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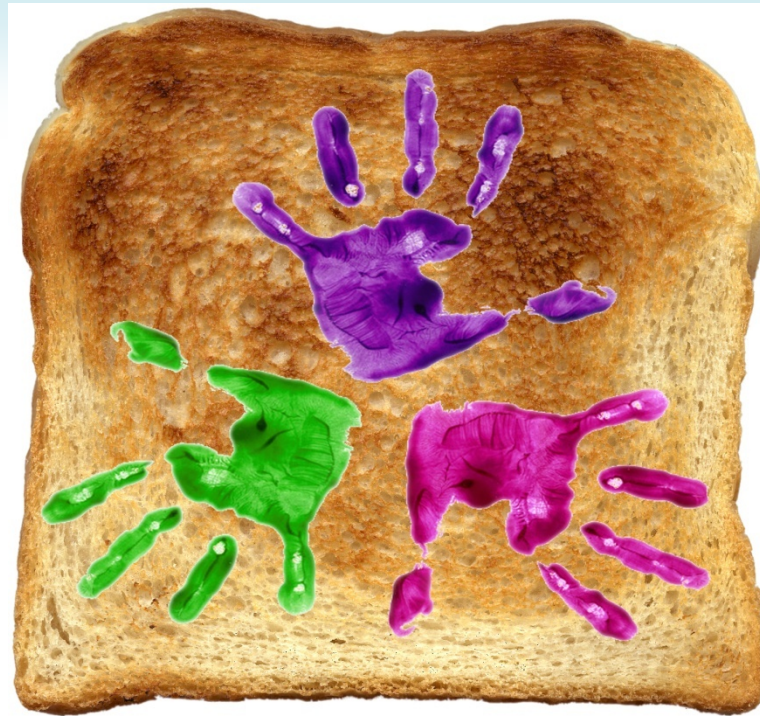
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School Breakfast: More than Snap, Crackle and Pop?

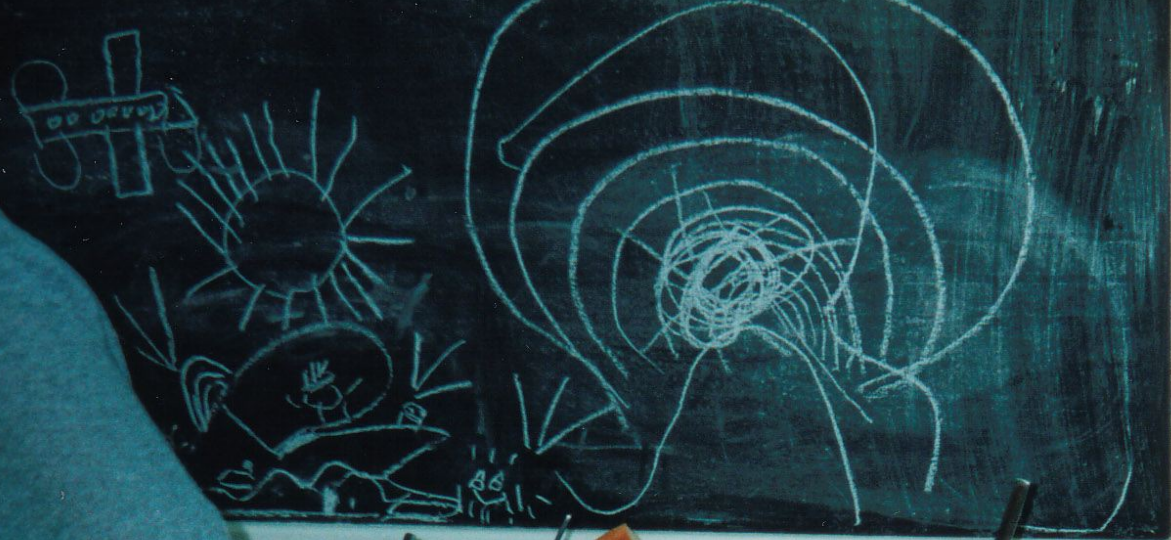


Greta Defeyter



What is a Breakfast Club?







What sort of 'breakfaster' are YOU?

'At the table!'

'On the Go!'

'Skipper!'

