DZNE
Deutsches Zentrum für Neurodegenerative Erkrankungen
in der Helmholtz-Gemeinschaft

OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG
Bereich SPORTWISSENSCHAFT

Tanzen gegen Demenz?

Prof. Dr. med. Notger Müller
DZNE & Otto-von-Guericke Universität, Magdeburg

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Lifestyle › Health & Families › Health News

Dementia research: Drug firms despair of finding cure and withdraw funding after a catalogue of failures

Alzheimer's will cause global economic crisis without breakthrough in treatment, experts warn

Charlie Cooper | @charliecooper8 | Tuesday 17 February 2015 | 0 comments

24.08.2012

SPIEGEL ONLINE

Demenz-Medikament

Pharmakonzerne scheitern reihenweise an Alzheimer-Arzneien

Bei der Suche nach einem Medikament gegen Alzheimer gibt es schon wieder einen Rückschlag: Innerhalb eines Monats musste der dritte Pharmakonzern in Folge einräumen, bei der Entwicklung einer Arznei gescheitert zu sein. Der Wirkstoff hatte sich in der Erprobung als weitgehend wirkungslos erwiesen.

Indianapolis - Die Suche nach der Superpille geht weiter: Der US-Pharmakonzern Eli Lilly and Company hat bei der Entwicklung eines Medikaments gegen Alzheimer einen Rückschlag erlitten. In der letzten Erprobungsphase vor der Zulassung habe der Wirkstoff Solanezumab das Studienziel nicht erreicht, teilte der Arzneimittelhersteller am Freitag mit. Bei einigen Patienten hätte der Wirkstoff aber zumindest eine Verschlechterung des Zustandes gebremst.

Über das weitere Schicksal des Mittels will Eli Lilly nach Gesprächen mit den Zulassungsbehörden entscheiden. An den Studien hätten weltweit mehr als 2050 Patienten aus 16 Ländern teilgenommen.

Ein Medikament, das gegen Alzheimer wirkt, wäre ein Segen für zahlreiche Menschen - und würde dem Hersteller riesige Profite versprechen: Mehr als 36 Millionen Menschen leiden laut Alzheimer-Weltbericht derzeit an einer Demenz, die meisten von ihnen an Alzheimer. Bis 2030 werden es wohl über 65 Millionen sein.

Published on FierceBiotech (http://www.fiercebiotech.com)

Pfizer writes off $725M Dimebon pact after final Phase III failure

January 17, 2012 | By John Carroll

The last flickering hope that Medivation's Dimebon could help Alzheimer's disease patients has just been extinguished. The biotech announced this morning that a 12-month study of the drug failed to register significant improvements for patients, mirroring two shorter Phase III studies in which Dimebon failed to outperform a sugar pill. Pfizer ($PFE) took the opportunity to bow out of its partnership, writing off its $225 million upfront and $500 million milestone program for what proved to be another embarrassing pipeline failure.

In 2008, Dimebon looked like an odds-on success, with positive data from a Russian study and 10 years of sales experience to underscore its safety. But Medivation ($MDVN) was shaken to the core when its first late-stage study ended in failure, with an additional pratfall for Huntington's disease to cap the disaster.

INDIANAPOLIS, Aug 17, 2010 /PRNewswire via COMTEX News Network/ -- Eli Lilly and Company (NYSE: LLY) will halt development of semagacestat, a gamma secretase inhibitor being studied as a potential treatment for Alzheimer's disease, because preliminary results from two ongoing long-term Phase III studies showed it did not slow disease progression and was associated with worsening of clinical measures of cognition and the ability to perform activities of daily living.

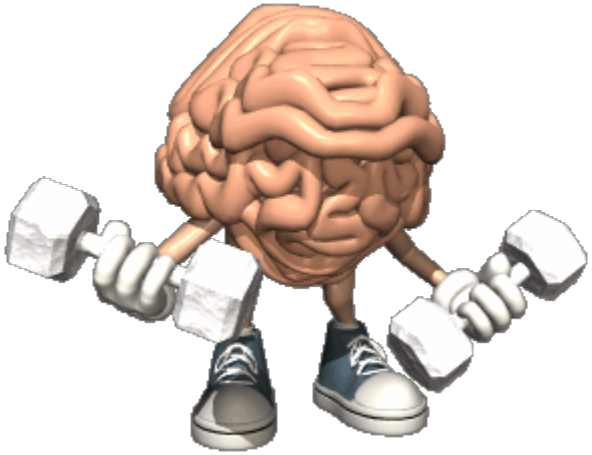
Cochrane Database of Systematic Reviews:

There is no evidence that MPACs (PBT1 or PBT2) are of benefit in Alzheimer's dementia

