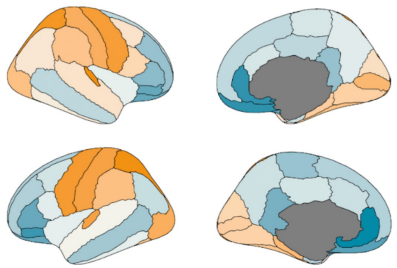
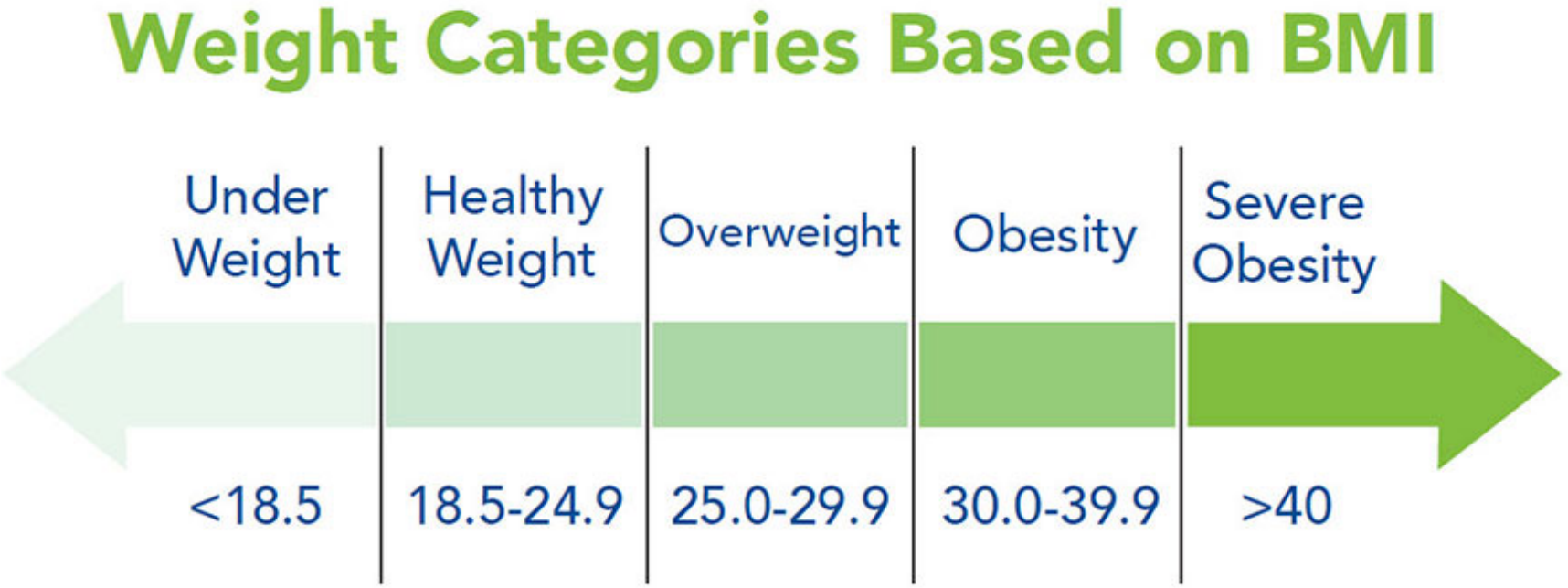
Mindful of your Waistline: The Relationship Between Obesity, Brain Atrophy, and Cognitive Decline



Filip Morys

What is obesity?

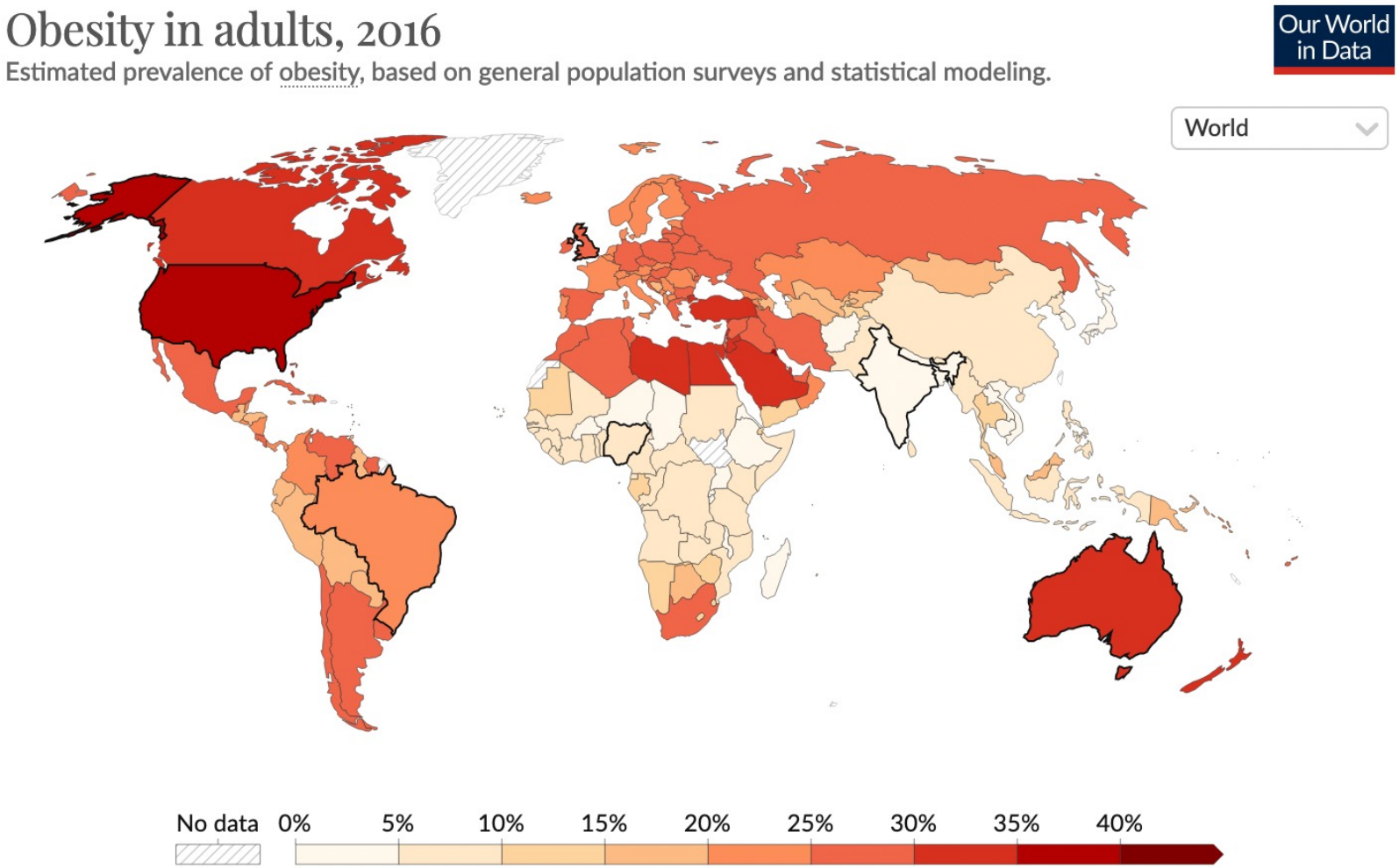


Poll #1

What percentage of the adult population have obesity or overweight?

