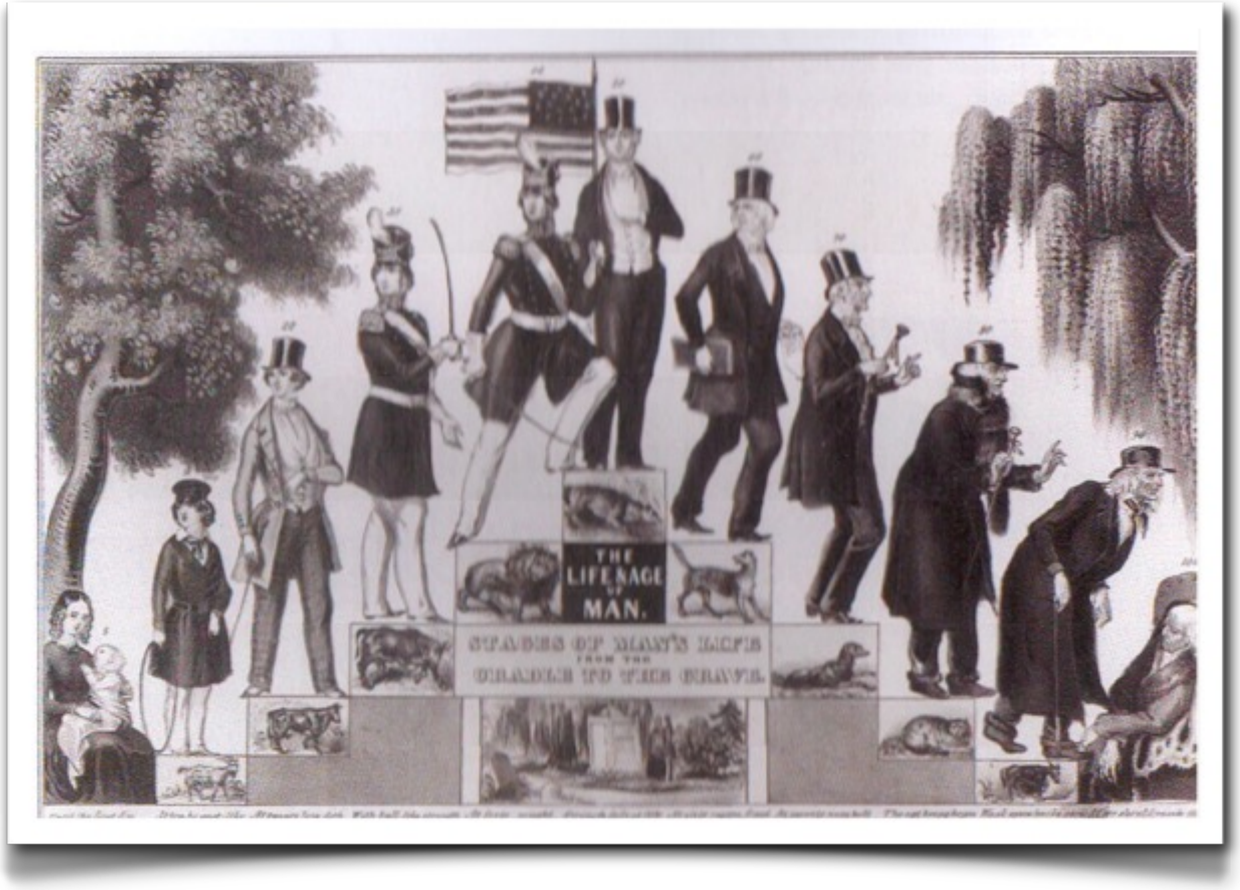
Lernen ein Leben lang?

Das plastische Hirn

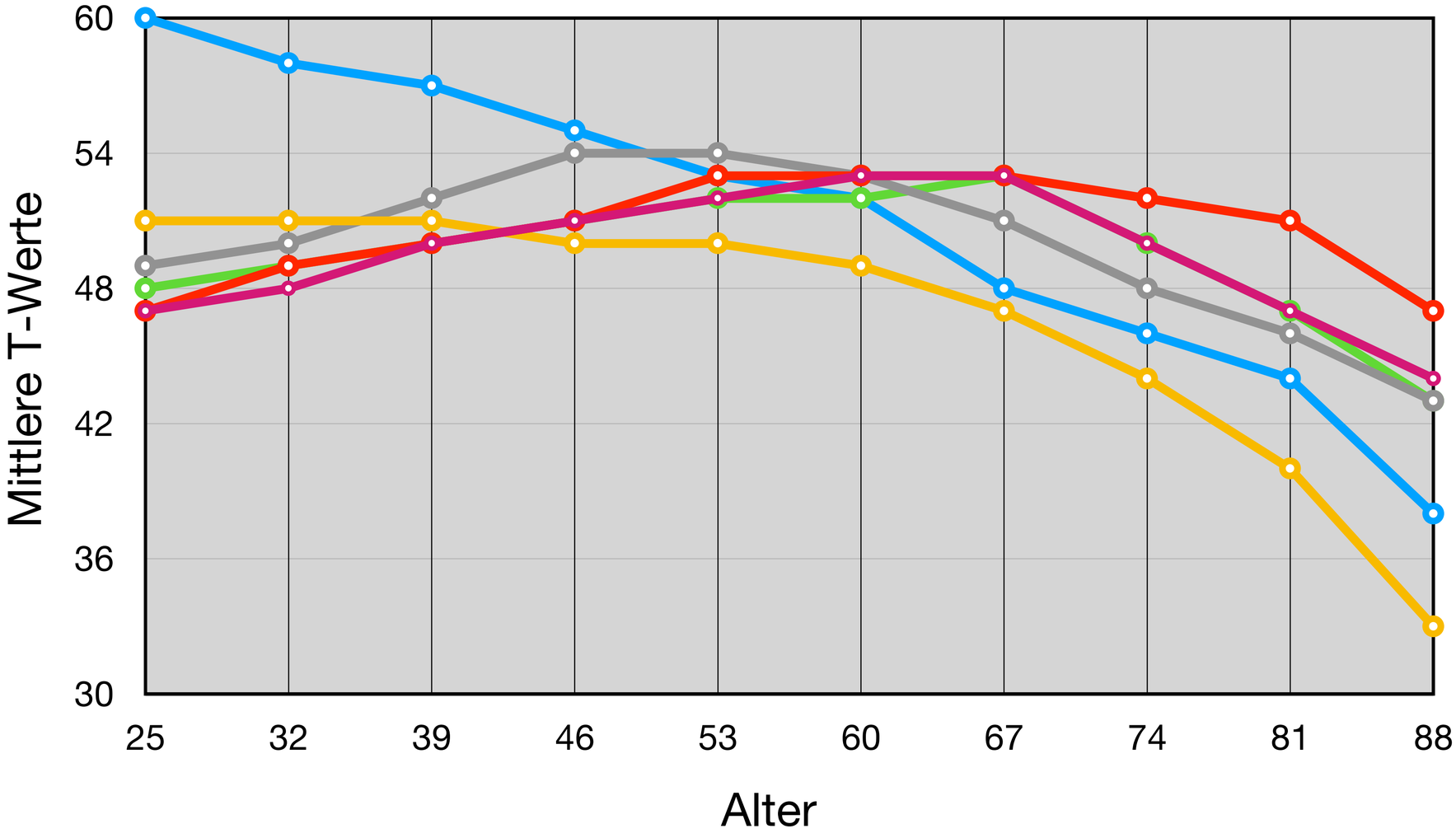
Prolog

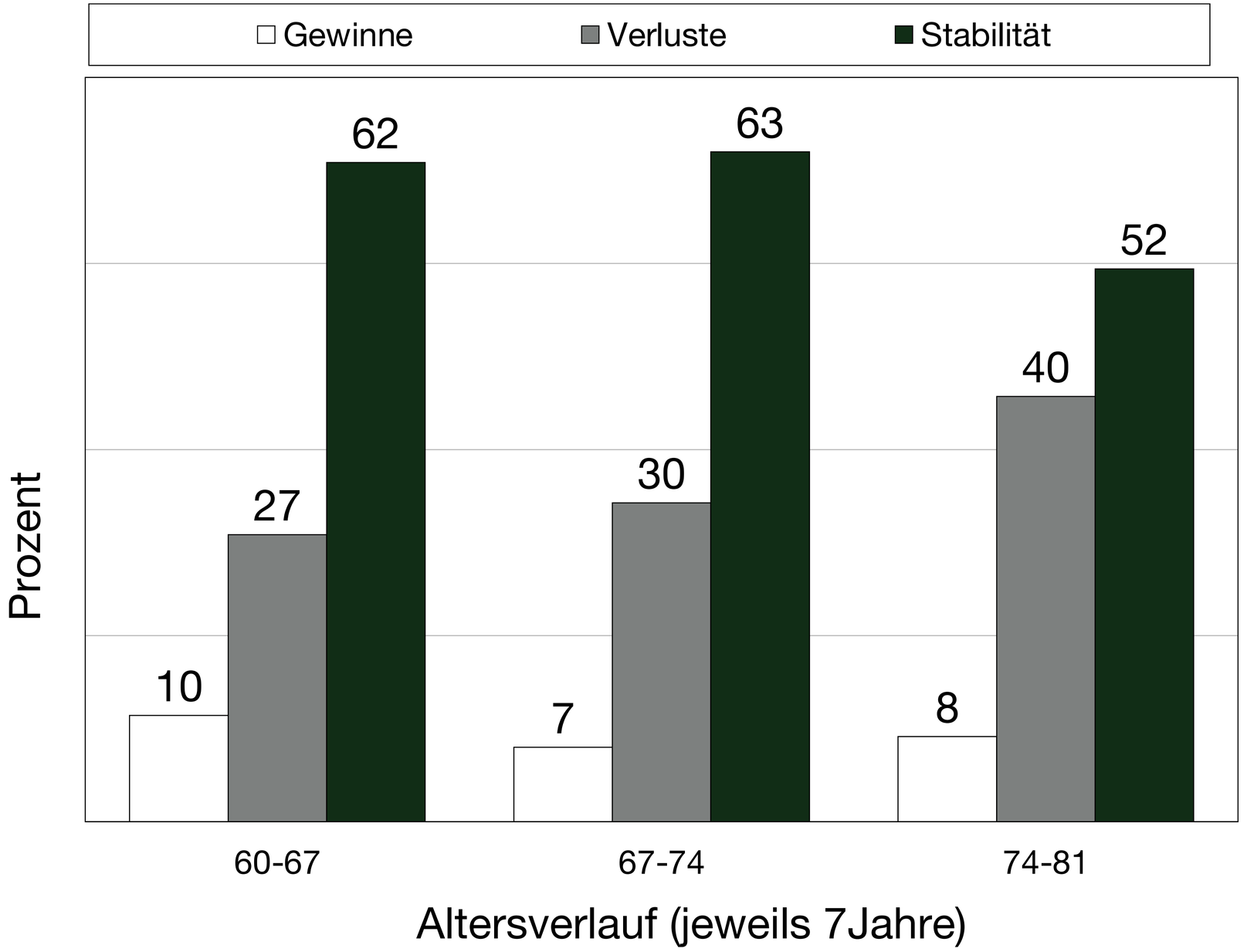
Die Lebensleiter



Alter = Schlechte Leistungen ?

