

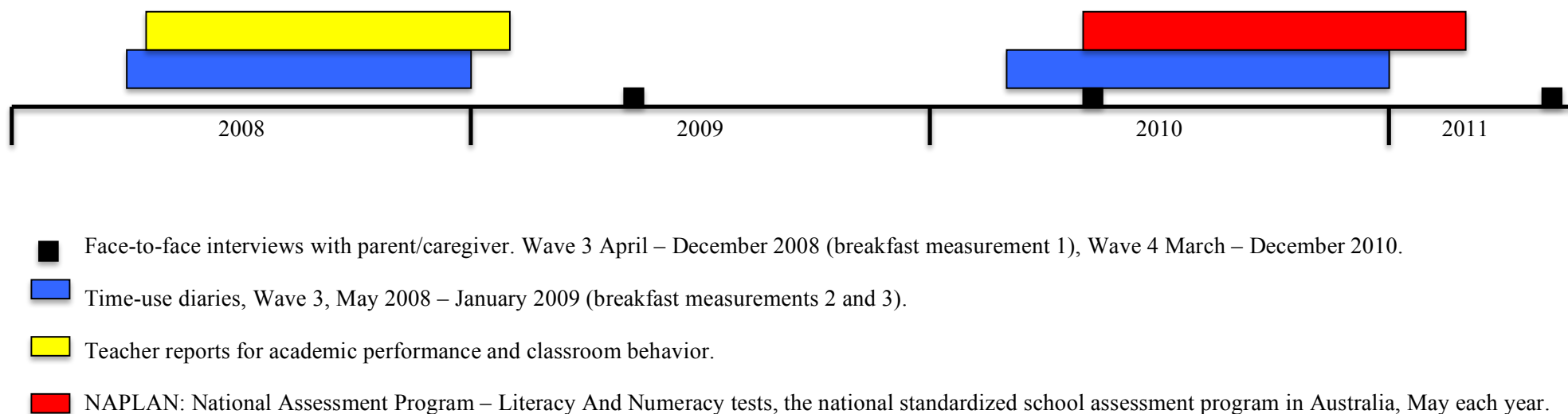
**Skipping breakfast among 8-9 year old children is associated with teacher-reported but not objectively measured academic performance two years later**

Figure S1. Time line showing the data collection periods for the Longitudinal Study of Australian children

Table S1. Differences between children who were included and excluded from the analyses (N=4,331)

Table S2. Cross-sectional associations between skipping breakfast aged 8-9 years and teacher-reported academic performance aged 8-9 years (N=2056)

Table S3. Cross-sectional associations between skipping breakfast aged 8-9 years and teacher-reported behavior aged 8-9 years (N=2054)



**Figure S1. Time line showing the data collection periods for the Longitudinal Study of Australian children**

**Table S1. Differences between children who were included and excluded from the analyses (N=4,331)**

Characteristic	Included (n=2,280) <i>n</i> (%) or mean $\pm$ SD	Excluded (n=2,052) <i>n</i> (%) or mean $\pm$ SD
Child's sex		
Boy	1181 (51.8)	1032 (50.3)
Girl	1099 (48.2)	1020 (49.7)
Breakfast at interview (N=4,331) <sup>1</sup>		
Ate breakfast	2216 (97.2)	1903 (92.8)
Skipped	64 (2.8)	137 (6.7)
Don't know	0 (0)	11 (0.5)
<b>Aged 8-9 years</b>		
Socio-economic status		
Most disadvantaged SES quartile	455 (20.0)	667 (32.6)
Least disadvantaged SES quartile	460 (20.2)	223 (10.9)
<i>Teacher-reported:</i>		
Reading progress (N=3,578)		
Far above/above average	825 (42.4)	516 (31.6)
Average	803 (41.2)	675 (41.4)
Far below/below average	319 (16.4)	440 (27.0)
Mathematics progress (N=3,560)		
Far above/above average	785 (40.6)	482 (29.7)
Average	884 (45.7)	788 (48.5)
Far below/below average	266 (13.8)	355 (21.9)
Overall achievement (N=3,547)		
Far above/above average	786 (40.7)	474 (29.3)
Average	911 (47.2)	790 (48.9)
Far below/below average	233 (12.1)	353 (21.8)
Behavior <sup>2</sup>		
Internalizing problems (N=3,582)	2.34 $\pm$ 2.83	2.89 $\pm$ 3.29
Externalizing problems (N=3,585)	3.15 $\pm$ 3.62	4.15 $\pm$ 4.10
Prosocial behavior (N=3,583)	7.75 $\pm$ 2.21	7.47 $\pm$ 2.33
Year 3 NAPLAN <sup>3</sup> results		
Reading (N=2,930)	437.6 $\pm$ 83.2	410.4 $\pm$ 83.5
Writing (N=2,931)	438.2 $\pm$ 73.4	419.9 $\pm$ 73.6
Spelling (N=2,933)	426.6 $\pm$ 75.0	409.0 $\pm$ 78.2
Grammar (N=2,930)	444.5 $\pm$ 86.0	416.4 $\pm$ 87.3
Numeracy (N=2,929)	430.3 $\pm$ 70.6	408.4 $\pm$ 70.4
<b>Aged 10-11 years</b>		
Teacher-reported		
Reading progress (N=3,240)		
Far above/above average	837 (43.7)	437 (33.0)
Average	785 (41.0)	589 (44.5)
Far below/below average	293 (15.3)	299 (22.6)
Mathematics progress (N=3,209)		
Far above/above average	784 (41.3)	390 (29.8)

