

Measuring the age of the brain



Rory Boyle

PhD Student - The Whelan Lab, TCD

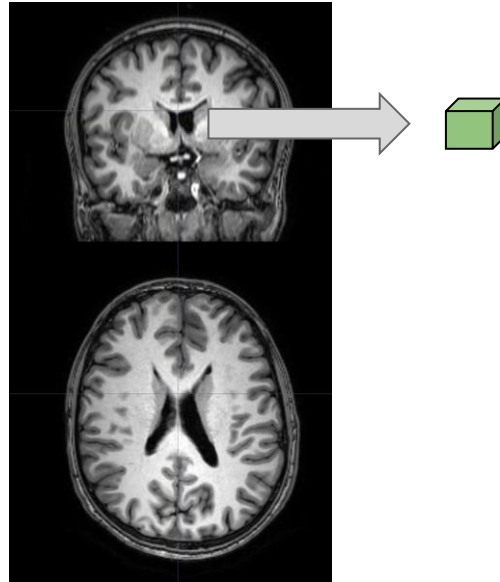


IRISH RESEARCH COUNCIL
An Chomhairle um Thaighde in Éirinn



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Measuring the brain with MRI

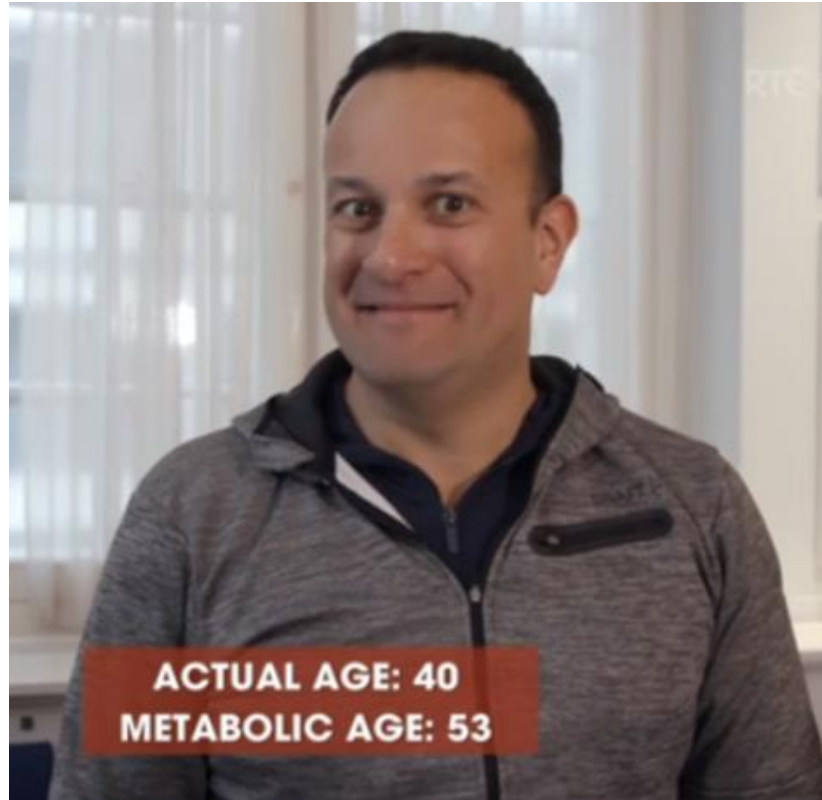


- **Voxels are 3d pixels and are tiny**
- **More than 100,000 voxels in a single MRI scan!**



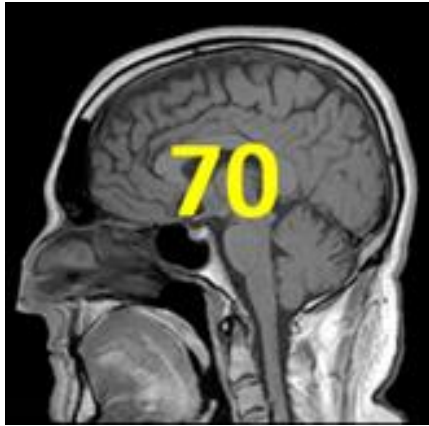
Not a fan of this type of approach...

