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The effects of brain-friendly diet on cognitive performance (Brave study)

Iina Savenius¹, Sanna-Maria Hongisto², Juhani Sibakov³, Jussi Loponen¹, Heli Diaz²,
Leila Fogelholm², Satu Pakarinen⁴, Kristian Lukander⁴ and Marika Laaksonen¹

¹Fazer Lab Research Team, Oy Karl Fazer Ab, Helsinki, Finland,

²Fazer Food Services, Helsinki, Finland,

³Fazer Bakery, Helsinki, Finland and

⁴Finnish Institute of Occupational Health, Helsinki, Finland

Abstract

Introduction:

Cognitive performance is related to lipid and glucose metabolism and metabolic activation that are regulated by diet. The Brave study has shown beneficial effects of brain-friendly diet (Brainfood) on metabolic health in office workers with elevated metabolic risk. We further examined the effects of Brainfood on cognitive performance.

Materials and methods:

We conducted a diet-switch, 4-week intervention study on 84 volunteers with elevated plasma LDL levels in pre-screening. During the control period participants continued their habitual eating pattern and were offered an optional lunch following western-type diet, and they did not receive nutritional guidance. In Brainfood period, lunch, snack and breakfast offering was optimised for the quality of carbohydrates and fat and the intake of salt and protein. Educated nutritionist instructed the participants to follow the Brainfood diet and regular meal pattern.

Participants kept a 3-day food record at the end of control and Brainfood periods. For each participant, we calculated the Brainfood ratio comparing the total frequencies of consumption of brain-friendly and brain-unfriendly foods. We ranked the subjects also according to the change in brain-friendly nutrient intake (saturated fat, polyunsaturated fat, fibre, sugar and salt) from control to Brainfood period.

Cognitive performance (cognitive control and flexibility, attention, inhibition, learning, and memory) were measured with a combination of traditional standardized neuropsychological tests (Bourdon-Wiersma double task, Stroop Colour and Word Test, WMS-III: Letter-Number Sequencing, Rey Auditory Verbal Learning Test) and modern computer and mobile tests (Flexible Attention Test FAT, N-Back task and Task-switching task) before and after the Brainfood diet. In addition, participants evaluated their vigilance, task load and performance after each test with the Karolinska Sleepiness Scale (KSS) and NASA Task Load Index (NASA-TLX).

We compared the change in cognitive performance before and after Brainfood diet between the subgroups with the highest and lowest Brainfood ratio and the highest and lowest brain-friendly nutrient intake using repeated measures analysis of variance.

Results:

Brainfood diet reduced intakes of saturated fat and salt, and increased intakes of polyunsaturated fat, fibre, vitamin C and D, iron and magnesium ($p < 0,03$). Participants with the highest Brainfood ratio improved reaction time (FAT; p -value for interaction 0,01, multiple comparison correction not applied), switch cost (Task-switching; $p = 0,02$) and inhibition tendency (Stroop; $p = 0,047$). Better dietary fat quality decreased self-reported physical strain (NASA-TLX; p -values $< 0,007$), and higher fibre intake decreased self-reported sleepiness (KSS; $p = 0,033$).

Discussion:

Brainfood diet may positively affect cognitive performance in office workers with elevated metabolic risk.

Conflict of Interest

There is no conflict of interest