Leistungen in Tests zur Messung wichtiger kognitiver Leistungen

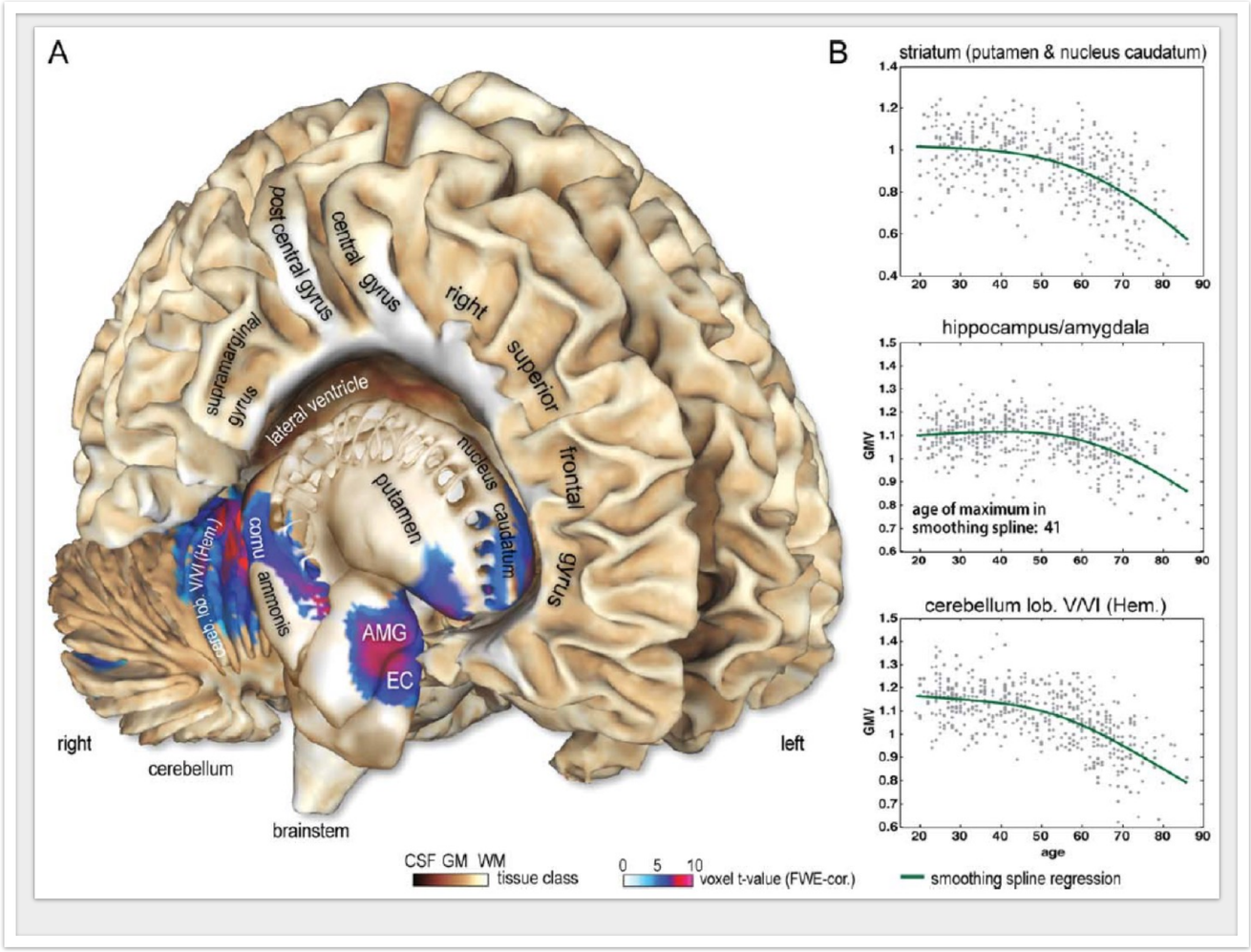




Martin, M. & Kliegel, M. (2014). Psychologische Grundlagen der Gerontologie, 4. Auflage. In C. Tesch-Römer, H.-W. Wahl, S. Weyerer & S. Zank (Reihenhrsg.), Grundriss Gerontologie: Band 3. Stuttgart: Kohlhammer.

Alter = Hirndegeneration ?

Hirnanatomie im Alter ...



Ziegler, G., Dahnke, R., Jäncke, L., Yotter, R. A., May, A., & Gaser, C. (2012). Brain structural trajectories over the adult lifespan. *Human Brain Mapping*, *33*(10), 2377–2389.

Anatomischer Abbau und psychische Leistungen

Psychologische Tests	Varianz altersbedingter Abbau Hirnvolumen	Varianz altersbedingter Abbau Durchblutung
Intelligenz	38%	10%

Rabbitt et al. 2006

n=69, Alter 62-85 Jahre

Die IHAB-Studie in Zürich

University of Zurich[UZH]

Home | Sitemap | Deutsch

International Normal Aging and Plasticity Imaging Center

- About Us
- Events
- Research
- Job Openings
- INAPIC Press Review
- Links
- Machen Sie mit bei unseren Studien!
- Lehre
- URPP Dynamics of Healthy Aging

The International Normal Aging and Plasticity Imaging Center

Processes of aging gain increasing interest in more and more areas of research worldwide. Considering the relatively large number of older workers and old persons in the near future, the amount of plasticity and developmental potentials of behaviors and abilities across normal aging is gaining increasing interest.

The key objective of the International Normal Aging and Plasticity Imaging Center (INAPIC) at the University of Zurich is to facilitate research on normal healthy behavioral and neural development and aging to explore the potential for plasticity and compensation across the lifespan. One central focus at the INAPIC thereby is on the possibilities and mechanisms for stabilization of life quality and health during adulthood as part of a health-focused research approach that extends and complements approaches only dealing with illness and illness-related processes (more information can be found → here ; German only). Studies at the INAPIC use functional and structural MRI at a 3-Tesla scanner, EEG, transcranial magnetic stimulation and transcranial direct current stimulation to uncover neural plasticity. The INAPIC infrastructure also includes an MR simulator used to familiarize study participants with the scanner environment as well as training labs with computers, treadmills, and a driving simulator.

One important goal of the INAPIC is to promote neuroimaging research on healthy aging and plasticity through the establishment of international research collaborations facilitated by 'plug and play' access to the neurophysiological assessment infrastructure as well as technical support and assistance regarding data collection and analyses. The center invites research groups to → submit research proposals for cooperation and use of measurement hours at the 3-Tesla scanner available to the INAPIC to establish international cooperation projects at the highest level of scientific quality.

The INAPIC is unique in Europe in combining the support of long-term longitudinal plasticity and aging research through a planning horizon of several years, the focus on potentials of normal development, and the provision of technical assistance and support to reduce the time of research groups needed to familiarize themselves with the available technical equipment. The INAPIC is supported by an international → advisory board representing neuropsychological, gerontological, medical and dementia-related and imaging experts to ensure the highest quality standards for our research and research cooperations.

The INAPIC is → funded primarily by the ↗ Velux Stiftung .

STUDIENTEILNAHME

→ Mehr Informationen finden Sie hier

Mock Scanner at the INAPIC

Aging & Cognition IfADo 2015 | EUCAS

3rd International Conference
Aging & Cognition 2015
1st conference of the European Cognitive Ageing Society (EUCAS)
Dortmund
23.04. to 25.04.2015

