



National Institute  
on Alcohol Abuse  
and Alcoholism

# Brain Health and Seafood Omega-3 fats

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# Global Burden of Psychiatric Disorders

The burden of mental, neurological, and substance use disorders **increased by 41%** between 1990 and 2010 and

now accounts for **one in every 10 lost years of health** globally.

**2010** **\$2.5–8.5 trillion** in lost output was attributed to mental, neurological and substance use disorders.

**2030** This sum is expected to nearly double if a concerted response is not mounted.

# ***2015 Dietary Guidelines for Americans***

“Emerging evidence also suggests that relationships may exist between eating patterns and some neurocognitive disorders and congenital anomalies.”

## **Scientific Report of the 2015 Dietary Guidelines Advisory Committee**

“Limited evidence suggests that **dietary patterns** emphasizing seafood, vegetables, fruits, nuts, and legumes are associated with **lower risk of depression** in men and non-perinatal women. However, the body of evidence is **primarily composed of observational studies** and employs a range of methodology in study design, definition, and measurement of **dietary patterns** and ascertainment of depression/depressive signs and symptoms.”

# Looking beyond dietary patterns for depression.

## 1. Dietary patterns

Healthy  
Mediterranean

## 2. Specific foods

Fish  
Olive oil

## 3. Specific nutrients (blood status)

n-3 HUFAs

## 4. Randomized Controlled Trials/ meta-analyses

n-3 HUFAs vs.  
placebo

## 5. Mechanistic basis

Multiple synergistic processes

# Mediterranean Diet Major Depression

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People regularly consuming Mediterranean diet were ~ **30%** less likely than their peers to have depression.

a meta-analysis including **n=9** studies





# Fish Consumption Depression

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People regularly consuming high levels of fish were nearly **20%** less likely than their peers to have depression.

a meta-analysis including **n=26** studies,  
**n=150,278**

Li F, et al. *J Epidemiol Community Health* (2015)