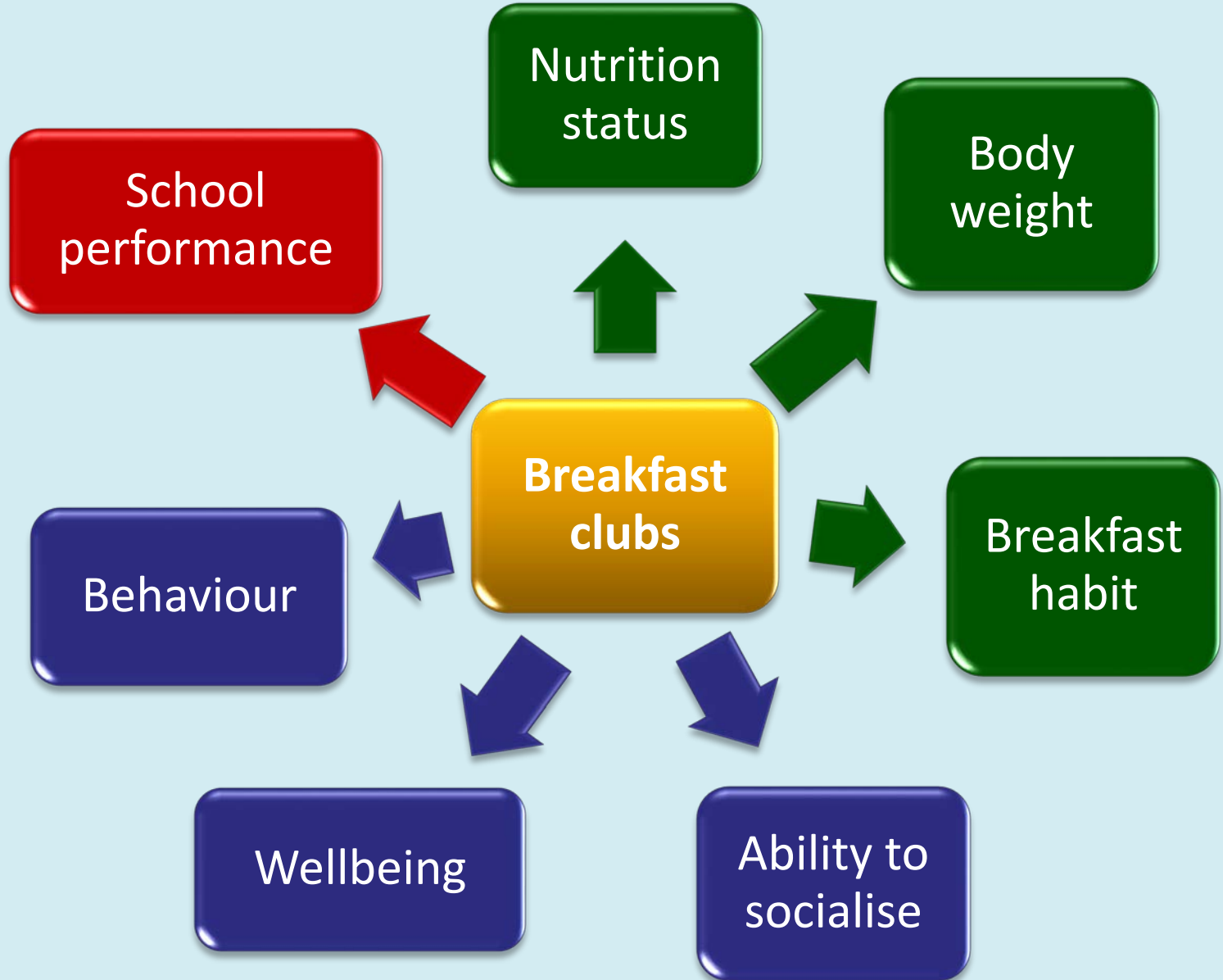
'All Day Breakfaster!'

Benefits of Breakfast Club

School breakfast participation has been linked to improvements in:

- Classroom behaviour (Bro et al, 1994)
- Maths grades (Murphy et al, 1998; Adolphus et al., 2013)
- School attendance (Simeon, 1998)

Main focus of research into children's breakfast habits has been the impact of the breakfast meal.



BREAKFAST CLUB



Breakfast sets you up for the day. Many people skip breakfast but did you know

- ↓ Breakfast should provide you with 25% of your daily intake of energy and nutrition.
- ↓ Breakfast can help improve your performance during the day.
- ↓ Missing breakfast can result in poorer physical and mental performance in the late morning hours.
- ↓ Eating a high carbohydrate breakfast improves your mood.
- ↓ Breakfast eaters are less stressed than breakfast skippers.
- ↓ Regular breakfast eating makes positive contribution to work and school performances.
- ↓ Skipping breakfast mean missing out on recommended daily amounts of vitamins and minerals.

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Eating cereal 'boosts concentration'

Eating cereal for breakfast can actually boost your concentration powers at work or school, scientists have found.



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Eating Breakfast Improves Concentration

Do you have the concentration powers of a four-year old?

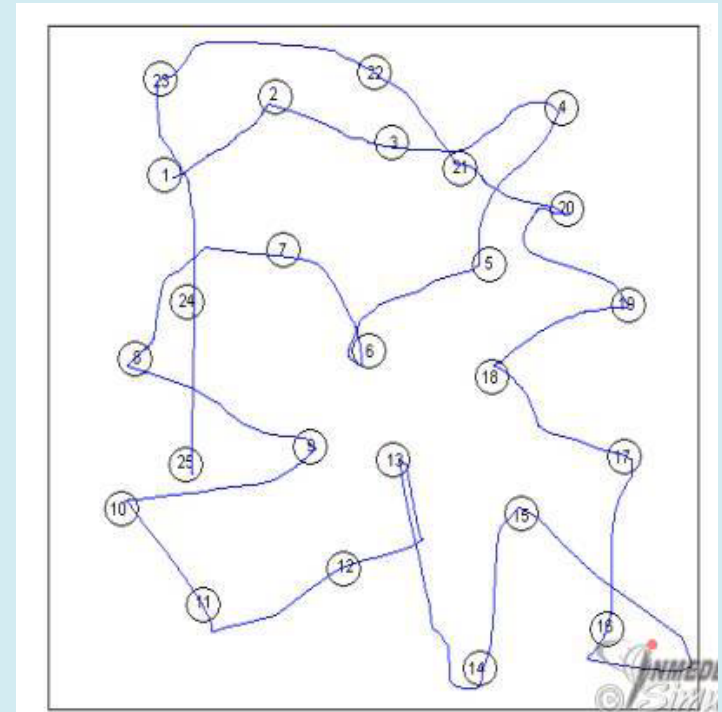
You're probably skipping breakfast. Researchers at Bristol University, reported in *Men's Health* magazine, found that people who didn't bother kick-starting the day with some fuel had trouble focusing and fumbled tasks later on. After a long night of not eating, you need to give your brain glucose to function.



