Cognitive research with nuts - what we know so far and what we are testing

A/Prof Alison Coates
University of South Australia
• Almonds are rich in essential nutrients and the Australian Dietary Guidelines encourage people to consume 30g per day

• Data from the US has demonstrated improvements in diet quality when nuts are part of the diet of both children and adults.

Nut Consumption and Children

• In the US ~ 30% of children and adolescents consume nuts on a given day

• In Australian <10% children are consumers of nuts and seeds (Australian Health Survey in 2012).

• The 2007 Australian National Children's Nutrition and Physical Activity Survey reported the average consumption for boys and girls aged 8-13 years was <3g per day


Nut Consumption and Children

• There are very few trials looking at the health benefits of nuts in children.
  – 1 small study with hazelnuts (15-30g for 8 weeks) and 1 study with Brazil nuts (15-25g for 16 weeks) have found improvements in blood lipids

• There are no RCTs that have assessed changes in cognitive performance with nuts in children.

• In a cross-sectional study in 317 healthy Korean children aged 6-18 years higher nut consumption was associated with better cognitive performance on a test of processing speed.

SPARC-K Study

- Snack Patterns using Almonds and Water and the effects on Cognition in Kids
- A feasibility study to determine whether Australian children aged 8-13 years will eat almonds for 8 weeks and the impact on cognitive performance.
Study Outline

Almond Phase
- **Week 0**
  - **Start phase 1**
    - In-clinic
    - 90 mins
- **Weeks 1-8**
  - At home
  - Consume 30g almonds
  - 5 days / week
  - + keep a checklist
- **Week 8**
  - **End phase 1**
    - In-clinic
    - 90 mins

Water Phase
- **Week 10**
  - **Start phase 2**
    - In-clinic
    - 90 mins
- **Weeks 10-18**
  - At home
  - Consume 250ml water
  - 5 days / week
  - + keep a checklist
- **Week 18**
  - **End phase 2**
    - In-clinic
    - 90 mins

Screening Visit
- In-clinic
- 60 mins

- Cross-over study
- Random order
Recruitment

Participants

- 40 healthy children aged 8-13 yrs (Av=9.8yrs)
- 19 children in Cohort 1 (13M/6F)


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Cognitive Testing

• Computerised test battery
  ~ 30-45 minutes
  • Attention/concentration
  • Executive function
  • Working memory
  • Spatial memory
  • Secondary memory
Cognitive Testing

Four Choice Reaction Time

Peg and Ball task

Attention & Concentration

Executive Function
Cognitive Testing

Corsi Block task

Picture Recognition task

Working memory
Spatial memory
Secondary memory
Sleep Assessments

- **Habitual Sleep**
  (Actiwatch, diaries and Pediatric sleep survey instrument)
  - Monitor sleep for week prior to testing
  - Sleep Quality
  - Total Sleep Disturbance

- **Sleepiness** before and after testing
  (Karolinska Sleepiness Scale)

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<th>Start Date</th>
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<th>End Date</th>
<th>End Time (out of bed)</th>
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Anthropometry, Diet + Physical Activity Assessments

- Height and weight
- Children's physical activity questionnaire (cPAQ).
- The Australian Child and Adolescent Eating Survey (ACAES).

Outcome Measures

- Sensory Properties
- Liking
  - Flavour
  - Texture
  - Overall

FLAVOUR LIKING

PLEASE MARK YOU PREFERENCE ON THE SCALE ABOVE WITH A SINGLE VERTICAL LINE
Outcome Measures

- Sensory Properties
- Food Qualities
- Hardness
- Crunchiness

CRUNCHINESS

Weak Strong

Barely detectable Moderate Very Strong

Strongest Imaginable

PLEASE MARK YOU PREFERENCE ON THE SCALE ABOVE WITH A SINGLE VERTICAL LINE
Engagement Activities

• Sticker charts to track consumption
• Coloring competitions
Preliminary Results
Preliminary Findings

Almond Texture Liking at Screening

-100  -50  0  50  100

greatest dislike  neutral  greatest like
Preliminary Findings

Almond Overall Liking at Screening

The chart shows the distribution of almond overall liking scores. The x-axis represents the range from greatest dislike to greatest like, with neutral scores marked by a dashed line. The y-axis lists various codes (SPK01 to SPK19), indicating different samples or conditions. The data points suggest a trend towards increasing liking as the scores move towards the greatest like end of the spectrum.
Preliminary Findings

Almond Hardness at Screening

Almond Crunchiness at Screening
Conclusion

- Almonds have the potential to support cognitive health in children.
- All 19 children to date have successfully completed Phase 1.
- 4/19 completed all testing to date with the remainder due to complete by Dec 14 2018.
Recruitment is our biggest challenge

Please spread the word in Adelaide to help us recruit for the next cohort starting early 2019
Acknowledgements

Study Team
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