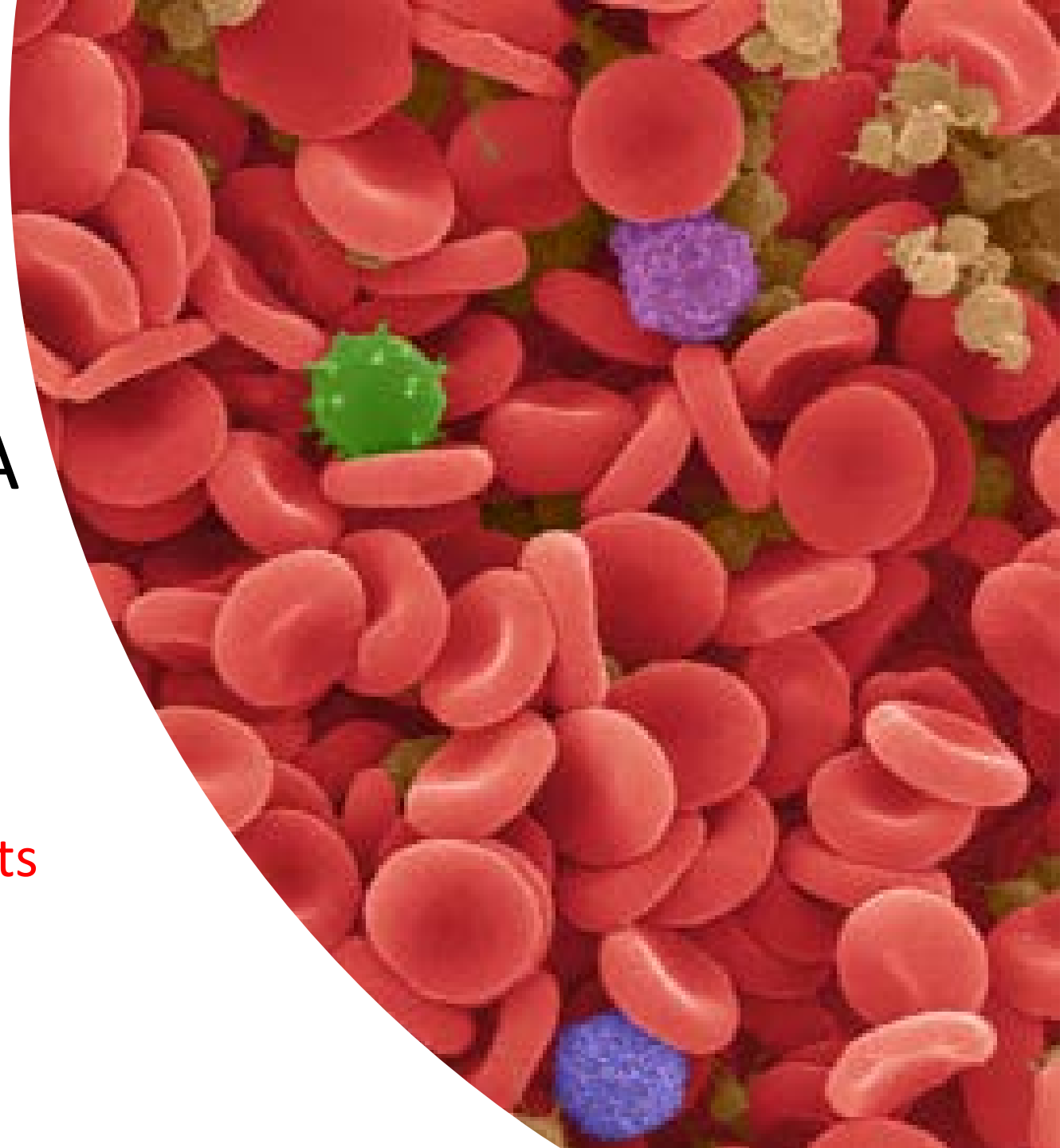
# EPA | DHA in Blood Major Depression

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Blood levels of EPA and DHA are lower in people with major depression.

**n=14** studies with **n=3,318** participants  
**g= 0.85**, **p<0.0000**

Lin et al., *Biol Psychiatry* (2010)





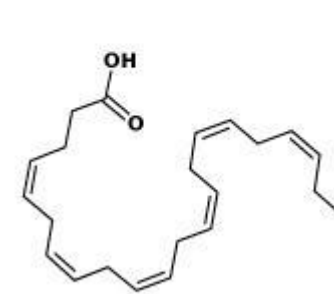
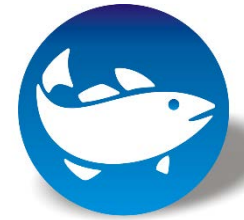
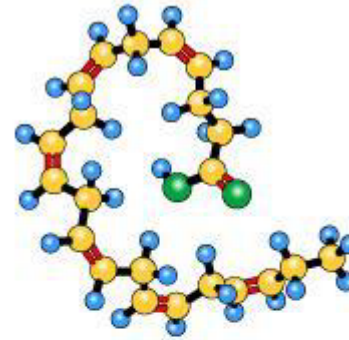
# EPA | DHA in RCTs

## Major Depression

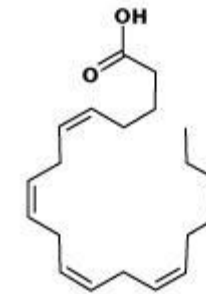
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EPA-enriched formulations appear to be effective for clinically significant depression.

Effects at least as strong as conventional therapies.



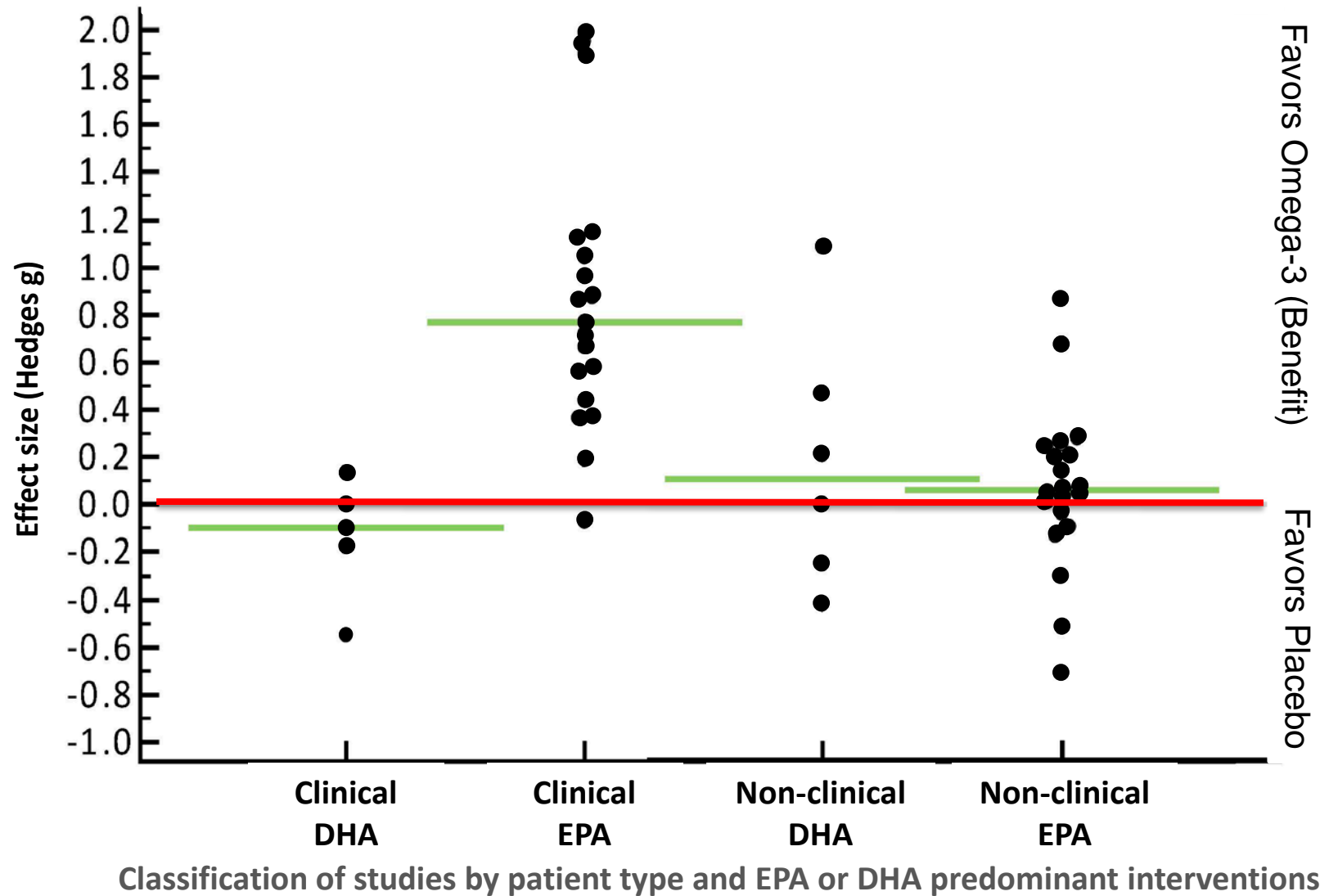
Docosahexaenoic acid  
DHA (22:6n-3)



