
FOODS FOR FUTURE AUSTRALIANS: INTELLIGENCE AND CONSUMPTION

Maria Makrides

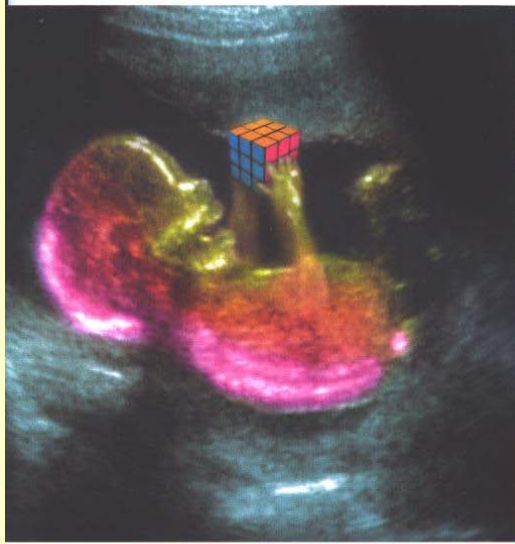
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WHY FOCUS ON INTELLIGENCE?

- It indicates the potential of the next generation
 - In non-industrialized countries there is a large burden to communities because of the loss in IQ associated with poor nutrition, poverty, poor environment
 - Also important in industrialized countries
 - A one-point increase in a nations average IQ is associated with a persistent 0.11% annual increase in gross domestic product (GDP) per capita
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FOCUS ON INTELLIGENCE



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- 3 DHA和AA 1:2的科学配比, 确保吸收更有效

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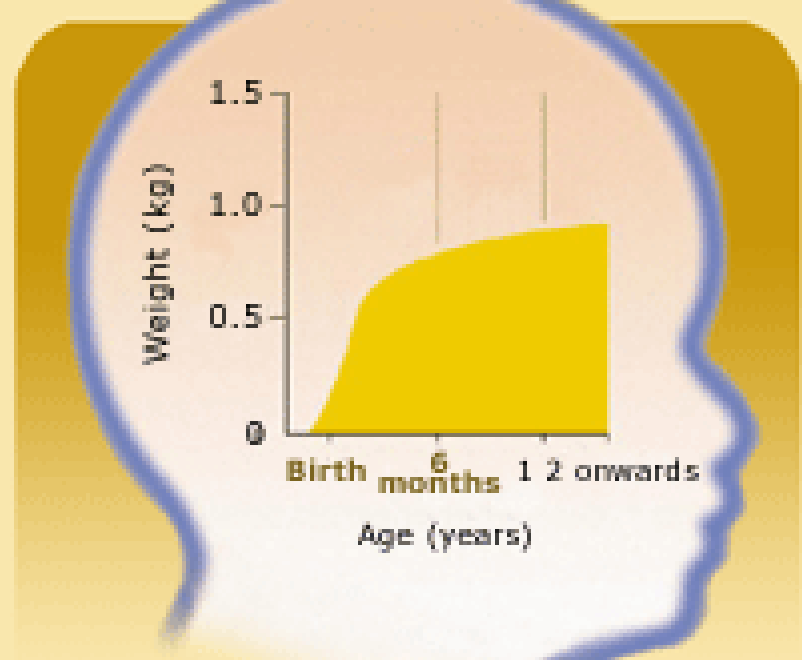
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NUTRITION AND THE BRAIN

- Brain growth spurt and major brain plasticity from last trimester of pregnancy until the end of the second year of life
- Permanent change?
- Later plasticity?

