

Food2Learn: Positive association between omega-3 index and cognition in healthy adolescents

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Food2Learn:

Positive association between omega-3 index and cognition in healthy adolescents

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Introduction

The impact of n-3 LCPUFA supplementation on cognition is debated. The adolescent brain has largely been neglected in this type of research. Previous studies found positive associations between fish consumption and academic achievement in adolescents. However, the association between LCUPA in blood and cognitive functioning has not been studied up to now. We investigate the association between Omega-3 Index measured in blood and cognitive function in healthy adolescents. Baseline data from Food2Learn, a double-blind, randomized, placebo controlled supplementation trial in healthy adolescents, were used.

Methods

Design: Cross sectional

Population: Healthy adolescents age 13-15 yr. attending lower secondary general education (n= 264)

Independent variable: Omega-3 Index[®] measured in blood

Dependent variables:

Cognitive tests: Letter Digit Substitution Test (LDST), D2 test of Attention, Digit Span Forward and Backward, Concept Shifting Test and Stroop test

Behavioural questionnaires: The Motivated Strategies for Learning Questionnaire, the Dutch version of the Centre for Epidemiologic Studies Depression Scale and The Rosenberg Self-Esteem Scale

Standardized math test (AMN)

Data analyses: multiple regression analyses or generalised linear model analysis (for count data)

Covariates: smoking, alcohol consumption, age, sex, BMI and parental education level

Results

Table 1: Fatty acid concentrations of participants in blood at baseline (mean ± sd)

	% w/w
Omega-3 Index	3.83 ± 0.60
DHA	2.58 ± 0.49
AA	11.18 ± 1.25
ObA	0.39 ± 0.16
DPA	0.43 ± 0.10

Table 2: Linear regression analysis for score on LDST.

Predictor variable	Beta (Standardized)	Significance (p-value)
Omega-3 Index	0.141	0.032 ←
Smoking (no/yes)	0.030	0.654
Alcohol consumption (units per week)	0.039	0.562
BMI	0.074	0.249
Age	0.022	0.732
Level of parental education (low-high)	-0.091	0.168
Sex (male/female)	0.178	0.006

Table 3: Generalised linear regression analysis (Poisson) for error of omission on D2 test.

Predictor variable	Beta (Standardized)	Significance (p-value)
Omega-3 Index	-0.049	0.011 ←
Smoking (no/yes)	0.018	0.359
Alcohol consumption (units per week)	0.027	0.104
BMI	0.038	0.047
Age	0.034	0.077
Level of parental education (low-high)	-0.082	0.000
Sex (male/female)	-0.026	0.185

Conclusion

Omega-3 Index was significantly associated with information processing operationalised as LDST score. This indicates that a higher Omega-3 Index is associated with better information processing speed. Also, students with a higher Omega-3 Index had fewer errors of omission, an indicator of inattention(i.e. they paid more attention than students with a lower omega-3 index). The Omega-3 Index (3.9%) was relatively low (well below the recommended range of 8-11%). Furthermore, the variation in Omega-3 Index was limited, which might explain the lack of more significant findings. A larger spread in Omega-3 Index will be achieved in our placebo controlled supplementation study (Food2Learn), which will elucidate the effect of LCPUFA supplementation on cognition, mood and academic achievement in adolescence.