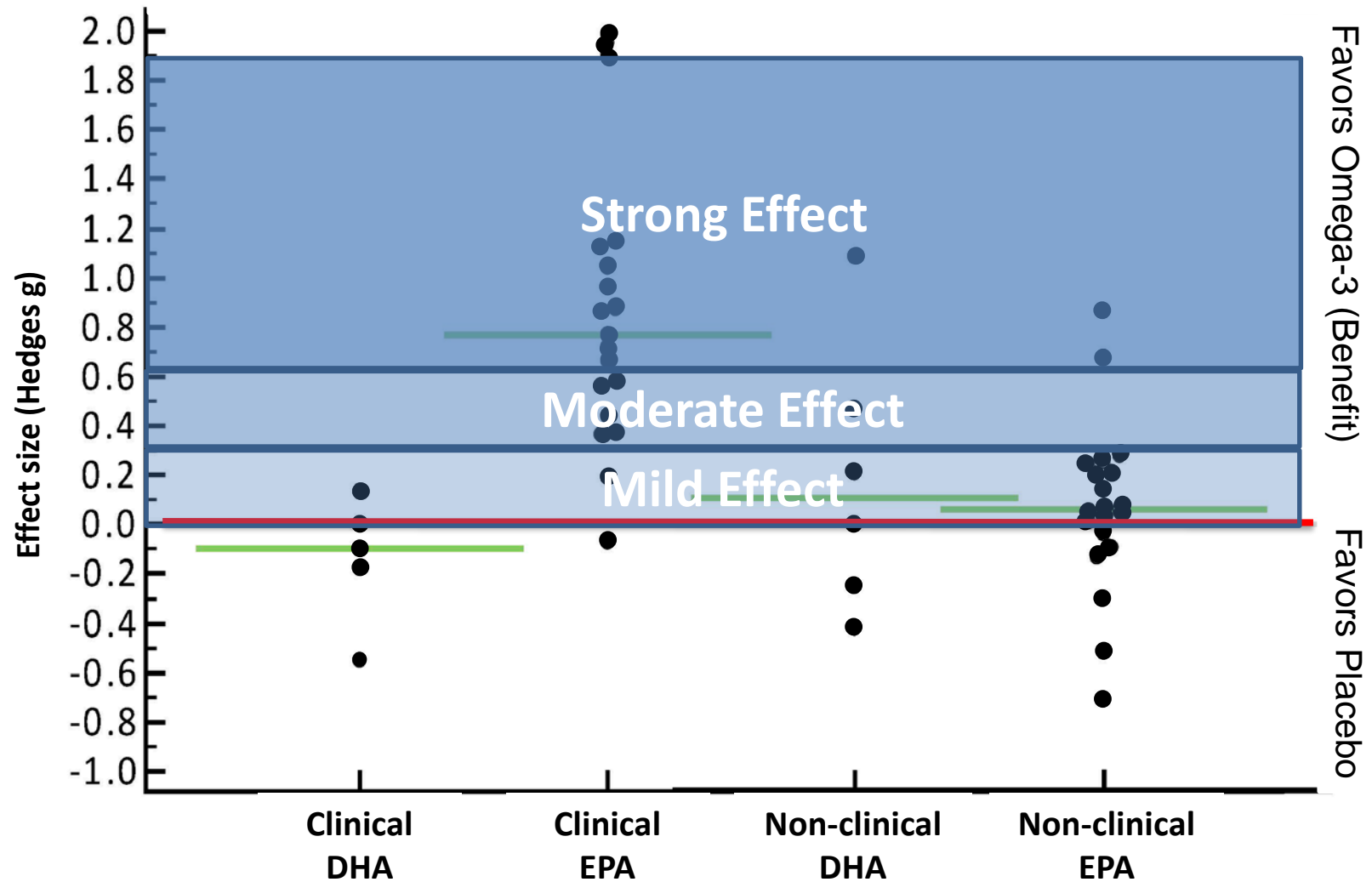
Eicosapentaenoic acid  
EPA (20:5n-3)