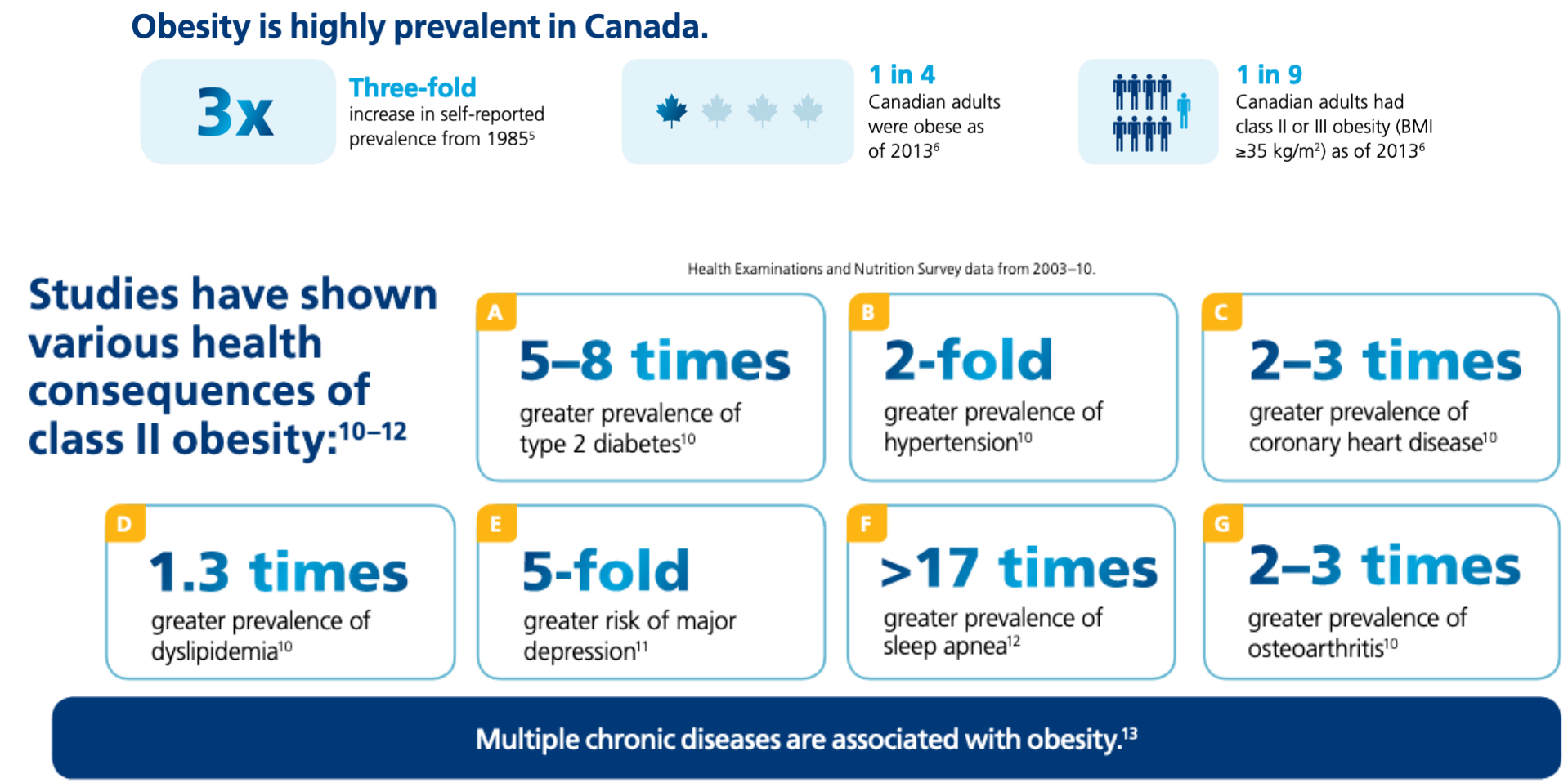
a) 13%
b) 39%
c) 52%

Incidence and health consequences of obesity



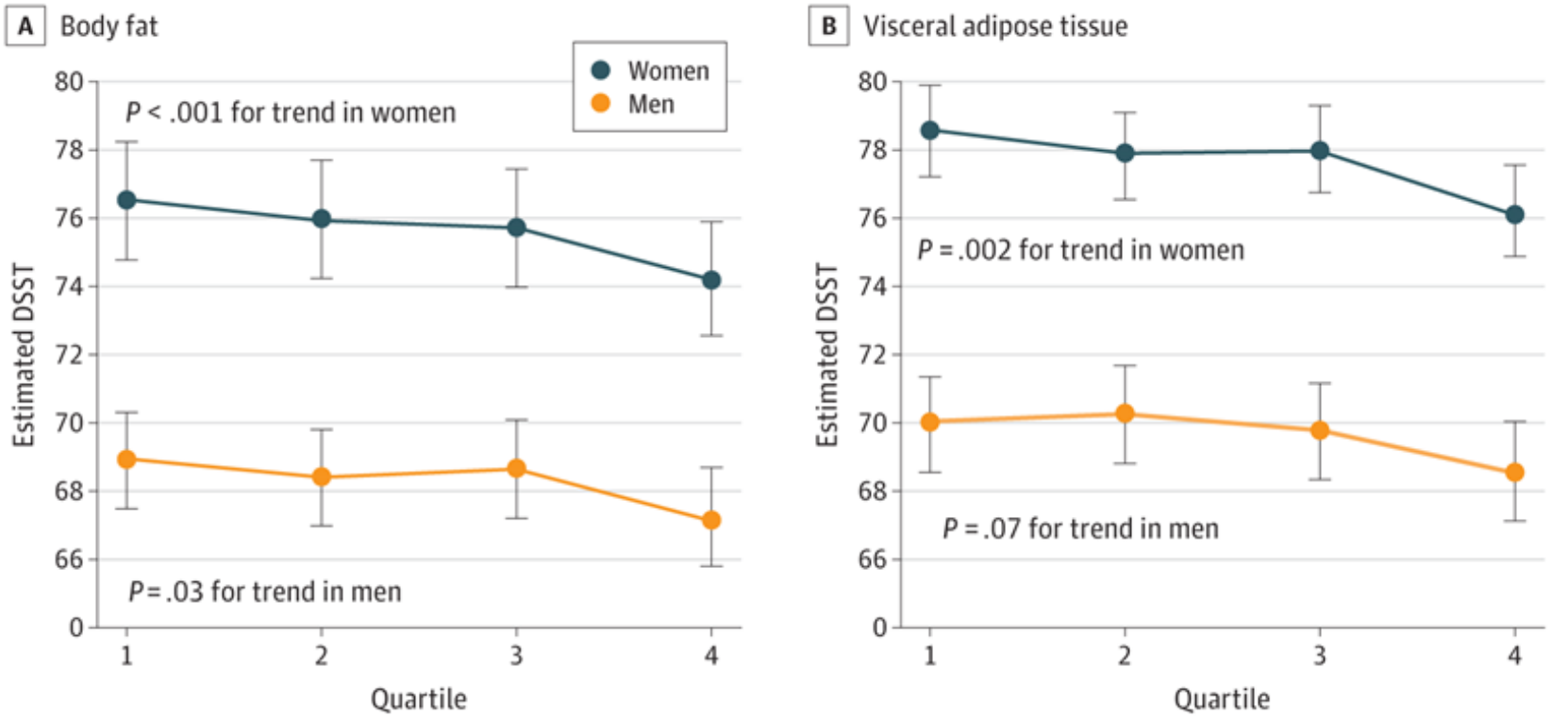
https://ourworldindata.org/obesity#what-share-of-adults-are-obese