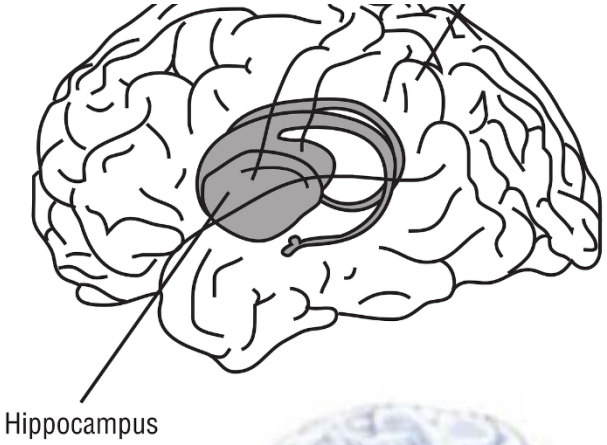
May 16, 2012

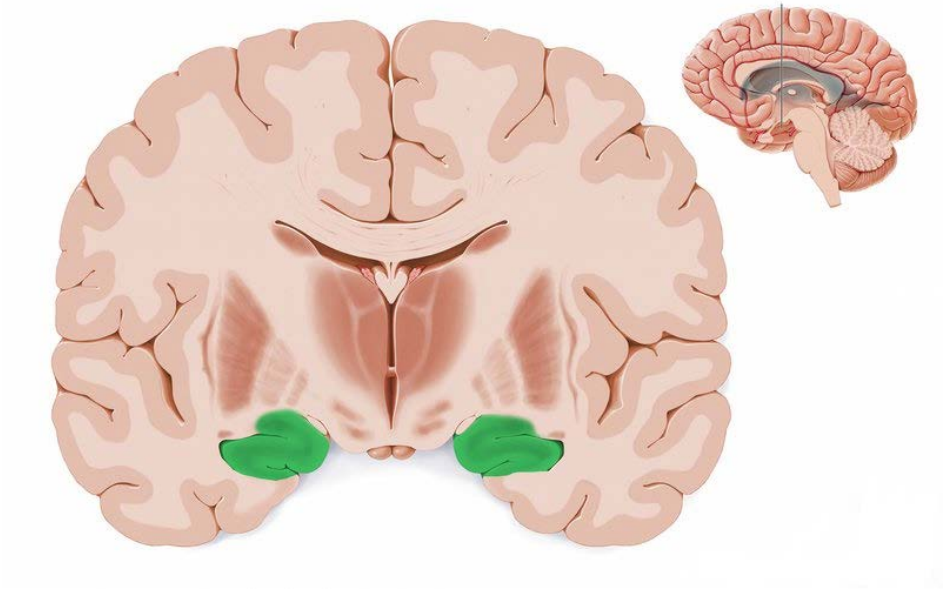
Lilly

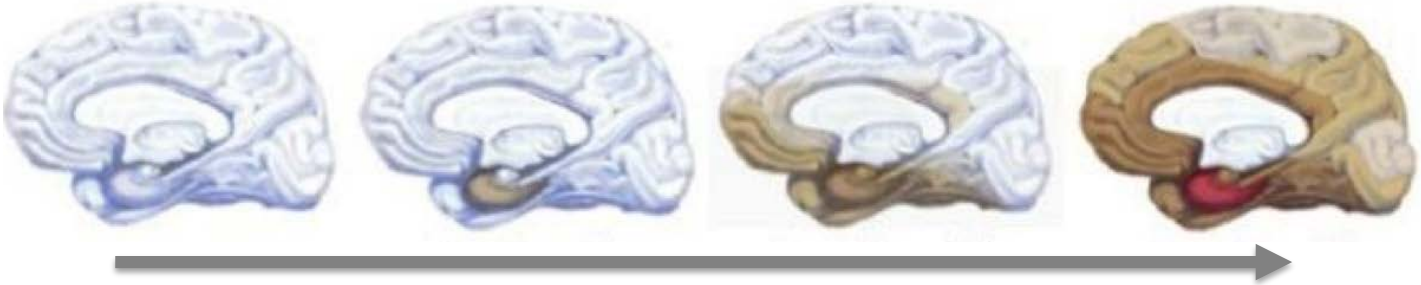
Prävention statt Medikamenten? Oder: Train your brain



Wichtigste Hirnregion für das Gedächtnis: Hippocampus

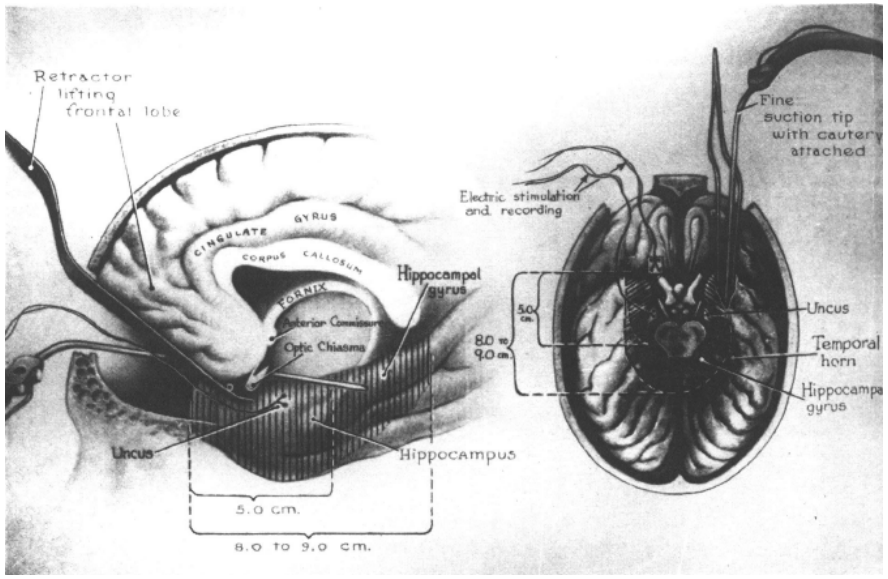






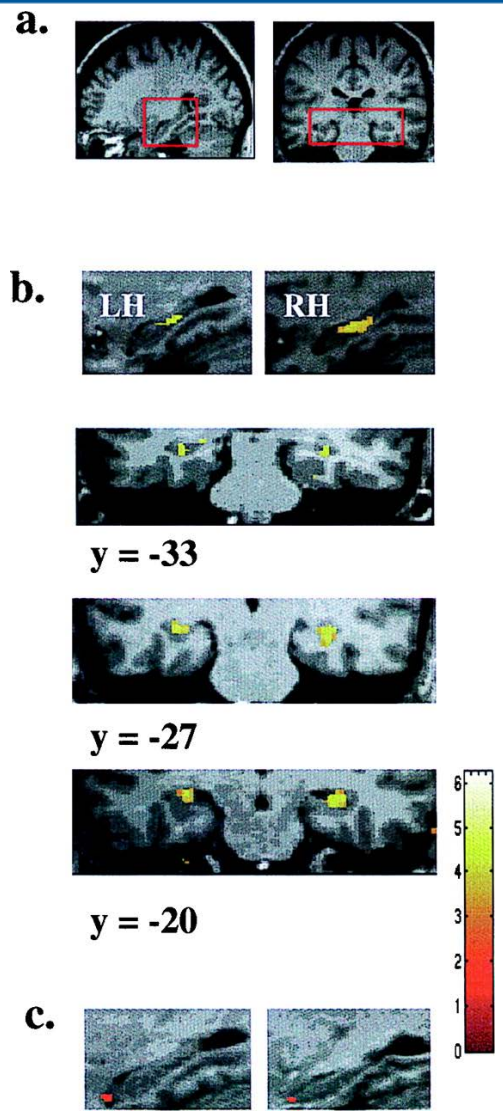
Alzheimer beginnt im Hippocampus

Der Fall H.M.

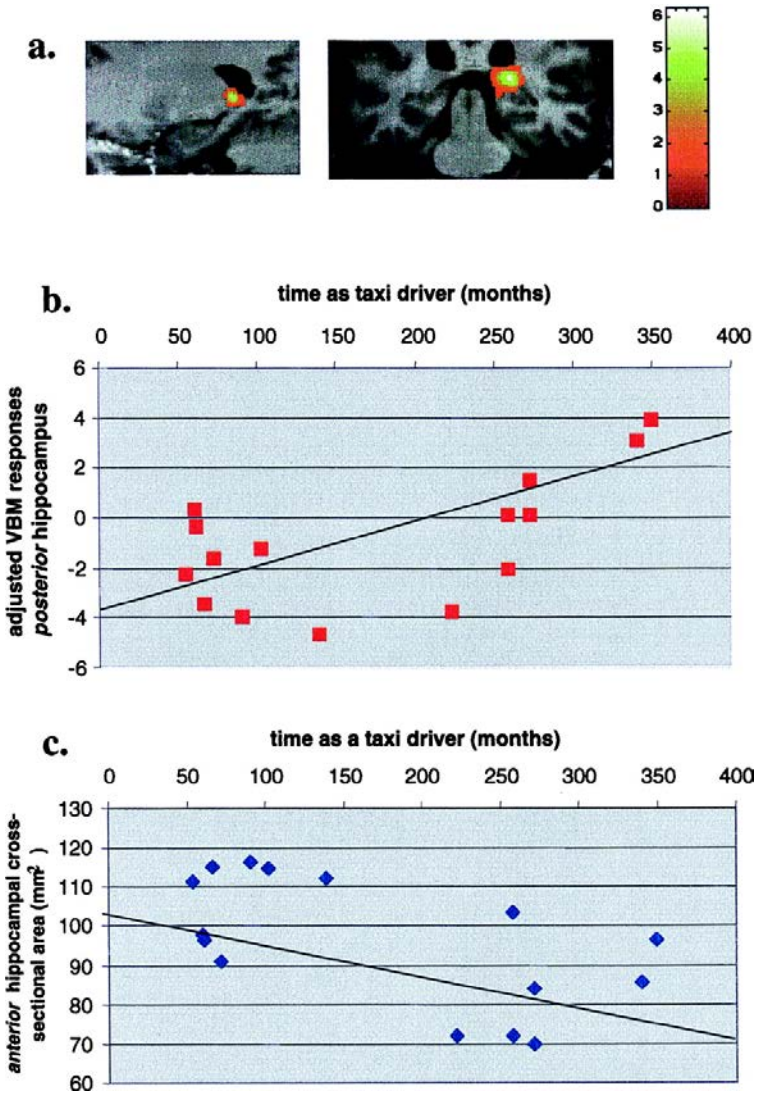


- 1953 im Alter von 27 J wg. schwerer Epilepsie operiert: beide Hippocampi wurden entfernt
- Nach OP: Keine Anfälle mehr, auf den ersten Blick unbeeinträchtigt
- Dann aber: Schwere anterograde Amnesie: HM konnte sich nichts Neus mehr dauerhaft merken (Neugedächtnis-Störung)
- Blieb stehen in der Zeit vor der OP (erschrak als er einen alten Mann im Spiegel sah)
- Alte Gedächtnisinhalte blieben intakt

