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

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University of South Australia

18th Australian Almond Conference
Pullman Hotel Melbourne, Albert Park, Victoria
October 30th - November 1st, 2018

SUPPORTED BY:
Horticulture Innovation Australia Ltd

HOSTED BY:
The Almond Board of Australia

Almonds and Diet Quality

- 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.

Burns et al. Nutr Res. 2016 Jan;36(1):80-9.

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**

O'Neil et al, Nutr Res, 2012. 32(3): p. 185-94. http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4364.0.55.007main+features12011-12.

The 2007 National Children's Nutrition and Physical Activity Survey.

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**.

Deon et al. 2018.37(4): p.1193-1201

Maranhao et al. Nutrition & Metabolism, 2011. 8(1): p. 32.

Kim et al. J Lifestyle Med, 2017. 7(1): p. 10-17

SPARC-K Study

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- **S**nack **P**atterns using **A**lmonds and Wate**R** and the effects on **C**ognition in **K**ids
- A feasibility study to determine whether Australian children aged 8-13 years will eat almonds for 8 weeks and the impact on cognitive performance**.**

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Study Outline

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Almond Phase

Screening Visit
In-clinic
60 mins

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

2 week break

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

- **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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https://www.nutsforlife.com.au/resources/fact-sheets/

https://www.nutsforlife.com.au/media/infographics/

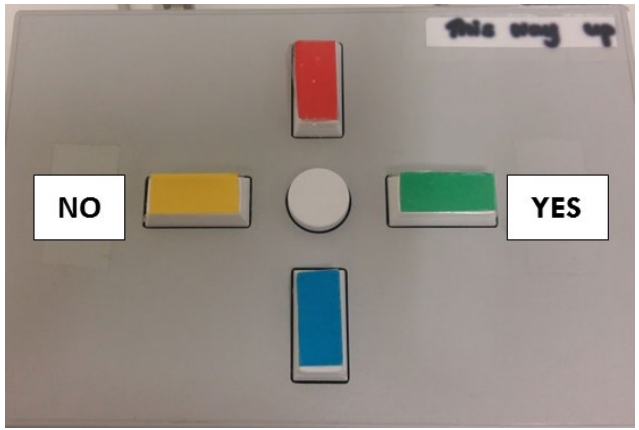
Cognitive Testing

- **Computerised test battery**

  ~ 30-45 minutes

  - Attention/concentration
  - Executive function
  - Working memory
  - Spatial memory
  - Secondary memory

COMPASS
cognitive assessment system



Cognitive Testing

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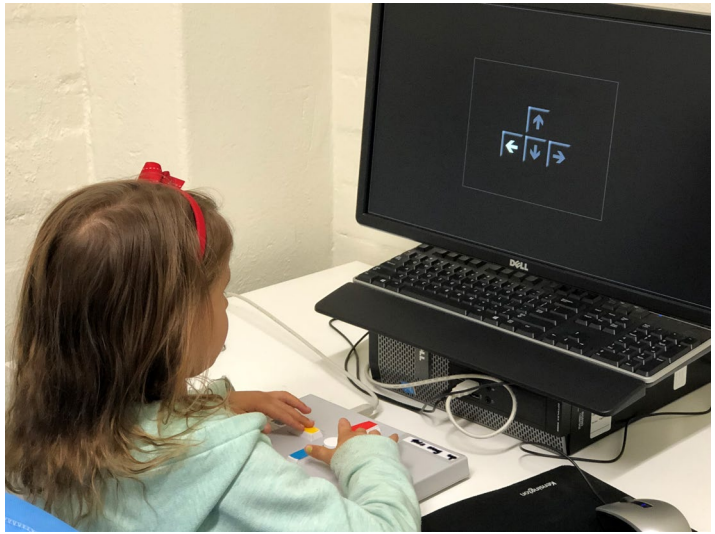
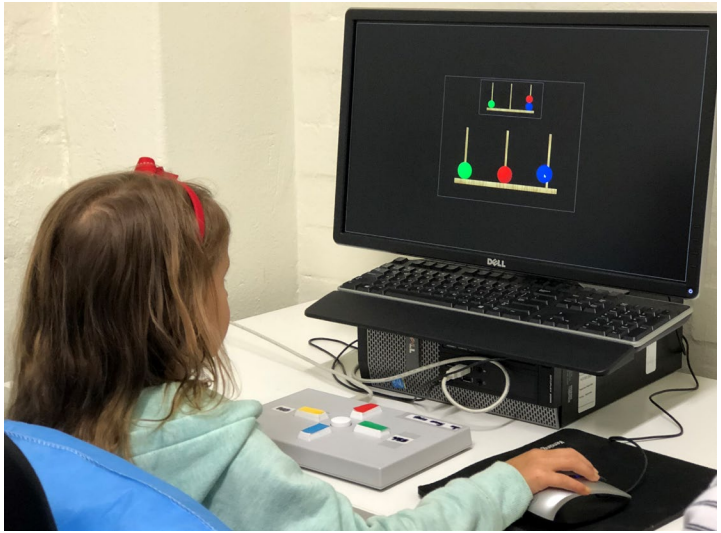
Four Choice Reaction Time



