

The Relationship between Stress, Carotenoids and Cognitive Function in The Irish Longitudinal Study on Ageing

Joanne Feeney

Queen's University Belfast and Trinity College Dublin, Ireland

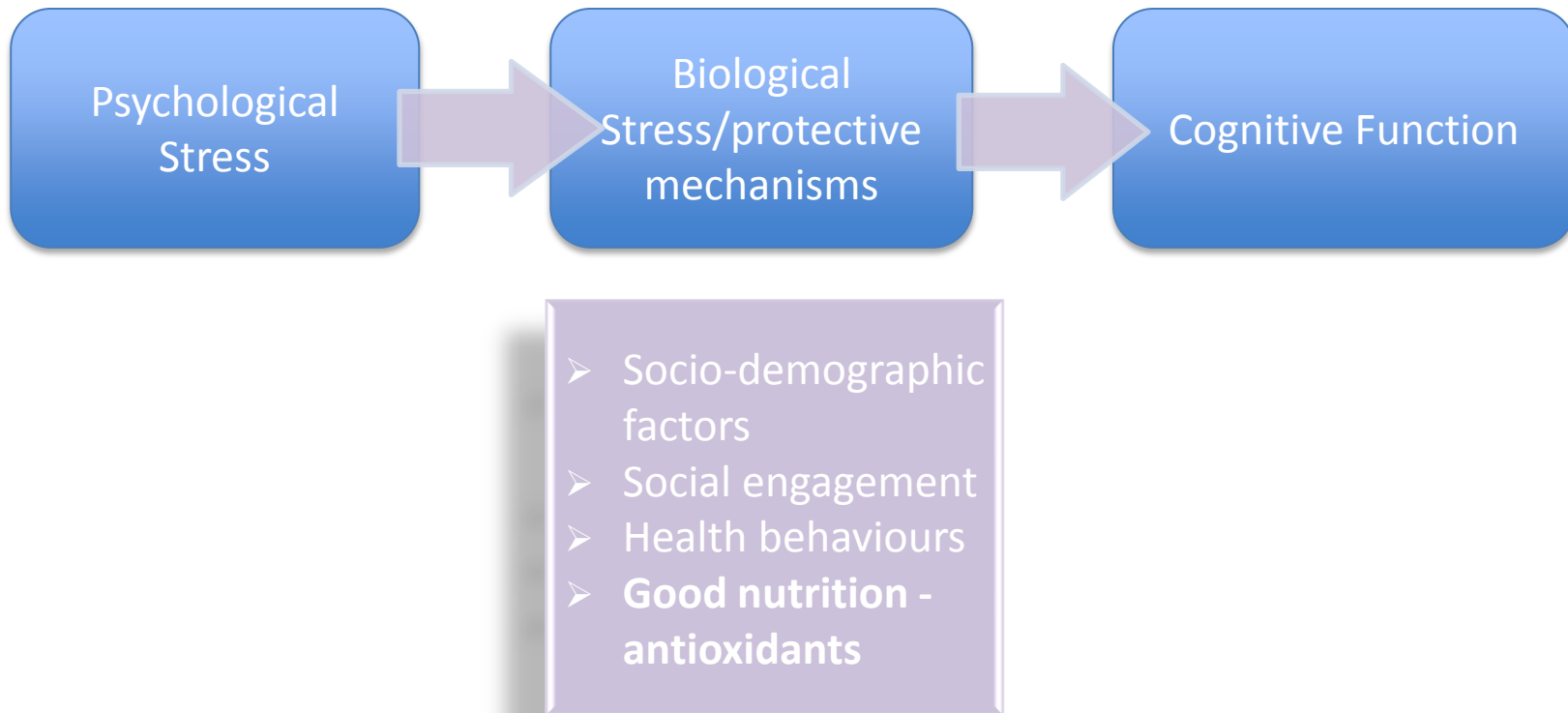


Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report

How does stress influence cognitive ability in older adults?



What are carotenoids?