Incidence and health consequences of obesity



www.rethinkingobesity.ca

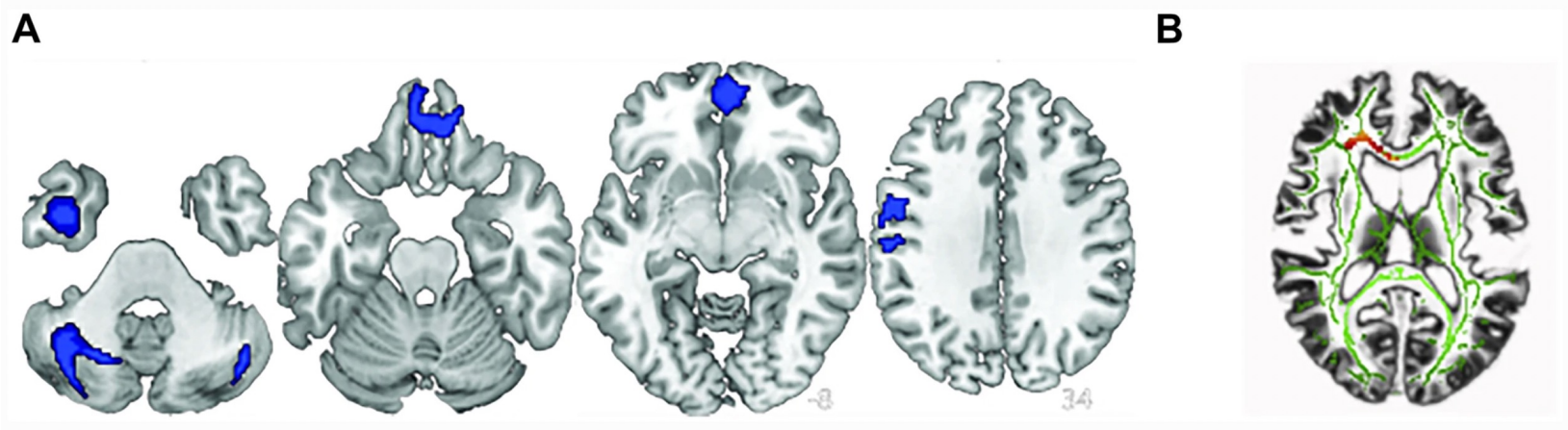
Obesity in adults is related to cognitive decline



Variable	Bioimpedance total body adiposity: Percentage of BF sex-specific quartiles 1	2	3	4	P value for trend[b]	Visceral adipose tissue: Visceral adipose tissue sex-specific quartiles 1	2	3	4	P value for trend[b]
MoCA score	27.1 (27.0-27.1)	27.0 (26.9-27.1)	27.0 (26.9-27.1)	26.8 (26.7-26.9)	.003	27.2 (27.1-27.3)	27.2 (27.1-27.3)	27.1 (27.0-27.2)	27.1 (27.0-27.2)	.19

Anand et al., 2022

Obesity in adults is related to brain changes



Garcia-Garcia et al., 2022

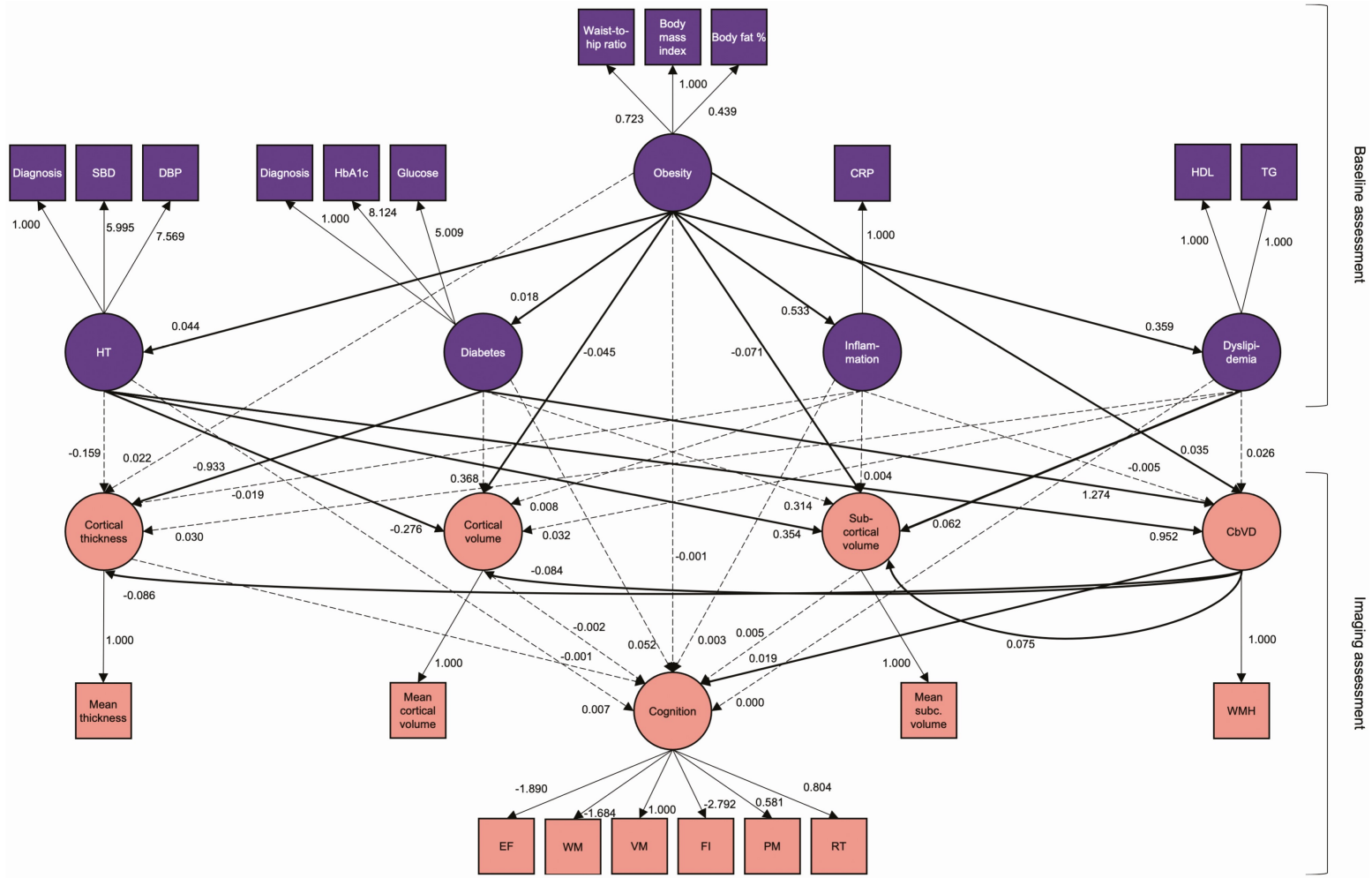
Poll #2

What factors link obesity and cognitive decline?