# Effect Sizes of Studies of Omega-3 Fatty Acids for Major Depression

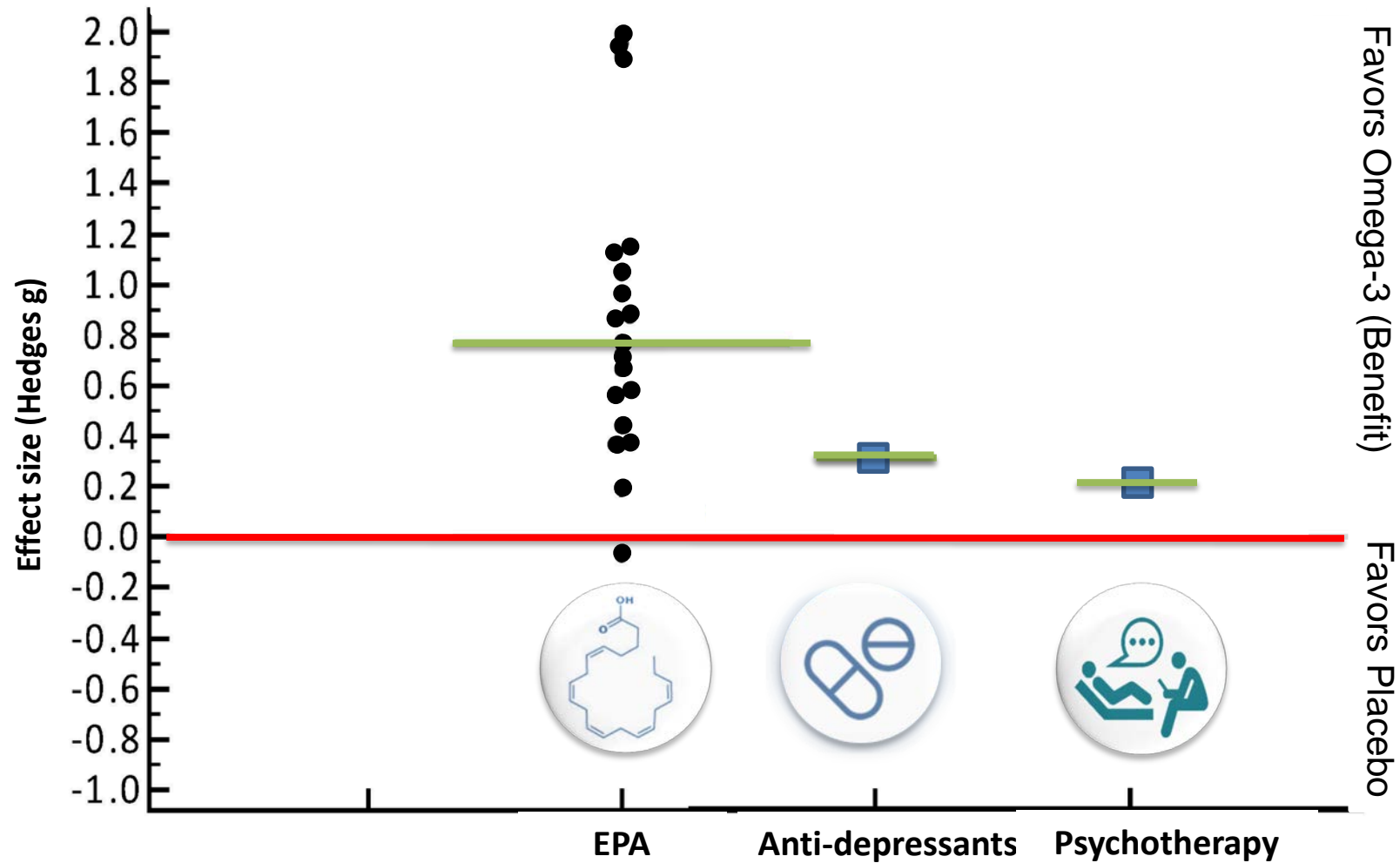


# Effect Sizes of Studies of Omega-3 Fatty Acids for Major Depression



Classification of studies by patient type and EPA or DHA predominant interventions