Attention & Concentration

Peg and Ball task



Executive Function

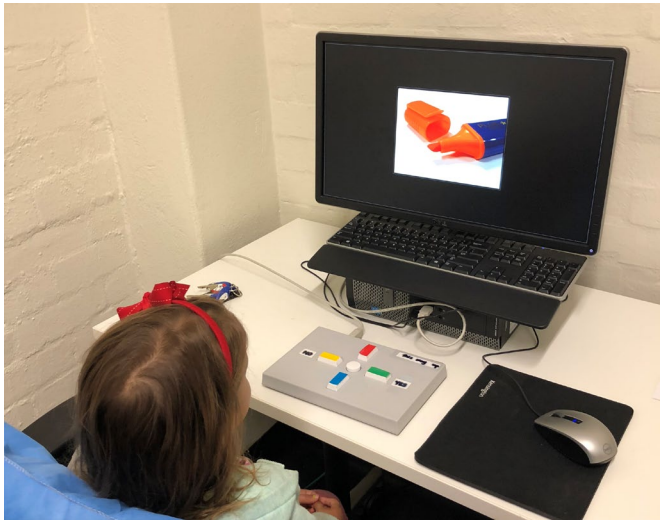
Cognitive Testing

Corsi Block task

Working memory

Spatial memory

Picture Recognition task



Secondary memory

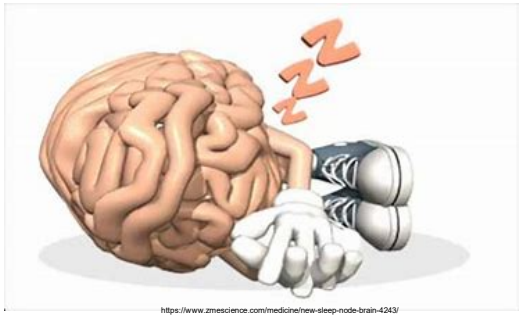
Sleep Assessments

- **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)

	Start Date	Start Time (lights out)	End Date	End Time (out of bed)	Sleep Quality (1-6)
E.g.	*05-04-18*	*22:30*	*06-04-18*	*08:30*	*3*
1					