a) Changes in brain vasculature
b) Neuroinflammation
c) Changes in the blood brain barrier
d) Dyslipidemia
e) All of the above

Association Between Midlife Obesity and Its Metabolic Consequences, Cerebrovascular Disease, and Cognitive Decline

Filip Morys ✉, Mahsa Dadar, Alain Dagher



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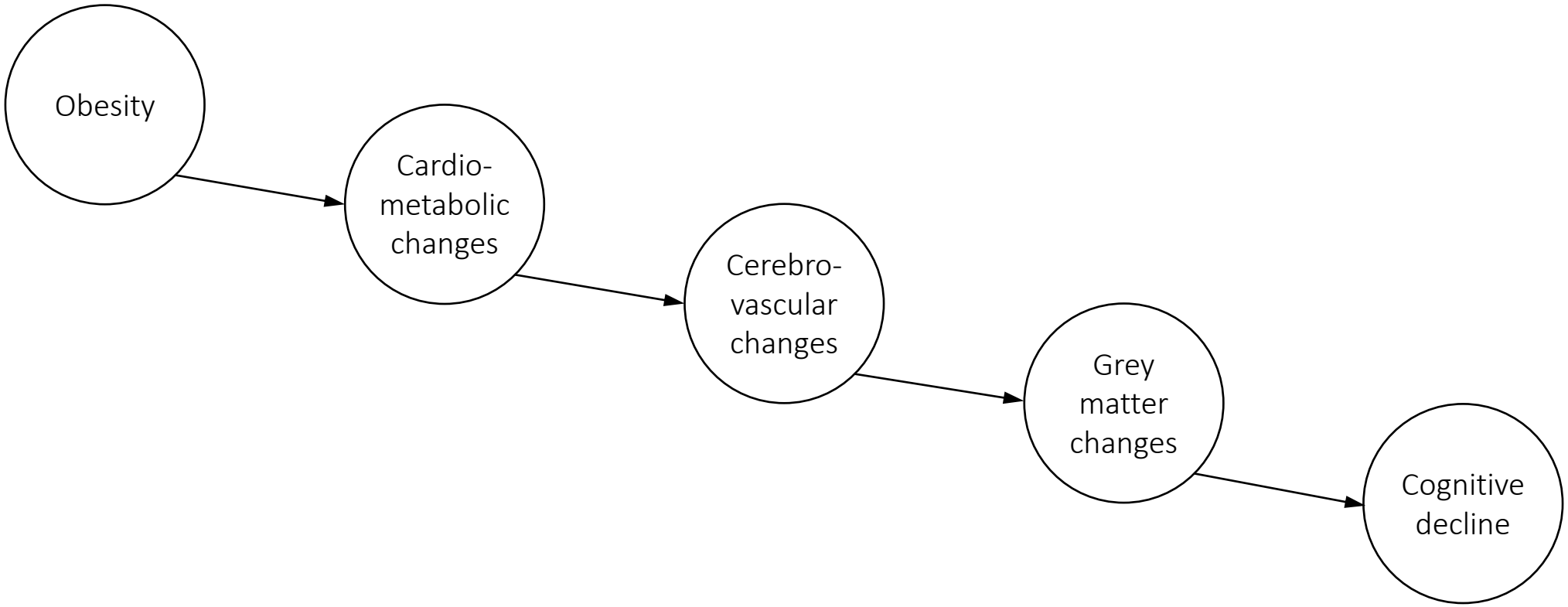
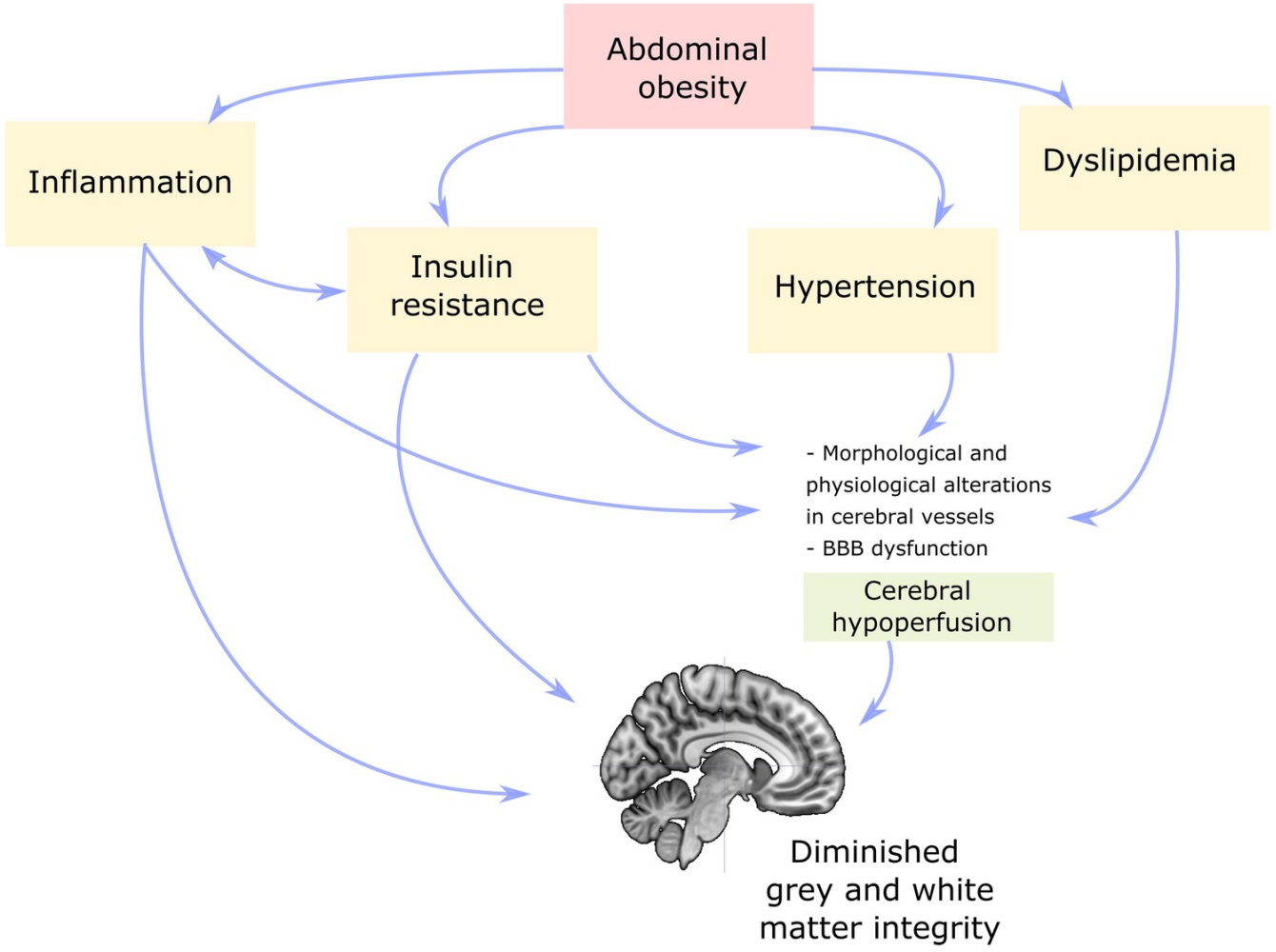