Conference

↓ EUCAS 2015 (PDF, 277 KB)
↗ eucas.org

Job Openings

Click here for more information

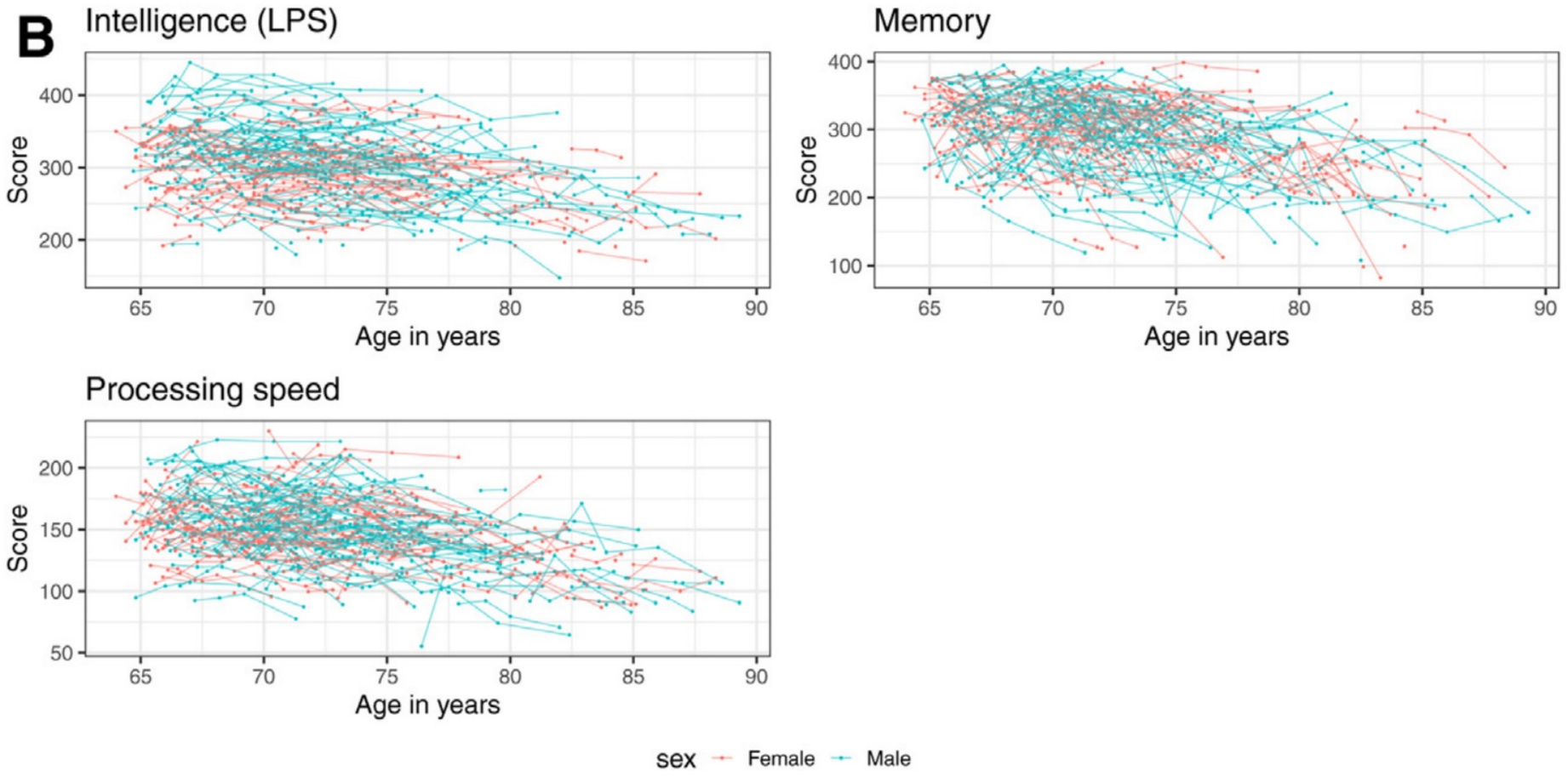
Research Internships for Students (German only)

For information regarding internship opportunities, please see here.

INAPIC Agenda

→ **Keine aktuelle Veranstaltung**

Veränderung der kognitiven Leistungen im Alter

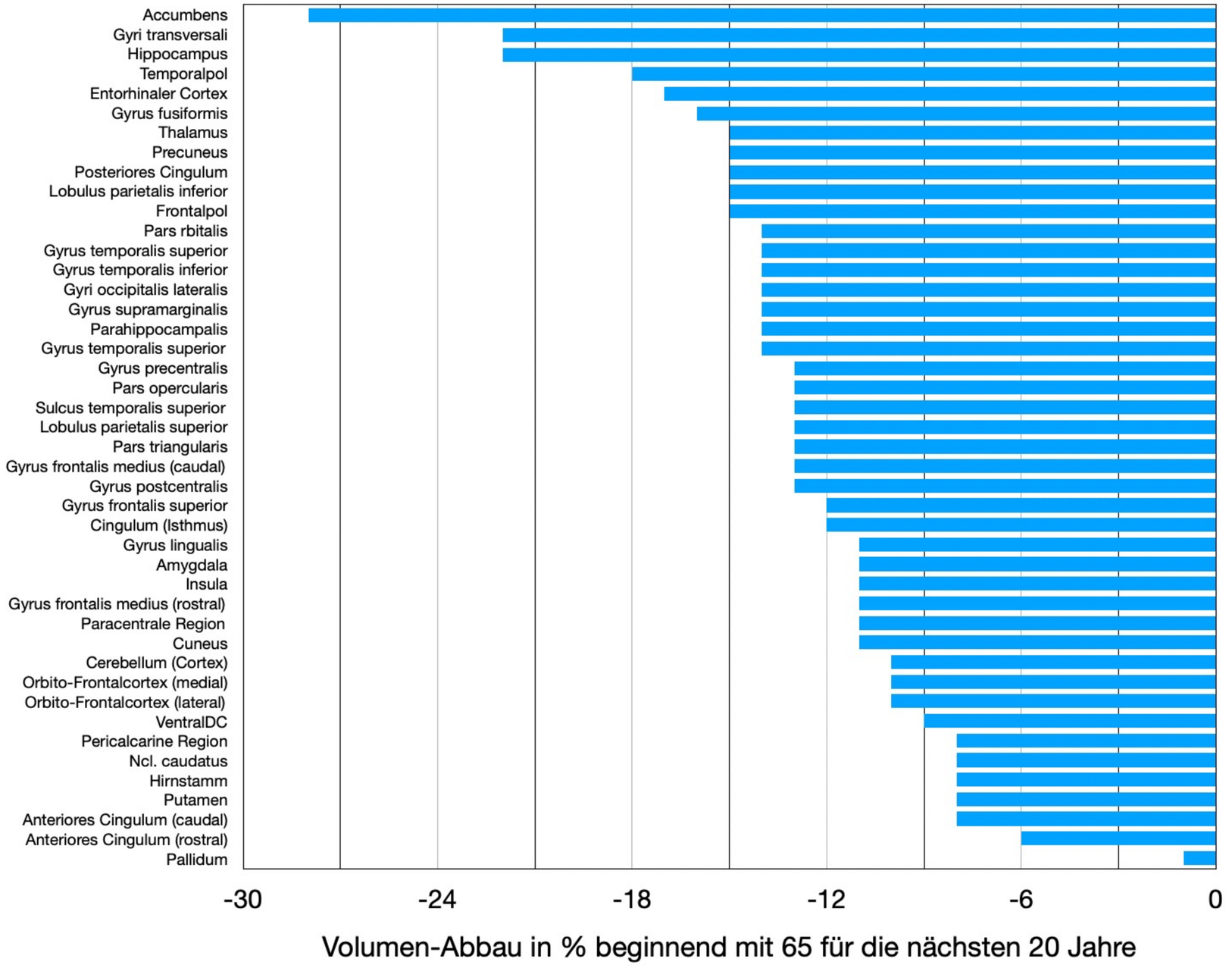


Sele, S., Liem, F., Mérillat, S., & Jäncke, L. (2021). Age-related decline in the brain: a longitudinal study on inter-individual variability of cortical thickness, area, volume, and cognition. *NeuroImage*, *240*, 118370.

Anatomischer Abbau und psychische Leistungen

Psychologische Tests	Varianz altersbedingter Abbau Hirnvolumen	Varianz altersbedingter Abbau Kortikale Dicke
General-Intelligenz	≈ 3%	≈ 0.1%
Geschwindigkeit	≈ 10%	≈ 5%
Gedächtnis	≈ 10%	≈ 5%
Fluency	≈ 15%	≈ 5%
Exekutive Funktionen	≈ 15%	≈ 10%

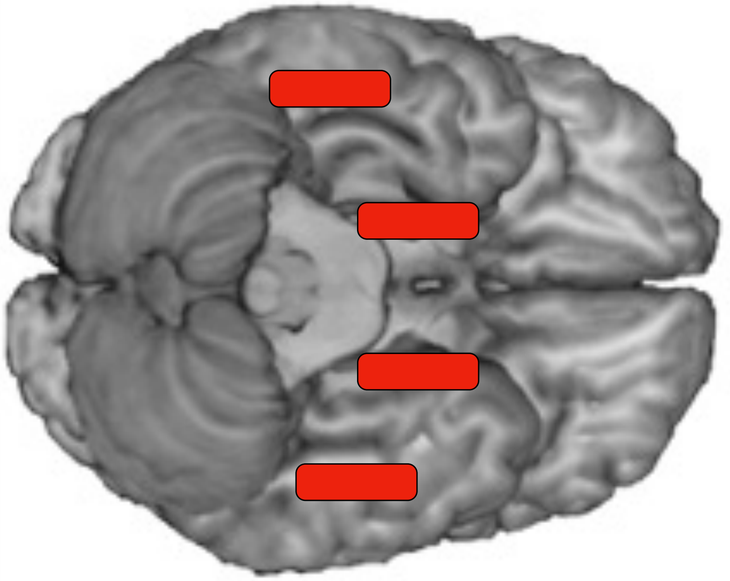
Sele, S., Liem, F., Mérillat, S., & Jäncke, L. (2021). Age-related decline in the brain: a longitudinal study on inter-individual variability of cortical thickness, area, volume, and cognition. *NeuroImage*, *240*, 118370.

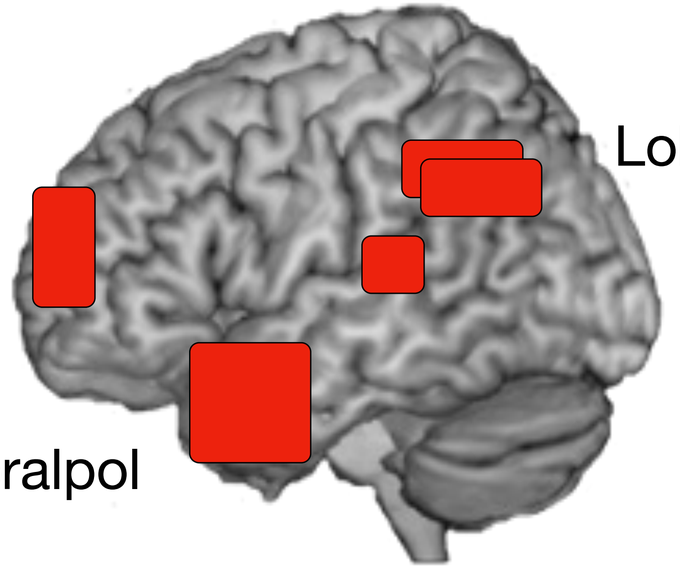


Sele, S., Liem, F., Mérillat, S., & Jäncke, L. (2021). Age-related decline in the brain: a longitudinal study on inter-individual variability of cortical thickness, area, volume, and cognition. *NeuroImage*, *240*, 118370.

