

Bewegen baat het brein

Dementie en beweging
02-02-2017



Dr. Karin Volkers
www.dementieinbeweging.nl



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Een causale relatie



Art Kramer

Nature,
1999

Ageing, fitness and neurocognitive function

In the ageing process, neural areas^{1,2} and cognitive processes^{3,4} do not degrade uniformly. Executive control processes and the prefrontal and frontal brain regions that support them show large and disproportionate changes with age. Studies of adult animals indicate that metabolic⁵ and neurochemical⁶ functions improve with aerobic fitness. We therefore investigated whether greater aerobic fitness in adults would result in selective improvements in executive control processes, such as planning, scheduling, inhibition and working memory. Over a period of six months, we studied 124 previously sedentary adults, 60 to 75 years old, who were randomly assigned to either aerobic (walking) or anaerobic (stretching and toning) exercise. We found that those who received aerobic training showed substantial improvements in performance on tasks requiring executive control compared with anaerobically trained subjects.

Each of the 124 subjects was given a cardiorespiratory fitness test, in which the rate of oxygen consumption was measured, and a variety of cognitive tasks, including task switching⁷, response compatibility⁸ and stopping⁹. These tasks were chosen because a subset of their conditions require executive control processes and they have been shown through human lesion, neuroimaging and animal studies to be supported by frontal or prefrontal regions of the brain.

Task switching is a measure of the 'cost' of switching between tasks, indicated by the difference in reaction time between those trials in which subjects switch between tasks and those in which they continue to perform the same task; response compatibility