http://www.actigraphy.com/solutions/actiwatch/actiwatch2.html



https://www.zmescience.com/medicine/new-sleep-node-brain-4243/

Anthropometry, Diet + Physical Activity Assessments

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

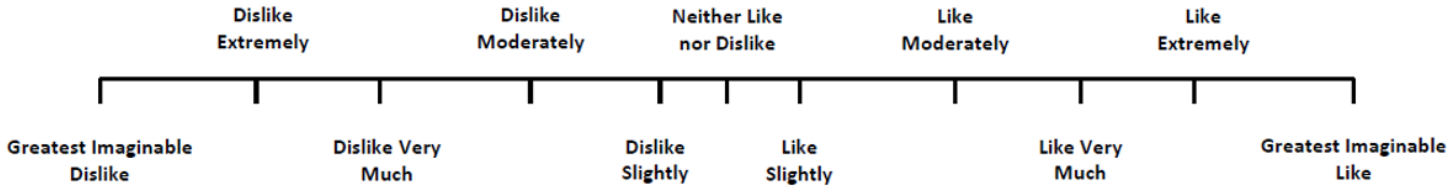
Australian Eating Survey

http://www.australianeatingsurvey.com.au/

Outcome Measures

- **Sensory Properties**
- **Liking**
- Flavour
- Texture
- Overall

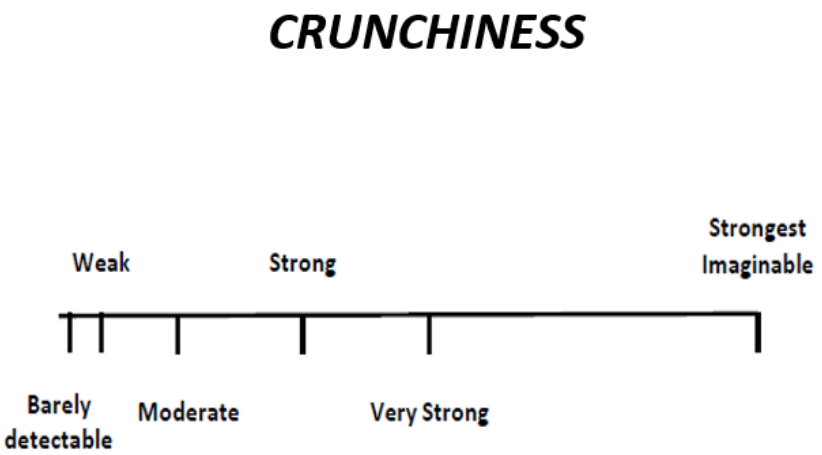
FLAVOUR LIKING



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

Outcome Measures

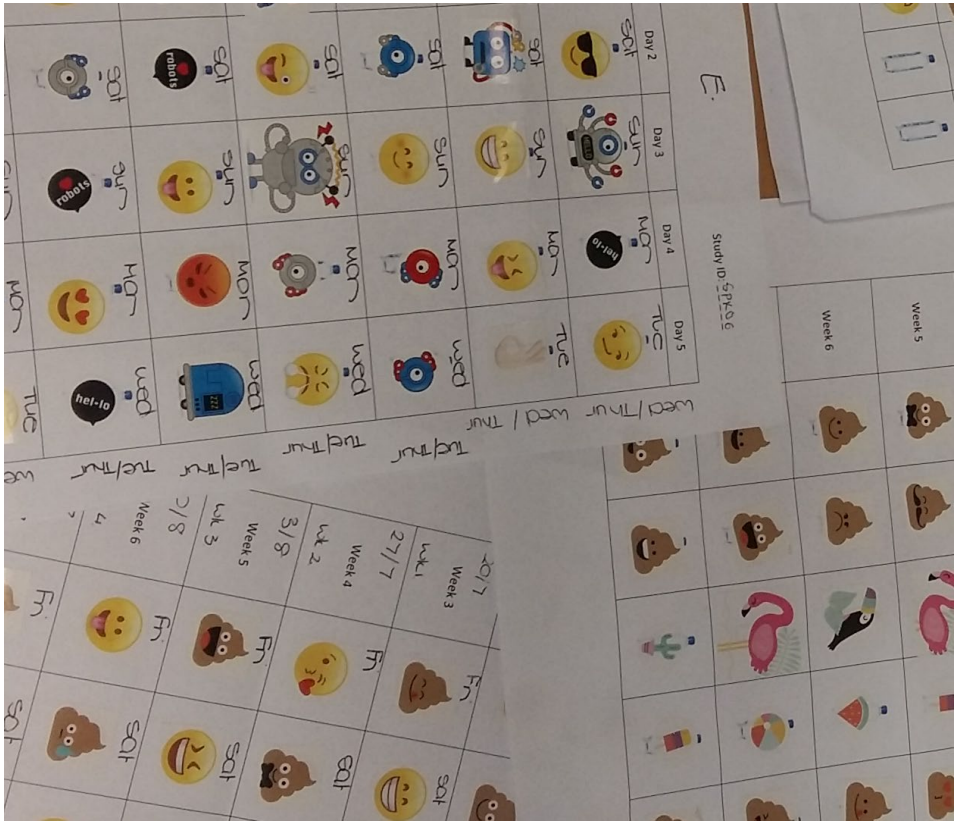
- **Sensory Properties**
- **Food Qualities**
- Hardness
- Crunchiness