Brain Growth Spurt: A Time of AA/DHA Accumulation in Cerebral Cortex



Human Whole Brain Weight from 10 Gestational Weeks to 4 Years of Age

DHA IN THE PERINATAL PERIOD

- An example of a nutrient that has an important role in brain development
- Other examples to have shifted public health policy – folate and iodine

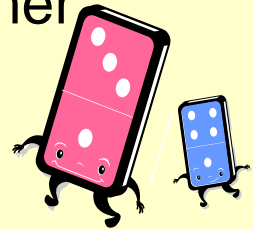


DINO AND DOMINO



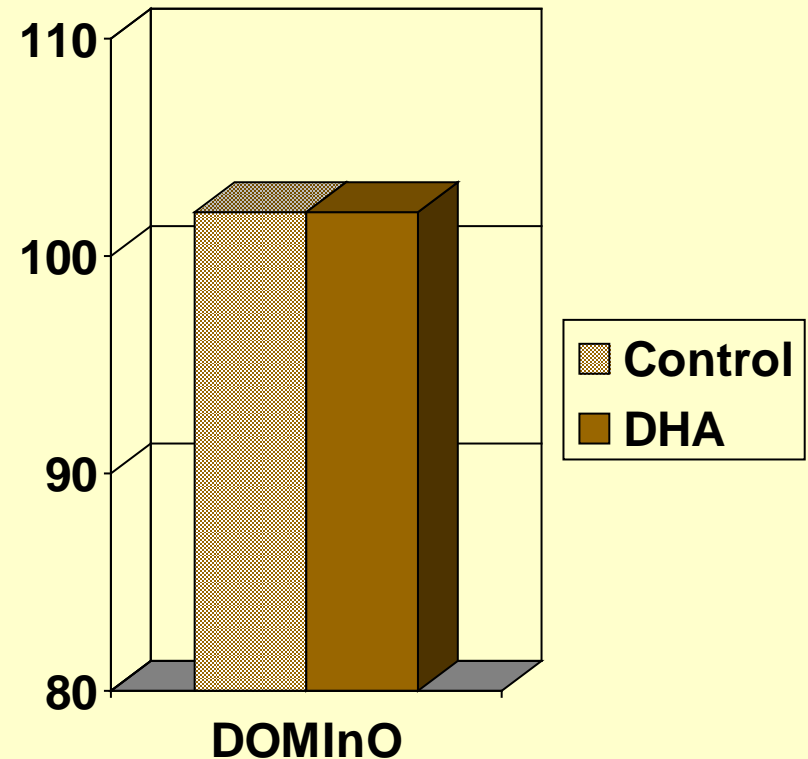
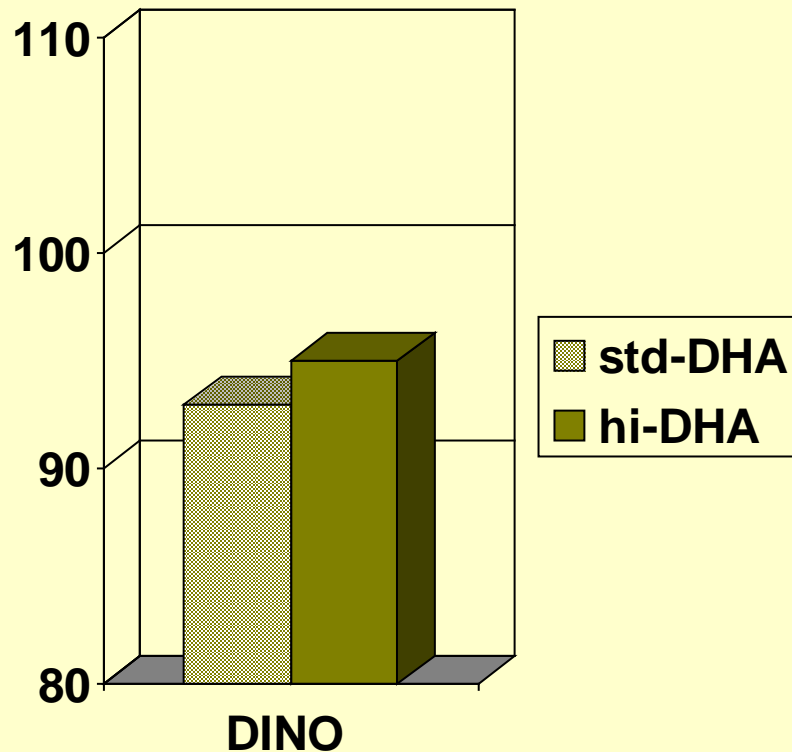
- **DHA to Improve Neurodevelopmental Outcome**
- 657 infants born <33 weeks gestation
- >95% follow-up
- Test dose: 900mg/day largely to lactating women
- Intervention to 40 w PMA
- JAMA 2009;301:175-82

