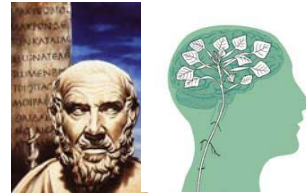


Neurocognitive and mood effects of foods



“Let food be your medicine and medicine be your food”

Hippocrates [c.460-400 BC]



can this be applied to mental function?

Food

- Functions of food
 - Nutritional
 - satisfy hunger and the need for essential nutrients
 - Social and sensory
 - Mental performance?
 - Subjective states
 - Objective performance
 - Health effects
- Does food affect
 - Health?
 - Performance?
 - Mood and well-being?
- Do macronutrients have different effects?
- Micronutrients/vitamins/supplements?

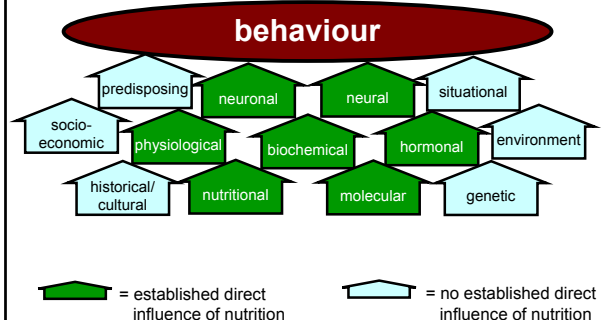
Types of claims on foods

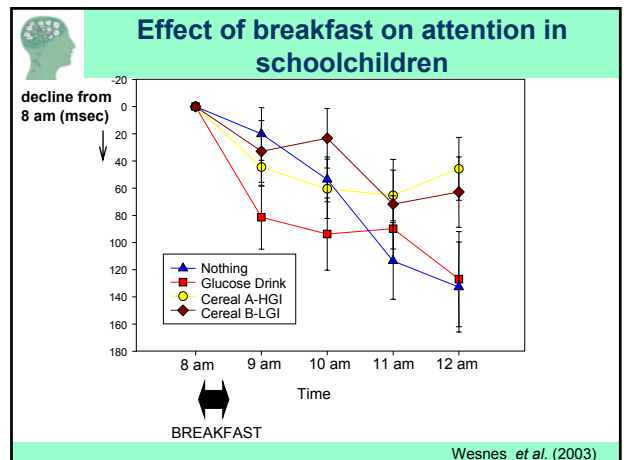
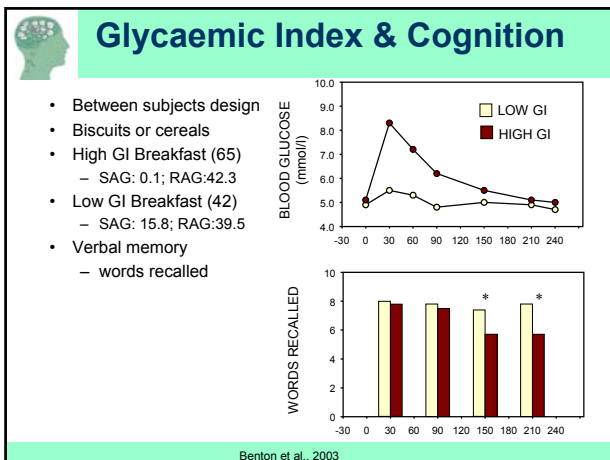
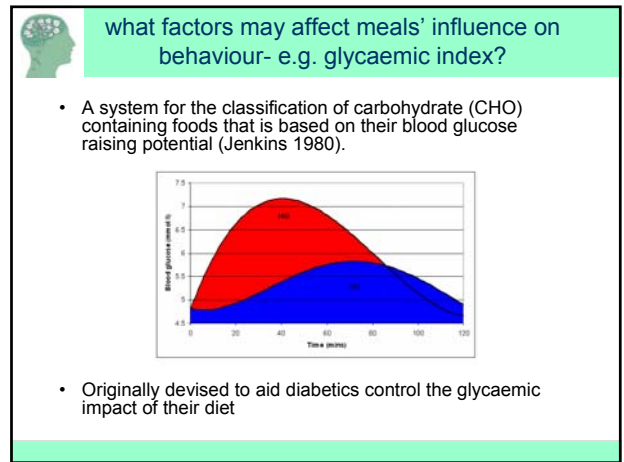
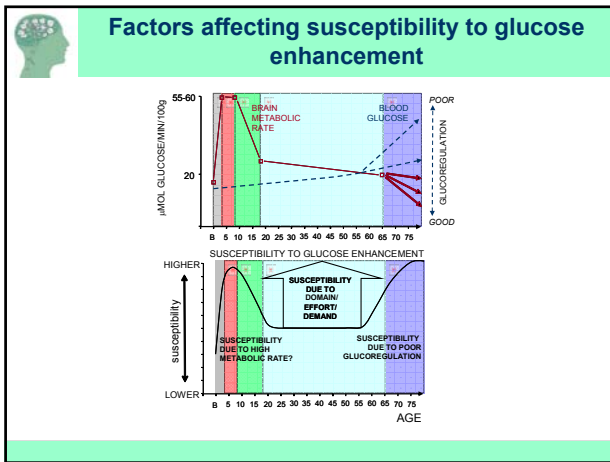
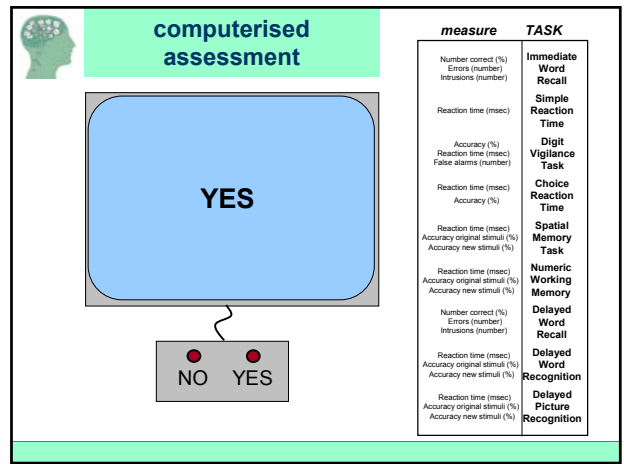