- Nutritional pigments, entirely dietary derived
Found in brightly coloured vegetables and fruit, egg yolk

Carotenes

Beta-carotene,
alpha-carotene
lycopene

Xanthophylls

Lutein, Zeaxanthin
cryptoxanthin



- Form macular pigment in the eye
- higher concentrations relative to other carotenoids in the brain
- **Stabilize reactive oxygen species (ROS)**



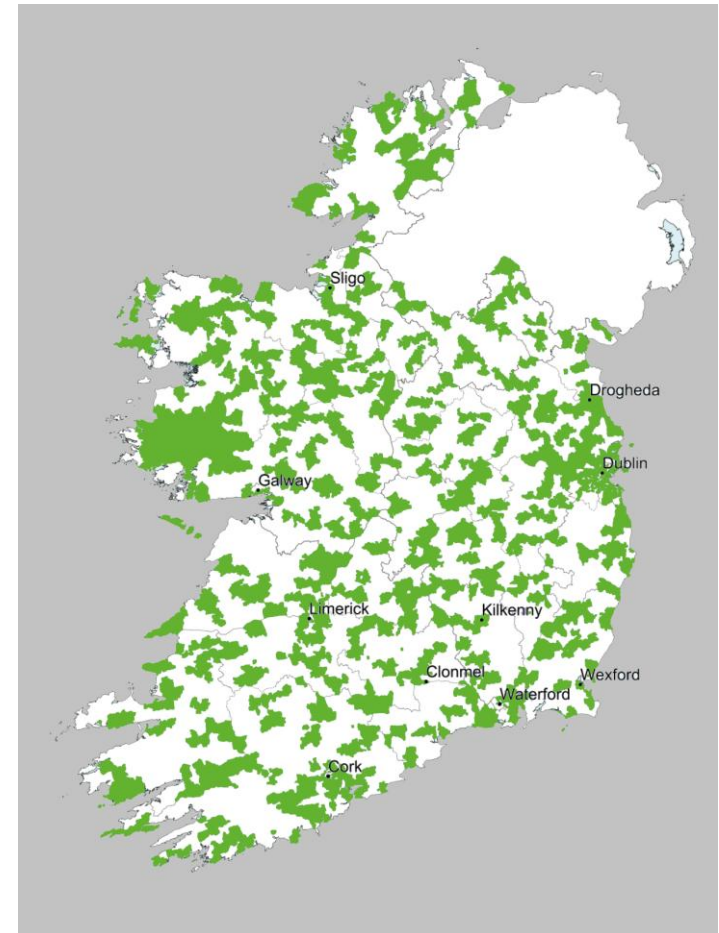
Aims

- To investigate the cross-sectional and longitudinal association between **psychological stress** and cognitive function
- To explore whether **lutein (L) and zeaxanthin (Z)** can moderate the effect of stress on cognition

Methods

The Irish Longitudinal Study on Ageing

- Observational cohort study of adults 50+ in Ireland, community dwelling at outset
- Three-stage approach to sampling
 - 3,155 population sampling units (clusters)
 - 640 clusters selected based on geographical spread and socio-economic status
 - 40 addresses randomly selected from each cluster
- Interviewers visited 25,600 houses
- n=8,504 community-dwelling adults
- Household response rate: 62%