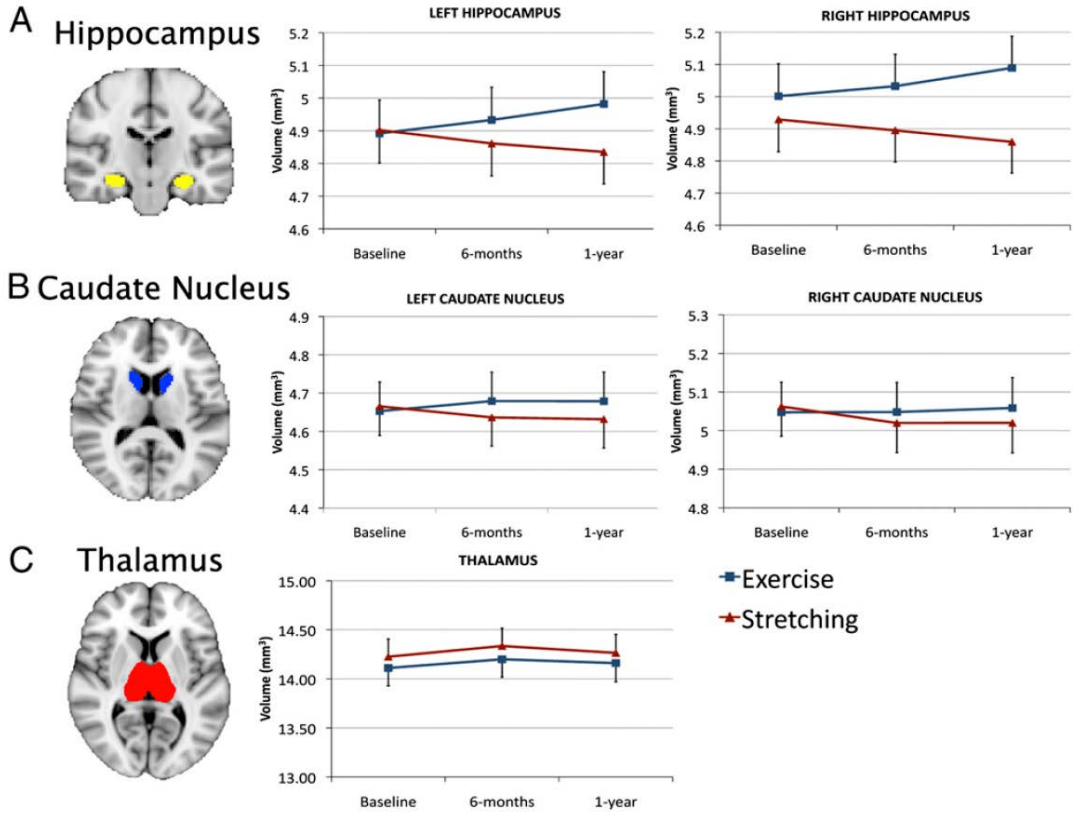
Gedächtnistraining (Taxifahren) und Hippocampus



Maguire et al, PNAS, 2000



Sport und Hippocampus



Erickson et al, PNAS, 2011

- 120 gesunde Senioren
- Die Hälfte machte 1 Jahr aerobes Fitness-Training
- Die andere Hälfte machte nichts
- 2% Volumenzunahme bei den Sportlern, 1% Abnahme bei den Kontrollen

Z Gerontol Geriat
DOI 10.1007/s00391-017-1202-x
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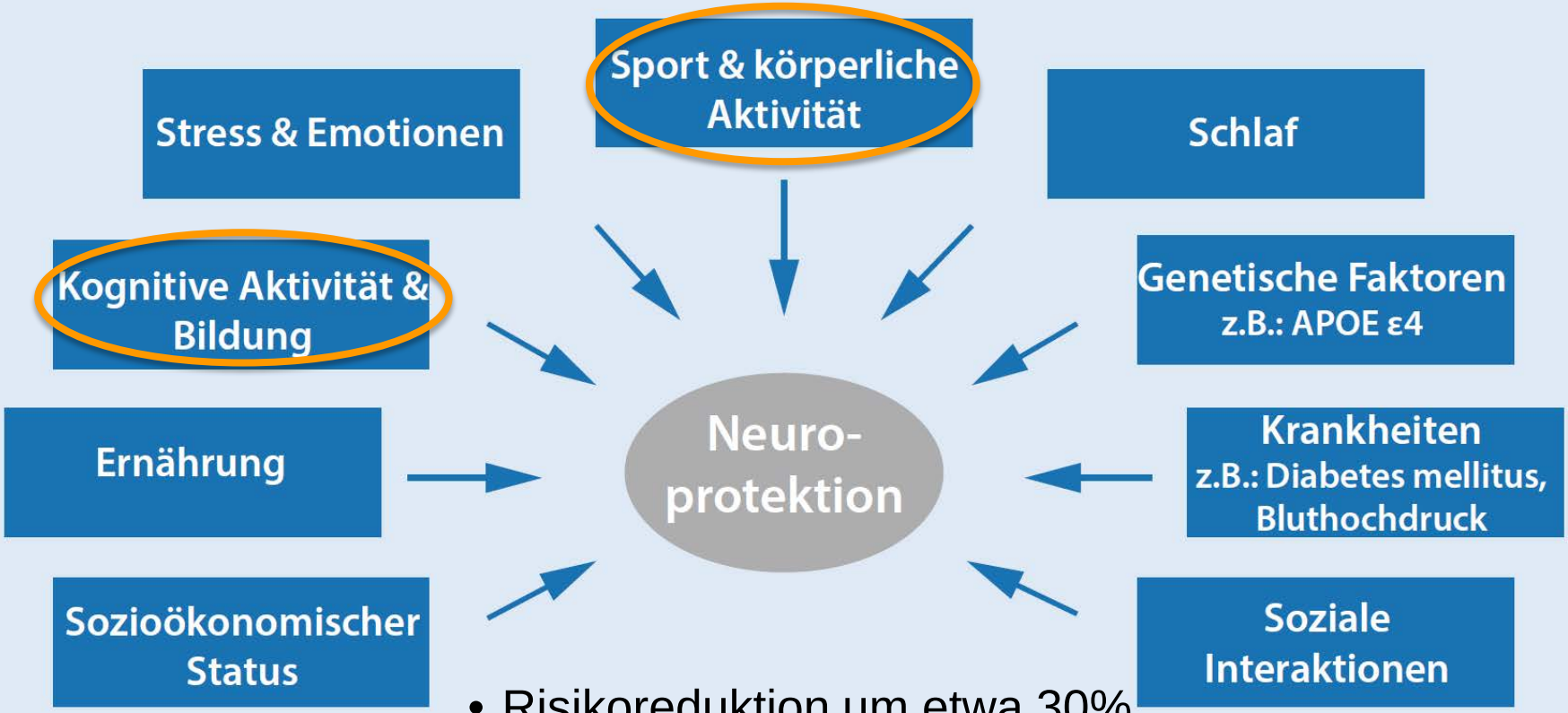
[2] Universitätsklinik für Neurologie, Otto-von-Guericke-Universität, Magdeburg, Deutschland
[3] Center for Behavioral Brain Sciences (CBBS), Magdeburg, Deutschland