Effects of School Breakfast Programs

UK study: Shemilt et al (2004)

- 8209 UK children
- 3 months funding for breakfast club vs. no funding
- Time to complete trail-making task faster after SBP
- Reduced absenteeism



Effects of School Breakfast Programs

US study: Murphy et al (1998)

- 133 children from low-income families
- 3 attendance groups:
 - Rarely
 - Sometimes
 - Often
- No details of breakfast served
- Higher Maths grades in 'often' group only
- No effects for Science, Social Studies and Reading



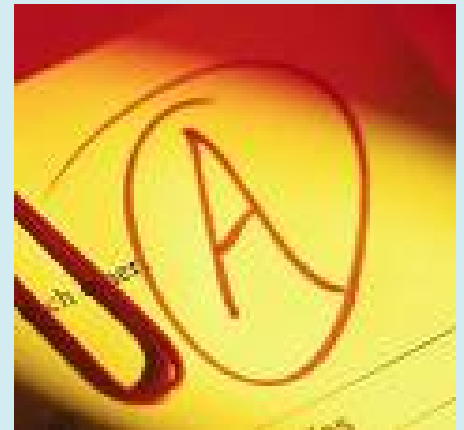
Effects of School Breakfast Programs - Conclusion

13 studies



Positive effects on
mental performance in 10

**Breakfast programs led to
improvement mainly in maths or
arithmetic scores**



- Effects not confined to undernourished.
- Duration ranged from 4 weeks to 3 years.
- Are effects caused by increased attendance?
- No coverage of breakfast type.

More Than Just a Meal?

Family Mealtime

- ✓ Community
- ✓ Belonging
- ✓ Interaction
- ✓ Social skills

Out of School Clubs

- ✓ Interaction
- ✓ Friendship
- ✓ Protection from victimisation

Breakfast club attendees eat a meal within a supportive group setting



Breakfast club attendees spend additional time in the school environment

Aims of Study 1

To investigate whether differences exist between:

- Breakfast club attendees
- After school club attendees
- School club non-attendees

In terms of:

- Friendship quality
- Peer victimisation



Participants

8 primary schools

268 children

163 females

105 males

Mean age = 8.4 years

Age range = 6.3 years – 10.11 years

94 breakfast club
attendees

59 females
35 males

Mean age = 8.24
years

86 after school club
attendees

47 females
39 males

Mean age = 8.75
years

88 school club non-
attendees

57 females
31 males

Mean age = 8.24
years

Friendship Qualities Scale

(Bukowski, Hoza and Boivin, 1994)

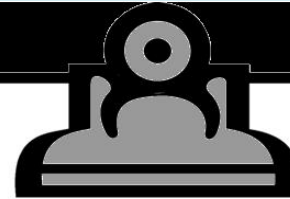
Companionship

Conflict

Help

Security

Closeness



- My friend helps me when I'm having trouble with something
- I feel happy when I'm with my friend
- I can get into fights with my friend

Multidimensional Peer Victimisation Scale

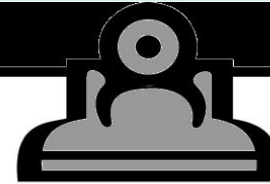
(Mynard and Joseph, 2000)