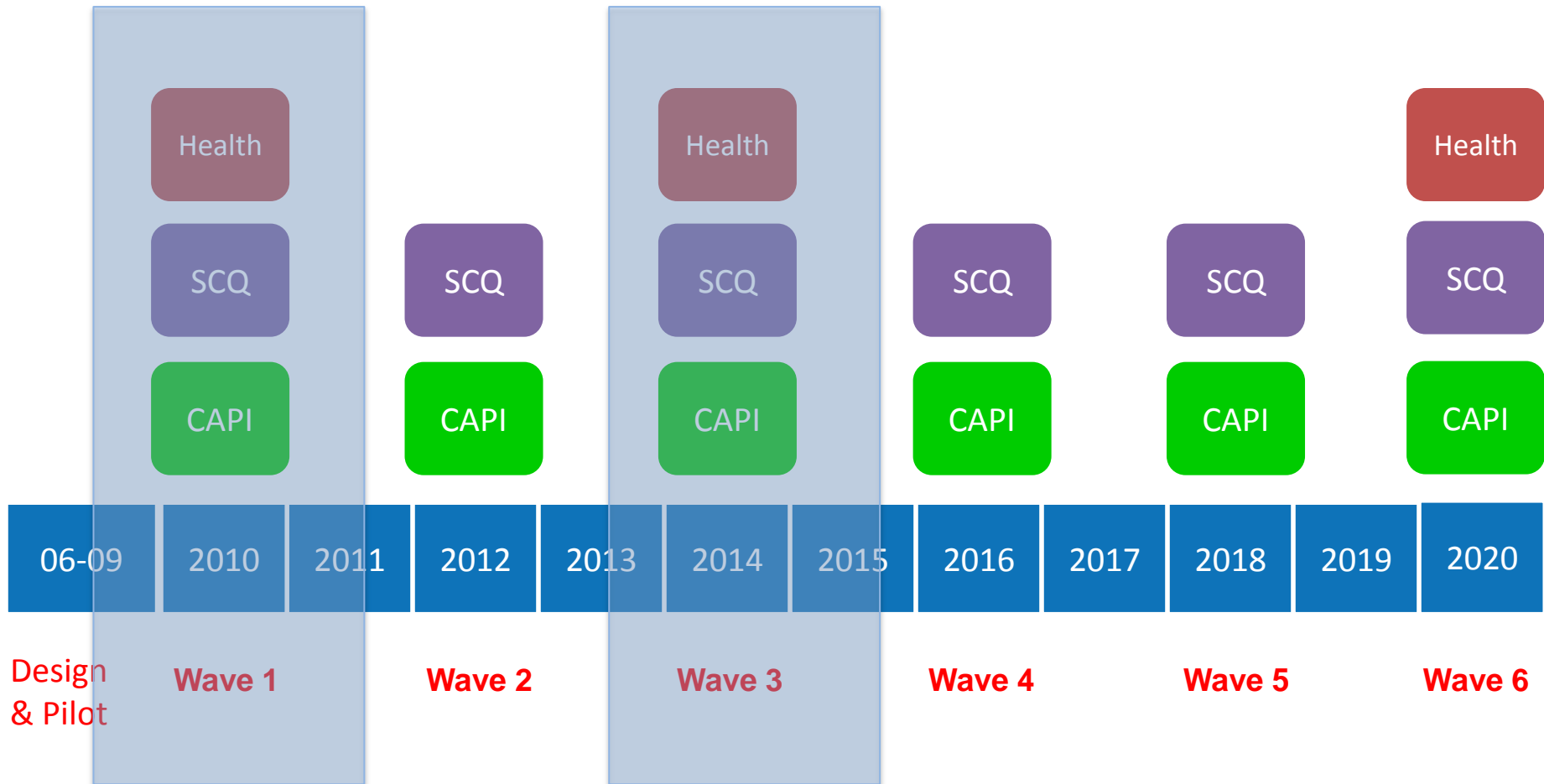
Data collection

Computer-Assisted Personal
Interview (CAPI)

Self-Completion Questionnaire
(SCQ)

Health assessment

Timeline



Data collection

Self-Completion
Questionnaire
(SCQ)



Perceived stress scale (short form)