Präventionsstrategien gegen Demenz



- Risikoreduktion um etwa 30%

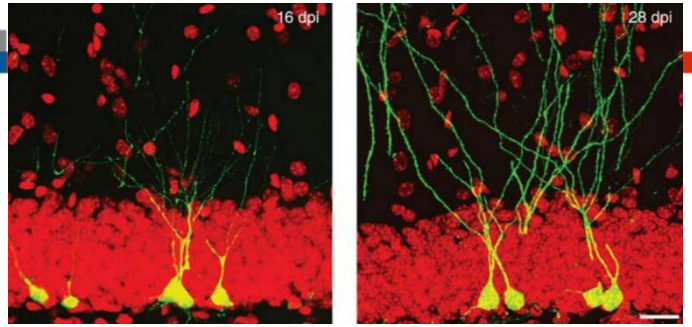
Körperliche & geistige Aktivität: Gegenwart

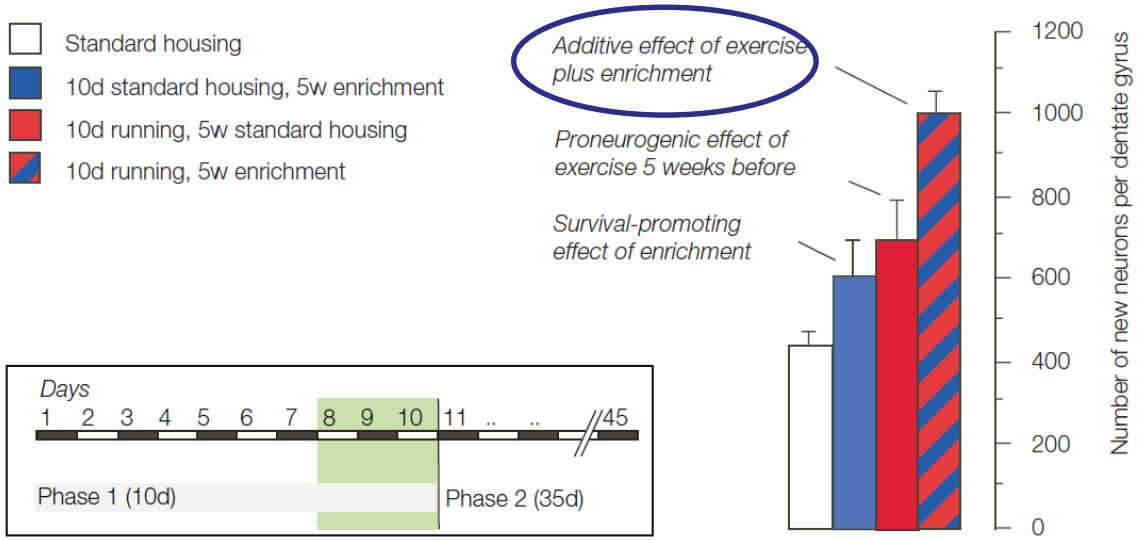
- Denken ohne Bewegung
- Bewegung ohne Denken

Körperliche & geistige Aktivität: Vergangenheit

=> Denken und Bewegen gehörten zusammen

Körperliche & geistige Aktivität im Tiermodell

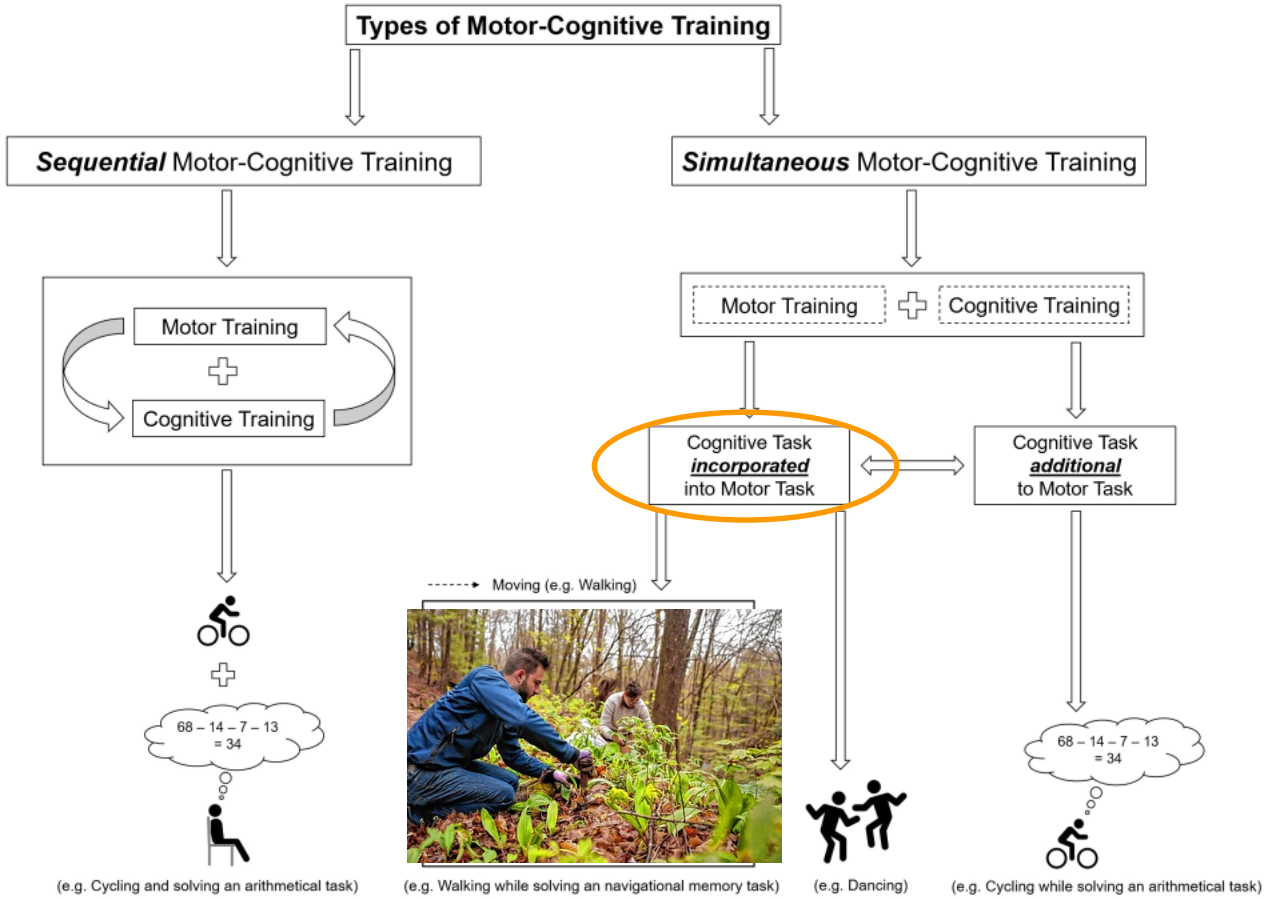




Kempermann et al, 2010

- Bewegung: Führt zur Neubildung von Nervenzellen im Hippocampus (Neurogenese)
- Kognitive Stimulation: Stabilisiert die neuen Netzwerke, sorgt dafür, dass die neugebildeten Nervenzellen dauerhaft überleben

Körperliche und geistige Aktivität beim Menschen



Tanzen

Tanzen als Äquivalent der Kombination aus körperlichem Training und kognitiver Stimulation beim Menschen?