Summary of mechanisms relating obesity to brain changes



Garcia-Garcia et al., 2022

Association Between Midlife Obesity and Its Metabolic Consequences, Cerebrovascular Disease, and Cognitive Decline

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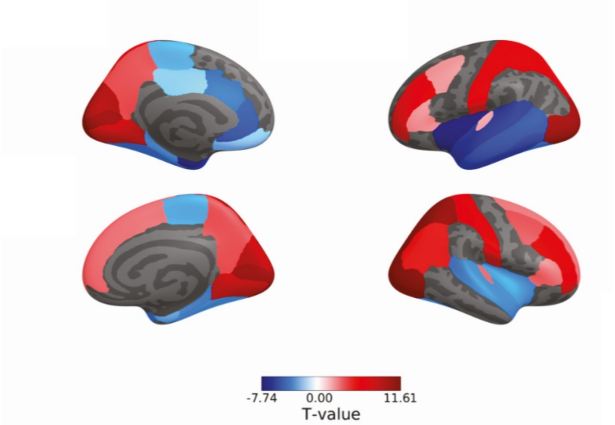
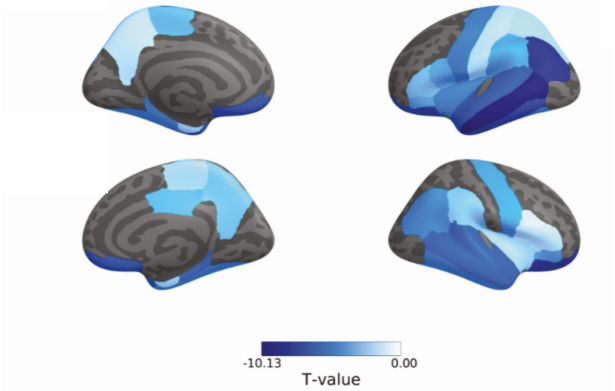
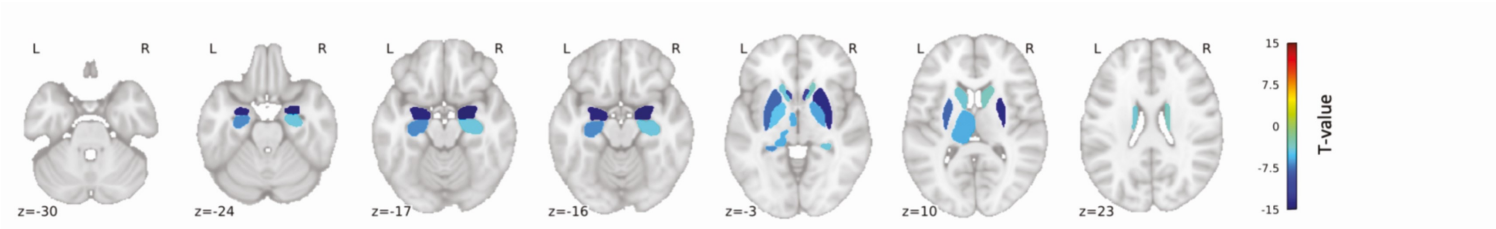
Cortical thickness



Cortical volume



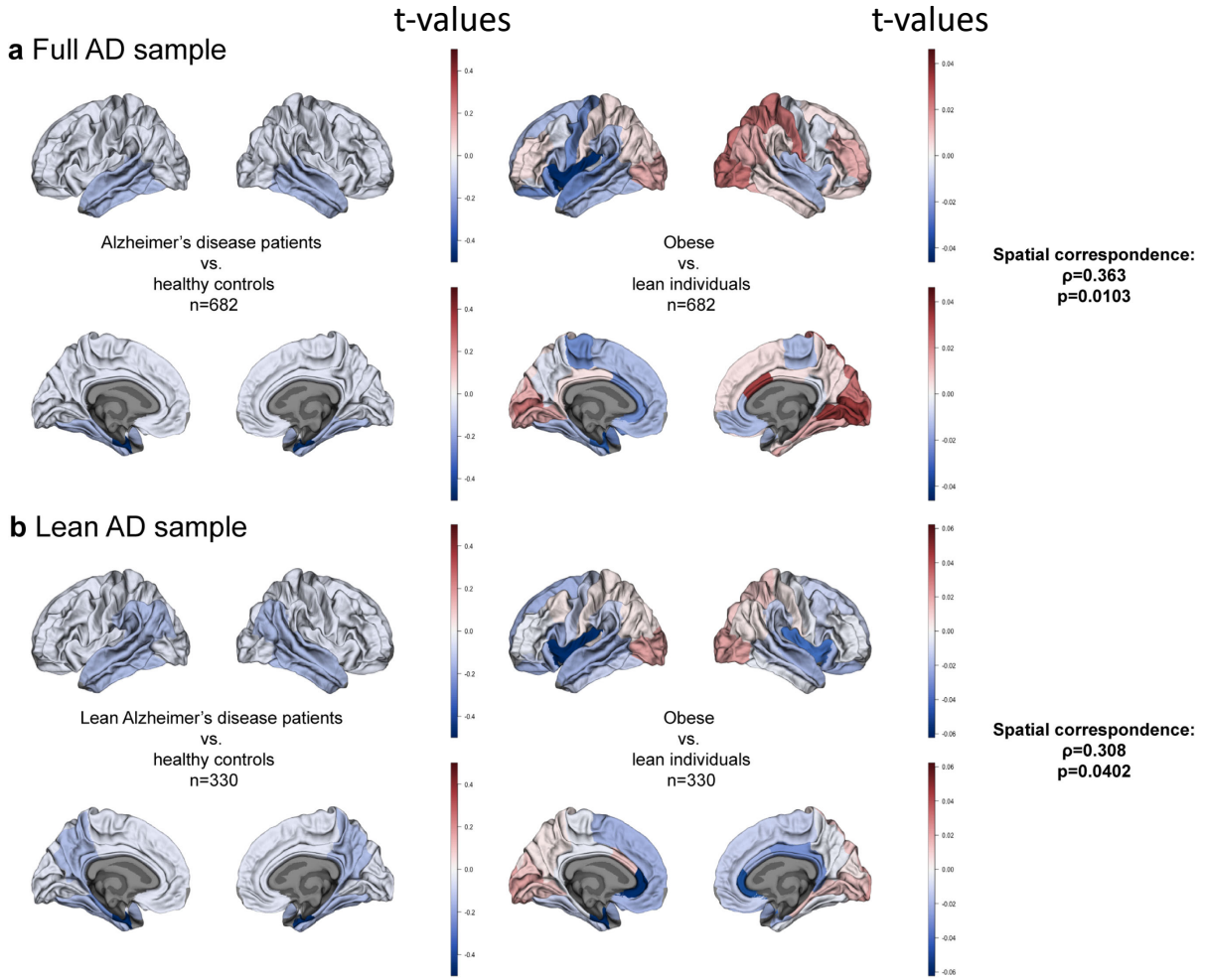


Subcortical volumes

Obesity-Associated Neurodegeneration Pattern Mimics Alzheimer's Disease in an Observational Cohort Study