NATURE | VOL 400 | 29 JULY 1999 | www.nature.com

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PFC

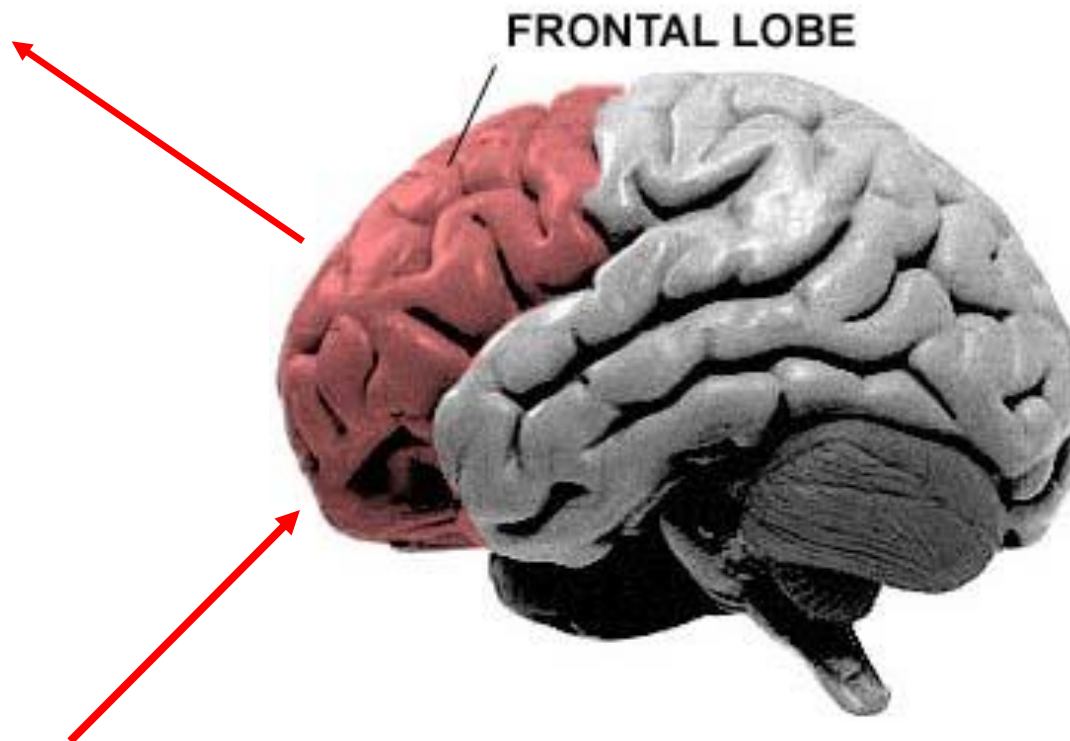
Inhibitie

Planning

Flexibiliteit

Aandacht

Initiatief



Kwetsbaar voor normale veroudering, betrokken bij vele subtypen dementie

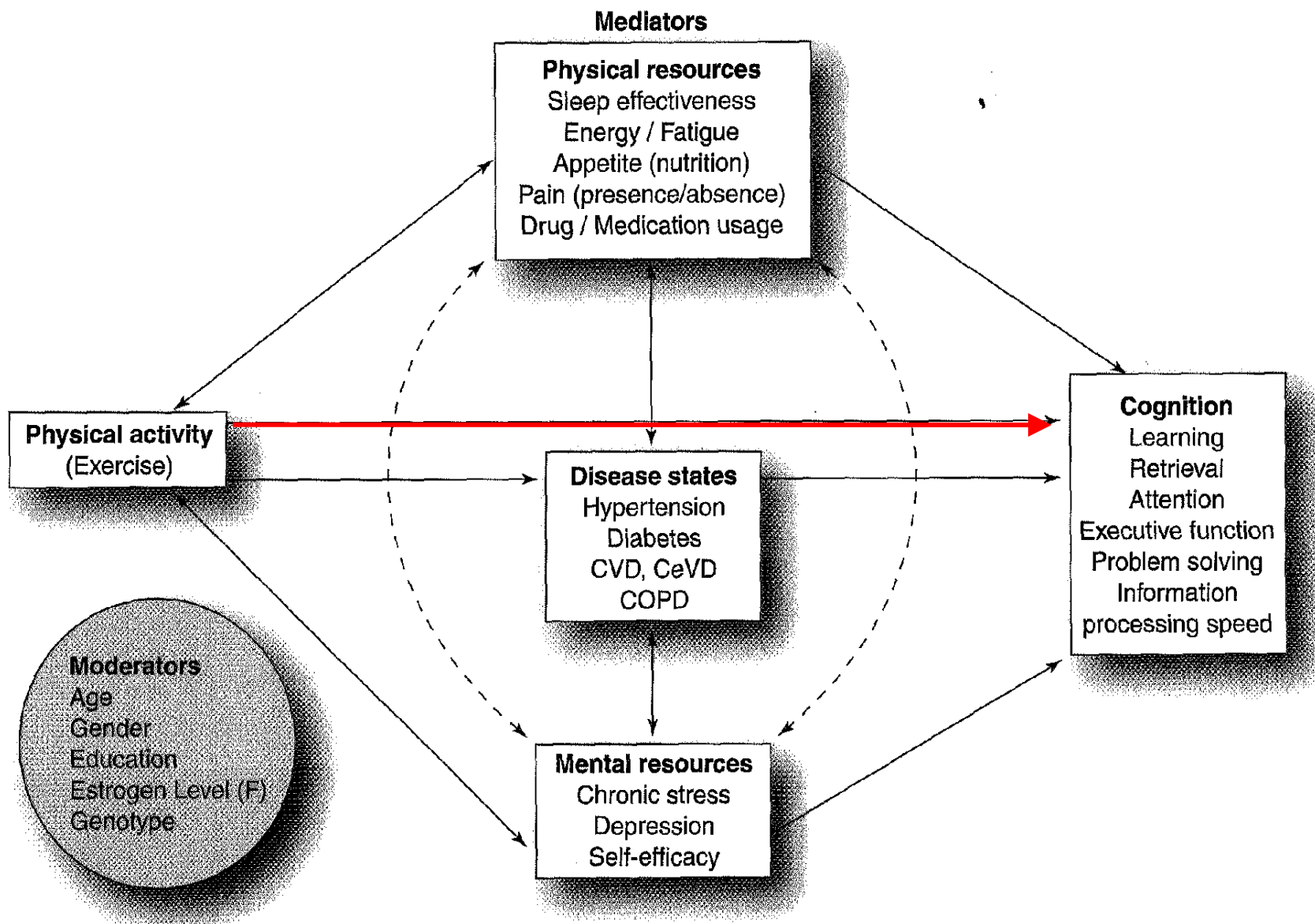


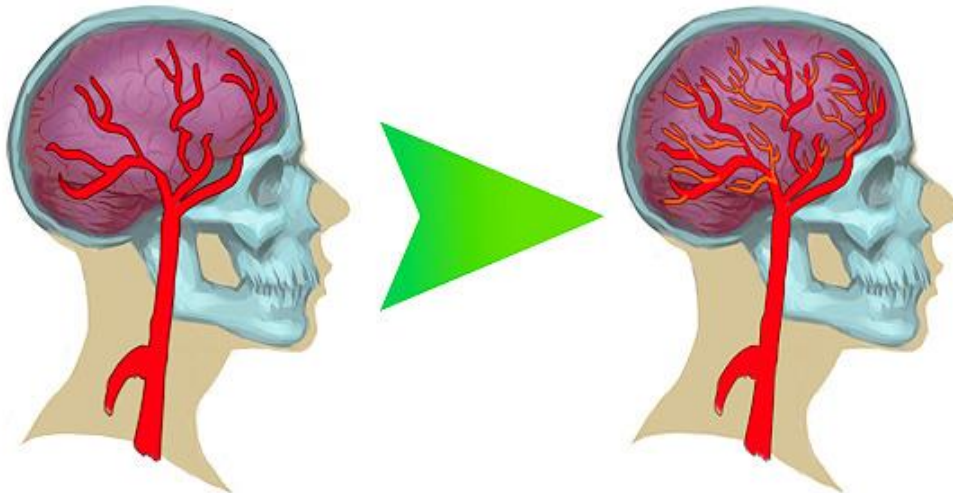
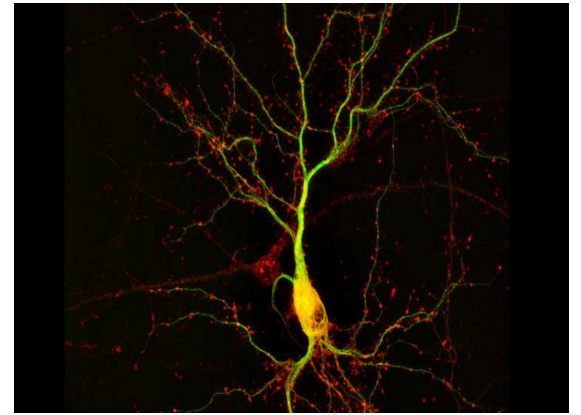
Figure 1.1 Working model of the role of mediators in exercise effects on cognition. F = female; CVD = cardiovascular disease; CeVD = cerebrovascular disease; COPD = chronic obstructive pulmonary disease.