Magdeburger Tanzstudie

Tanzen		Fitnesssport
Koordination/Kognition	vs.	Ausdauer/Kraft
Komplexe Bewegungsfolgen	vs.	zyklische, sich wiederholende Bewegungen
Konstantes Lernen	vs.	Automatisierung

- Strukturelle Hirnverändungen
- Kognitive Leistungen
- Gleichgewicht

Methoden

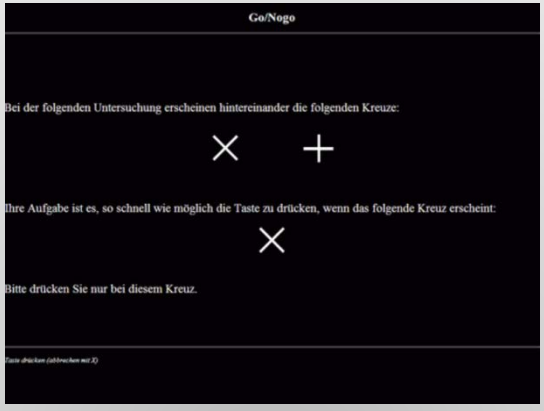
Kernspin

SIEMENS MAGNETOM Verio syngo MR B17 (3Tesla)

T-1-weighted MPRAGE sequence (224 sagittal slices, voxelsize: 0.8 x 0.8 x 0.8 mm^3, TR: 2500ms, TE: 3,47ms, TI: 1100ms, flip angle: 7)

Voxel-based Morphometry (Ashburner, 2013) in SPM 12

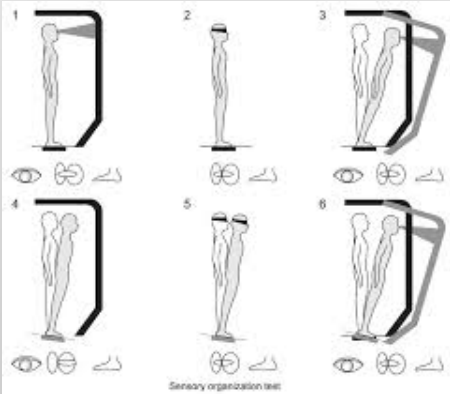
Kognitive Tests



Test battery for Attention Perforamance (TAP)
(Zimmermann & Fimm, 2009)

- Alertness
- Go/Nogo
- Geteilte Aufmerksamkeit
- Flexibility

Gleichgewicht

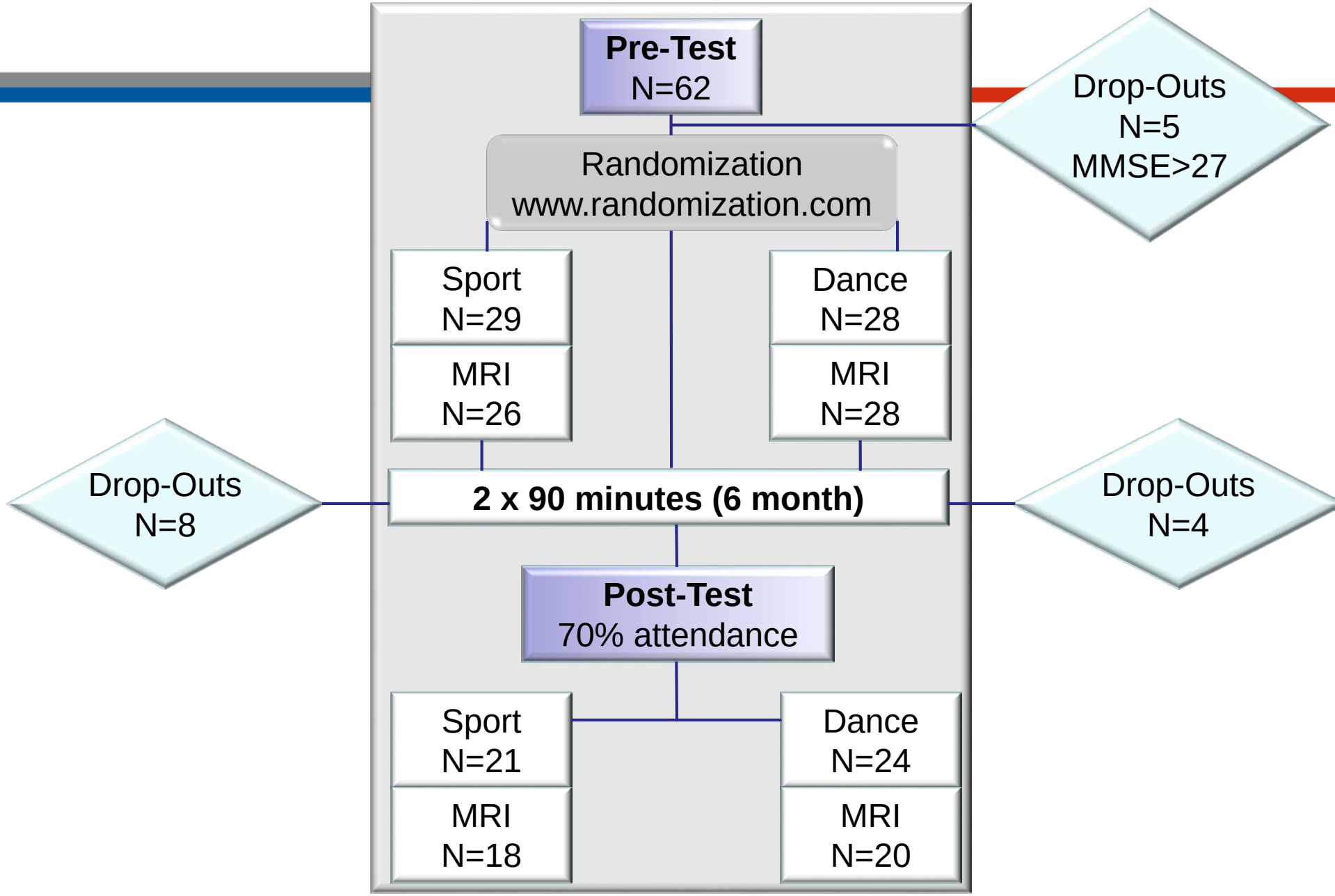


Sensory Organization Test
(Balance Master NeuroCom®)

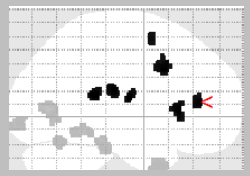
- Differentiates contributions from
  - somatosensory
  - visual
  - vestibular

