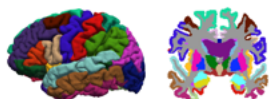


1. BACKGROUND

- Depressive episodes may accelerate brain aging¹.
- The brain age gap estimate (brainAGE) measures the divergence between individuals' chronological and biological brain ages as predicted from MRI data².



$$\text{brainAGE} = \text{predicted age} - \text{actual age}$$

- We identified modifiable risk factors that predict brainAGE in middle to elderly adulthood, in individuals with and without a history of major depression.

2. METHODS

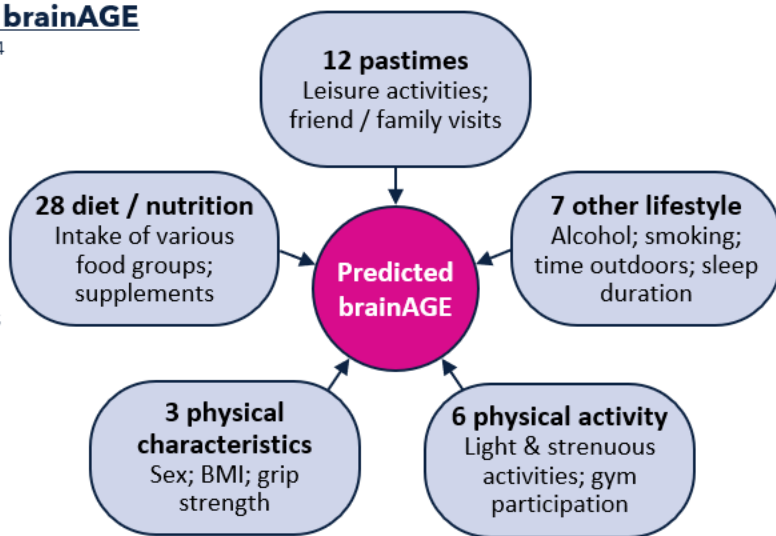
(1) BrainAGE calculation and participant groups

- BrainAGE was computed for 43,000 UK Biobank³ participants (ages 44-82) by applying support vector regression to measures of cortical thickness, surface area, and subcortical volumes.
- A subset of participants were assigned to 2 groups based on history of major depression.

Group	Sample size	Mean age	Mean brainAGE	% female
Non-psychiatric controls	n = 36,206	63.84 yrs	-0.08 yrs	52.41%
Depression history-positive	n = 896	63.10 yrs	+0.25 yrs	65.96%

(2) Identifying predictors of brainAGE

- Explainable Boost Regression⁴ was carried out in each participant group.
- 56 features + 5 automatically detected interactions were included in each model.
- Positive** predicted brainAGE reflects an **older** predicted brain age than the individual's chronological age, and vice versa for negative predicted brainAGE.



3. RESULTS

Figure 1: Importance (mean absolute prediction) for the top 6 predictors in each group

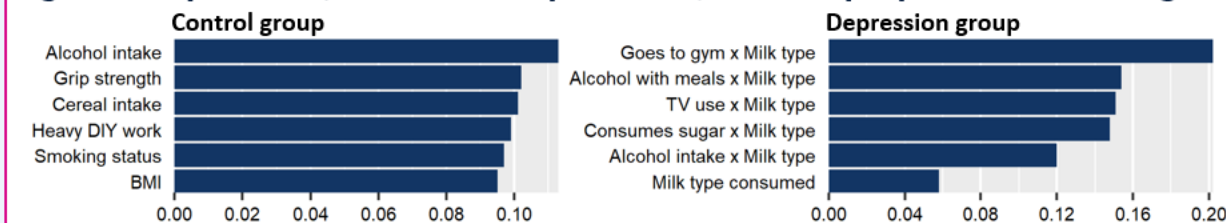
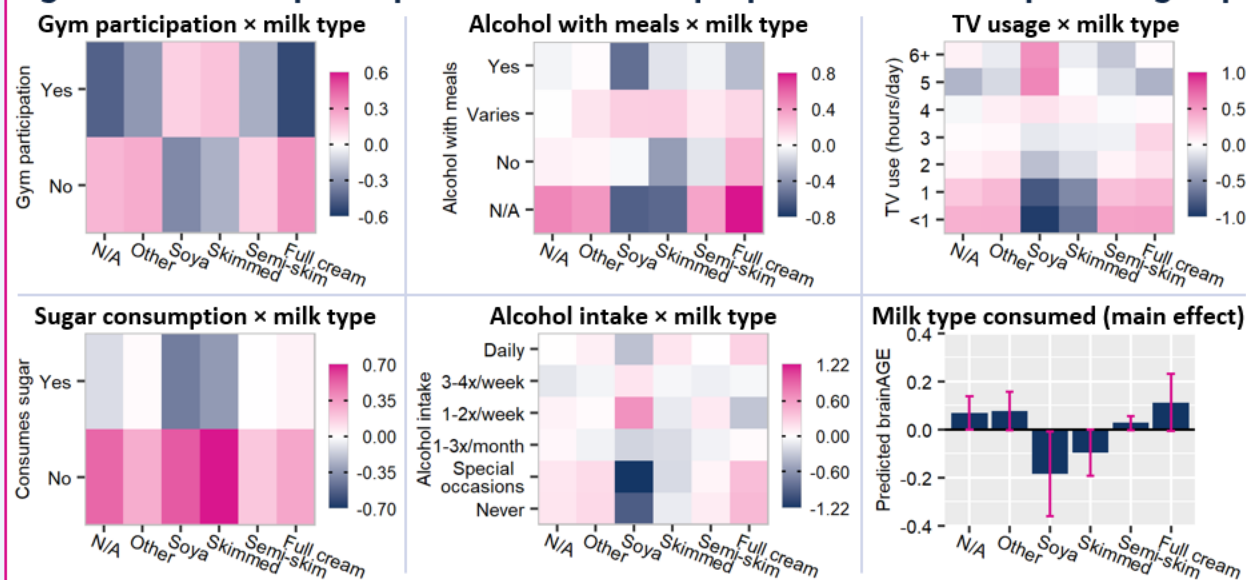


Figure 2: BrainAGE partial predictions for the top 6 predictors in the depression group



4. CONCLUSIONS

- The relationships between lifestyle exposures and brain aging in individuals with a depression history point to a potential role of interactions with nutrition.
- This study represents a meaningful advancement towards personalized interventions.

REFERENCES

- Schiweck et al. 2020, *Brain Behav Immun*, 87, 603-9.
- Sudlow et al. 2015, *PLoS Med*, 12(3), e1001779.
- Franke et al. 2010, *NeuroImage*, 50, 883-92.
- Nori et al. 2019, doi:10.48550/arxiv.1909.09223.