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

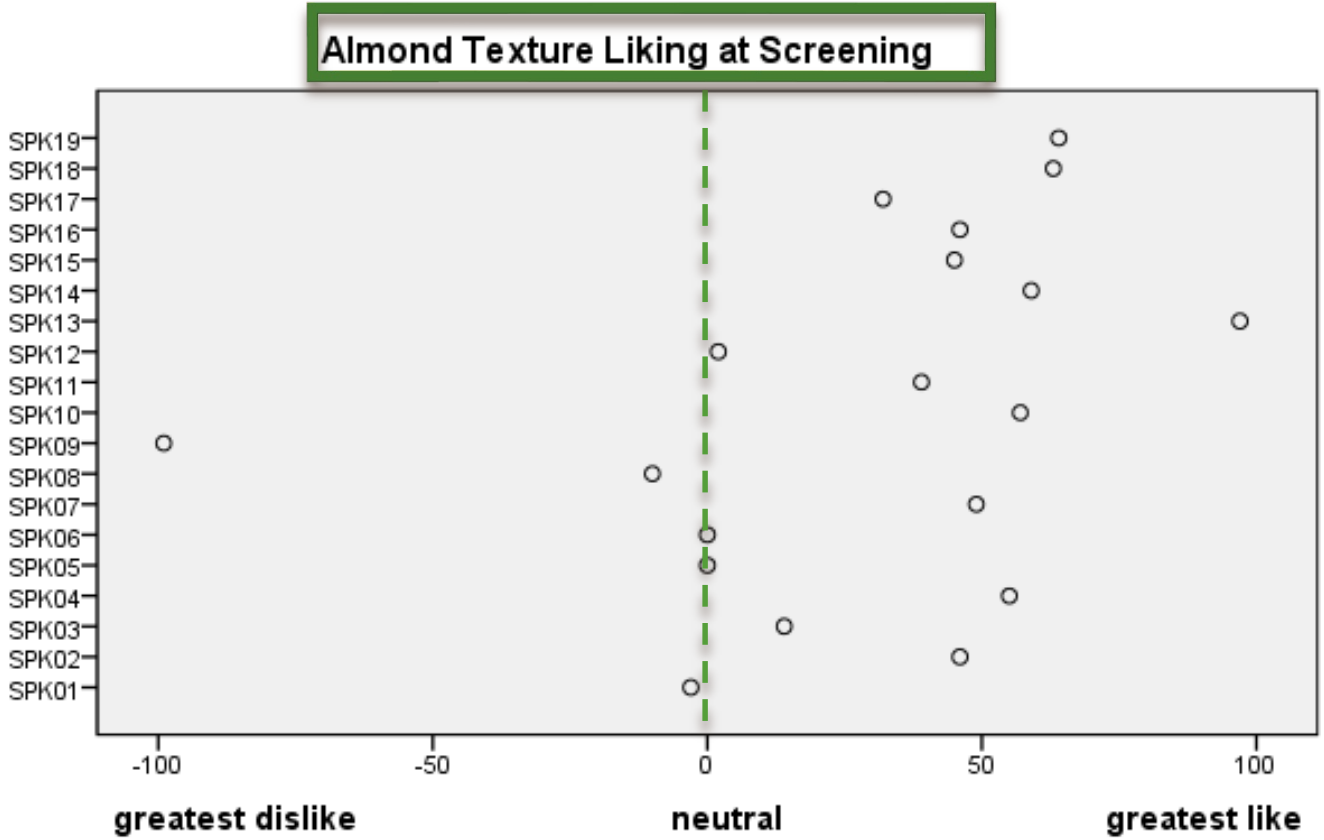
Engagement Activities

- Sticker charts to track consumption
- Coloring competitions

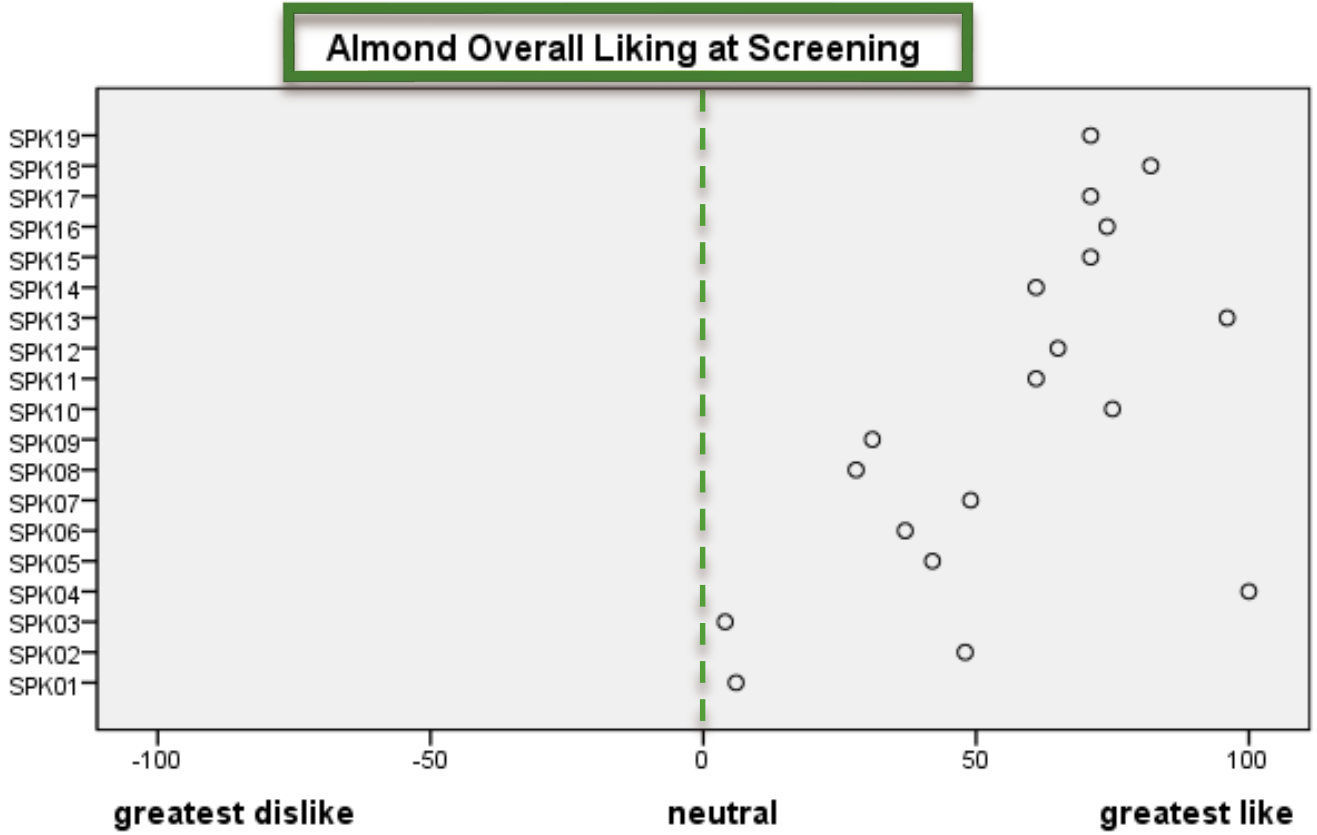


Preliminary Results