- **DHA to Optimise Mother Infant Outcome**

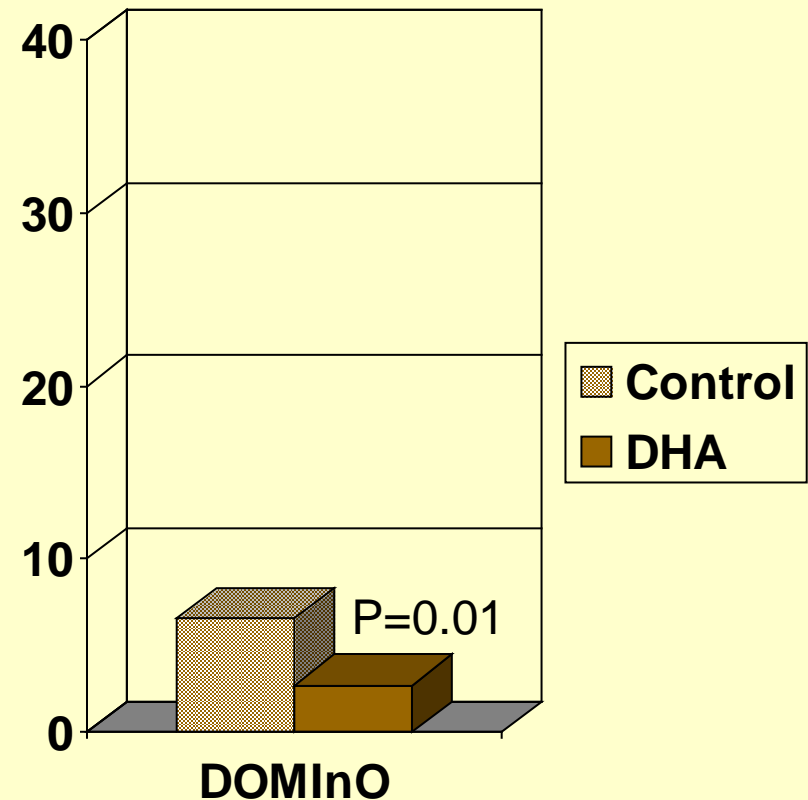
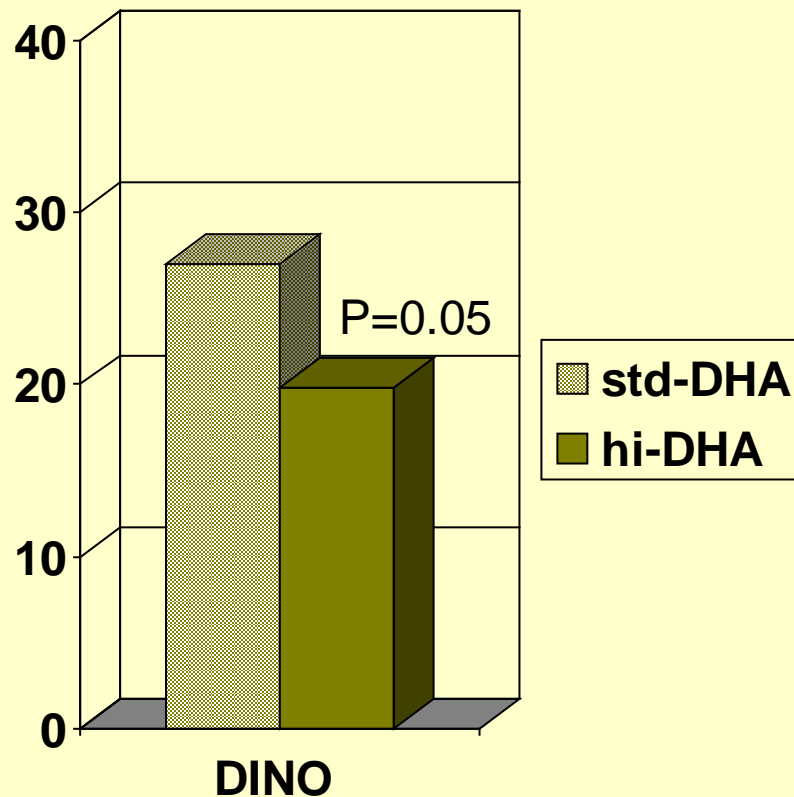