Ncl. accumbens

Hippocampus / Gyrus fusiformis





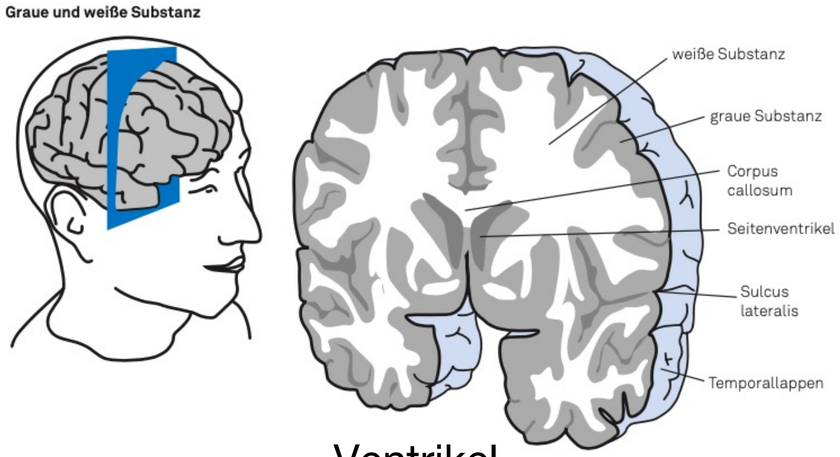
Lobulus parietalis inferior

Frontalpol

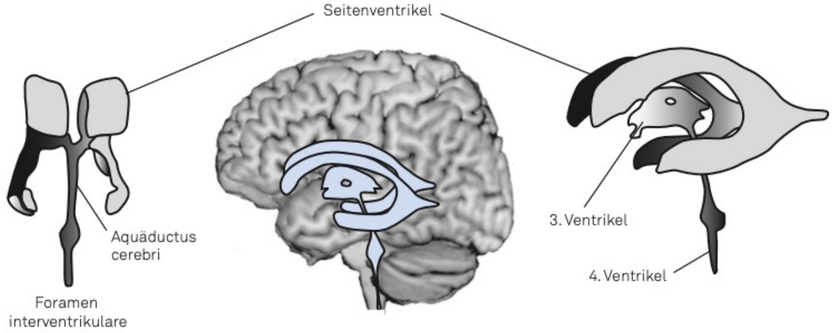
Heschlscher Gyrus

Temporalpol

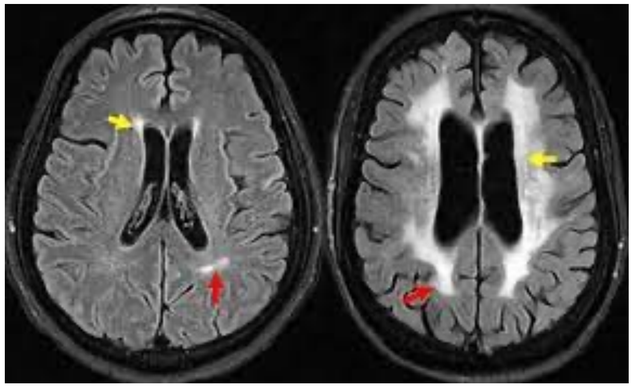
Graue und weisse Substanz



Ventrikel

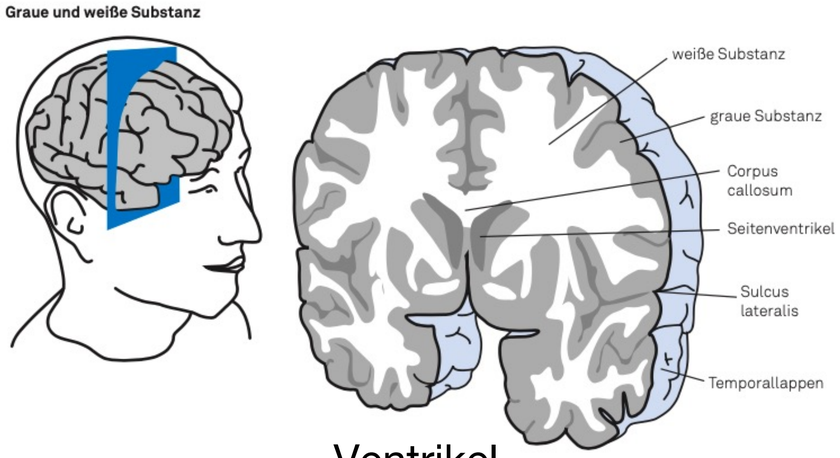


WMH

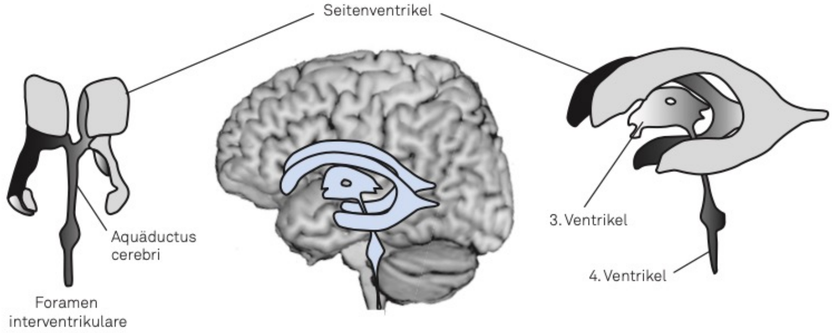


Region	Volumenän-derung	Änderungs-richtung
Graue Substanz (GM)	0.73 %	Abnahme / Jahr
Weisse Substanz (WM)	0.79 %	Abnahme / Jahr
Seitenventrikel (SV)	4 %	Zunahme / Jahr
White-Matter-Hyperintensities (WMH)	7.3 %	Zunahme / Jahr

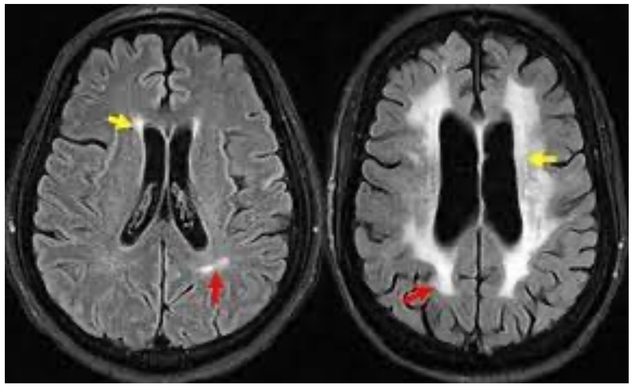
Graue und weisse Substanz



Ventrikel



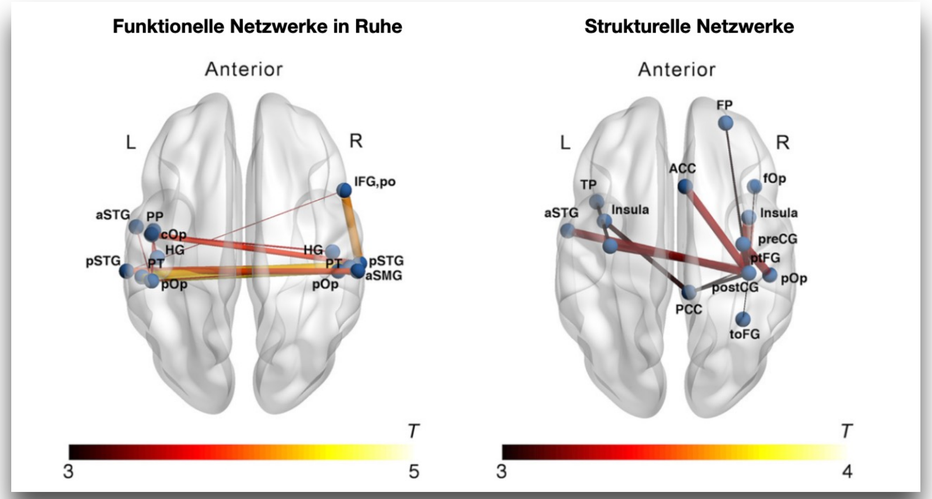
WMH

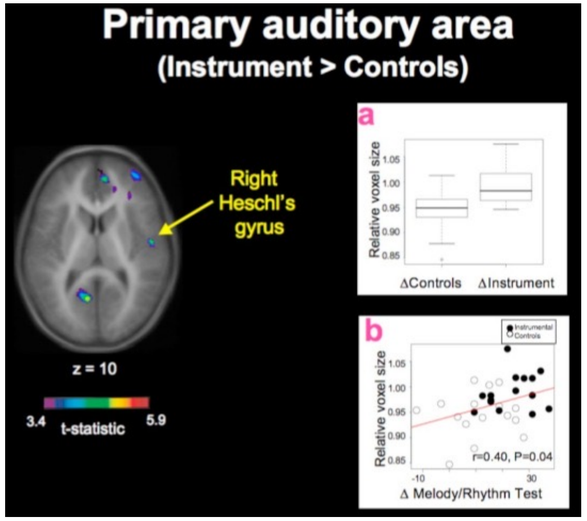


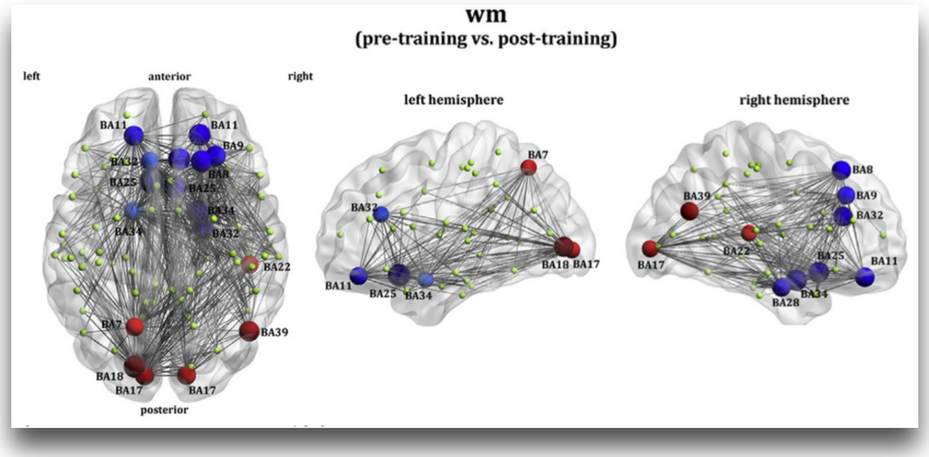
Change	Change	Zusammen-hang
SV	GM	R = -0.51
SV	WM	R = -0.50
SV	WMH	R = 0.50
WMH	GM	R = -0.50