  systems on dynamic postural control

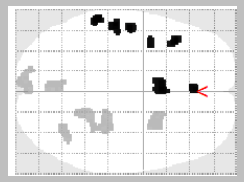
Design

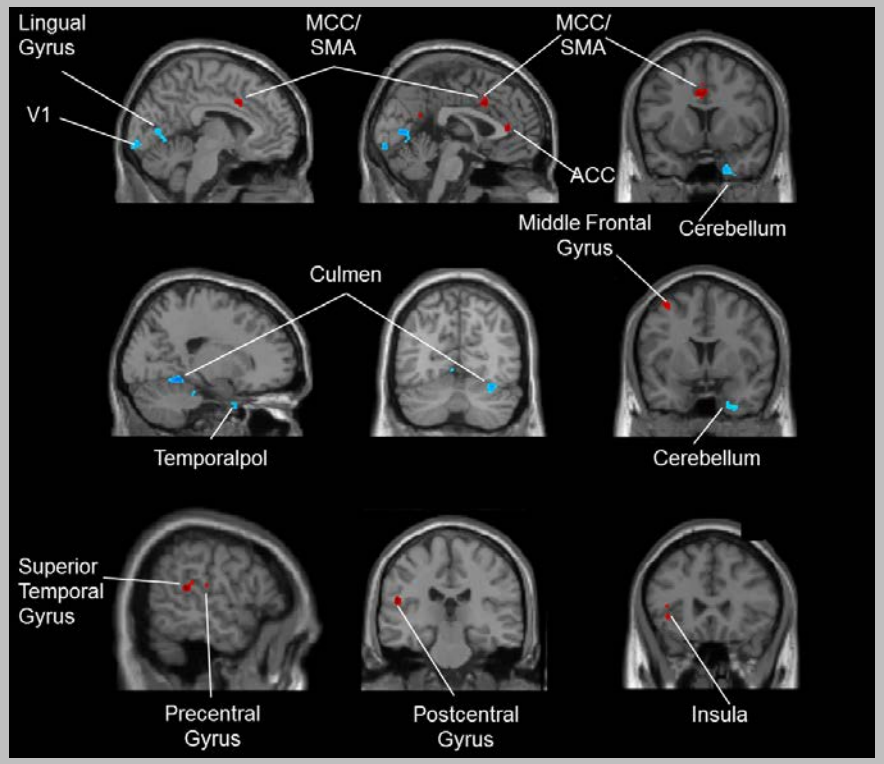

Pre-Test
N=62
Drop-Outs
N=5
MMSE>27
Randomization
www.randomization.com
Sport
N=29
MRI
N=26
Dance
N=28
MRI
N=28
Drop-Outs
N=8
2 x 90 minutes (6 month)
Drop-Outs
N=4
Post-Test
70% attendance
Sport
N=21
MRI
N=18
Dance
N=24
MRI
N=20