Physical activity and the brain

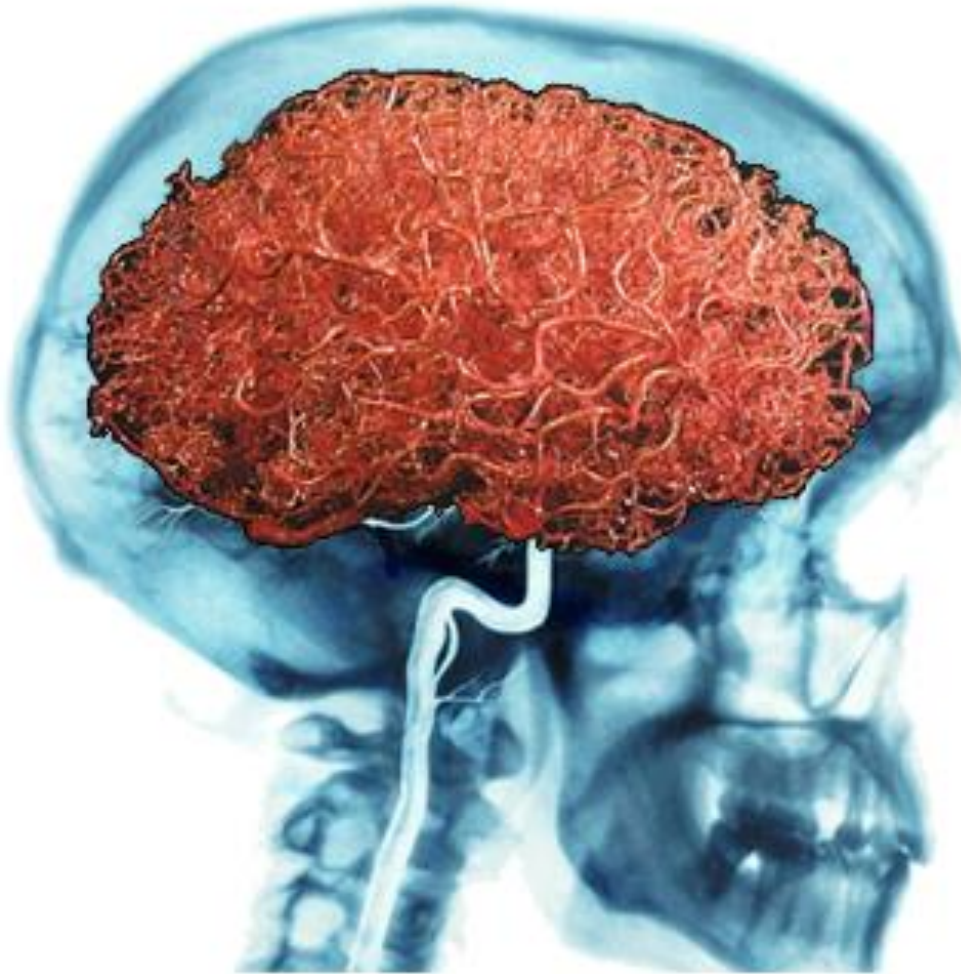


Neurogenesis
Angiogenesis
Synaptogenesis



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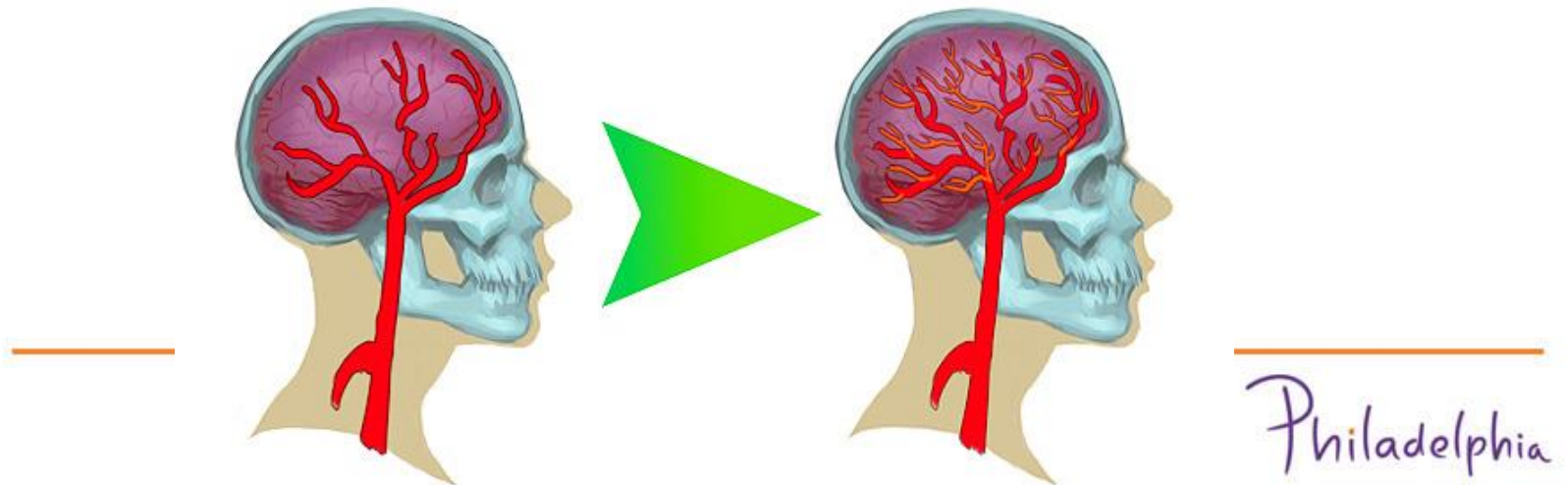
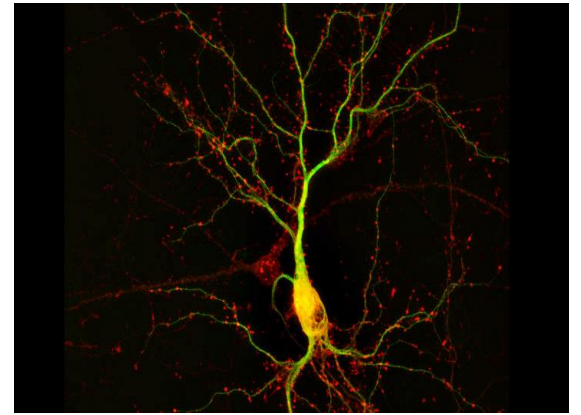
±150.000 kilometer aan
bloedvaten in je brein