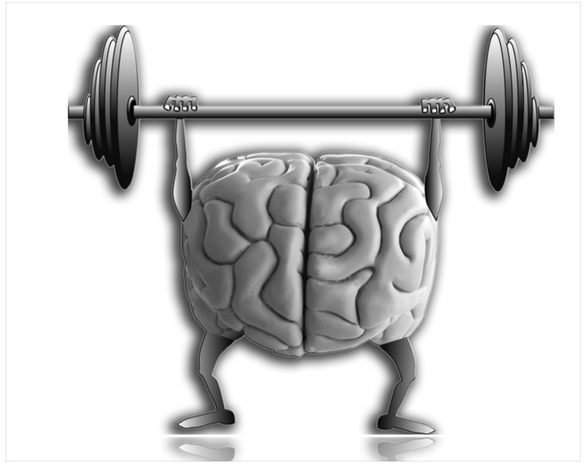
Lernen im Erwachsenenalter

Das plastische Hirn

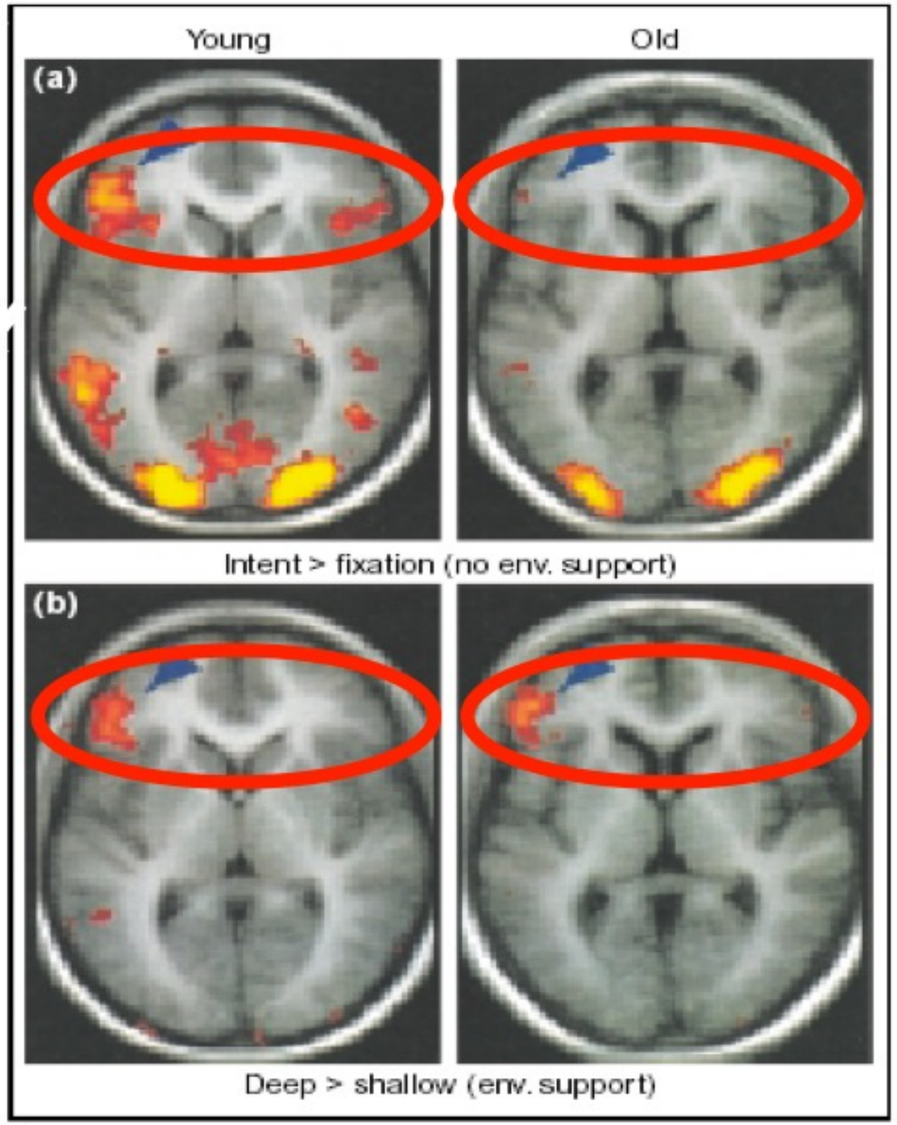








Hirndurchblutung im Alter



Lernen ohne Strategie

Lernen mit Strategie
(elaborierte Verarbeitung)

Logan et al. 2002

Nordic Walking

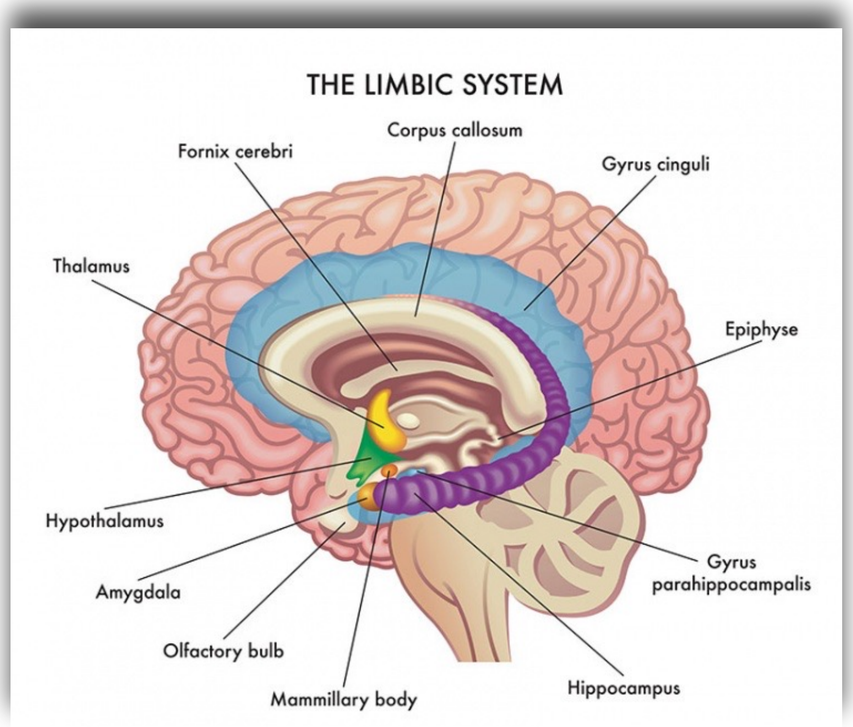
Erickson, K. I., Voss, M. W., Prakash, R. S., Basak, C., Szabo, A., Chaddock, L., Kim, J. S., Heo, S., Alves, H., White, S. M., Wojcicki, T. R., Mailey, E., Vieira, V. J., Martin, S. A., Pence, B. D., Woods, J. A., McAuley, E., & Kramer, A. F. (**2011**). Exercise training increases size of hippocampus and improves memory. *Proceedings of the National Academy of Sciences of the United States of America*, *108*(7), 3017–3022.

Wichtige Ergebnisse

Hippocampus ↑

Gedächtnisfähigkeiten ↑

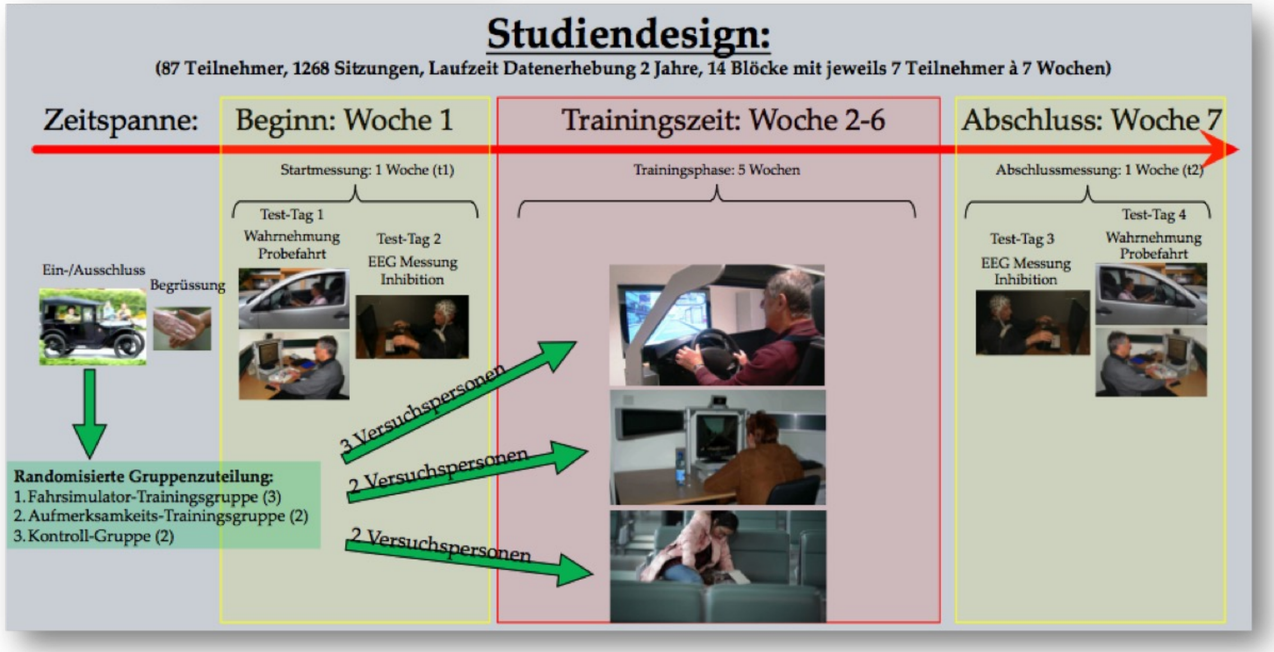
Serumspiegel von **BDNF** ↑



Erickson, K. I., Voss, M. W., Prakash, R. S., Basak, C., Szabo, A., Chaddock, L., Kim, J. S., Heo, S., Alves, H., White, S. M., Wojcicki, T. R., Mailey, E., Vieira, V. J., Martin, S. A., Pence, B. D., Woods, J. A., McAuley, E., & Kramer, A. F. (2011). Exercise training increases size of hippocampus and improves memory. *Proceedings of the National Academy of Sciences of the United States of America*, *108*(7), 3017–3022.