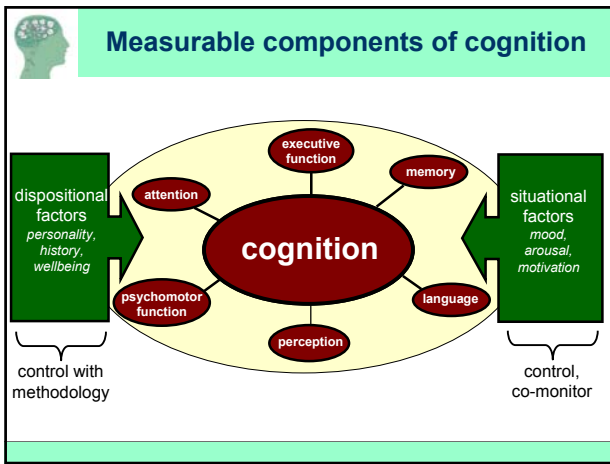
- TYPE A: Enhanced Function Claim
- TYPE B: Reduction of Disease Risk Claim
- Soft claims
- ‘image’ claims
- Science, industry and politics interact

example claims

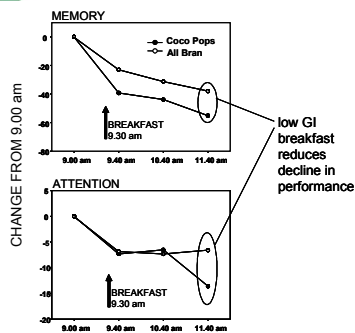
- Increases physical endurance
- Improves and increases concentration and reaction speed
- Boosts alertness and concentration
- Gives you a lift
- Helps you work, rest and play

Influences on behaviour





Effect of type of breakfast



Ingwersson et al (2007) *Appetite*, In press

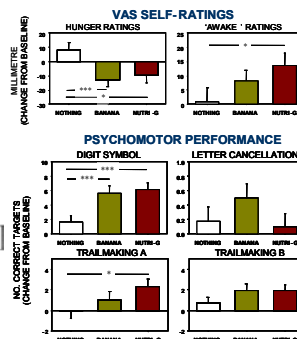
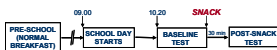
Effects of a mid-morning snack

Participants

Forty-one schoolchildren aged 8.6 to 11.5 years (mean 10.1 years) took part in the study. (seven excluded as they reported having 'nothing' for breakfast on one or more study days).