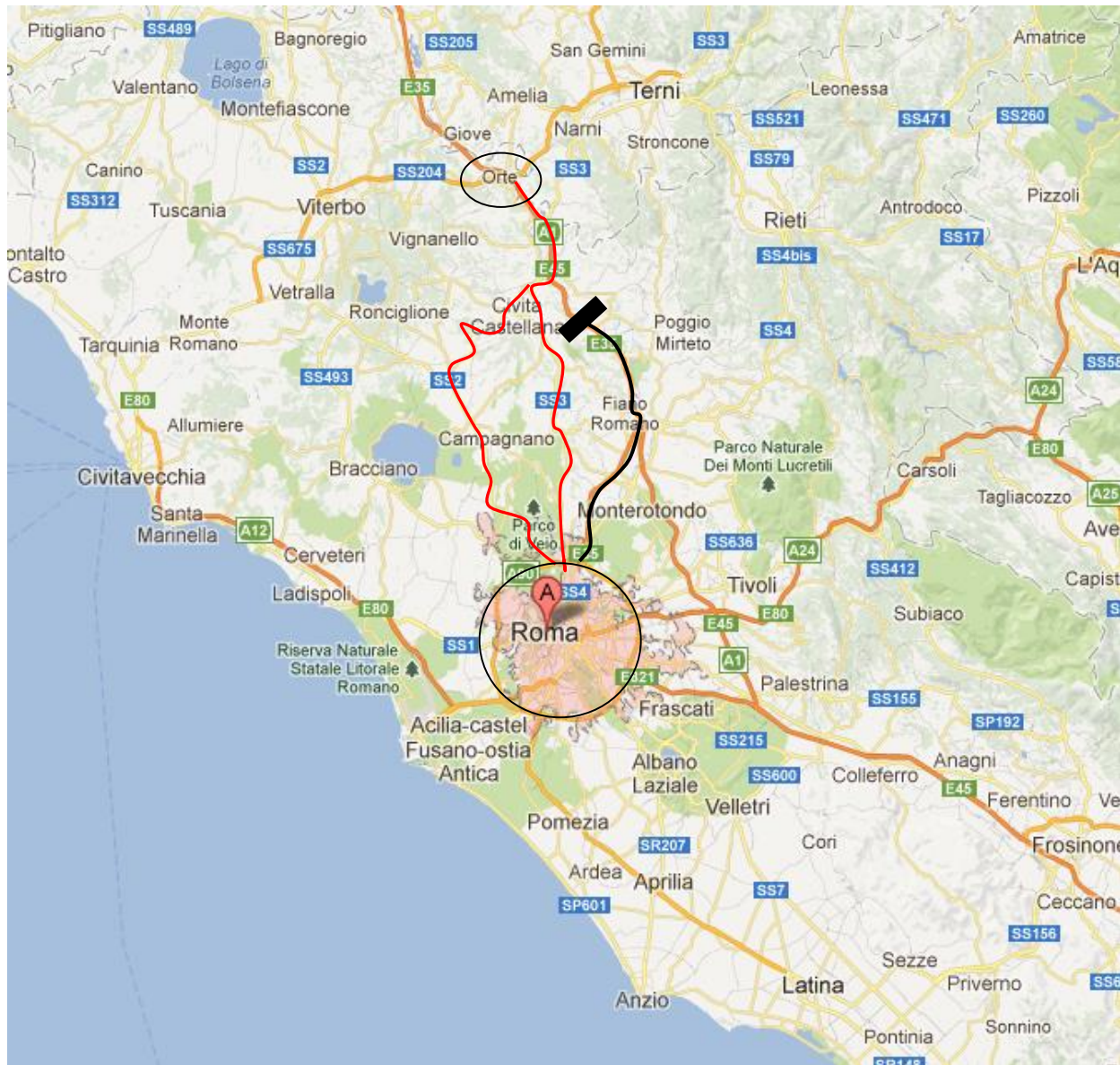


Physical activity and the brain

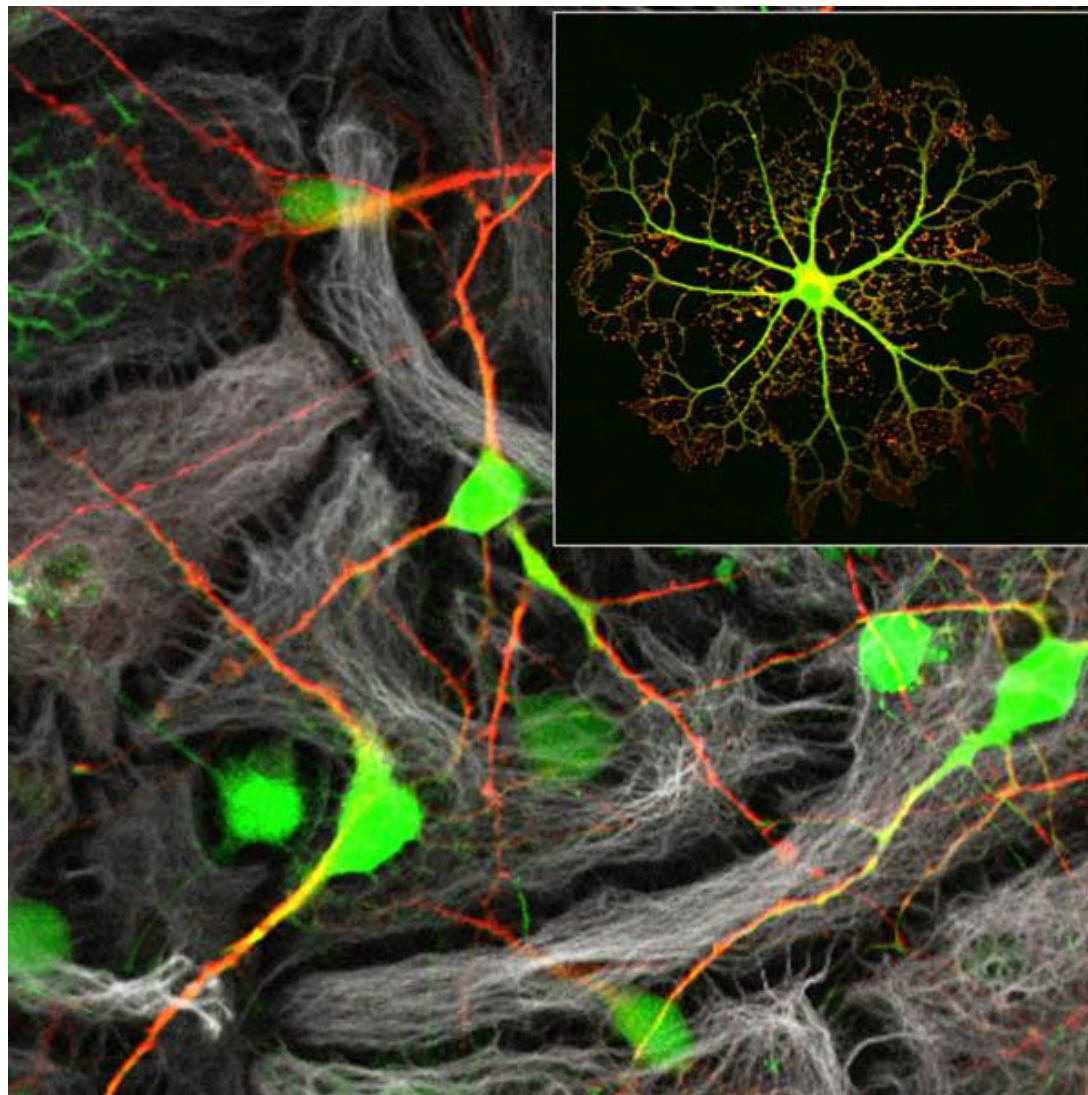


Neurogenesis
Angiogenesis
Synaptogenesis





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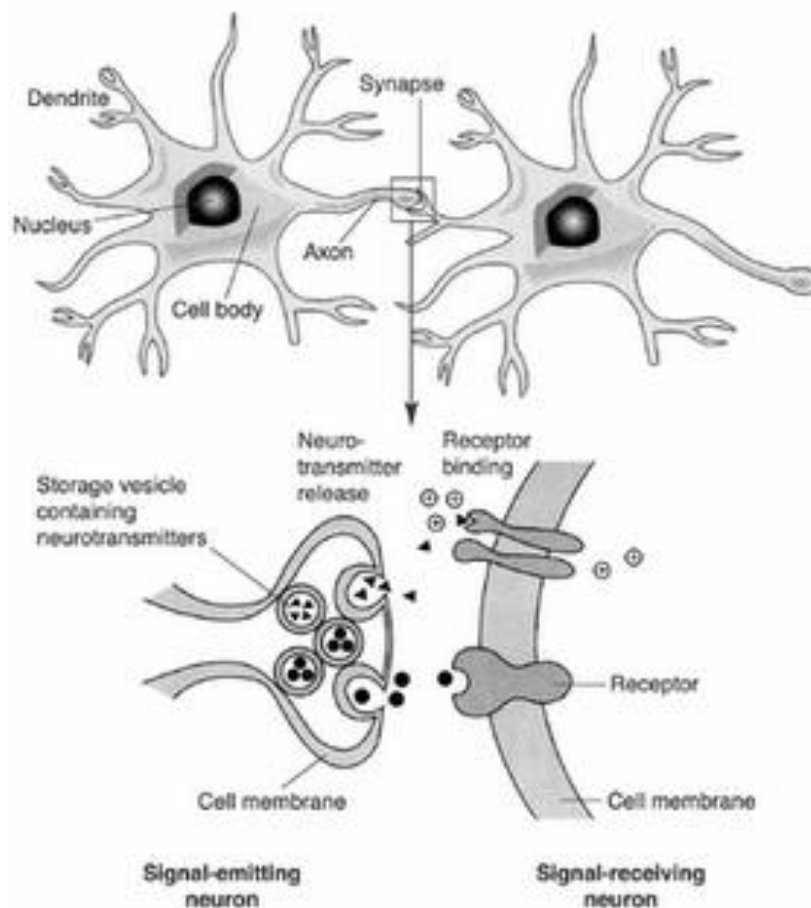


Nerve growth factors

Neurotransmitters

When our brains have the nutrients they need to create neurotransmitters in the necessary quantities, we're most fully alive, engaged, and productive.

When we're unable to produce neurotransmitters in the necessary quantities, our moods, intellectual capability, and behavior tend to deteriorate.



(End Your Addiction Now, Lewis & Gant)

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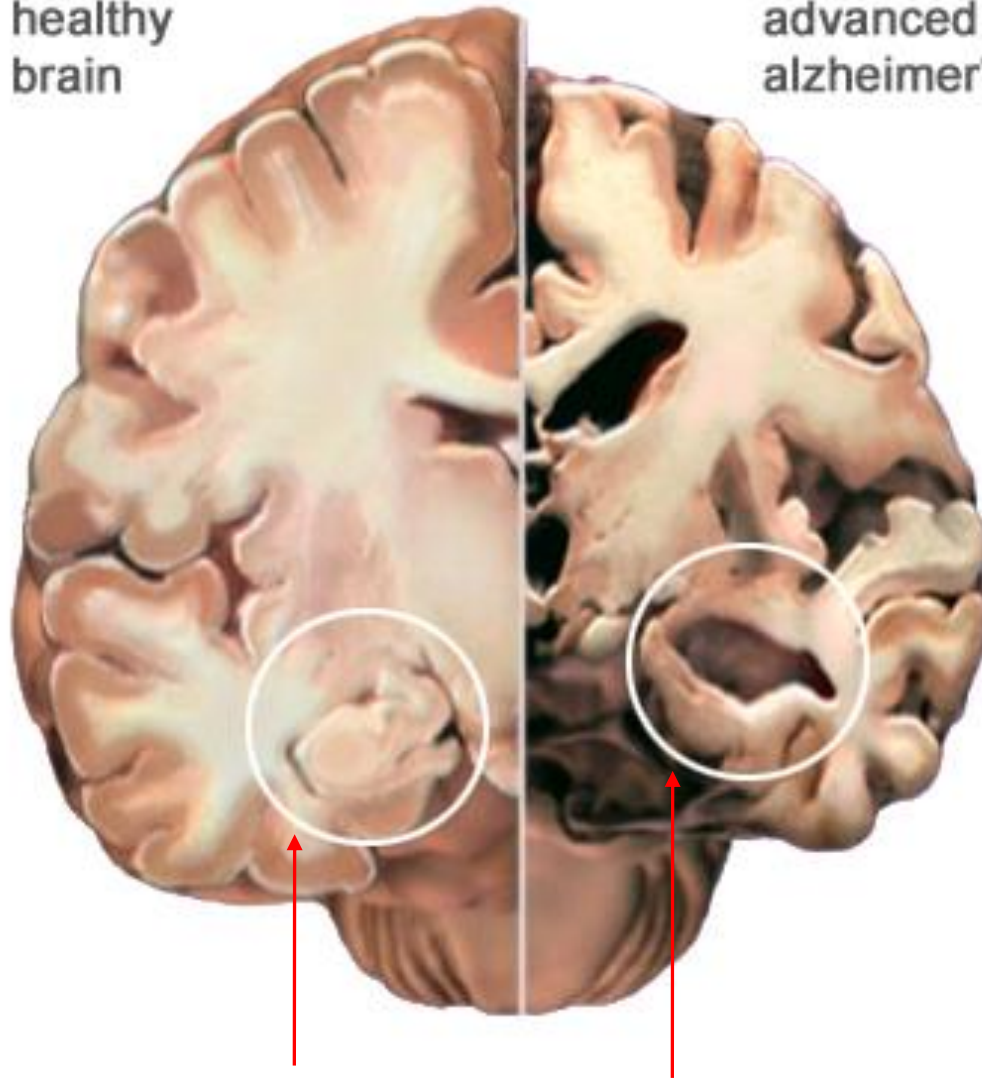
Normal Healthy
Human Brain