Physical victimisation

Social manipulation

Verbal victimisation

Attacks of physical property

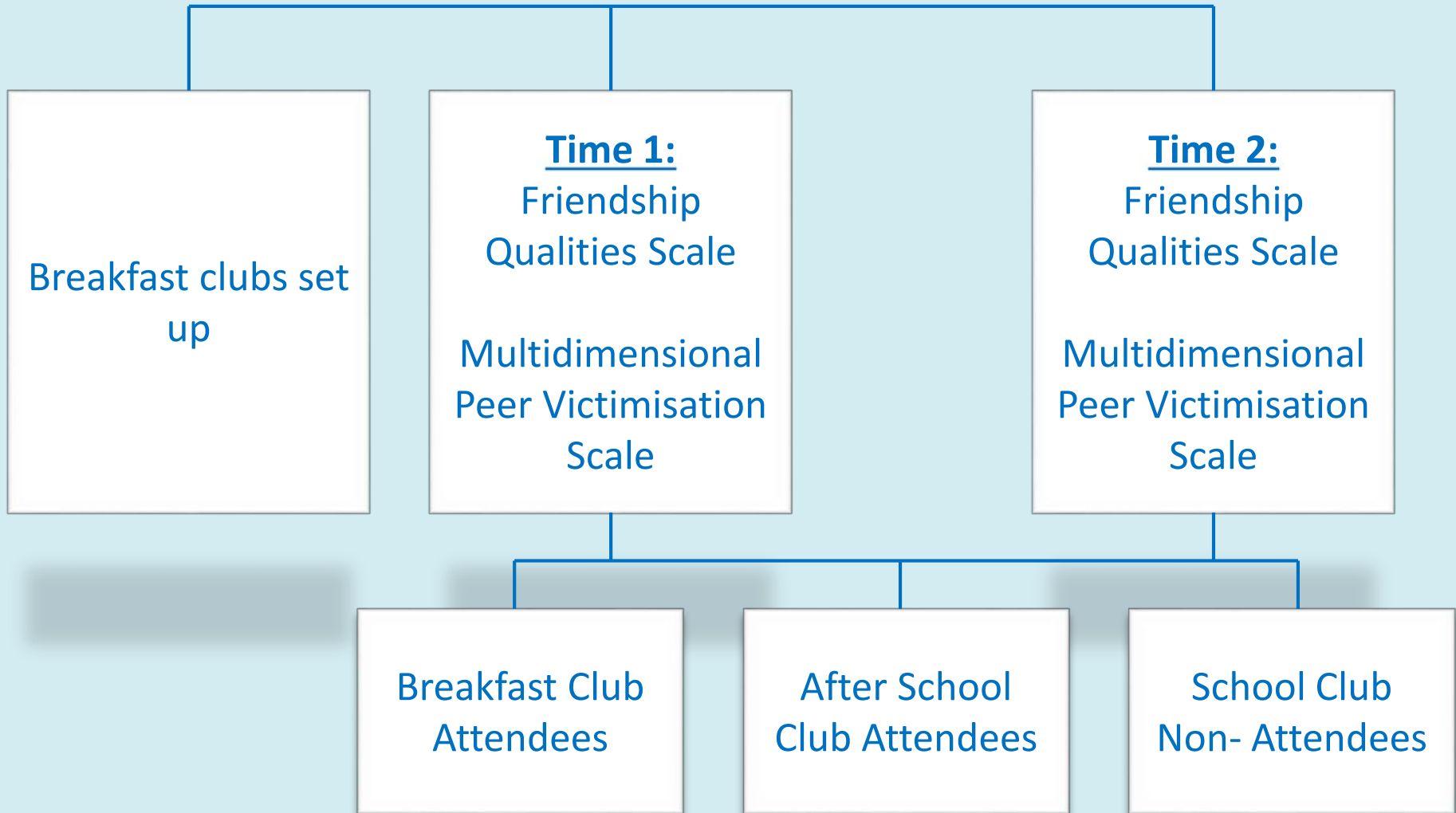


- Kicked me
- Tried to stop my friends from liking me
- Called me names
- Taken something of mine without asking

Procedure

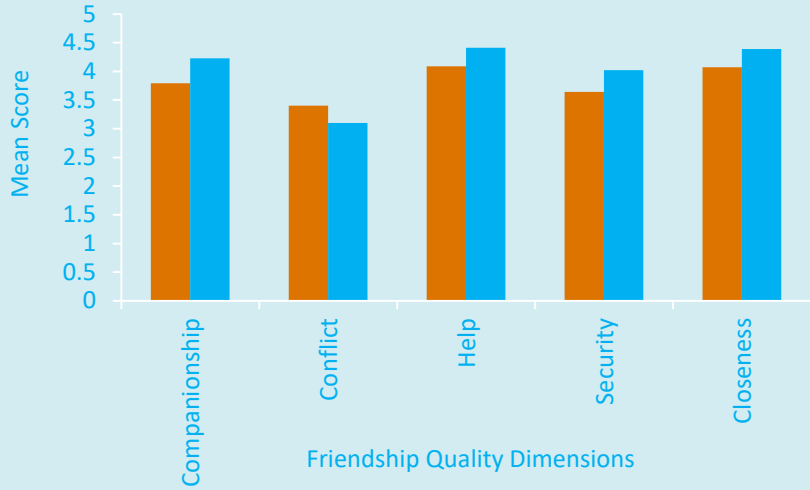
2 months

6 months

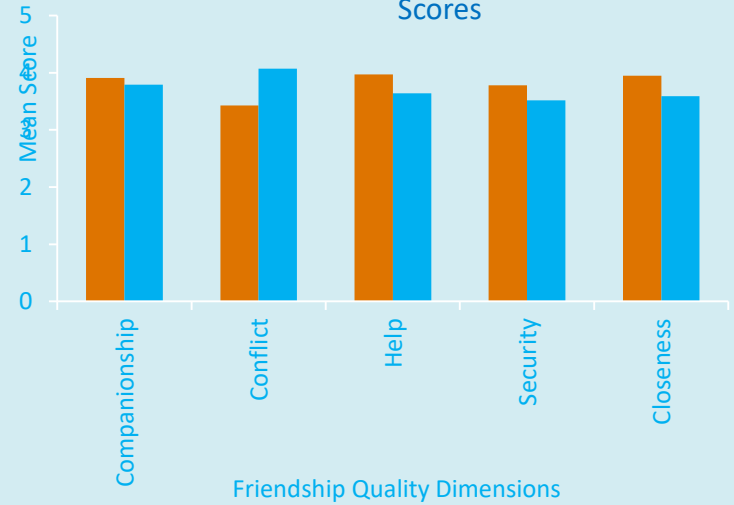


Results: Friendship Quality

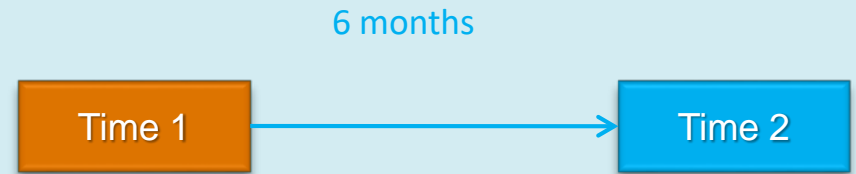
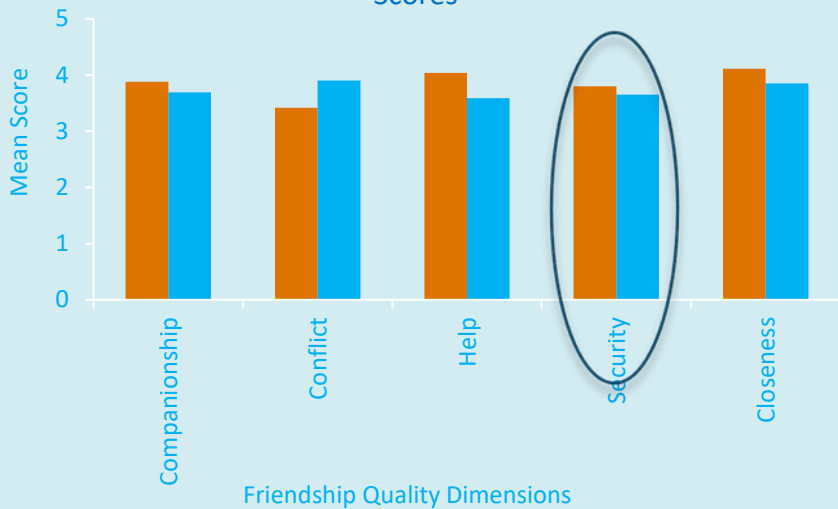
Breakfast Club: Mean Friendship Quality Scores