# Effect Sizes of Therapies for Clinically Significant Major Depression

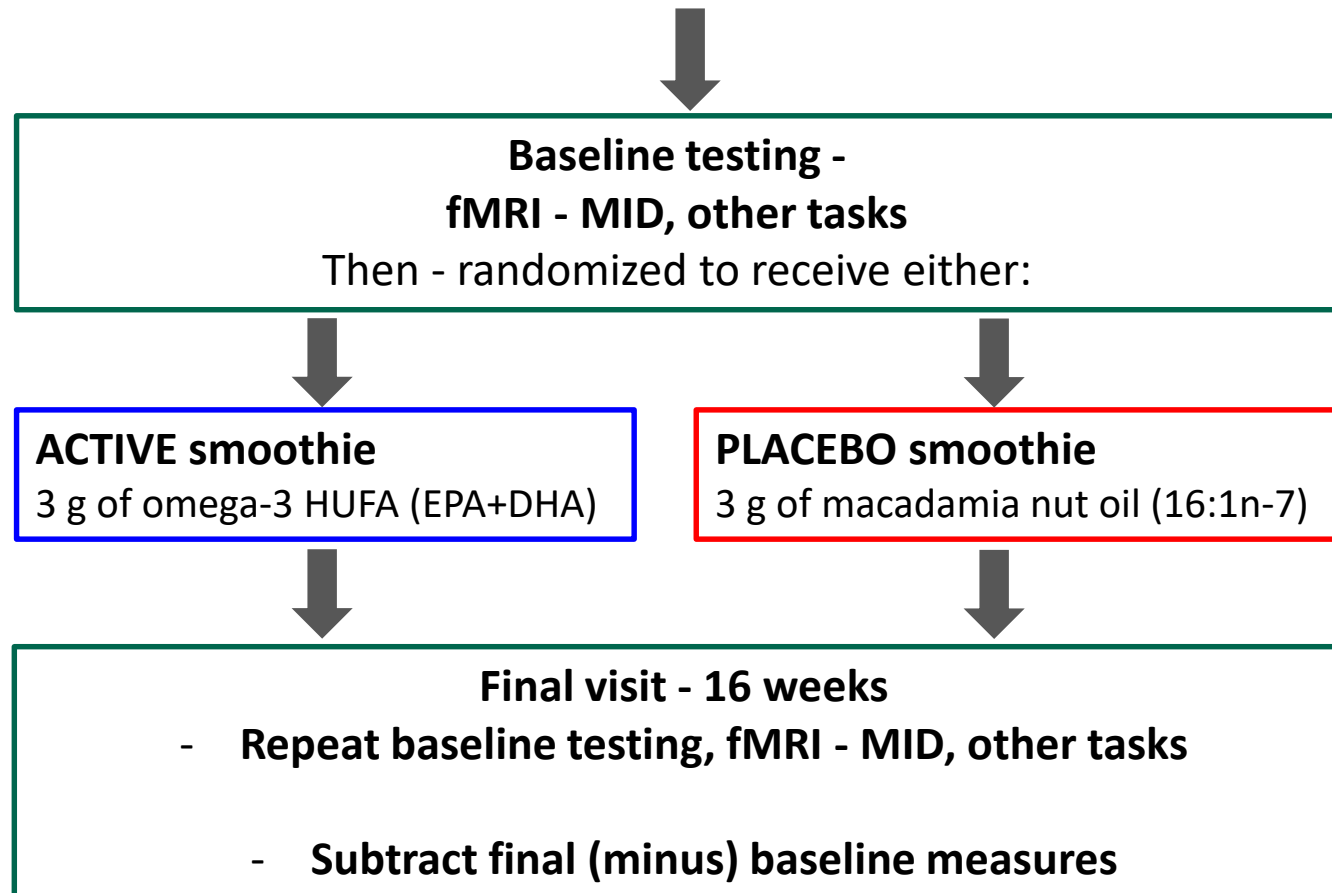


# NORAA Trial

## Neuroimaging Omega-3 and Reward in Adults with ADHD

Do omega-3 fats restore brain reward response?