End-Stage
Alzheimer's
Disease



healthy
brain

advanced
alzheimer's



Hippocampus

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Published in final edited form as:

Neuropsychologia. 2009 August ; 47(10): 2015–2028. doi:10.1016/j.neuropsychologia.2009.03.004.

Cognitive Reserve

Yaakov Stern

Cognitive Neuroscience Division of the Taub Institute, and the Departments of Neurology and Psychiatry, Columbia University College of Physicians and Surgeons

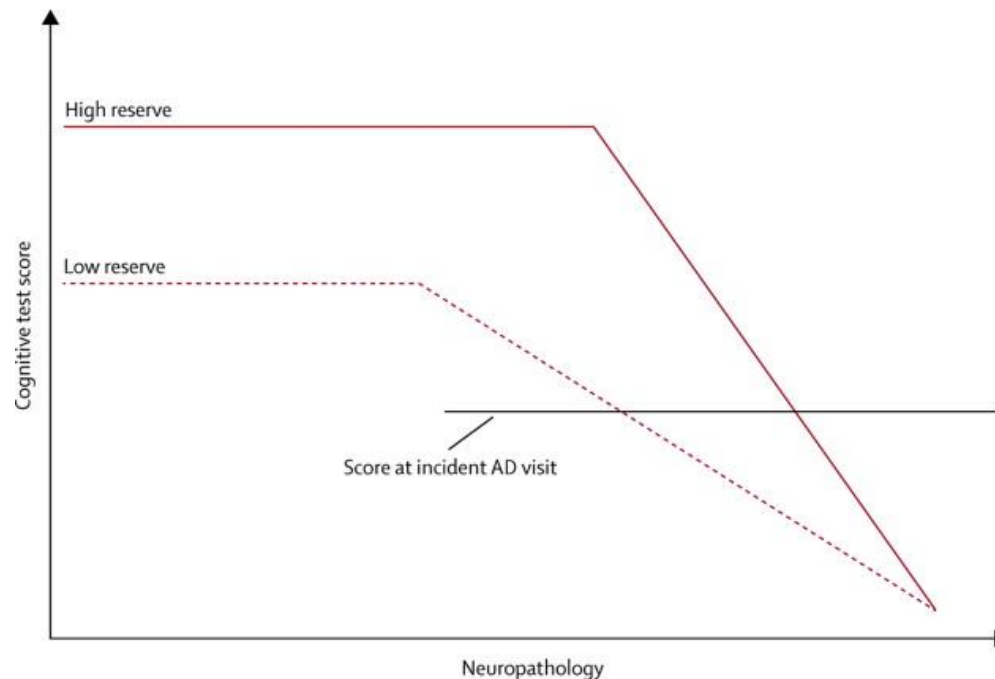
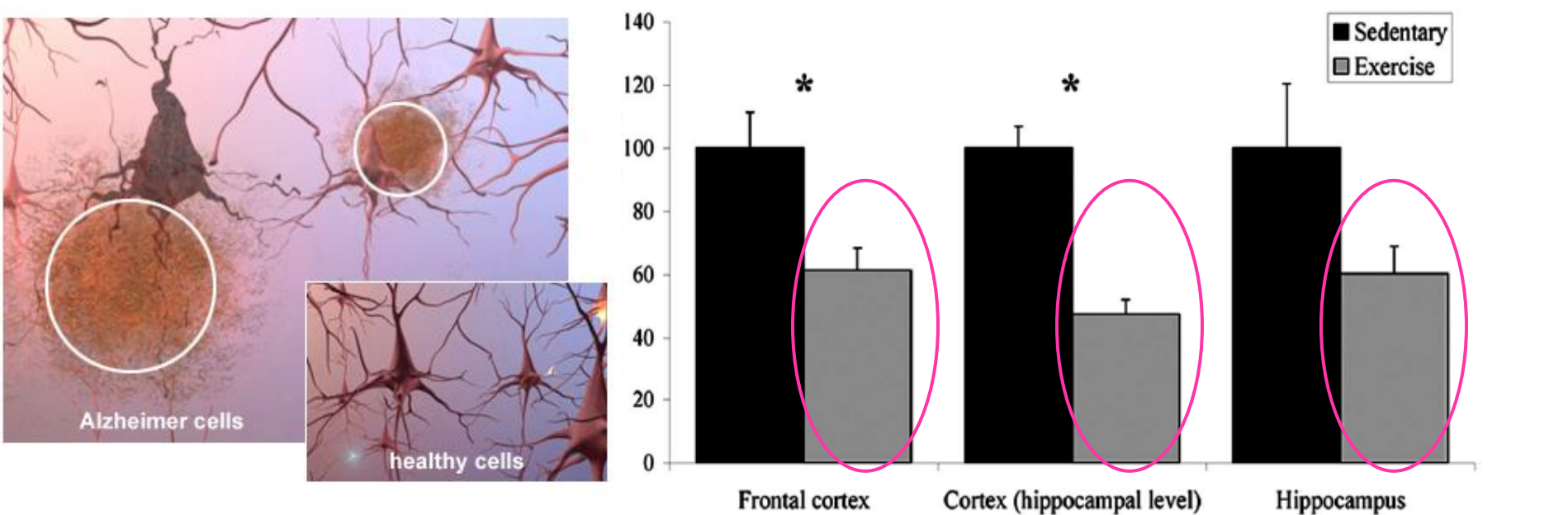
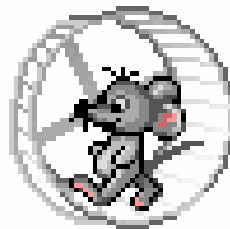


Fig. 2. The relationship between pathology and performance is attenuated in high relative to low reserve.