After School Club: Mean Friendship Quality Scores

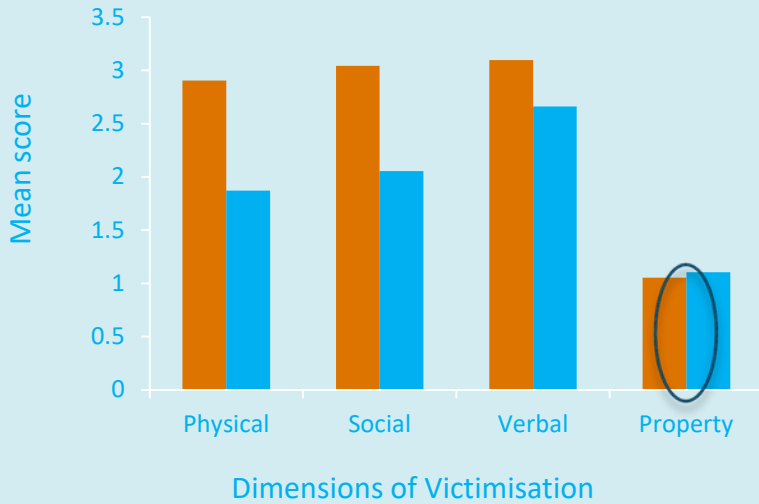


No School Club: Mean Friendship Quality Scores

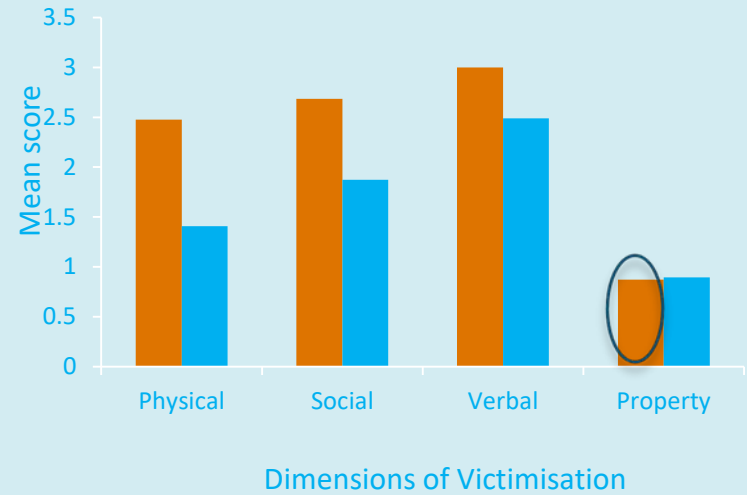


Results: Peer Victimization

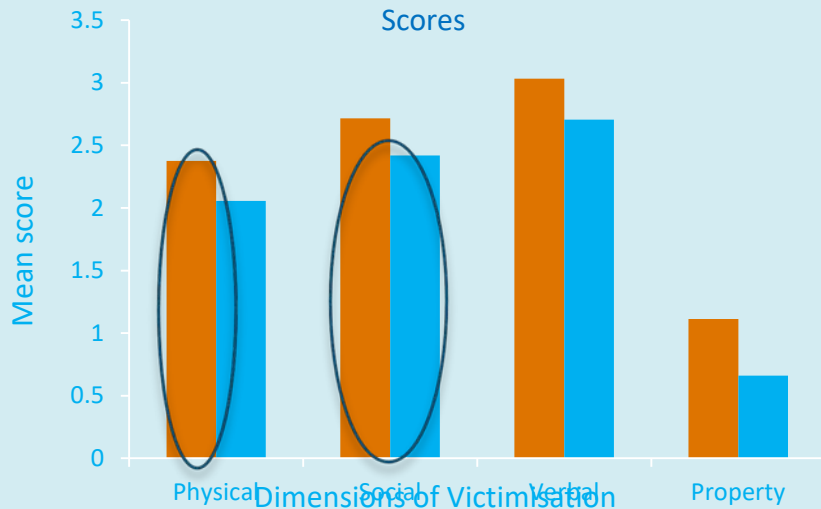
Breakfast Club: Mean Victimization Scores



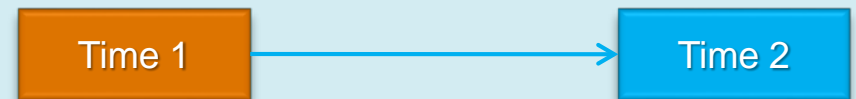
After School Club: Mean Victimization Scores



No School Club: Mean Victimization Scores



6 months



Discussion – Friendship Quality

No significant differences between groups on any measure at baseline



6 months later

- Increase in positive friendship features and decrease in conflict within the breakfast club group
- Decrease or no change in positive features and an increase in conflict within the after school club group and no school club group

Does small, unstructured group activity make a difference?