- 2399 pregnant women from 20 weeks gestation
- >95% follow-up
- Test dose: 800mg/day to pregnant women
- Intervention to delivery
- JAMA 2010;304:1675-83

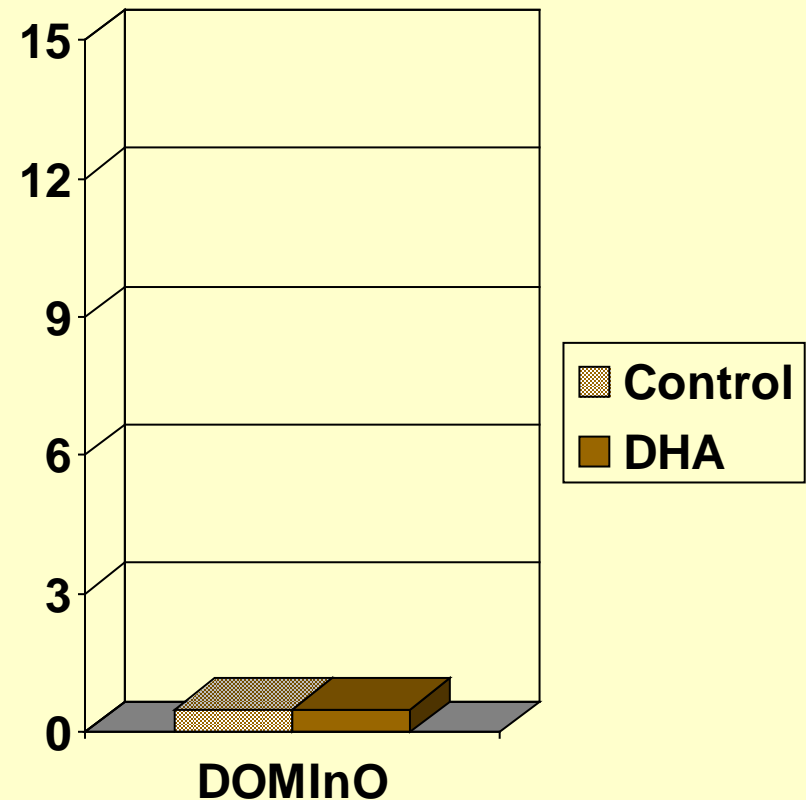
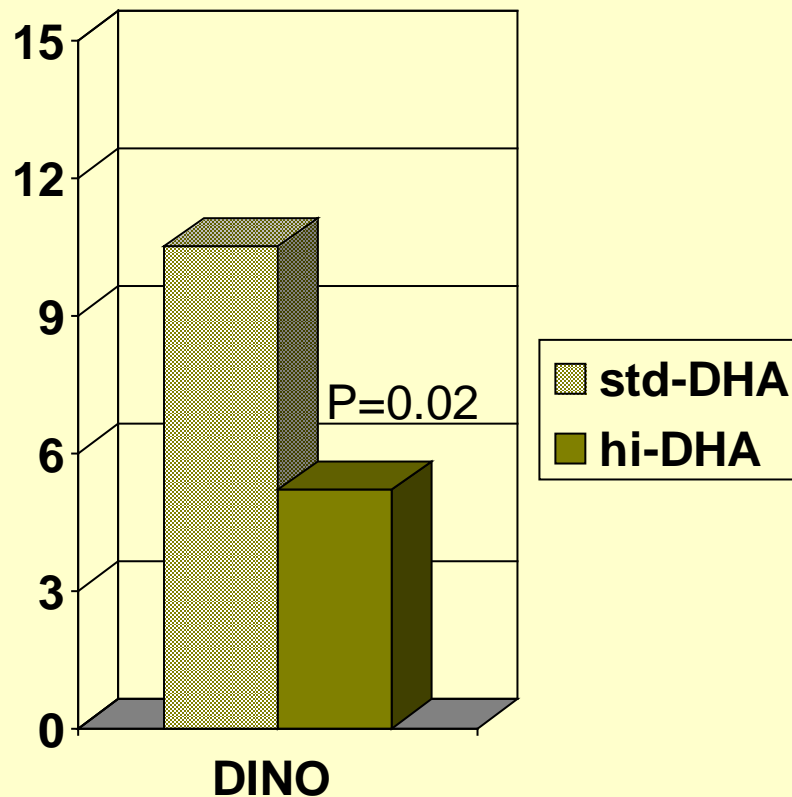
MEAN DQ FROM BAYLEY MENTAL/COGNITIVE SCALES