Fysieke activiteit en het amyloid eiwit (Alzheimer pathologie)



Adlard et al., *J Neurosci* 2005



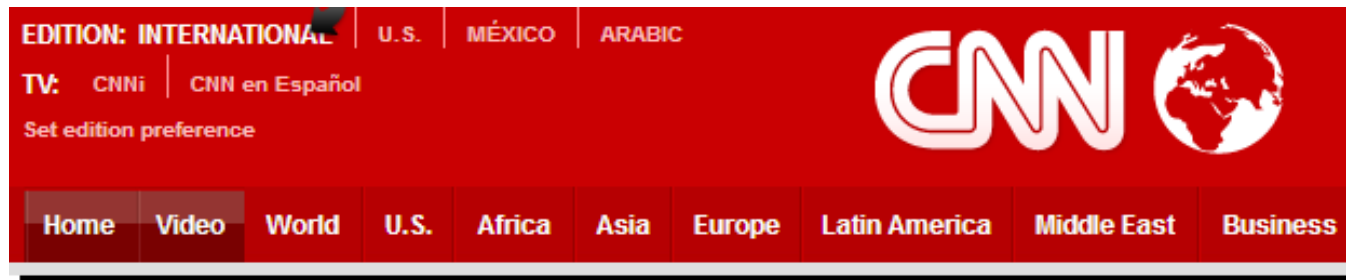
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Physical inactivity causes 1 in 10 deaths worldwide, study says

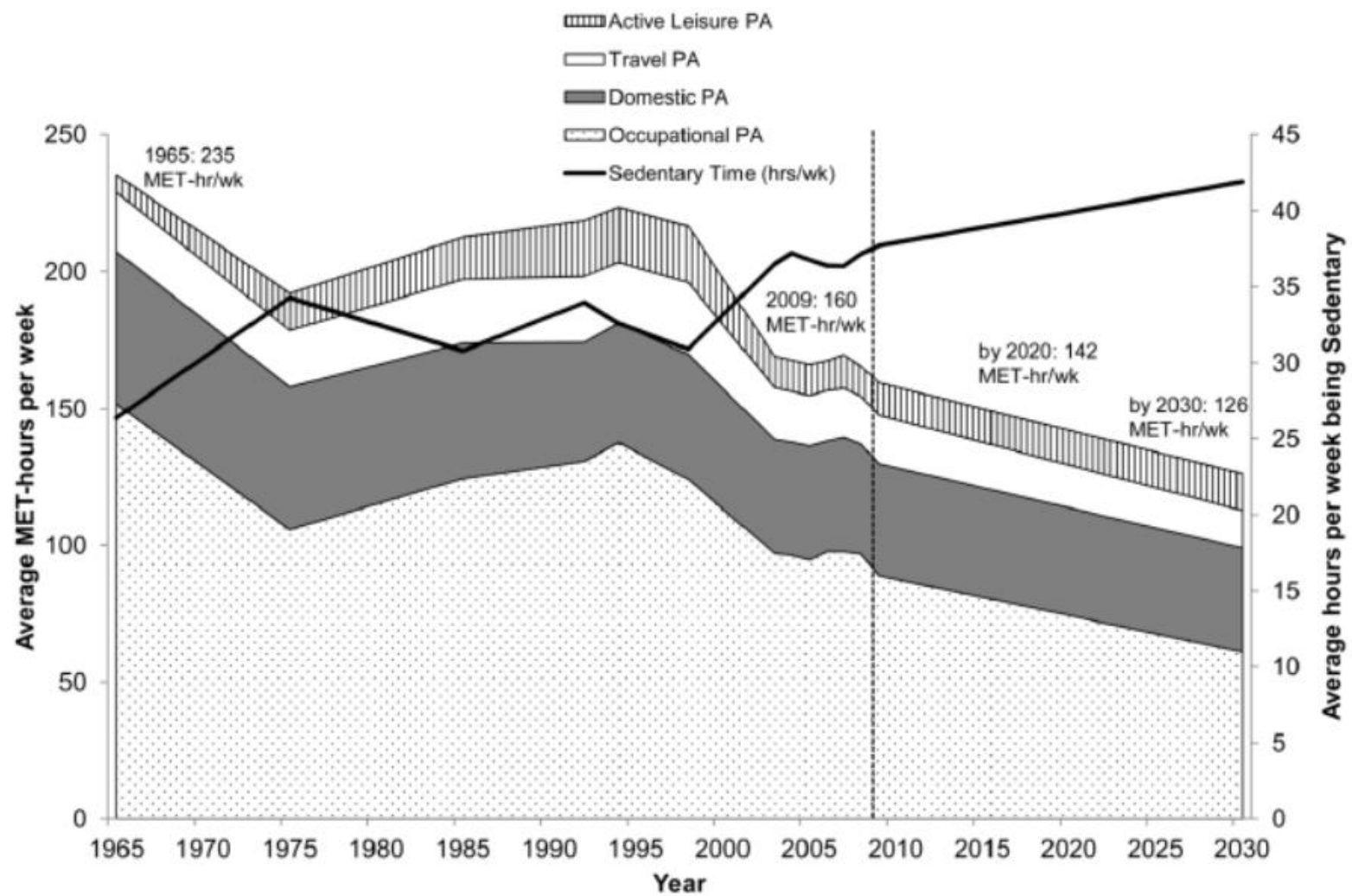
By [Matt Sloane](#), CNN

July 26, 2012 — Updated 1626 GMT (0026 HKT)

Lichamelijke inactiviteit veroorzaakt 1 op 10 sterfgevallen wereldwijd
Vergelijkbaar met de gevaren van roken en obesitas.
Pandemie.