Article type: Research Article

Authors: Morys, Filip[a; *] | Potvin, Olivier[b] | Zeighami, Yashar[a; c] | Vogel, Jacob[a] | Lamontagne-Caron, Rémi[b] | Duchesne, Simon[b; d] | Dagher, Alain[a] | for the Alzheimer's Disease Neuroimaging Initiative[1]



Interim summary

Obesity leads to brain changes and cognitive decline

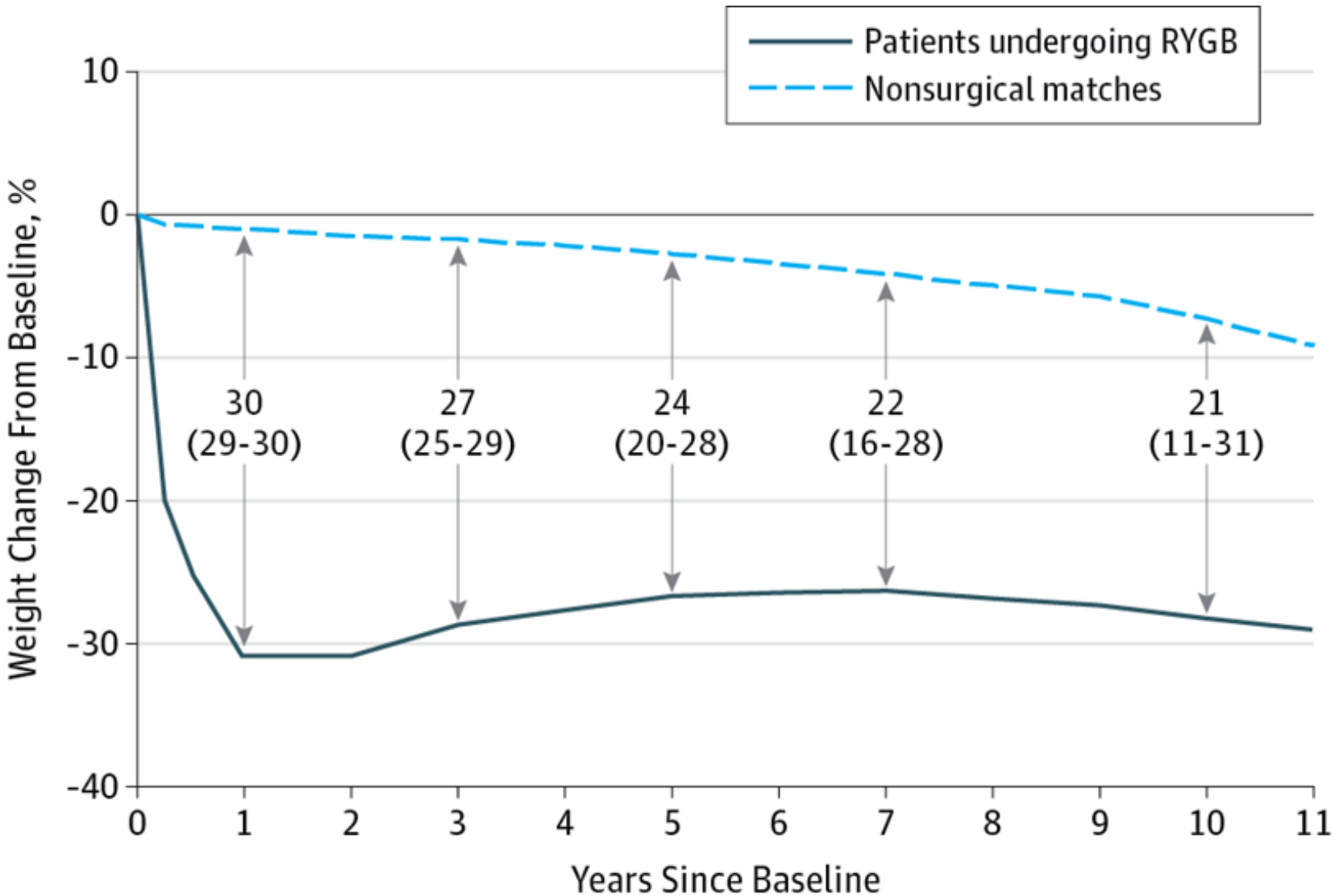
Obesity-related brain changes are similar to those in Alzheimer’s disease

Poll #3

Can weight loss lead to improvement of neurocognition?