Drive-Wise-Projekt Zürich

Gian Claudio Casutt



Casutt, G., Martin, M., & Jäncke, L. (2016). Driving Simulator Training Is Associated with Reduced Inhibitory Workload in Older Drivers. *Geriatrics*, *1*(3), 16.

Casutt, G., Theill, N., Martin, M., Keller, M., & Jäncke, L. (2014a). The drive-wise project: driving simulator training increases real driving performance in healthy older drivers. *Frontiers in Aging Neuroscience*, *6*, 85.

Casutt, G., Theill, N., Martin, M., Keller, M., & Jäncke, L. (2014b). The drive-wise project: driving simulator training increases real driving performance in healthy older drivers. *Frontiers in Aging Neuroscience*, *6*, 85.

Wichtige Ergebnisse

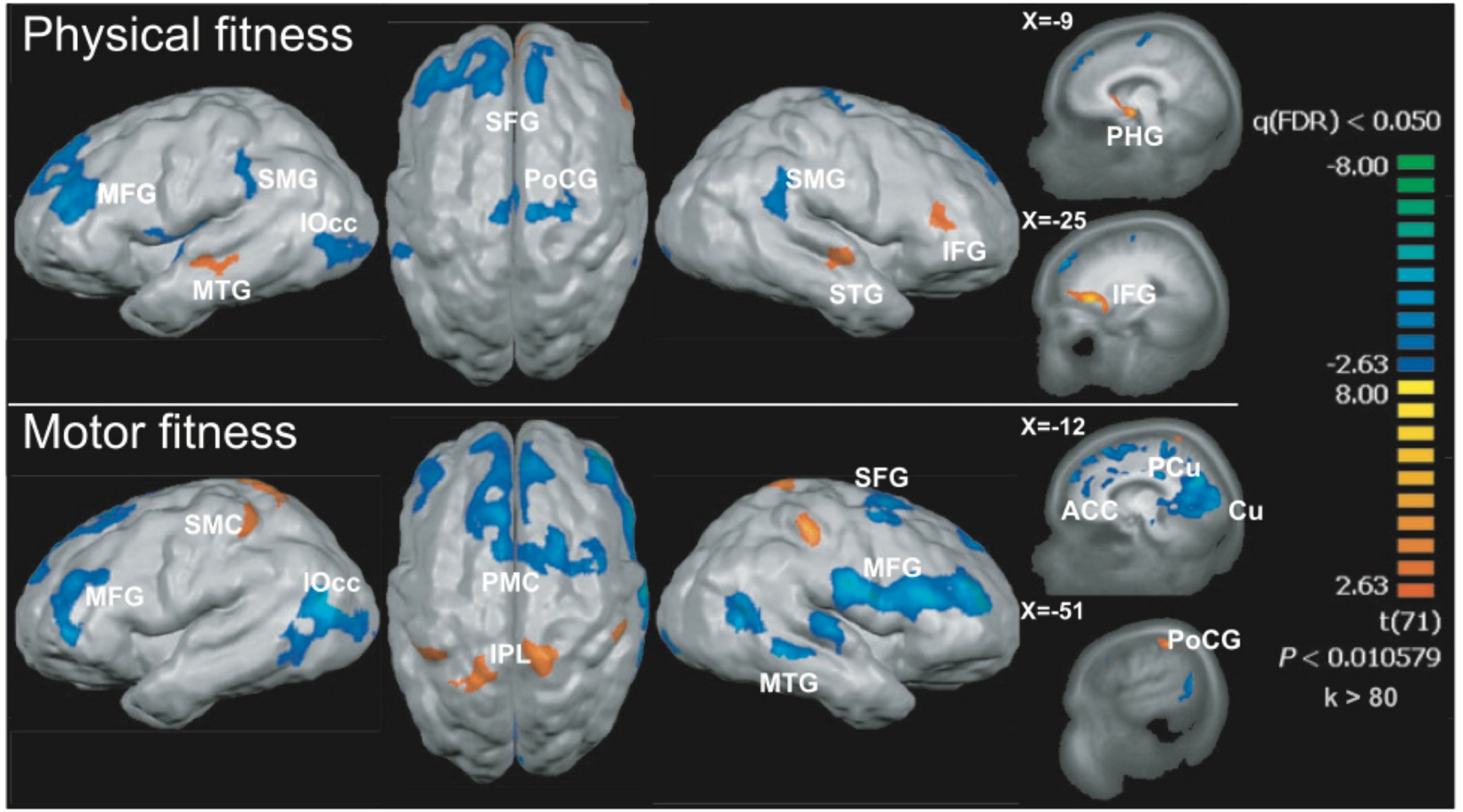
Fahrsimulatortraining ↑ kognitive Leistungen.

Fahrsimulatortraining ↑ Inhibitionsleistungen.

Fahrsimulatortraining ↑ Fahrleistungen.

Fahrsimulatortraining = **Multitaskigtraining**

Hirnaktivität beim Lösen von Aufgaben (Exekutive Funktionen)



Ballesteros, S., Voelcker-Rehage, C., & Bherer, L. (2018). *Cognitive and Brain Plasticity Induced by Physical Exercise, Cognitive Training, Video Games and Combined Interventions*. Frontiers Media SA.

NeuroImage 284 (2023) 120461

Contents lists available at ScienceDirect

NeuroImage

journal homepage: www.elsevier.com/locate/ynimg

Associations between white matter hyperintensities, lacunes, entorhinal cortex thickness, declarative memory and leisure activity in cognitively healthy older adults: A 7-year study

Isabel Hotz [1,*], Pascal Frédéric Deschwanden [1], Susan Mérillat, Lutz Jäncke

Dynamics of Healthy Aging, University Research Priority Program (URPP), University of Zurich, Stampfenbachstrasse 73, Zurich CH-8006, Switzerland

Wichtige Ergebnisse

Ausdünnung des entorhinalen Kortex
= schlechtere Gedächtnisleistungen

Körperliche & **soziale Aktivität** mit
65 = geringere Ausdünnung des
entorhinalen Kortex

Gute Bildung = gute
Gedächtnisleistung

Leichter **Alkoholkonsum** reduziert
Abbau des entorhinalen Kortex

Rauchen steigert Abbau des
entorhinalen Kortex

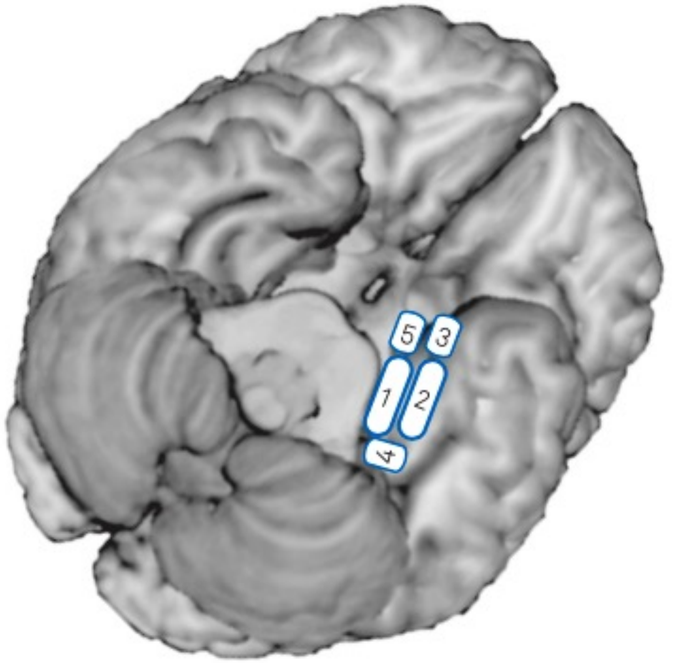


Abbildung 13-8: Die wichtigen mesiotemporalen Hirngebiete. Dargestellt ist die basale Ansicht. 1: Hippocampus, 2: Gyrus parahippocampalis, 3: perirhinaler Kortex, 4: entorhinaler Kortex, 5: Amygdala.

Die Bronx-Studie

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Leisure Activities and the Risk of Dementia in the Elderly

Joe Verghese, M.D., Richard B. Lipton, M.D., Mindy J. Katz, M.P.H.,
Charles B. Hall, Ph.D., Carol A. Derby, Ph.D., Gail Kuslansky, Ph.D.,
Anne F. Ambrose, M.D., Martin Sliwinski, Ph.D., and Herman Buschke, M.D.