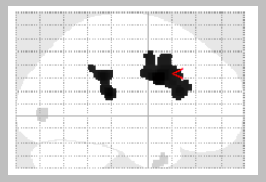
Gehirnvolumenänderungen nach 6 Monaten



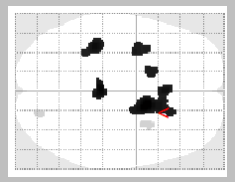
Grey Matter

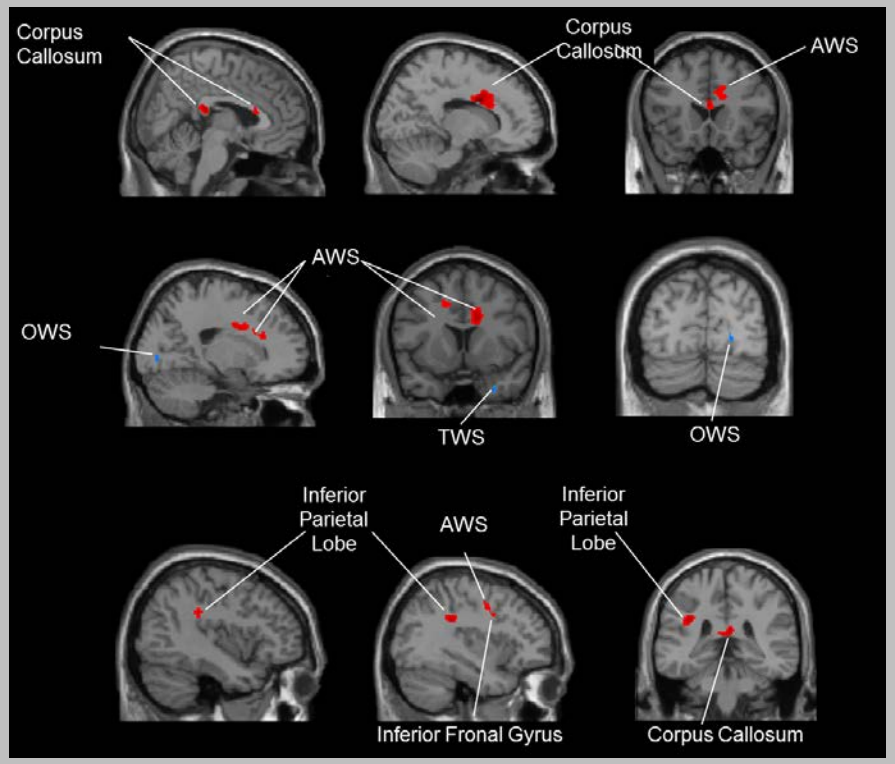






White Matter

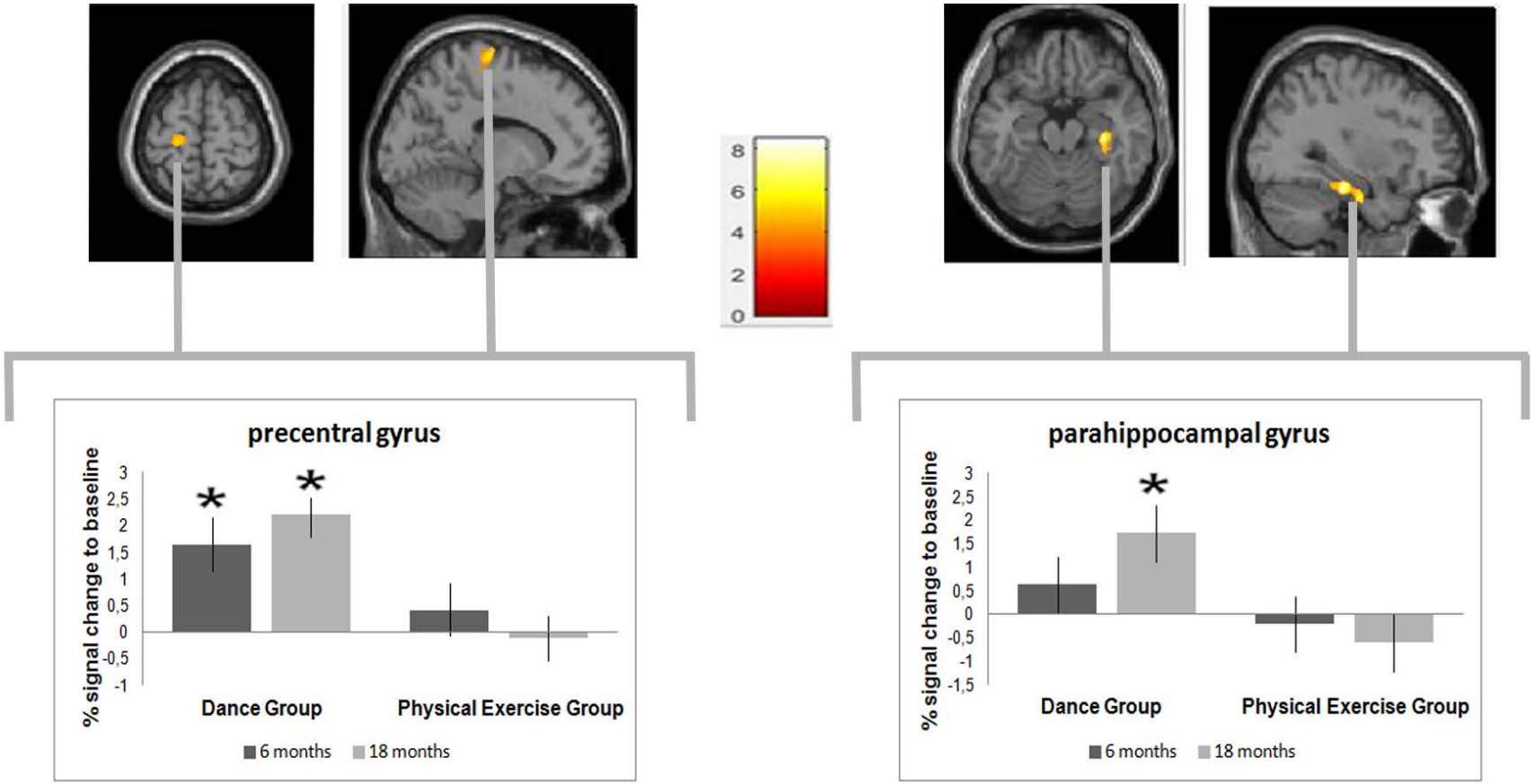




Dance > Sport

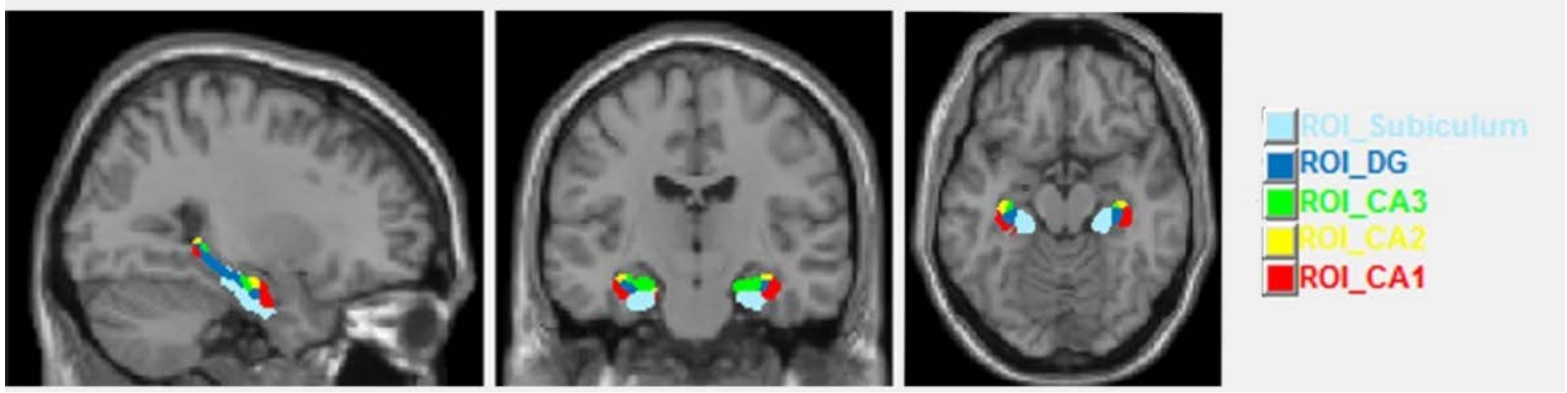
Sport > Dance

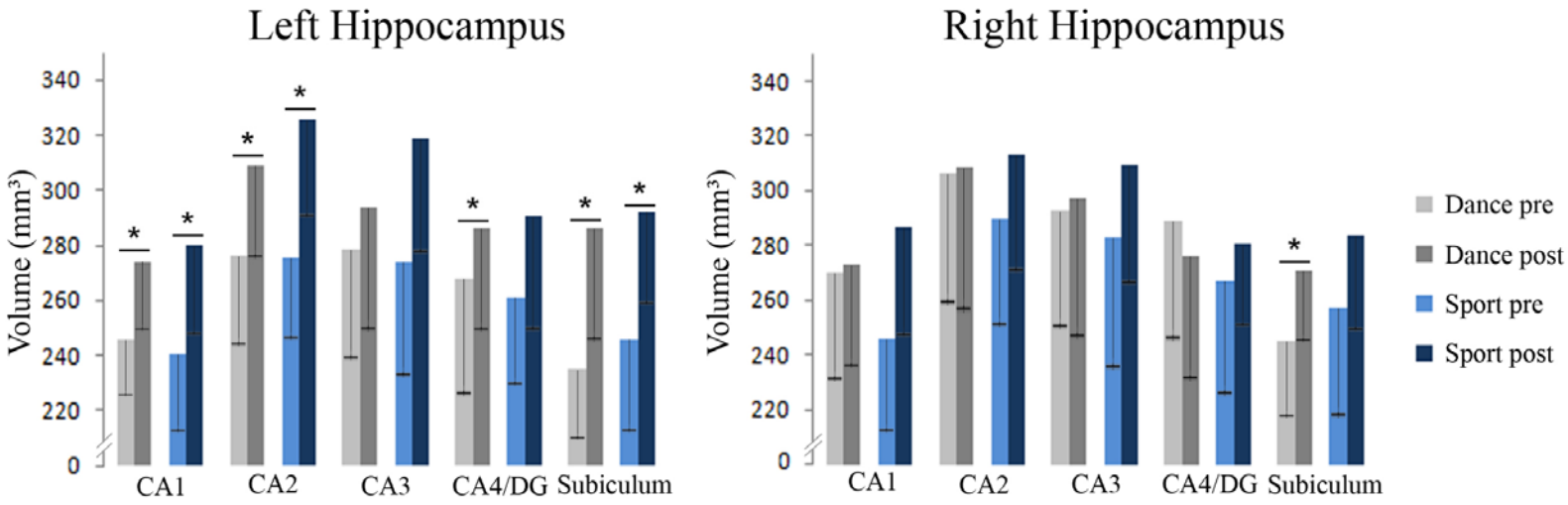
Gehirnvolumenänderungen nach 18 Monaten



Müller et al., 2017

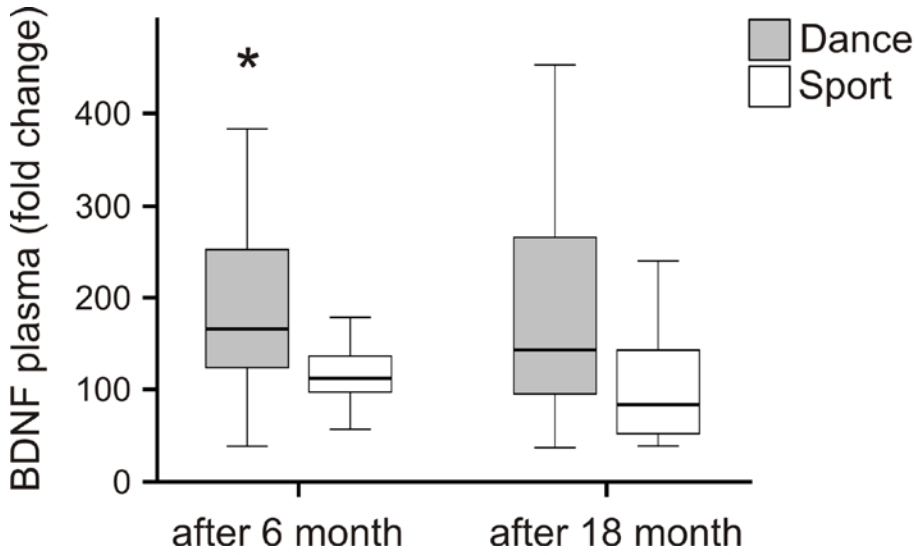
Hippocampus nach 18 Monaten

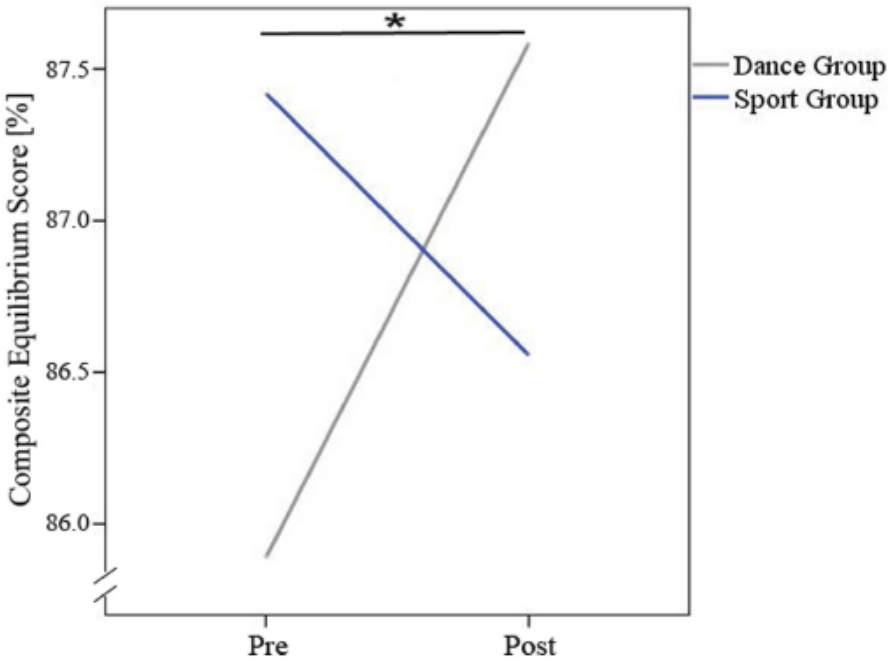




Rehfeld et al., 2017

BDNF-Spiegel und Gleichgewicht





Müller et al., 2017

Tanzen im Vergleich

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.

- 470 gesunde Teilnehmer älter als 75 J
- 124 bekamen im Verlauf eine Demenz
- 15 Freizeitaktivitäten: oft/frequent: mind 2 x pro Woche
- Selten/rare: max 1 x pro Woche

Reduktion um 76 %!

Table 2. Risk of Development of Dementia According to the Frequency of Participation in Individual Leisure Activities at Base Line.*

Leisure Activity and Frequency	Subjects with Dementia	All Subjects	Hazard Ratio for Dementia (95% CI)
	no.		
Cognitive activities			
Playing board games			
Rare	108	366	1.00
Frequent	16	103	0.26 (0.17–0.57)
Reading			
Rare	40	87	1.00
Frequent	84	382	0.65 (0.43–0.97)
Playing a musical instrument			
Rare	120	452	1.00
Frequent	4	17	0.31 (0.11–0.90)
Doing crossword puzzles			
Rare	117	407	1.00
Frequent	7	62	0.59 (0.34–1.01)
Writing			
Rare	104	382	1.00
Frequent	20	87	1.00 (0.61–1.67)
Participating in group discussions			
Rare	117	437	1.00
Frequent	7	32	1.06 (0.48–2.33)
Physical activities			
Dancing			
Rare	99	339	1.00
Frequent	25	130	0.24 (0.06–0.99)
Doing housework			
Rare	39	106	1.00
Frequent	85	363	0.88 (0.60–1.20)
Walking			
Rare	19	65	1.00
Frequent	105	404	0.67 (0.45–1.05)
Climbing stairs			
Rare	44	153	1.00
Frequent	80	316	1.55 (0.96–2.38)
Bicycling			