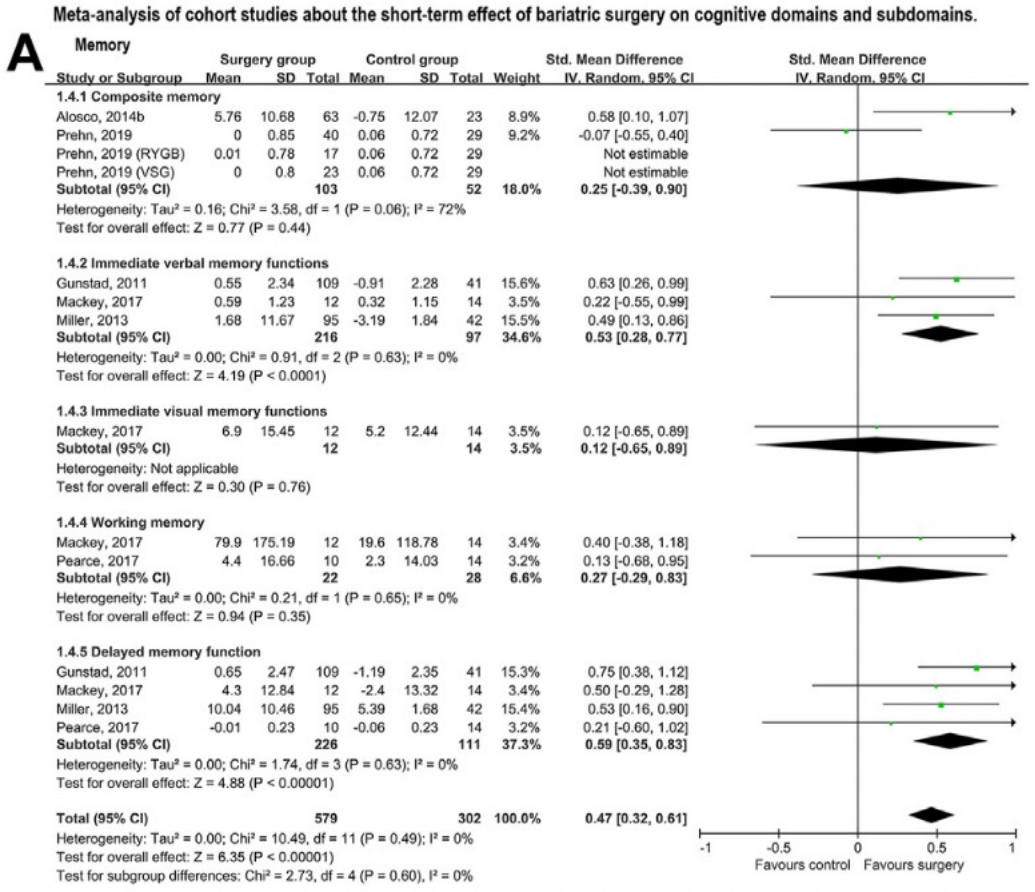
a) Yes
b) No

Bariatric surgery



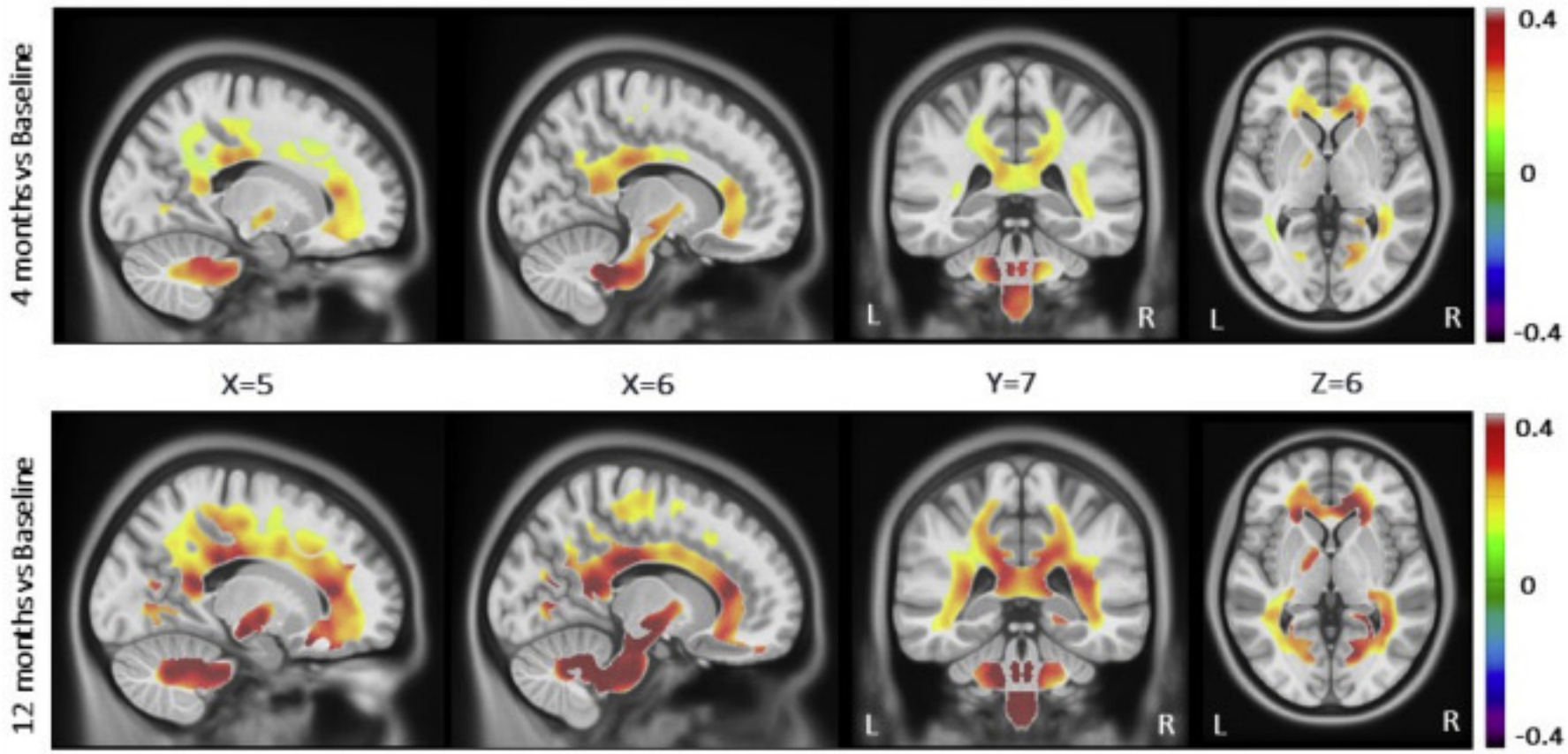
Maciejewski et al., 2016

Cognitive improvement after bariatric surgery



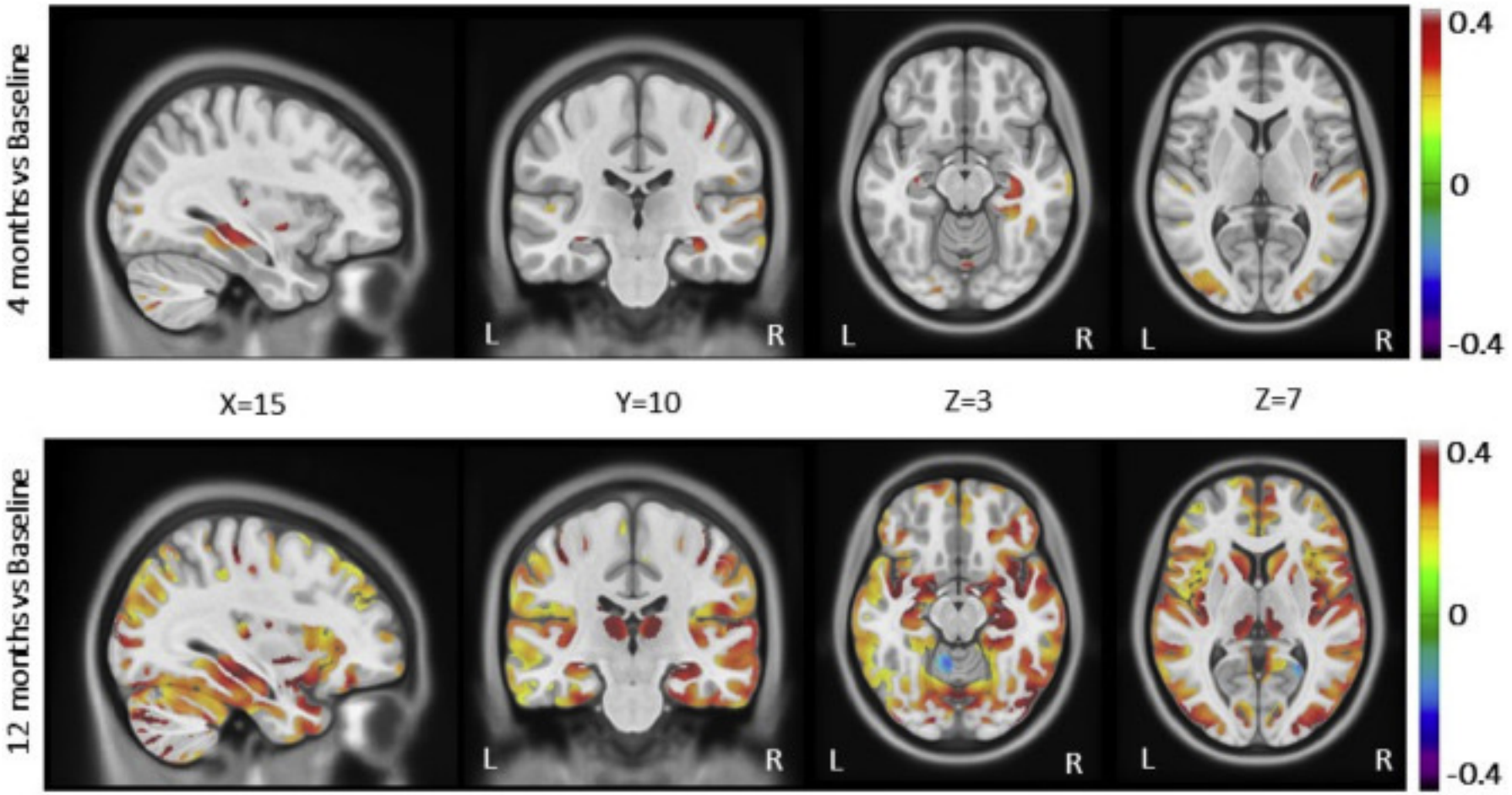
Chun-mei Li et al., 2022

Brain health improvement after bariatric surgery



Michaud et al., 2020

Brain health improvement after bariatric surgery



Michaud et al., 2020

Interim summary

Neurocognitive changes in obesity can be reversed with weight loss

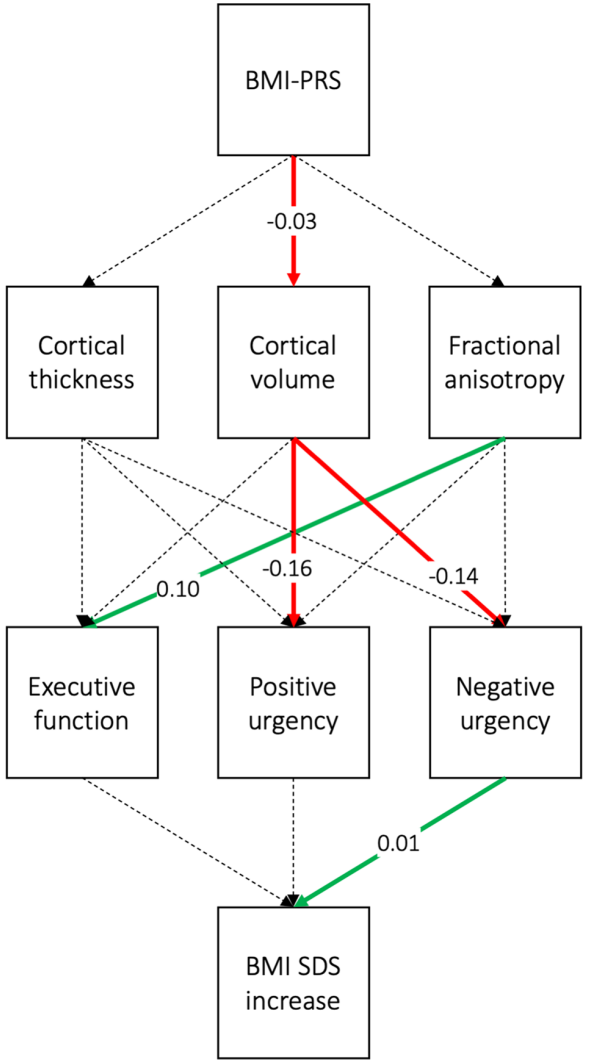
Can cognitive and brain changes lead to obesity?

Genetic risk for obesity

Brain changes

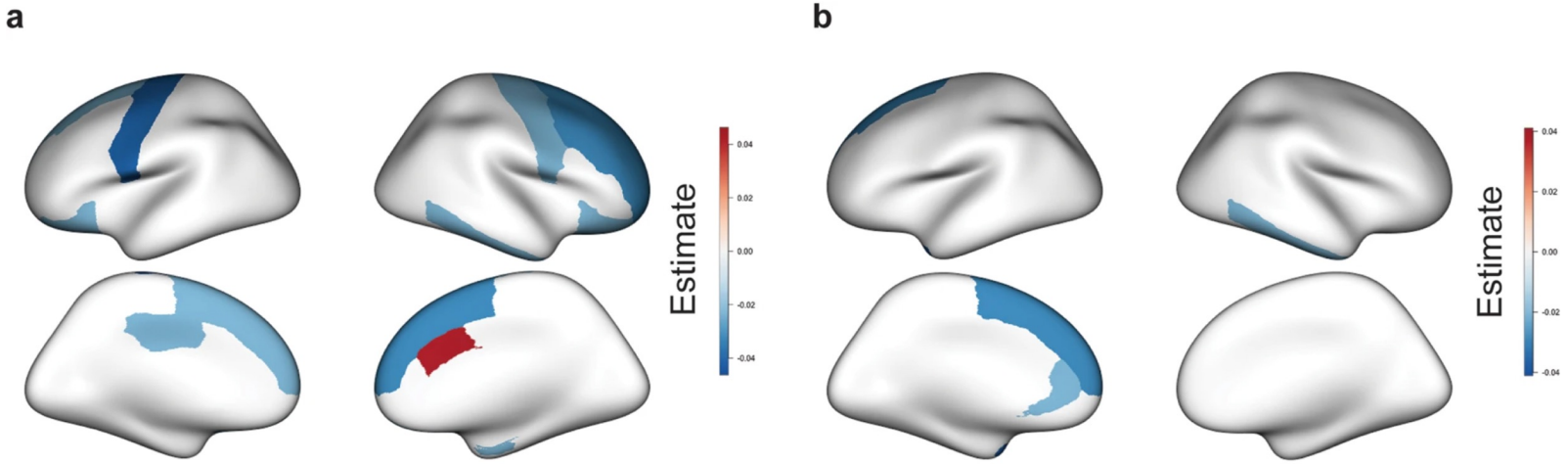
Behavioural changes

Increase in BMI



Can cognitive and brain changes lead to obesity?

Changes in the brain reflecting genetic risk for obesity



Summary

- Obesity is extremely prevalent in the world
- It is related to multiple chronic diseases and is a major modifiable risk factor for cognitive decline and dementia
- Mechanisms linking obesity to cognitive decline are changes in the brain occuring as effects of dyslipidemia, hypertension, diabetes, or systemic inflammation
- Obesity-related brain changes can be reversed by weight loss
- Changes in neurocognition can also lead to obesity

Acknowledgements



Mentors:

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Main collaborators:

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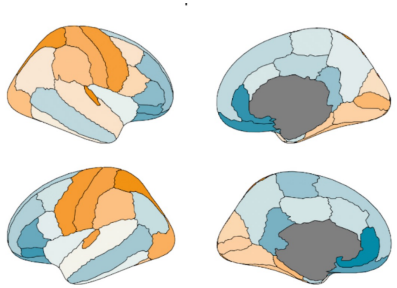
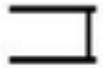


Filip Morys

Digit:	1	2	3	4	5	6	7	8	9
Symbol:									

Samples

Test

2	5	7	1	2	1	2	9	7	3	5	4
											

1	4	3	5	9	6	8	1	2	4	2

...

Friedel et al. 2017