ABSTRACT

Alltagstätigkeiten und Demenz

Dalle-E-3 (26.10.2023)

+

Dalle-E-3 (26.10.2023)

+

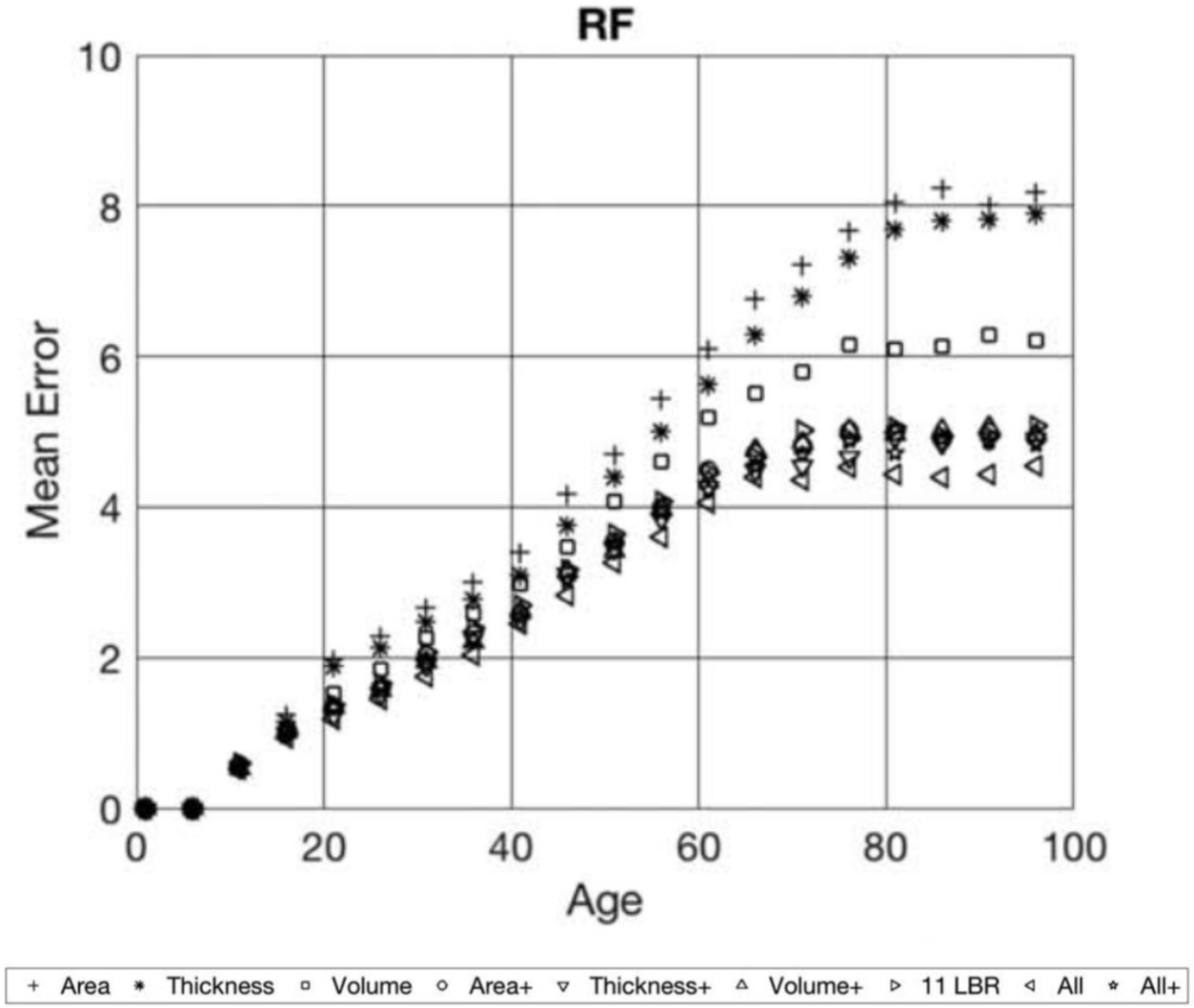
Dalle-E-3 (26.10.2023)

+

?

Verghese et al. (2006). Leisure activities and the risk of amnestic mild cognitive impairment in the elderly. *Neurology*, *66*(6), 821–827.
Verghese et al. (2003). Leisure activities and the risk of dementia in the elderly. *The New England Journal of Medicine*, *348*(25), 2508–2516.

Bestimmung des Alters anhand anatomischer Besonderheiten



Valizadeh, S. A., Hänggi, J., Mérillat, S., & Jäncke, L. (2017). Age prediction on the basis of brain anatomical measures. *Human Brain Mapping*, *38*(2), 997–1008.

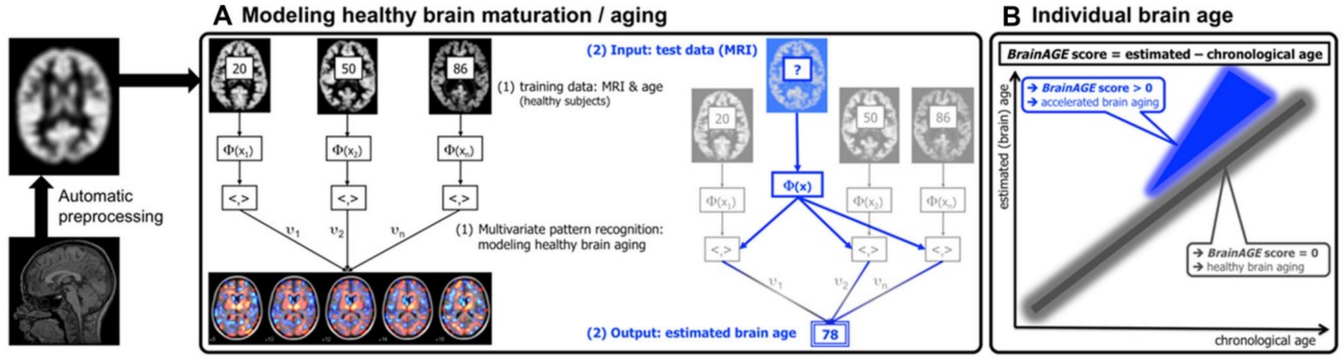
Chronologisches und biologisches Alter des Gehirns

Brain Struct Funct (2018) 223:297–305
https://doi.org/10.1007/s00429-017-1491-2

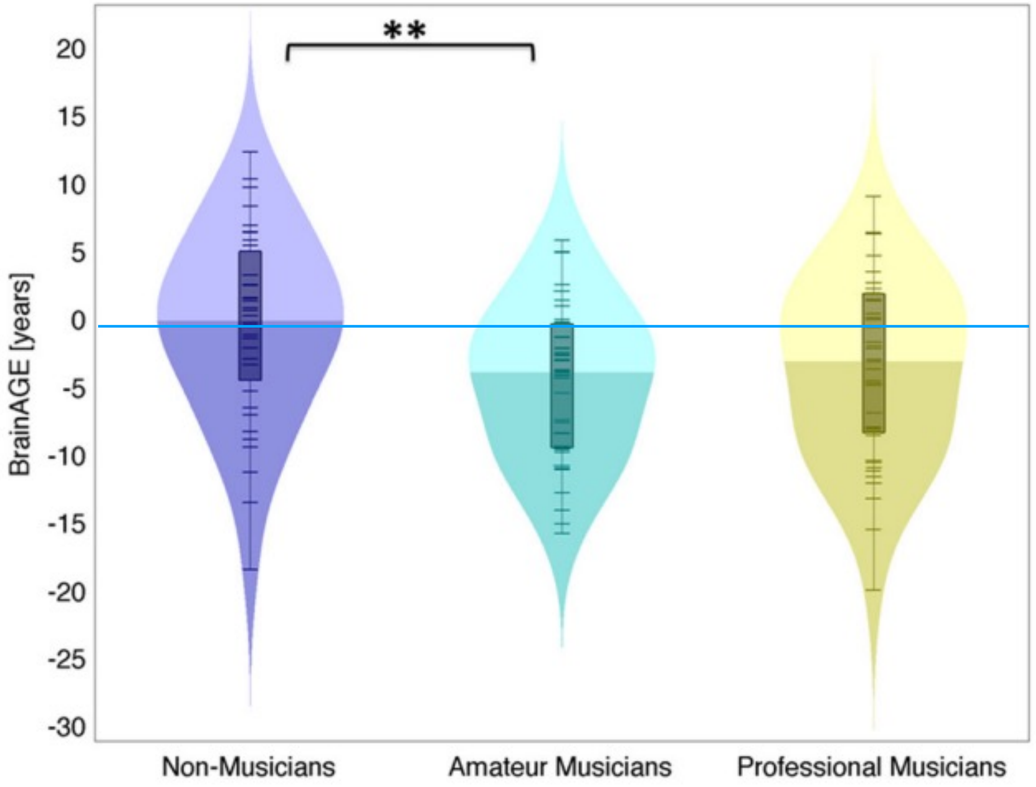
ORIGINAL ARTICLE

Keeping brains young with making music

Lars Rogenmoser[1] · Julius Kernbach[1,2] · Gottfried Schlaug[1] · Christian Gaser[3]