**Actual
Age = 40**



**Metabolic
Age = 53!**

BrainPAD = Brain-Predicted Age Difference



**+10 years
brainPAD
(‘older’
brain)**

BrainPAD is an informative measure

Higher brainPADs (i.e. 'older' brains) associated with:

1. Slower walking speed
2. Weaker grip strength
3. Weaker lung function
4. Higher biological 'wear and tear'
5. Poorer cognitive performance
6. *Increased mortality risk*

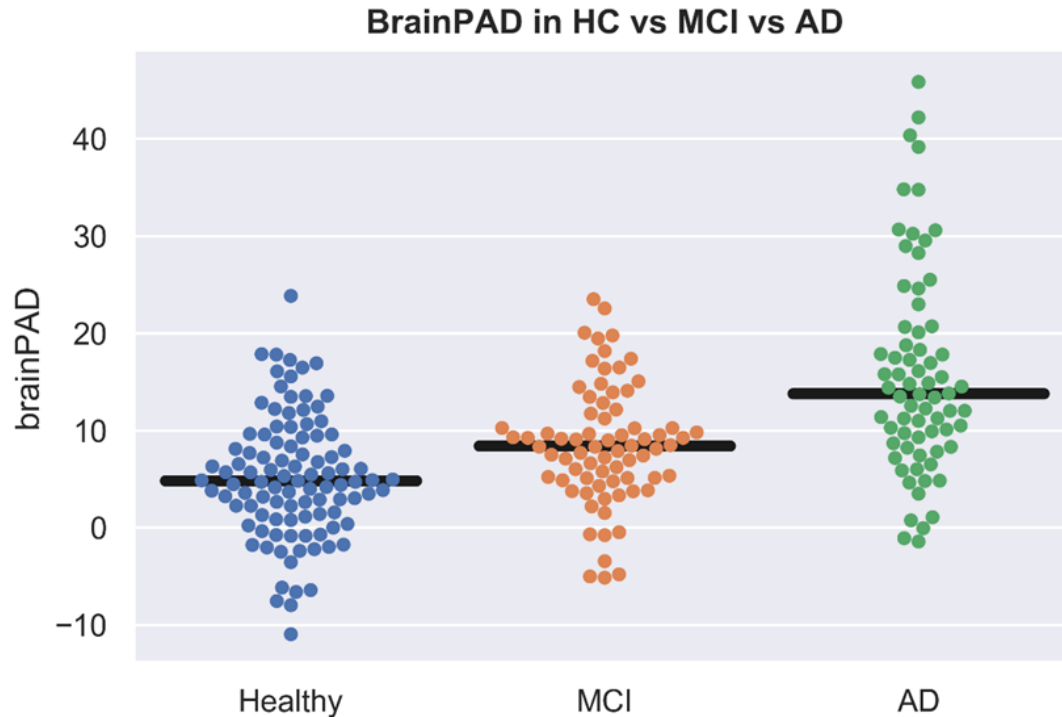
Molecular
Psychiatry

Original Article | OPEN | Published: 25 April 2017

Brain age predicts mortality

J H Cole , S J Ritchie, M E Bastin, M C Valdés Hernández, S Muñoz Maniega, N Royle, J Corley, A Pattie, S E Harris, Q Zhang, N R Wray, P Redmond, R E Marioni, J M Starr, S R Cox, J M Wardlaw, D J Sharp & I J Deary

BrainPAD is higher in mild cognitive impairment and Alzheimer's Disease



Ways of reducing BrainPAD and keeping our brains young?

- **Keep learning & keep moving!**

Education & exercise associated with lower brainPADs



Published in final edited form as:
Neurobiol Aging. 2016 April ; 40: 138–144. doi:10.1016/j.neurobiolaging.2016.01.014.

Differences between chronological and brain age are related to education and self-reported physical activity

Jason Steffener^{1,2,3,*}, Christian Habeck⁴, Deirdre O'Shea^{4,5}, Qolamreza Razlighi⁴, Louis Bherer^{1,2,3}, and Yaakov Stern⁴

- **Sing and play music!**

Amateur musicians had significantly lower brainPADs than non-musicians



Brain Struct Funct
DOI 10.1007/s00429-017-1491-2

ORIGINAL ARTICLE

Keeping brains young with making music

Lars Rogenmoser¹ · Julius Kernbach^{1,2} · Gottfried Schlaug¹ · Christian Gaser³

- **Try meditation!**

People who regularly did meditation had significantly lower brainPADs



NeuroImage
Volume 134, 1 July 2016, Pages 508–513



Estimating brain age using high-resolution pattern recognition: Younger brains in long-term meditation practitioners

A big fan of this type of approach!

**Actual
Age = 88**



**Metabolic
Age = 73!**



Joe Ó Muircheartaigh

@muirioch

Follow



I guess age is just a number - my uncle Míchéal Ó Muircheartaigh at 88 abseiling over cliff at Dúnsíon near Dingle, just a few fields over from where he was born in 1930. LAOCH. FATHACH.
[@Julienbehal](#) photos for Positive Ageing Week.



4:05 AM - 4 Oct 2018

843 Retweets 4,912 Likes



93

843

4.9K



**Thank you
for
listening!**