Treatments

1. control (nothing)
2. a banana (95-105 g, ~ 20 g carbohydrate)
3. Kellogs Nutrigrain bar (37g, ~ 26 g carbohydrate)



Summary

- In healthy young adults effects of glucose are only seen during high mental effort
- Slow release CHO may be more effective
- Snacks may 'top up' glucose
- Very few data available for children
 - low GI data implies susceptibility
 - no dose-response for children
 - no comparative (child-adult) data
- Effects are robust in the elderly, those with poor glucose tolerance
 - shifted dose-response
 - effects of slow release CHO?

Fish oil or snake oil?

"Fish oil study's GCSE successes"

"Pupils' behaviour better with fish oil"

"Oily fish makes 'babies brainier'"

"Fish oil may help teenage behaviour"

"Pupil food pill plan 'considered'"

Omega-3 supplementation in healthy populations

- Fontani et al (2005) reported 4 g of fish oil per day for 35 days resulted in:
 - improved mood
 - reduction on reaction time of attention tasks
 - significant measurable effects on electrical brain activity
 - effects between start and finish only – not between placebo and active groups!

HCNU study [PI Dr. David Kennedy*]

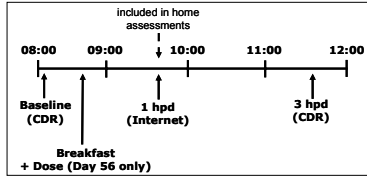
- Design
 - 88 healthy schoolchildren aged 10-12 years
 - No previous omega-3 supplementation for past 3 months
 - Not regular consumers of oily fish
 - Randomised, double blind, placebo controlled
- Three matched treatments
 - Placebo (soybean/corn oil mix)
 - 400mg DHA (~8mg EPA)
 - 1000mg DHA (~20mg EPA)

*david.kennedy@unn.ac.uk

Study timeline



STUDY DAYS



DHA summary and issues

- Paper currently undergoing peer review!
- General issues
 - Dose?
 - Length of treatment regimen?
 - Cohort?
 - DHA/EPA ratio

HCNU vitamin study [PI Dr. David Kennedy*]

- Design
 - 96 male and female children aged 8 to 14 yrs
 - No dietary supplementation for past 3 months
 - Randomised, double blind, placebo controlled
- Two matched treatments
 - Placebo
 - Active

Active ingredients	Dosage per tablet
L-Lysine monohydrochloride	50.00 mg
Beta-Carotene	0.514 mg
Vitamin A	Vit. A:715 IU
Thiamine nitrate	Vit. B1 nitrate: 0.500 mg
Riboflavin	Vit. B2: 0.550 mg
Pyridoxine hydrochloride	Vit. B6 hydrochloride: 0.550 mg
Cyanocobalamin	Vit. B12: 0.600 mg
Ascorbic acid	Vit. C: 22.00 mg
Vitamin D3	Vit. D3: 3.75 mcg= 150 IU
Vitamin E acetate (d,l-alpha-tocopherol acetate)	d,l-alpha-tocopherol acetate: 5.215 mg = 5.22 IU d,l-alpha-tocopherol acetate = 3.50 mg Vit. E
Folic Acid	50 mg
Biotin	15.00 mcg
Vitamin PP (Nicotinamide)	6.00 mg
Copper(II)carbonate	Cu: 0.3 mg
Calcium phosphate (dibasic anhydrous)	Ca: 65.0 mg
Ferrous(II)sulfate	Fe: 2.50 mg
Zinc oxide	Zn: 2.50 mg
Magnesium oxide, heavy	Mg: 12.5 mg

*david.kennedy@unn.ac.uk

conclusions

- Paper currently undergoing peer review!

Summary and issues

- modulation of psychological function
 - often complex dose-time-task interactions
 - sensitivity of testing systems used
- acute vs. chronic effects?
 - neuroadaptation
- applications
 - ageing
 - dementia
 - 'meaningful' effects
- mechanisms?
- top-down vs. bottom up approach?
- refinement
 - sometimes better effects from less refined products?
- standardisation
- individual differences

Human Cognitive Neuroscience Unit

[Behaviour, Brain and Nutrition Research Centre from Summer 2007]



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