Exploring uptake of a university-level educational intervention to prevent cognitive decline and reduce dementia risk: the Tasmanian Healthy Brain Project

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Background

- Low educational attainment is associated with increased vulnerability to age-related cognitive decline through reduced cognitive reserve (CR)[1]
- Strategies to enhance CR, such as late-life education, may reduce risk of Alzheimer's disease (AD)[2]

Aims

- Define group differences in adherence of the university-level educational intervention
- Characterise predictors of joining the intervention
- Inform recruitment for future educational interventions to reduce the risk of AD

Methods

- Participants (n = 562) voluntarily nominated for fee-reduced university-level education
- Logistic binomial regression with age, education, gender, CR[3], APOE, Dementia Rating Scale and Hospital & Anxiety Depression Scale (R v3.6.1): intervention/control outcome
- Bayes Factors provided support for main effect models

	Control (n=125)	Experimental (n=437)	Total (n=562)
Age			
Mean (SD)	62.8 (6.43)	59.5 (6.59)	60.2 (6.69)
Median [Min, Max]	63.0 [50.0, 78.0]	59.0 [50.0, 78.0]	60.0 [50.0, 78.0]
Education (years)			
Mean (SD)	11.1 (1.20)	11.3 (0.971)	11.2 (1.03)
Median [Min, Max]	12.0 [7.00, 12.0]	12.0 [8.00, 13.0]	12.0 [7.00, 13.0]
Gender			
Female	78 (62.4%)	305 (69.8%)	383 (68.1%)
Male	47 (37.6%)	132 (30.2%)	179 (31.9%)
Cognitive Reserve			
Mean (SD)	-0.106 (1.06)	0.0430 (0.971)	0.00970 (0.994)
Median [Min, Max]	0.0305 [-2.68, 2.11]	0.0611 [-2.87, 2.89]	0.0551 [-2.87, 2.89]
Missing	1 (0.8%)	5 (1.1%)	6 (1.1%)
APOE e4			
e4-	68 (54.4%)	243 (55.6%)	311 (55.3%)
e4+	40 (32.0%)	111 (25.4%)	151 (26.9%)
Missing	17 (13.6%)	83 (19.0%)	100 (17.8%)
Dementia Rating Scale-2 AECM MOANS (z)			
Mean (SD)	-0.0366 (1.04)	0.0155 (0.983)	0.00394 (0.994)
Median [Min, Max]	0.0349 [-2.79, 2.39]	0.0349 [-2.79, 1.92]	0.0349 [-2.79, 2.39]
Hospital Anxiety and Depression Scale - D			
Mean (SD)	2.84 (2.35)	2.39 (2.23)	2.49 (2.26)
Median [Min, Max]	2.00 [0.00, 10.0]	2.00 [0.00, 12.0]	2.00 [0.00, 12.0]
Missing	0 (0%)	1 (0.2%)	1 (0.2%)
Hospital Anxiety and Depression Scale - A			
Mean (SD)	2.84 (2.35)	2.39 (2.23)	2.49 (2.26)
Median [Min, Max]	2.00 [0.00, 10.0]	2.00 [0.00, 12.0]	2.00 [0.00, 12.0]
Missing	0 (0%)	1 (0.2%)	1 (0.2%)

Table 1: Baseline characteristics of THBP cohort stratified by educational intervention (voluntary nomination, non-random assignment)

Summary

- Ongoing longitudinal study of the cognitive benefits of later-life university education engagement
- Strongest predictors of joining intervention were age and cognitive reserve, accounting for APOE, gender and other covariates
- Educational interventions should target participants with a broad age range and cognitive profile

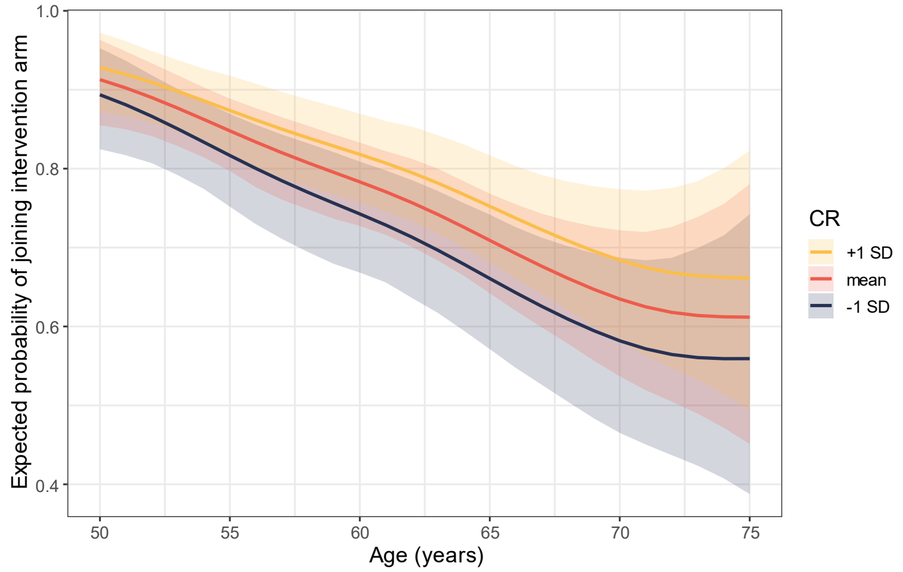

Figure 1. Expected probability of joining the intervention arm of the Tasmanian Healthy Brain Project, stratified by cognitive reserve and age. Bayesian logistic regression with a smooth, penalised regression spline (fitted for age) was used to estimate the log-odds of voluntarily joining the intervention arm, which would involve undertaking fee-subsidised University-level education. Log-odds have been converted to a probability to aid interpretation.

Results & Conclusions

- On average, the interventional group was younger, more educated, displayed higher CR and lower APOE-ε4 penetrance (Table 1).
- Bayes Factors provided strong support for CR and age, but not gender, being predictors of joining the intervention:
- $BF = \frac{s(age) + gender + CR}{s(age) + CR} = 1.4$ $BF = \frac{s(age) + CR}{s(age)} = 29.7$ $BF = \frac{Intercept}{s(age) + CR} = < 0.0001$
- Probability of joining intervention was associated with participant's age and CR (Figure 1), however was not associated with participants' gender. Being younger and having higher CR was associated with a greater likelihood of joining the intervention
- Modifiable lifestyle factors offer great preventative potential. This research highlights the importance of targeted recruitment to educational interventions in later-life. In ageing populations where risk of cognitive decline and AD risk is increasing by the year, educational interventions should target participants with a broad range of age and cognitive abilities.

Acknowledgements

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References. 1: Livingston G, *et al*. Dementia prevention, intervention, and care. **2:** Stern Y, *et al*. Influence of education and occupation on the incidence of AD. **3:** Ward DD, *et al*. Modeling cognitive reserve in healthy middle-aged and older adults: the THBP.