PERCENTAGE WITH DQ < 85 (MILD COGNITIVE DELAY)



PERCENTAGE WITH DQ < 70 (MAJOR COGNITIVE DELAY)



SUMMARY

- Preterm infants have far worse developmental outcomes than term infants
- Small shifts in the mean DQ scores appear to have big effects on the proportion of children with delayed cognitive development
- Most evident for preterm infants in the hi-DHA group



INTERPRETATION AND CONTEXT

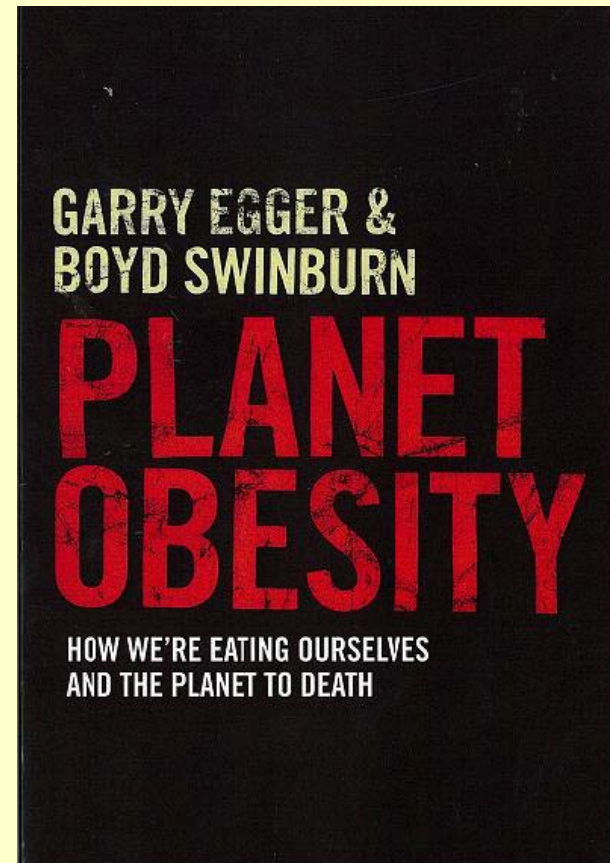
- Would normally expect about 16% of children to have scores <85
- On the whole, the singleton, term population was doing well but the population of babies born <33 weeks gestation is shifted to the left with lower mean scores and more delayed outcomes
- But in both studies, we seem to be “mopping-up” the low performing tail with no effect on the high performing tail
- **Implication:** Supplementation may be effective at preventing cognitive delay in susceptible children but we are unlikely to create “superhumans”

POTENTIAL IMPLICATIONS

- So, we've made some improvement in IQ and let's assume that this improvement translates to an improved standard of living as measured by GDP
 - But, increasing GDP implies increased productivity and increased consumption
 - From a nutritional point of view, do we really want uncontrolled increased consumption?
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NUTRITIONAL OUTCOMES OF INCREASED CONSUMPTION

- Increased food consumption ultimately equates to obesity, unless the increased consumption is expended
- Nutritionally, the energy equation is simple 7000 kcal = 1kg
- Easy to gain 1kg per year



HOW DO WE AND THE SOCIETY KEEP A HEALTHY “STEADY STATE”?