Discussion – Peer Victimization

No significant differences between groups on any measure at baseline



6 months later

- Reduction in physical and social victimisation within the breakfast club group and the after school club group
- Does out of school club participation provide children with a protective peer group?
- Presence of floor effects might be due to there being little opportunity for attacks on property within primary school

Study 1: Conclusion



The effect of glycaemic index of breakfast cereal on children's cognitive performance



Study 2: Background



- Rising demand on cognitive and intellectual performance
- Imbalanced diet
- The effects of *diet* on cognitive performance
- The effects of *breakfast* on *children's* cognitive performance

Background



- Skipping breakfast has detrimental effects (e.g. Smith et al, 1994)
- Consumption of breakfast has positive effects (e.g. Pollitt et al, 1998)
- Wesnes et al (2003)
 - 9- to 16-year-olds
 - Cheerios, Shreddies, glucose drink or no breakfast
 - Computerised tests of attention and memory
 - Prior to and at 30, 90, 150 and 210 minutes after breakfast

Background



- Glucose Drink & No Breakfast:
Decline in Focused Attention and Episodic Memory



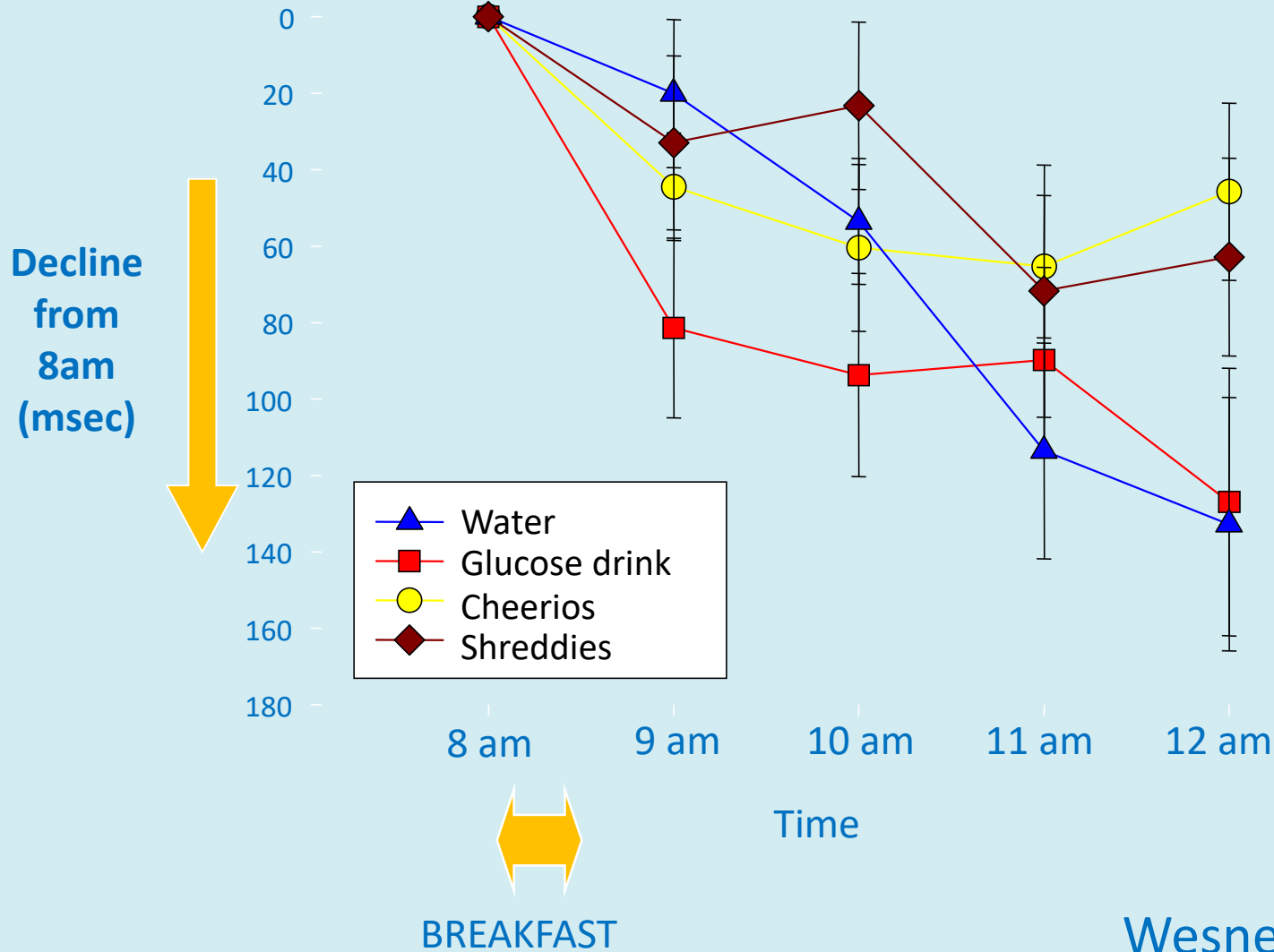
- Cheerios & Shreddies:
Decline seen in Focused Attention and Episodic Memory was significantly reduced



- Breakfast in the form of cereal can have a positive effect on cognitive performance in school children



Benefit of breakfast on attention in 9-16 year olds



Wesnes et al. (2003)

Background



- Breakfast compared to *no* breakfast
- *Composition* of breakfast
- The brain's main source of energy is glucose
- Increased blood glucose has positive effect on cognitive performance
(e.g. Martin & Benton, 1999; Sünram-Lea et al., 2002)

Background



- The body's main source of glucose is carbohydrates
- Carbohydrates exerts its effects on blood glucose in two ways

Background



- High Glycaemic Index (GI > 70)
- Low Glycaemic Index (GI < 40)