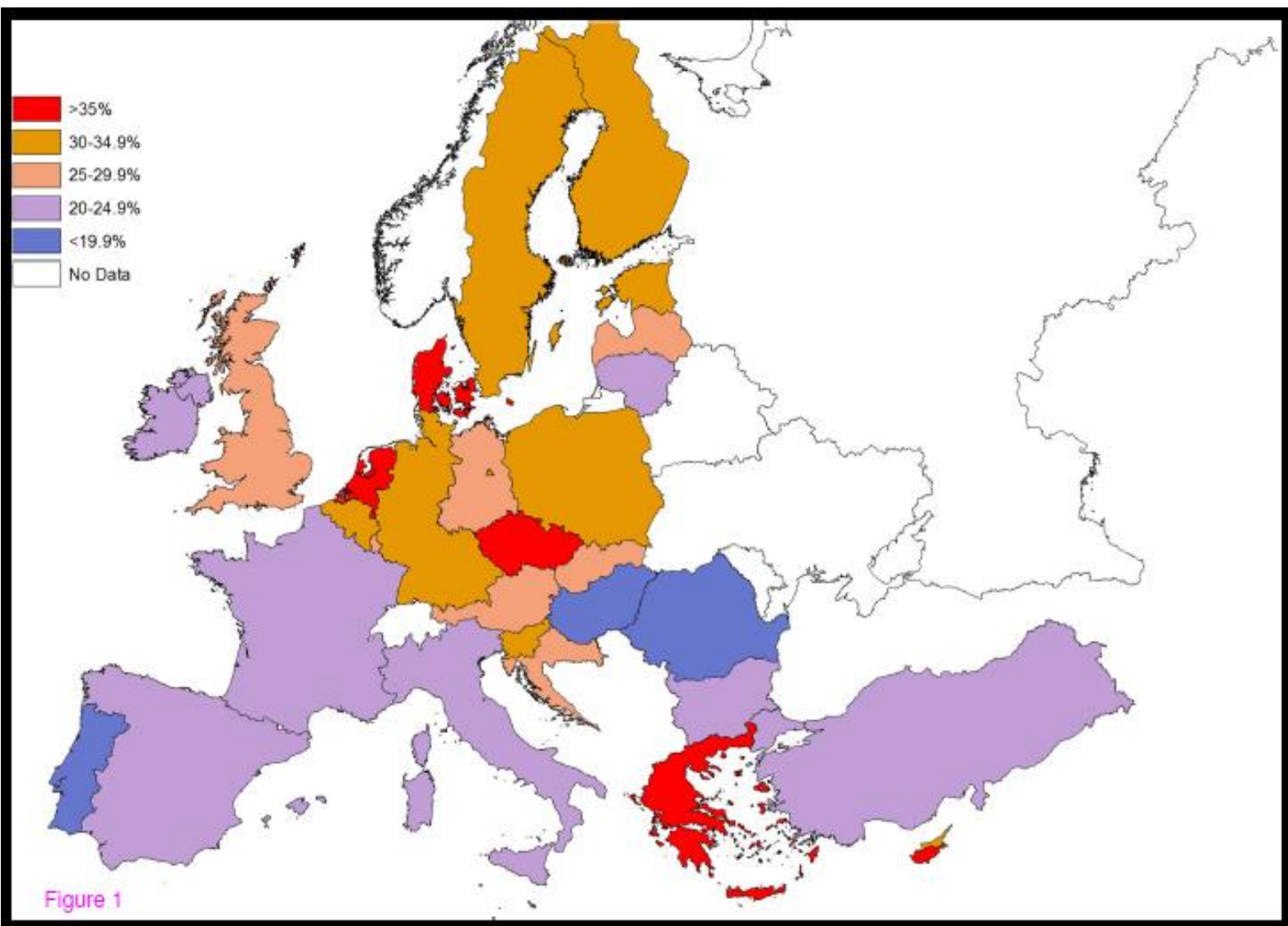
The Lancet, 2012

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Ng & Popkin, 2012

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% van de bevolking (≥ 15 jaar) dat gemiddeld tussen de 7-16 uur/dag zit. Bennie et al., 2013

Int J Behav Nutr Phys Act 10, 107

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Inactiviteit

Inactiviteit is wanneer men geen enkele dag in zomer en winter ten minste 30 minuten matig intensief lichamelijk actief is.



75% van de verzorgingshuisbewoners en
90% verpleeghuisbewoners zijn inactief

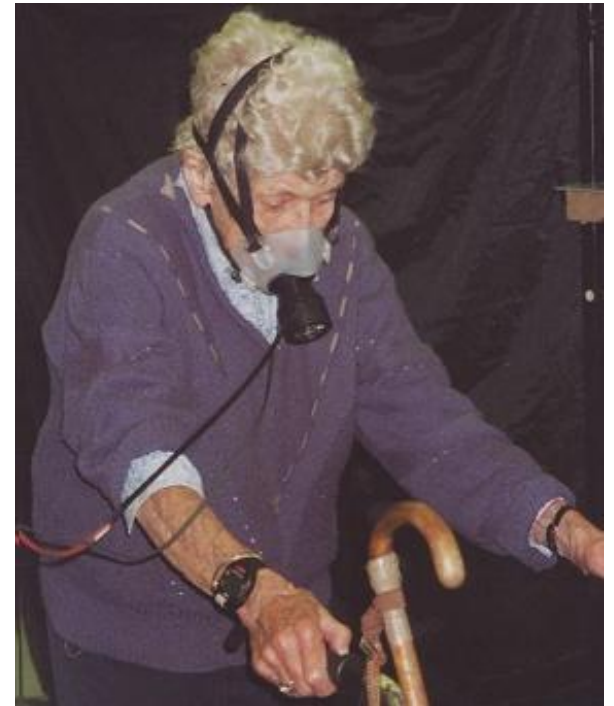
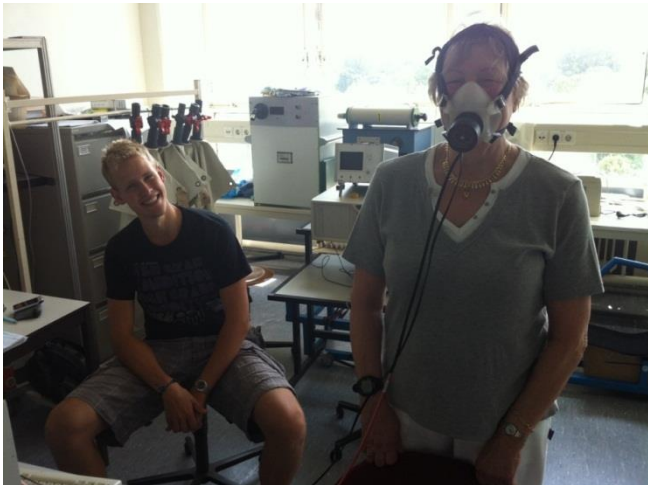
(Tiessen-Raaphorst e.a., 2010).

15 verpleeghuizen; meerderheid van de 451 bewoners
lag 17 uur in bed (Bates-Jensen et al. 2004, *Nurs Res*)

Klinische studies

The intensity of chair-assisted exercises in older cognitive healthy people

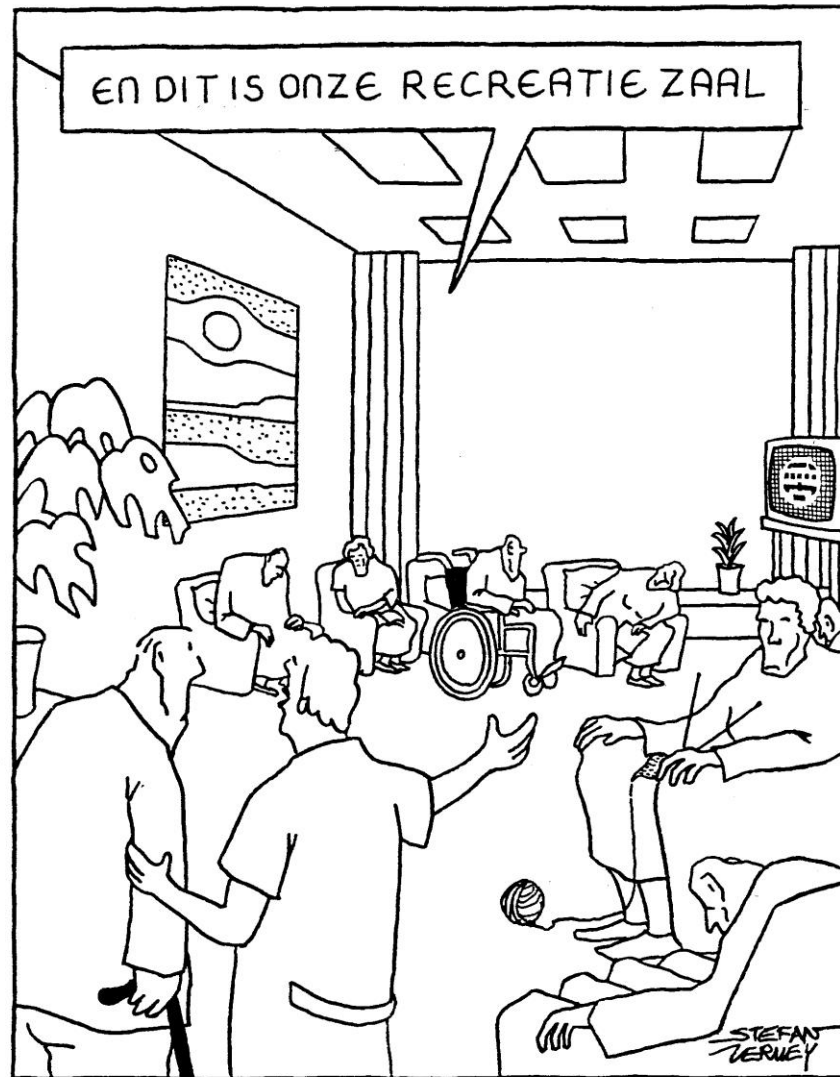
Volkers et al., Journal of Aging and Physical Activity,
in publication



Walking with a rollator and the level of physical intensity in Adults 75 years of age or older

Eggermont et al., 2006

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Wat doet inactiviteit?

