	98.08 (10.92)
PCL-R	30.90 (0.99)	32.40 (1.58)	31.65 (1.50)	15.42 (4.57)	16.00 (3.18)	15.68 (3.98)
WAS	5.40 (2.59)	26.00 (7.29)	15.70 (11.83)	4.63 (3.53)	19.80 (6.61)	11.32 (9.15)

^a PCL-R, Psychopathy Checklist-Revised; WAS, Welsh Anxiety Scale; SILS, Shipley Institute of Living Scale.

Table 2
Dichotic listening performance, word targets

	Psychopaths			Controls		
	Low-anxious (n=10)	High-anxious (n=11)	Total (n=21)	Low-anxious (n=19)	High-anxious (n=15)	Total (n=34)
	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)
Correct detections	49.80 (9.52)	48.55 (16.80)	49.14 (13.50)	47.74 (14.18)	52.13 (14.87)	49.68 (14.44)
Left Ear	21.10 (8.12)	22.64 (7.88)	21.90 (7.83)	21.63 (6.82)	22.33 (9.58)	21.94 (8.03)
Right Ear	28.70 (7.67)	25.91 (10.08)	27.24 (8.91)	26.11 (9.09)	29.80 (7.34)	27.74 (8.45)
False alarms	17.00 (14.16)	16.55 (10.48)	16.76 (12.05)	14.11 (13.01)	14.40 (10.25)	14.24 (11.70)
Laterality quotient (WLQ)	0.157 (.265)	0.058 (0.169)	0.105 (0.220)	0.089 (0.211)	0.169 (0.211)	0.124 (0.212)
WLQ > 0,% of participants	80.0%	81.8%	81.0%	78.9%	80.0%	79.4%

Word targets :
RE advant.
No group effect

Table 3
Dichotic listening performance, emotion targets

	Psychopaths			Controls		
	Low-anxious (n=10)	High-anxious (n=11)	Total (n=21)	Low-anxious (n=19)	High-anxious (n=15)	Total (n=34)
	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)	<i>M</i> (S.D.)
Correct detections	53.10 (17.10)	54.09 (17.11)	53.62 (16.68)	43.16 (15.00)	52.07 (11.21)	47.09 (13.98)
Left Ear	27.70 (9.20)	28.92 (9.08)	28.83 (8.93)	24.68 (9.11)	30.00 (5.53)	27.03 (8.09)
Right Ear	25.40 (8.90)	25.18 (8.34)	25.29 (8.39)	18.47 (8.11)	22.07 (6.82)	20.06 (7.67)
False alarms	13.00 (11.25)	12.45 (17.00)	12.71 (14.20)	10.32 (13.78)	7.80 (12.31)	9.21 (13.02)
Laterality quotient (ELQ)	0.045 (0.123)	0.068 (0.081)	0.057 (0.101)	0.134 (0.239)	0.163 (0.113)	0.147 (0.192)
ELQ > 0,% of Participants	70.0%	90.9%	81.0%	73.7%	93.3%	82.3%

Emotion targets:
Left-ear advant.
Reduced in psychopaths