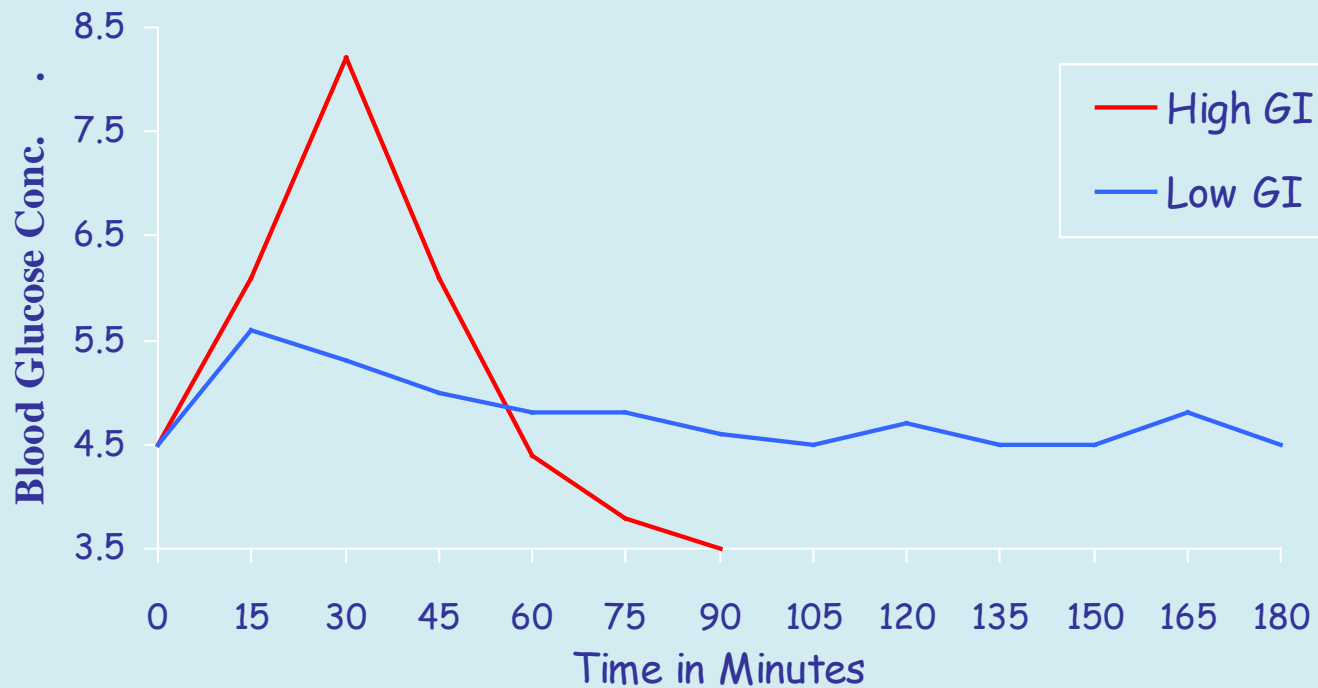


Fig. 1: Blood glucose response after intake of high and low GI carbohydrates

Present Study

Aims

- 
- 
- 
- 
- a) Does the glycaemic index of breakfast have an effect on cognitive performance?

Prediction: low rather than high GI breakfast more beneficial to performance, particularly in late morning

- b) Are the effects found across all cognitive functions or restricted to particular processes?

Participants



- 6- to 11-years (N = 64)
Mean age 9:3 (range 6:8 -11:7); 38 females, 26 males



- Three age groups:
 - 7-year-olds (N = 18)
Mean age 7:2 (range 6:3-7:11); 10 females, 8 males



- 9-year-olds (N = 23)
Mean age 9:1 (range 8:2-9:11); 10 females, 13 males



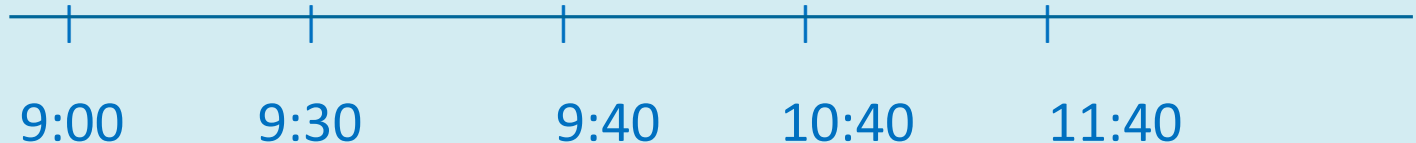
- 11-year-olds (N = 23)
Mean age 11:0 (range 10:0-11:7); 18 females, 5 males

Procedure



- Two consecutive days
- High GI: Coco Pops
(35g with 125ml semi-skimmed milk)
- Low GI: All Bran
(35g with 125ml semi-skimmed milk)

Baseline Breakfast Test 1 Test 2 Test 3



Procedure

Cognitive Drug Research (CDR)
Computerised Assessment Battery (Wesnes et al, 2003)

- Word Presentation
- Immediate Word Recall
- Picture Presentation
- Simple Reaction Time
- Digit Vigilance
- Choice Reaction Time
- Spatial Working Memory
- Numeric Working Memory
- Delayed Word Recall
- Delayed Word Recognition
- Delayed Picture Recognition



Fig. 2: CDR Test Battery

Analysis of Data



- Focused Attention
- Sustained Attention
- Working Memory
- Episodic Memory
- Speed of Memory

Analysis of Data



- Change from Baseline

Test 1/2/3 – Baseline



- (3 x 2 x 3) ANOVA
(assessment x breakfast x age group)