Rev. Neurosci., Vol. 22(3): 259–266, 2011 • Copyright © by Walter de Gruyter • Berlin • Boston. DOI 10.1515/RNS.2011.026

Impoverished environment, cognition, aging and dementia

Karin M. Volkers and Erik J.A. Scherder
Rev. Neurosci., Vol. 22(3): 259–266, 2011

e-mail: k.volkers@psy.vu.nl

Abstract

Animals living in an impoverished environment, i.e., without the possibility of physical and social activity, perform worse on cognitive tests compared to animals in an enriched environment. The same cognitive differences are also observed in

2009), an area in the medial temporal lobe that is involved in long-term memory and spatial navigation (Lui et al., 2011). It is important to note that these studies only show a 'relationship' between physical activity and cognition, not a 'causal' relationship.

A causal relationship, i.e., an effect of physical activity on cognition, is shown by intervention studies with children (Tompson et al., 2008), adolescents (Budde et al., 2008), older cognitive healthy people (Angevaren et al., 2008), persons with mild cognitive impairment (Lam et al., 2010) and older persons with Alzheimer's disease (Yaguez et al., 2011). Results of the studies with older people show that particularly executive functions such as inhibition, scheduling, planning and working memory respond positively to an increase in

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Verarmde omgeving en cognitie?

Environmental Influences on Cognitive Decline in Aged Rats

Gordon Winocur

Neurobiology of Aging (1998): 19(6), 589-597.

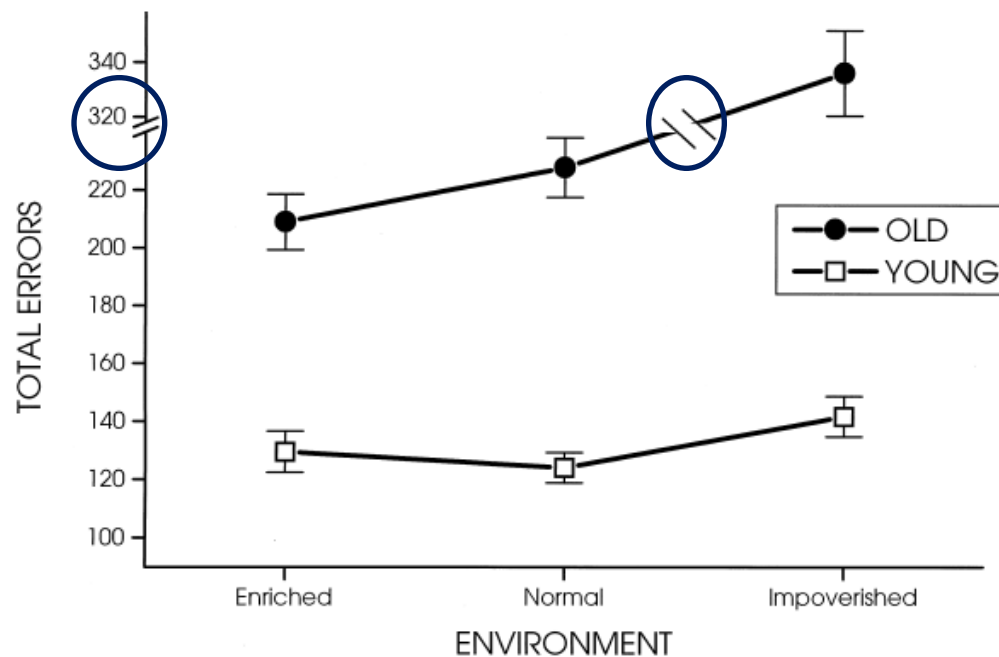
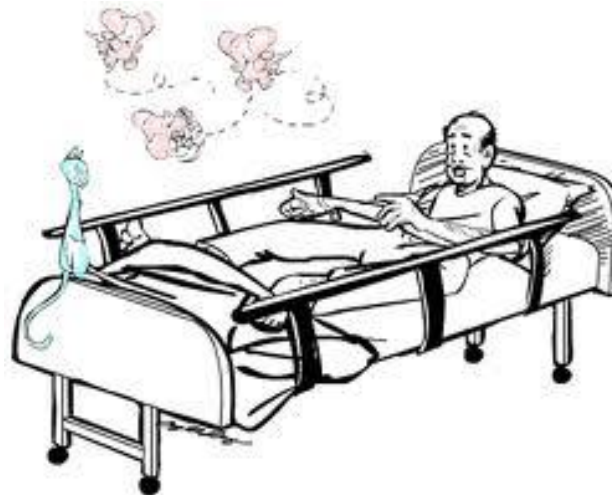


FIG. 2. Mean number of errors made by young and old rats, housed in enriched, impoverished, or standard environments in Experiment 1.

Gebrek aan beweging Restraints



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An active and socially integrated lifestyle in late life might protect against dementia

Laura Fratiglioni, Stephanie Paillard-Borg, and Bengt Winblad

IT'S NEVER TOO LATE!



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CLINICAL INVESTIGATIONS

Exercise Program for Nursing Home Residents with Alzheimer's Disease: A 1-Year Randomized, Controlled Trial

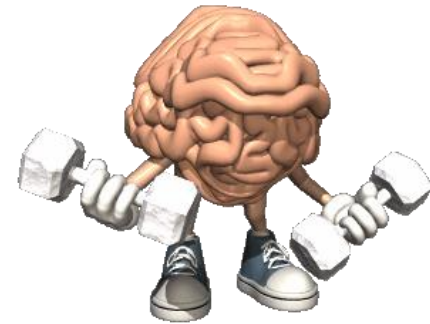
Yves Rolland, MD, PhD,^{,†,§} Fabien Pillard, MD,[†] Adrian Klapouszczak, MD,[†]
Emma Reynish, MD,^{*,§} David Thomas, MD,[‡] Sandrine Andrieu, MD, PhD,[§]
Daniel Rivière, MD[†] and Bruno Vellas, MD, PhD^{*,§}*

Het effect van de wandelingen op Cognitie

Resultaten:

- Geen effect op EF of geheugen in de gehele groep
- Milde dementie ($MMSE \geq 20$):

Het aantal minuten/week hadden een effect op EF ($t = 1.909$; $ES=0.36$)



ERIK SCHERDER

Laat je hersenen

Vragen?



niet zitten

Hoe lichaams-
beweging
de hersenen
jong houdt



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Bedankt voor uw aandacht



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