Musizierende haben ein „jüngeres“ Gehirn



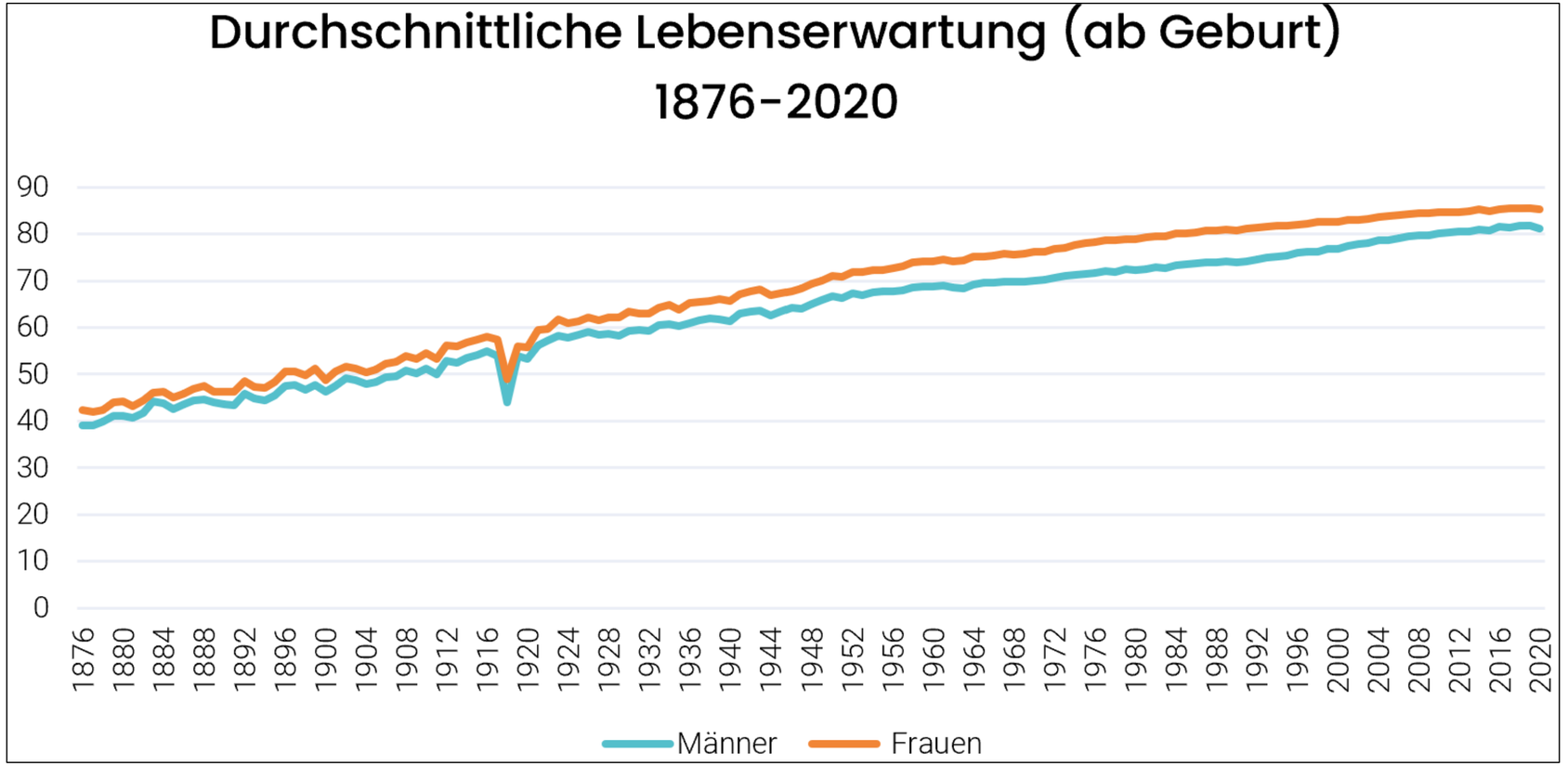
Rogenmoser, L., Kernbach, J., Schlaug, G., & Gaser, C. (2018). Keeping brains young with making music. *Brain Structure & Function*, *223*(1), 297–305.

Was muss sich ändern?

Die Einstellung zum Alter muss sich ändern !

Dalle-E-3 (26.10.2023)

Lebenserwartung in der Schweiz



Bundesamt für Statistik (2022)

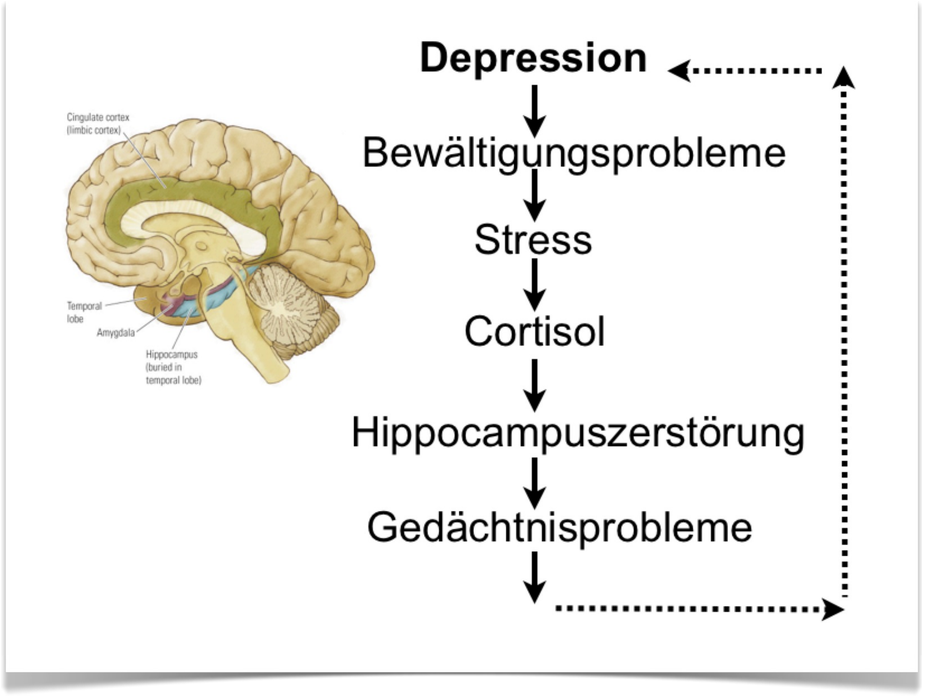
Alter im Wandel der Zeit





Stress …


Stress, Belastungen,
Krankheiten
Lebenszeit in Jahre


Cingulate cortex
(limbic cortex)
Temporal
lobe
Amygdala
Hippocampus
(buried in
temporal lobe)
Depression
Bewältigungsprobleme
Stress
Cortisol
Hippocampuszerstörung
Gedächtnisprobleme

Welches sind die besten Anti-Aging-Interventionen?

Untersuchte Einflussfaktoren

Ernährung

(Homocystin / Vit. B6, B12 & Folsäure / Antioxidantien / Fett / Ernährungsmuster, Vitamine, mediterrane Ernährung)

Soziale Kontakte, Freizeitaktivität & körperliche Betätigung

Hormonsubstitution

(Östrogen / Progesteron)

Aspirin und andere NSAIDs

(nonsteroidal antiinflammatory drugs)

Ginko Biloba

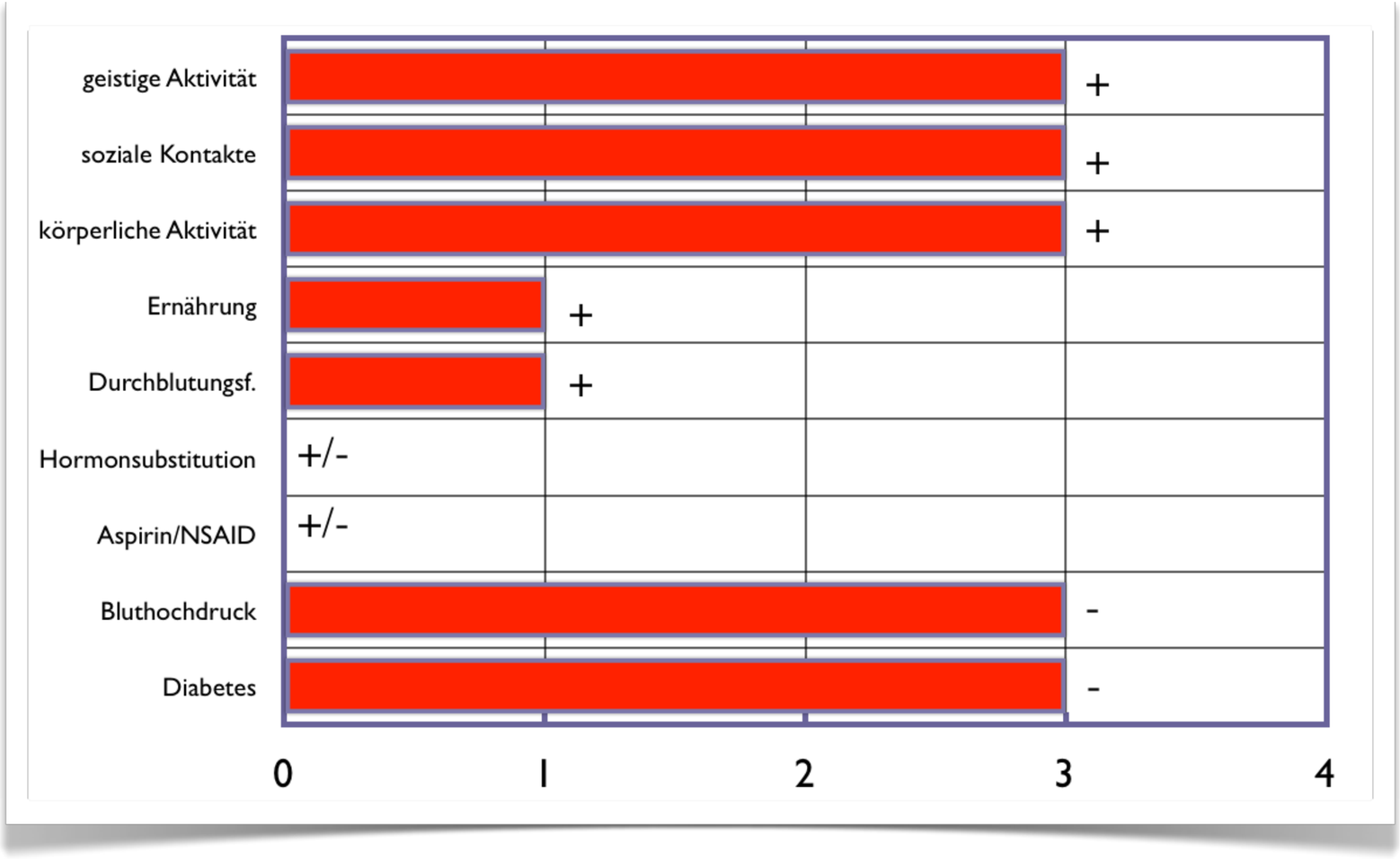
Andere Vasodilatoren

Bluthochdruck

Diabetes

Coley, N., Andrieu, S., Gardette, V., Gillette-Guyonnet, S., Sanz, C., Vellas, B., & Grand, A. (2008). Dementia prevention: methodological explanations for inconsistent results. *Epidemiologic Reviews*, *30*, 35–66.

Einflussfaktoren auf geistige Fitness im Alter !



nach Coley et al., 2008

Konklusion


DEMENZ
IST DOOF

Fazit

- Das Gehirn ist plastisch auch im Alter.
- Wir können immer noch lernen.
- **Use it or lose it**
- Kognitive & anatomische Reserve
- Lebensfreude - Aktivität

Selbstdisziplin - Ästhetik

Dalle-E-3 (26.10.2023)

Herzlichen Dank für Ihre Aufmerksamkeit !