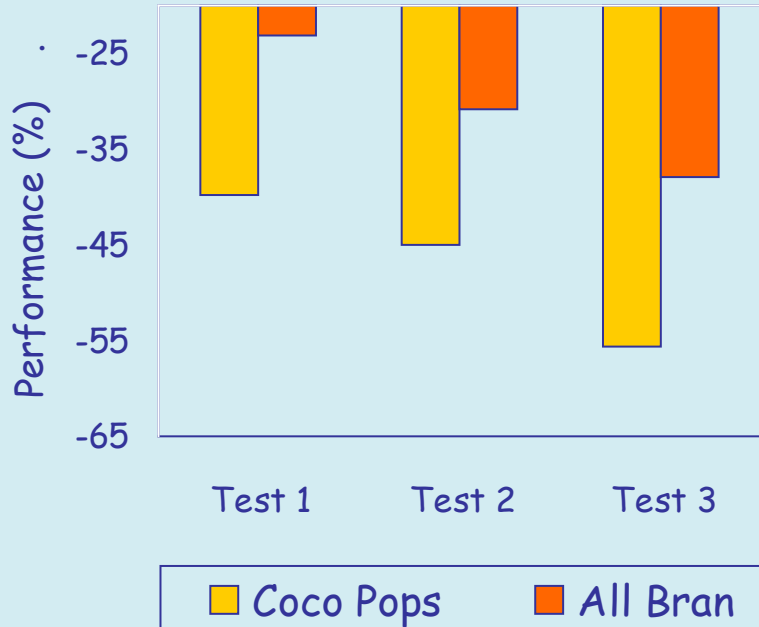
Results



- Older children perform better than younger children
- Decline in performance throughout the morning

Results

Episodic Memory



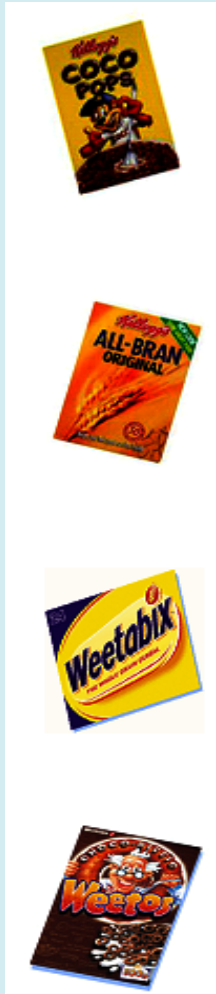
Main effect of Breakfast $F(1,61) = 5.313, p < 0.05$

Significantly smaller decline in performance after consumption of low GI All Bran compared to high GI Coco Pops

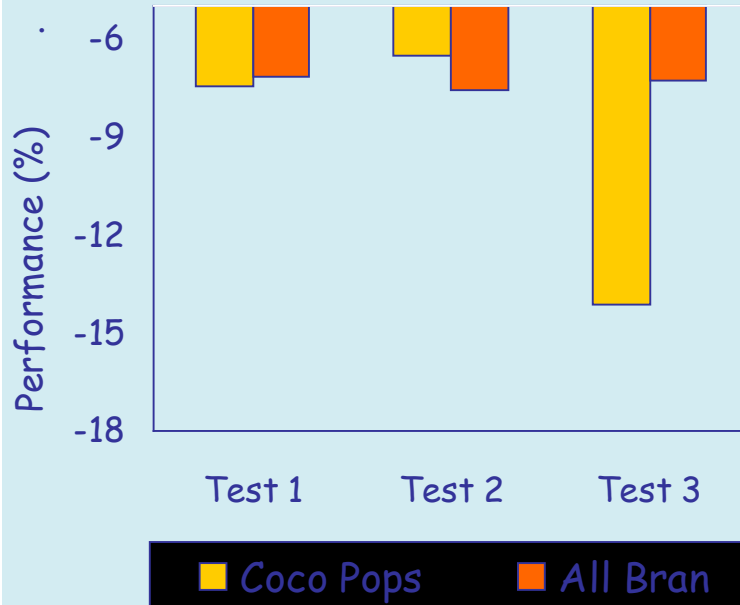
Fig. 3: Performance on Episodic Memory



Results



Sustained Attention



Breakfast * Assessment Time
 $F(2,122) = 3.820, p < 0.05$

Significantly decline in performance on Test 3 after consumption of high GI Coco Pops compared to low GI All Bran

Fig. 4: Performance on Sustained Attention

Discussion



Aims

- a) Can the Glycaemic Index of breakfast affect children's cognition?
- b) Are the effects found across all cognitive functions or restricted to particular processes?

Discussion



- Significantly less decline on Episodic Memory and Sustained Attention across the morning after consumption of Low GI (All Bran) compared to high GI (Coco Pops)
- Changes in cognitive performance may be a reflection of changes in blood glucose levels, in this case triggered by glycaemic index

Discussion



- Effect of GI may be different for different cognitive processes
- Micronutrients and other macronutrients can also influence cognitive performance (Lieberman et al, 1986)

Plans for Future Research:

- To investigate the effects of lunch and mid-morning snack

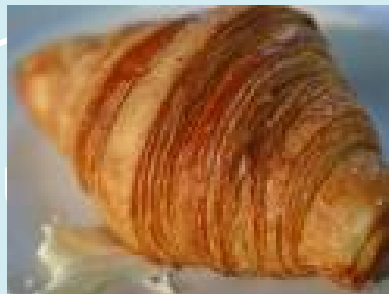
How might breakfast clubs improve performance?

- 1) Short-term nutritional impact
- 2) Long-term nutritional impact
- 3) Hunger, mood, motivation
- 4) ↑ in attendance at school
 - Time spent at school
 - Time spent with peers and teachers



Overall conclusions and future directions

- Generally positive effects of breakfast and breakfast clubs
- Effects of breakfast more demonstrable in undernourished children but breakfast clubs appear effective for all
- Range of techniques used to measure success
- How are adolescents affected?





What do you think of our Breakfast Club?

It gives me chance to have my breakfast

I don't get bullied here

I think the price is good because you get breakfast and baby-sitting

Friendly service

It's good that children can attend on intermittent basis (parent)

Great for getting children out of bed (parent)

I get to eat my breakfast with my friends and we can have a long chat

I like to help serve the food

There are games to play after and you get more food than at home!

I like the food and you can sit at any table!