- ✧ Feelings of stress over the past month
- ✧ 0-16

Health
assessment



Blood plasma samples

- ✧ Concentration of **lutein and zeaxanthin** peripherally, measured by HPLC



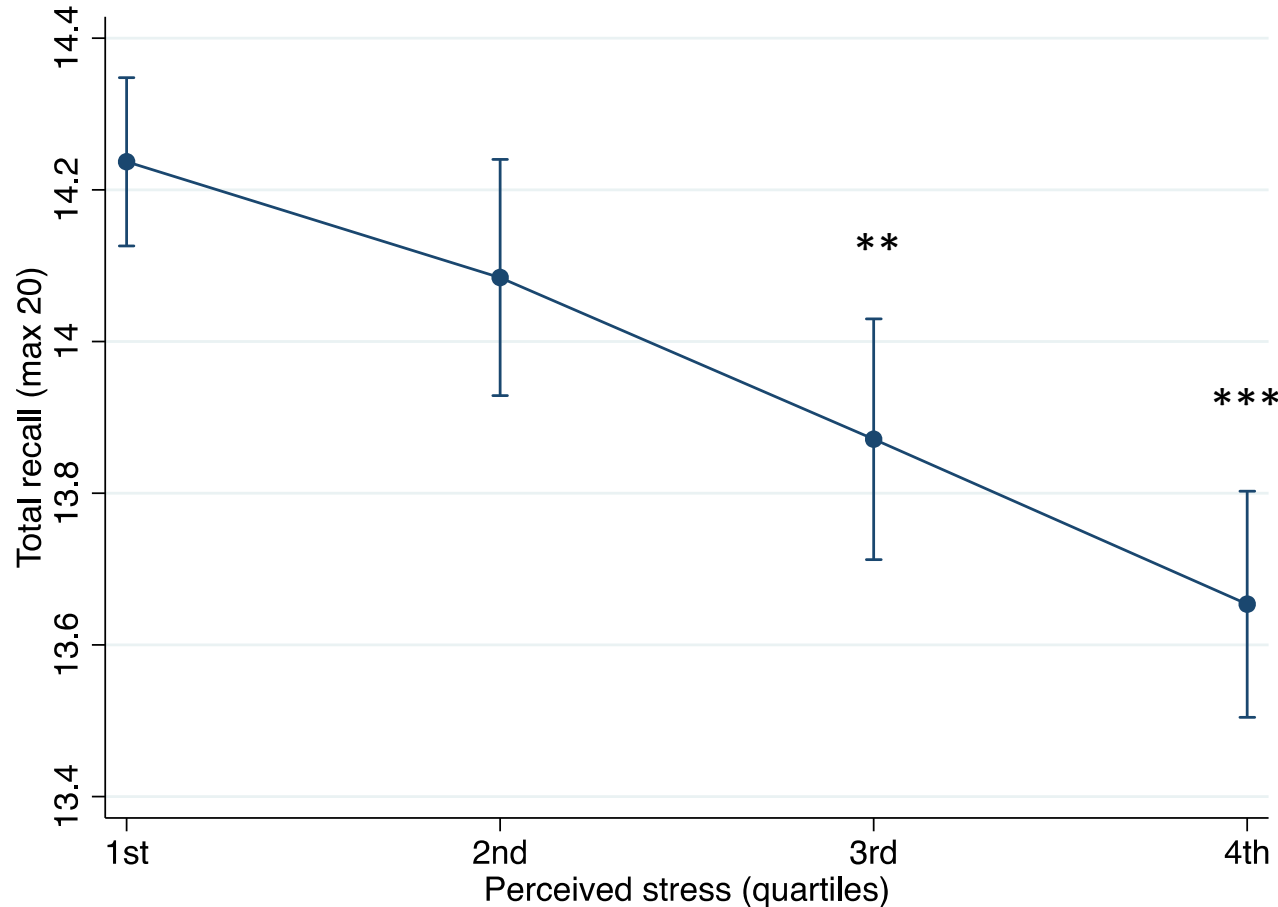
Cognitive tests

- ✧ Memory (word recall)
- ✧ Global cognition (MoCA)
- ✧ Executive function (Colour Trails Task 2)
- ✧ Attention (Sustained Attention to Response Task)