Rare	116	443	1.00
Frequent	8	26	2.09 (0.97–4.49)
Swimming			
Rare	108	386	1.00
Frequent	16	83	0.71 (0.22–2.29)
Playing team games			
Rare	120	450	1.00
Frequent	4	19	1.00 (0.14–7.79)
Participating in group exercise			
Rare	88	330	1.00
Frequent	36	139	1.18 (0.72–1.94)
Babysitting			
Rare	114	429	1.00
Frequent	10	40	0.81 (0.11–6.01)

Was die Medien daraus machen

HEALTHGUIDANCE
HEALTHGUIDANCE FOR BETTER HEALTH

Conditions / Disabilities | Fitness / Wellness | Medicine | Mental Health | Women's Health

» HOME » CONDITIONS DISABILITIES » ALZHEIMERS DISEASE »

The Best Means of Avoiding Alzheimer's Is Dance?

BY JULIETTE SIEGFRIED | ALZHEIMERS DISEASE | RATING: ★★★★

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Radfahren verdoppelt das Risiko einer Demenz?

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Zukunft

frontiers in Physiology

PERSPECTIVE
published: 29 May 2019
doi: 10.3389/fphys.2019.00672

Physical Exercise as Personalized Medicine for Dementia Prevention?

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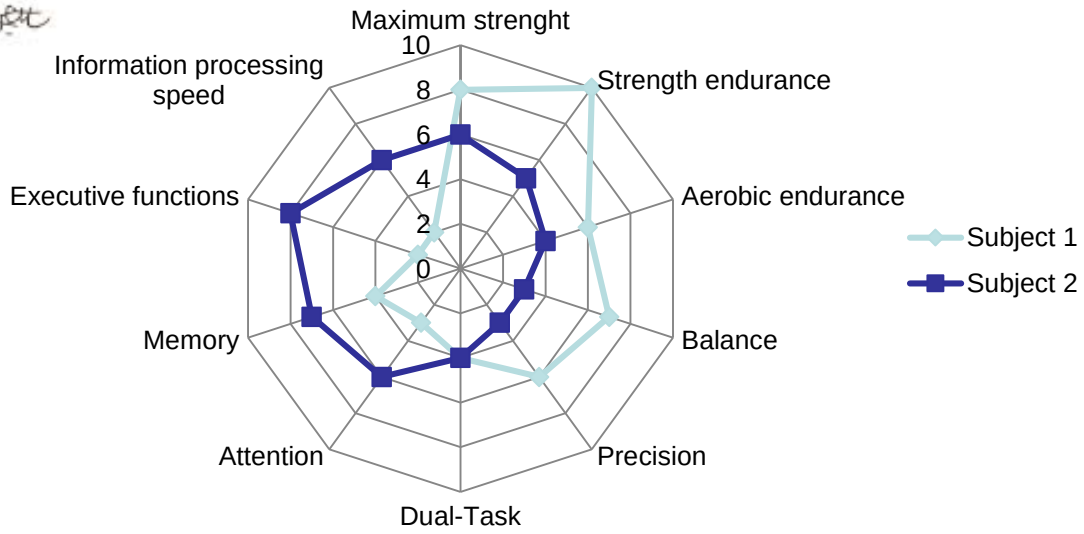


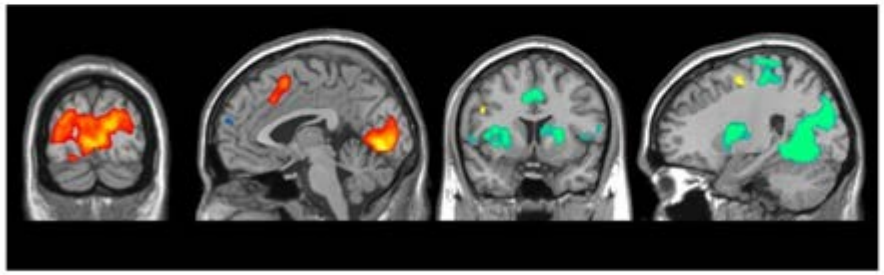
Raus aus der Forschung, rein in den Alltag!

NEURO PROTECTION LAB

www.neuroprotection.weebly.com

Welcome to our lab website

The neuroprotection lab was founded in 2012 by Prof. Notger Müller. We are located at the Campus of the University Clinic in Magdeburg, Germany. Our research focuses on three main questions: What are the reasons for the inter-individual variations in memory capacity? How can we optimize preventive strategies to meet individual needs? What markers in an individual distinguish whether he/she will show normal or pathological cognitive aging?



" Your brain is like a muscle - it can be trained. "

HEALTHY AGING
COGNITIVE TRAINING
ATTENTION & MEMORY
PREVENTION
NEUROPLASTICITY
EARLY DIAGNOSIS

Danke für die Aufmerksamkeit!