- Anticipation of reward – fMRI Monetary Incentive Delay Task
- 36 adults with ADHD (aged 18-55) enrolled



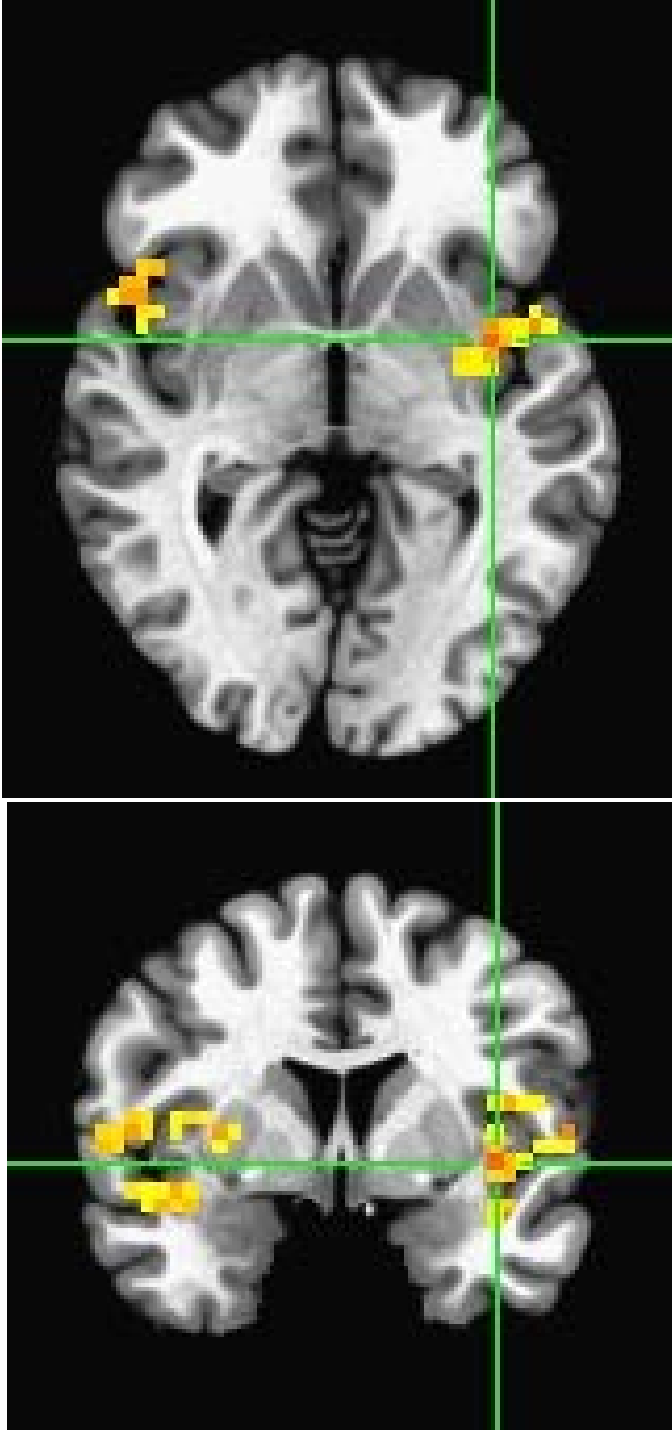
# DHA + EPA improves the reward responses in Adults with ADHD

**Substantial activation in the DHA|EPA group  
(change from baseline, MID task)  
No change in the placebo group**

Activated brain regions were the  
bilateral insular cortex and the  
superior temporal cortex

Brain regions that were activated are involved in:

- Emotional responses to reward
- Attentional processes related to reward
- The meaning of reward (salience network)





## Mauritius Child Health Project

Age 8-16,  
Randomized, stratified by age, gender  
Blinded, 38.7% Creole, 61.3% Indian