N = 3,577

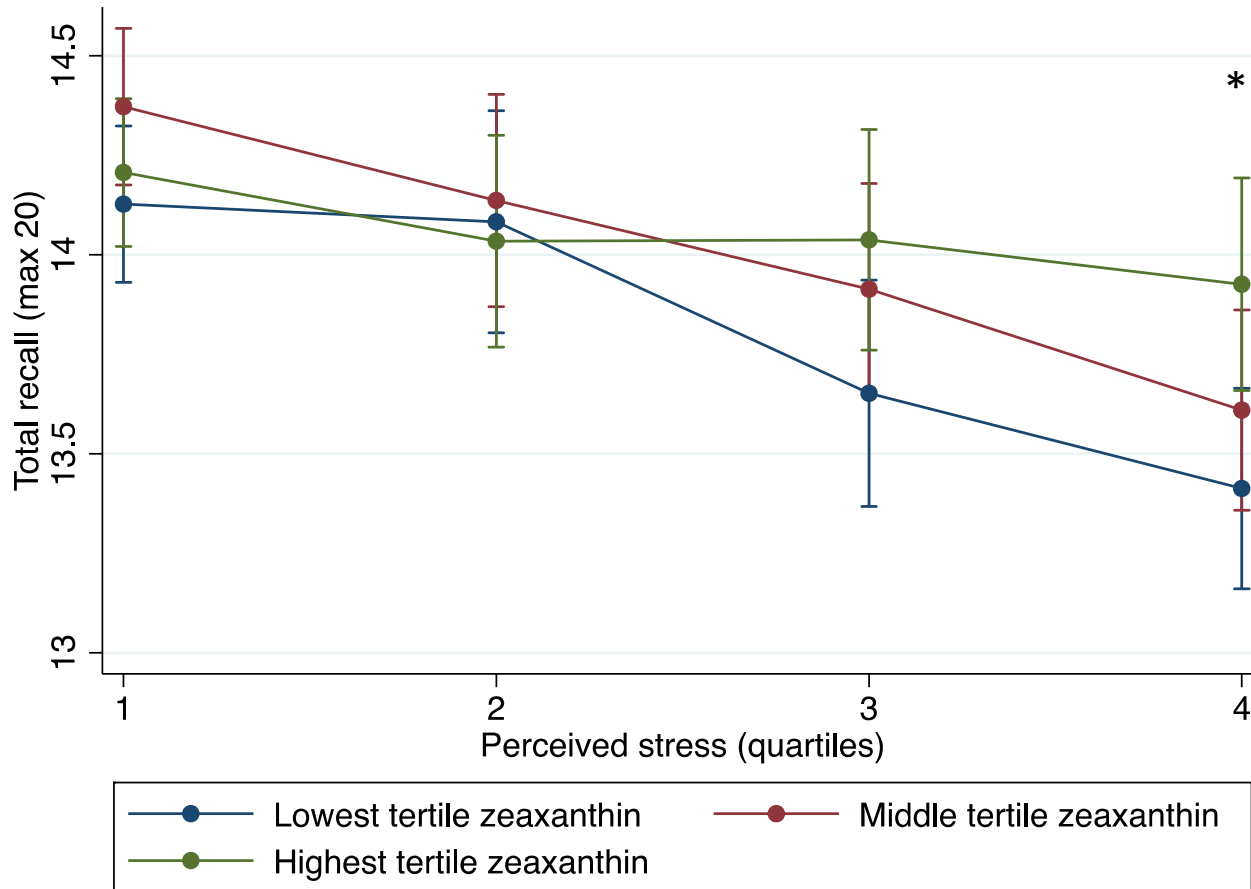
Results

Negative linear association between stress and word recall



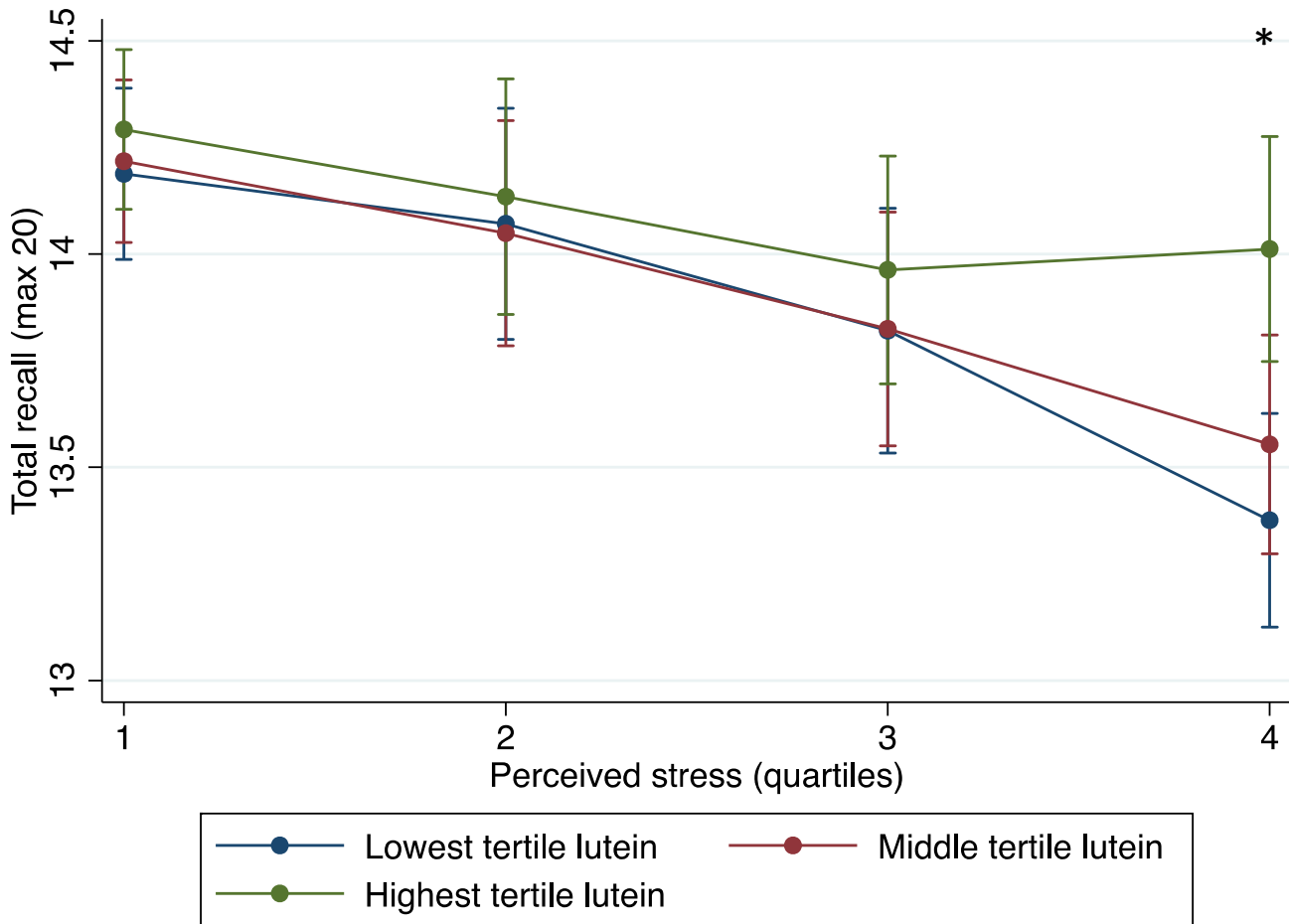
p<.01, *p<.001; Mixed effects regression model adjusted for age, sex, education, smoking, alcohol use, exercise, plasma vitamin D and vitamin B-12, chronic health conditions

The relationship between stress and memory performance differs according to level of Z



*p<.05; Mixed effects regression model adjusted for age, sex, education, smoking, alcohol use, exercise, plasma vitamin D and vitamin B-12, chronic health conditions

Similar pattern is evident for L



*p<.05; Mixed effects regression model adjusted for age, sex, education, smoking, alcohol use, exercise, plasma vitamin D and vitamin B-12, chronic health conditions

Conclusions and future steps

- Circulating blood carotenoids lutein and zeaxanthin moderate the association between perceived stress and memory performance in this sample
- Cross-sectional association only
- What does this mean, if anything?
- Location and role of these nutrients in the brain

Acknowledgments

Aisling O'Halloran

Rachel Moran

Daniel Carey

John Nolan

Stephen Beatty

Professor Rose Anne Kenny

Professor Ian Young

TILDA participants

Funders



Irish Life

The
ATLANTIC
Philanthropies



An Roinn Sláinte
DEPARTMENT OF HEALTH