Reviewer’s report

Title: Effects of supplementation with n-3 polyunsaturated fatty acids on cognitive performance and cardiometabolic risk markers in healthy subjects of middle and older age: a randomized cross-over controlled study

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Reviewer: Niki Antypa

Reviewer’s report:

The manuscript is a notable study of the effects of omega-3 fatty acids on cognition and physiological measures in a healthy sample. The combination of the type of assessments is particularly interesting and useful for the current knowledge on omega-3 effects. However, the manuscript needs several modifications.

Major Compulsory Revisions

1. No sociodemographic data of the sample are provided. This would be useful information, so future studies can make comparisons and attribute possible differences between findings.

2. The authors provide only a p-value in the results. This is insufficient information in the results section, the F test (or any other) along with degrees of freedom need to be reported (either in table or in the text).

This has to be reported for all cognitive tests and physiological measures.

3. Instead of #-Omega-3 being reported, the manuscript would significantly benefit if effect sizes would be reported for all effects. Cohen’s d for example is a common tool to establish effect size in controlled trials.

4. Furthermore, although Tukey’s test is mentioned in the statistical method section, it is nowhere mentioned in the results section. Are the p values reported uncorrected?

Minor Essential Revisions

Introduction

1. The authors review prior evidence examining the effects of omega-3 fatty acid supplementation on mood and cognitive functioning of healthy samples. One randomized-controlled trial is missing (Antypa et al., J Psychopharmacol 2009 23: 831).

Method

2. “The intervention periods were separated by a five week washout period.” The choice of this washout period demands some justification. Is it enough time for
omega-3 effects to be washed out? Can the authors provide some reference of prior evidence on this matter?

3. The working memory description could be shortened (or written in a more succinct manner), whereas a brief description of the selective attention test is necessary. There are many types of selective attention tests, and the reader deserves to know which one has been used in the present study, without referring to other references.

4. A power analysis is missing in the study. Did the sample size allow for only small effects to be detected?

5. “Generally, n = 38 in the calculations.” This is a very vague sentence in the statistical analysis section. It should be clarified or removed.

6. Are changes in EPA, DHA concentrations available from blood samples? If not, this should be at least stated as a limitation. If yes, these results should be presented.

7. Results on the selective attention test should be only briefly mentioned in the discussion, since only a trend of association was observed. Furthermore, how did the authors deal with multiple testing? Some reference should be made with regard to this point in the discussion.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.