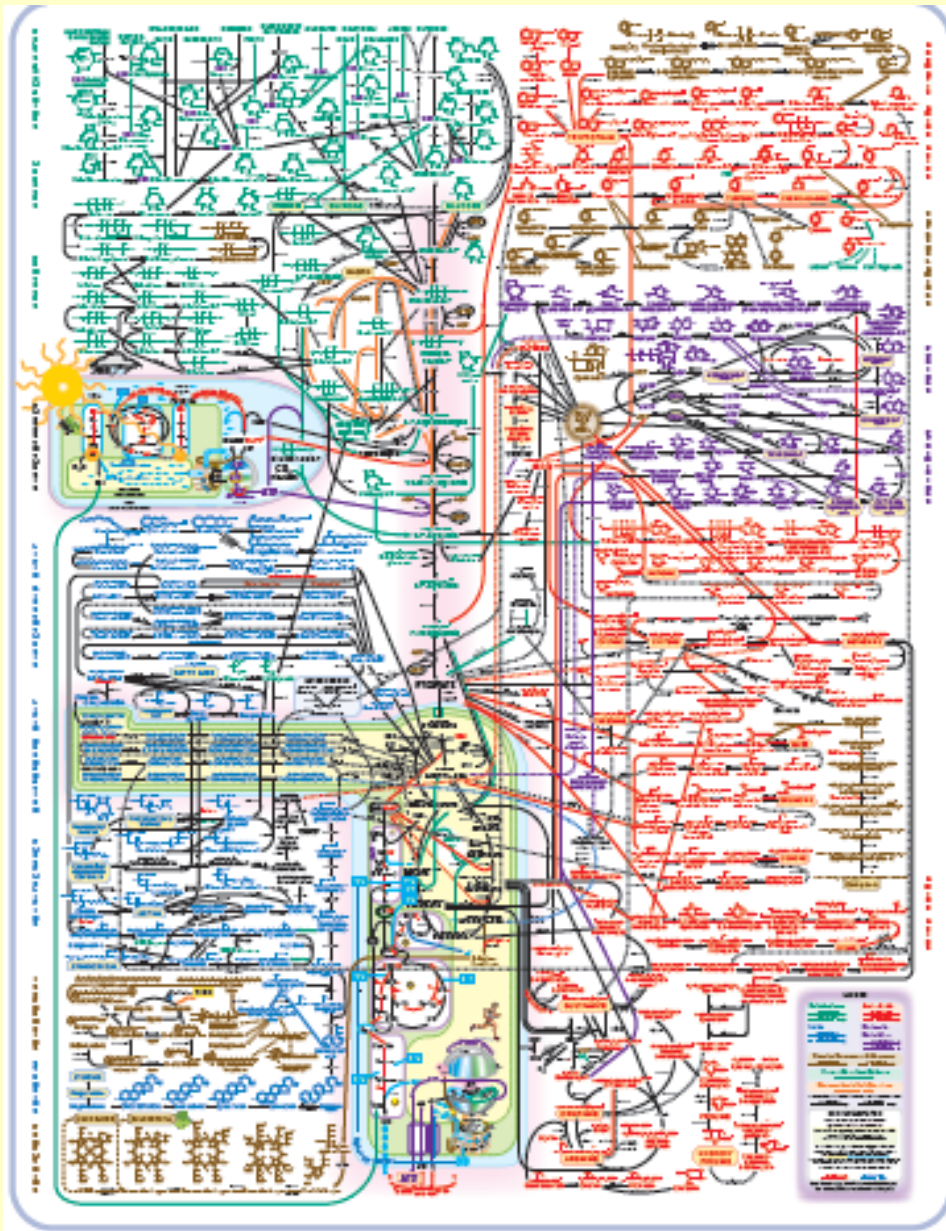
- Individually, energy consumed = energy expended
 - From a society viewpoint, this implies no economic growth/food industry growth unless there is population growth
 - Can we have a smart, productive society that is not reliant on constant growth and consumption?
 - Can we decouple productivity from consumption?
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NUTRITIONAL METABOLISM

Mostly about turning food energy (food carbon in the form of protein, fat, carbohydrate, alcohol) into energy for life

Excess energy is stored

Energy trading in the body



CARBON OR ENERGY PRICING

- Should we be pricing food based on the amount of energy it took to produce the food?
 - Can we be smart and productive without high, uncontrolled consumption (side effect of increasing obesity)?
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