Preliminary Findings

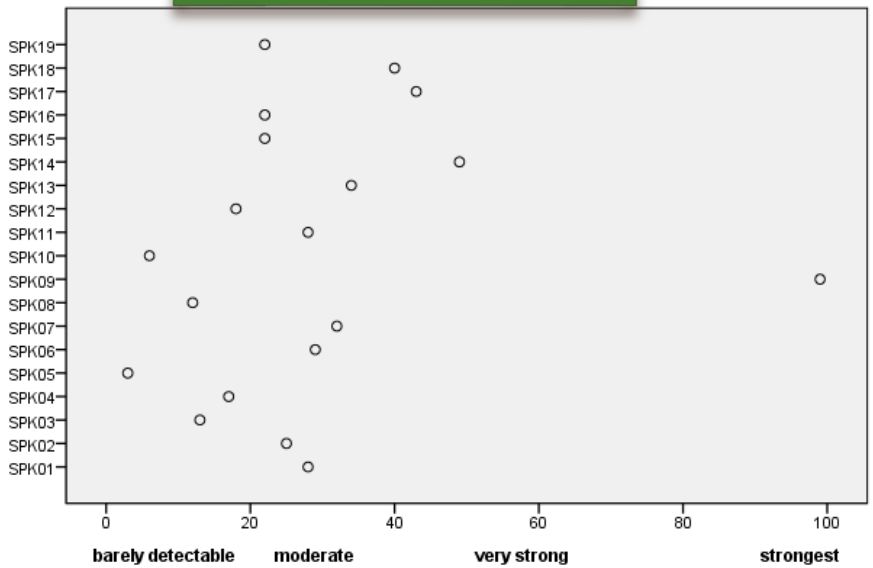


Preliminary Findings

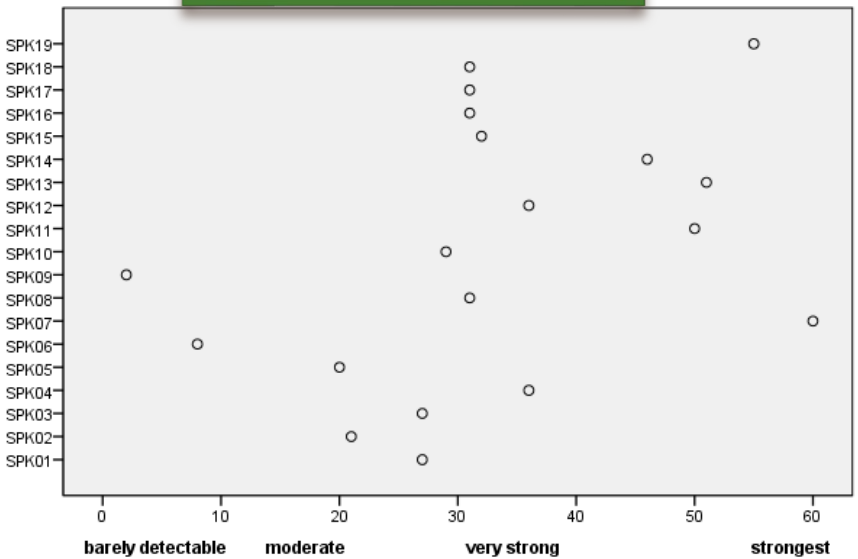


Preliminary Findings

Almond Hardness at Screening

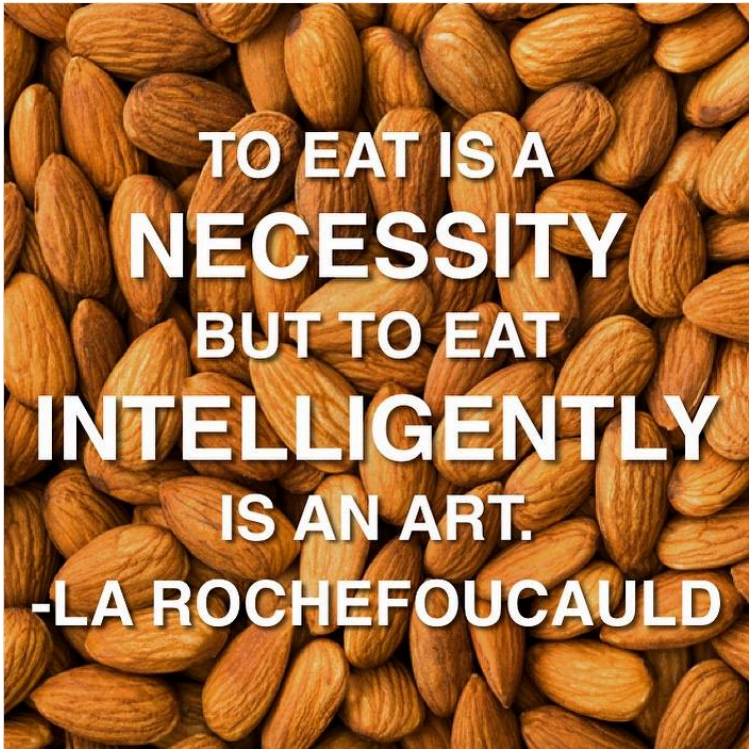


Almond Crunchiness at Screening



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

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Study Team

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Prof Jonathan Buckley

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