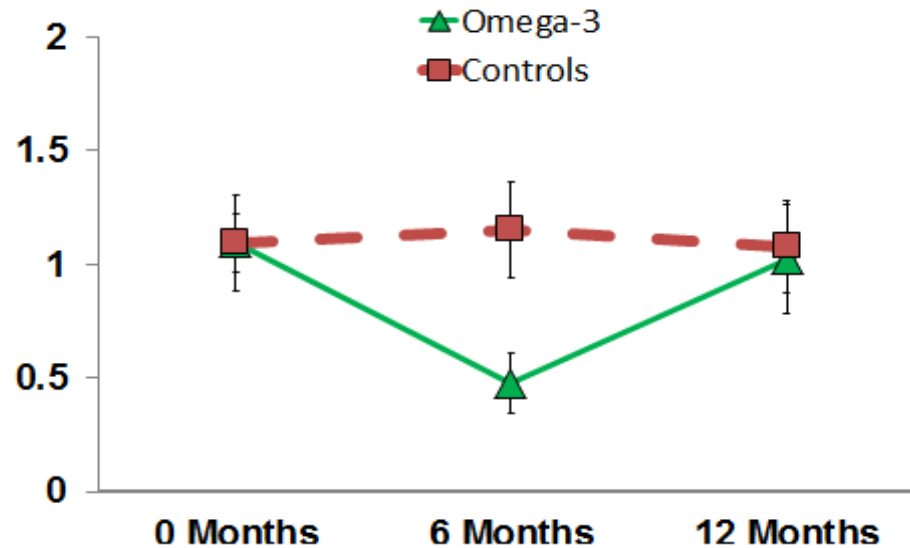
**n=95 omega-3, n= 89 placebo**

6 mo. intervention, 6 mo. follow up  
Child Behavior Checklist (parent)

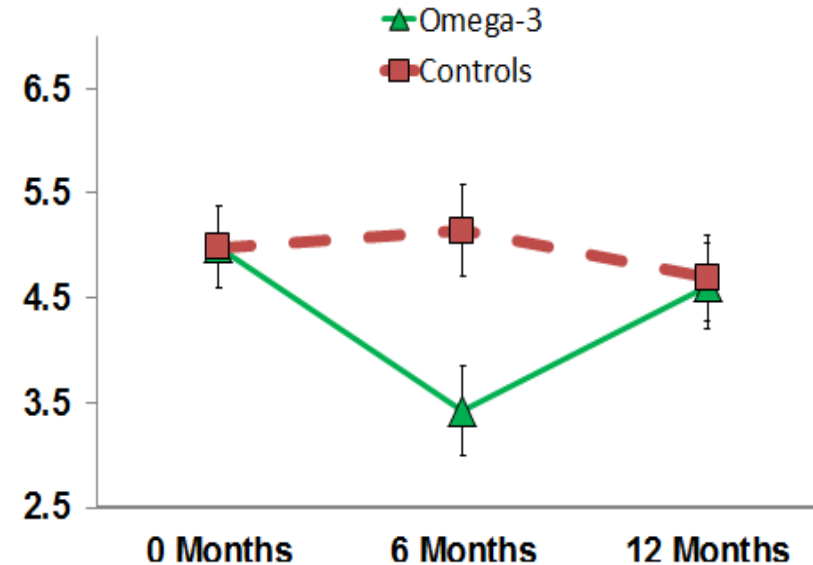
## Omega-3 specific



### Child Proactive Aggression

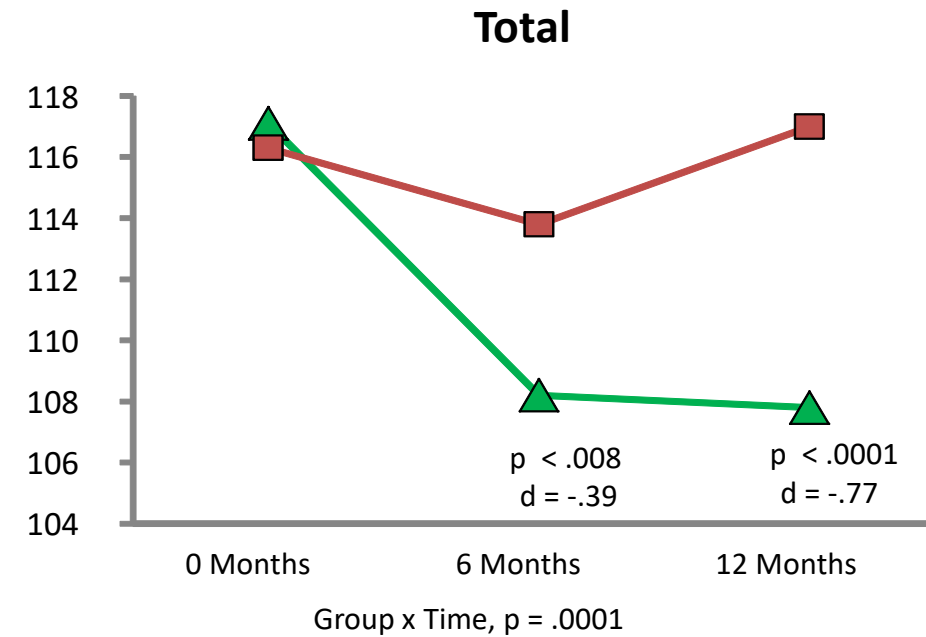


### Child Reactive Aggression

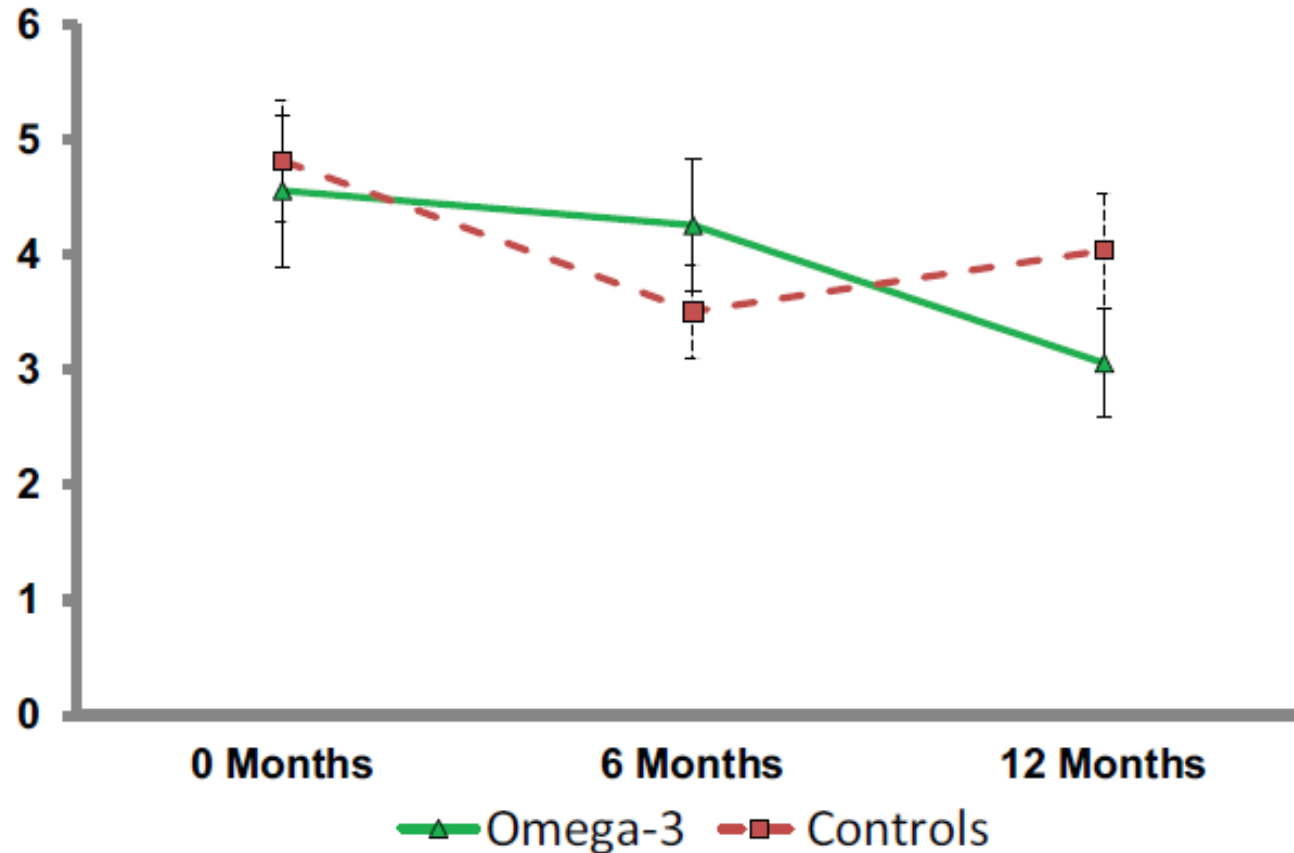


# Parents were less psychopathic when their children took omega-3's

## Parent Psychopathic Personality Inventory



# Reductions of Intimate Partner Psychological Aggression among caregivers when their children receive 1 gm/d of omega-3's



Reductions in child externalizing behaviors (Child Behavior Checklist) were correlated with reduction in Intimate Partner Aggression (XXX), only in the omega-3 group.

**Omega-3 group,  $r = 0.40$ ,  $p < 0.01$**

Placebo group  $r = 0.13$ ,  $p = ns$

~ 25% reduction at 12 m, Group X time  $p < 0.01$ ,  $n = 121$



**Thank you**

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# Nutritional medicine as mainstream in psychiatry

Jerome Sarris, Alan C Logan, Tasnime N Akbaraly, G Paul Amminger, Vicent Balanzá-Martínez, Marlene P Freeman, Joseph Hibbeln, Yutaka Matsuoka, David Mischoulon, Tetsuya Mizoue, Akiko Nanri, Daisuke Nishi, Drew Ramsey, Julia J Rucklidge, Almudena Sanchez-Villegas, Andrew Scholey, Kuan-Pin Su, Felice N Jacka, on behalf of The International Society for Nutritional Psychiatry Research

***The emerging and compelling evidence for nutrition as a crucial factor in the high prevalence and incidence of mental disorders suggests that diet is as important to psychiatry as it is to cardiology, endocrinology, and gastroenterology.***

***Lancet Psychiatry (2015)***