Average	836 (44.0)	614 (46.9)
Far below/below average	279 (14.7)	306 (23.4)
Overall achievement (N=3,227)		
Far above/above average	812 (42.6)	410 (31.1)
Average	870 (45.6)	653 (49.5)
Far below/below average	226 (11.8)	256 (19.4)
Behavior <sup>2</sup>		
Internalizing problems (N=3,268)	2.29 ± 2.97	2.51 ± 3.02
Externalizing problems (N=3,267)	2.88 ± 3.54	3.55 ± 3.87
Prosocial behavior (N=3,268)	7.93 ± 2.20	7.72 ± 2.18
Year 5 NAPLAN <sup>3</sup> results		
Reading (N=3,841)	518.7 ± 79.7	492.0 ± 82.9
Writing (N=3,828)	501.8 ± 68.6	485.9 ± 71.0
Spelling (N=3,835)	501.8 ± 66.2	485.3 ± 72.9
Grammar (N=3,835)	527.7 ± 80.9	501.6 ± 88.3
Numeracy (N=3,820)	512.1 ± 72.1	489.7 ± 73.3

<sup>2</sup>NAPLAN, National Assessment Program – Literacy And Numeracy.

<sup>1</sup>Breakfast consumption reported by the parent/caregiver at the face-to-face interview was assessed using the question “Did <study child> eat breakfast today?”. This measure of breakfast consumption was used for this analysis as nearly all participants (those included and excluded from the main analysis) had data for this question.

<sup>2</sup> Values are the unadjusted mean ± SD score for the three scales of the Strengths and Difficulties Questionnaire. Better behavior is indicated by lower scores for internalizing problems (range 0 – 18) and externalizing problems (range 0 – 20) and higher scores for prosocial behavior (range 0 – 10).

<sup>3</sup> Values are the unadjusted mean ± SD for each domain of the NAPLAN assessments. Possible score range 0-1,000, higher scores indicate better academic performance.

**Table S2. Cross-sectional associations between skipping breakfast aged 8-9 years and teacher-reported academic performance aged 8-9 years (N=1,953)**

<b>Outcome and category of skipping breakfast</b>	<b>Above average<sup>1</sup></b> <i>n</i> (%)	<b>Average<sup>1</sup></b> <i>n</i> (%)	<b>Below average<sup>1</sup></b> <i>n</i> (%)	<b>Model 1<sup>2</sup></b> PR (95% CI)	<b>Model 2<sup>3</sup></b> PR (95% CI)	<b>Model 3<sup>4</sup></b> PR (95% CI)
<b>Reading progress</b>						
Never skipped	742 (42.7)	716 (41.2)	218 (16.2)	1.00 (ref)	1.00 (ref)	1.00 (ref)
≥1 skips	83 (39.9)	87 (41.8)	38 (18.3)	1.08 (0.98, 1.20)	1.08 (0.98, 1.19)	1.05 (0.96, 1.15)
<i>P</i> -value				0.10	0.10	0.25
<b>Mathematics progress</b>						
Never skipped	699 (40.6)	783 (45.4)	242 (14.0)	1.00 (ref)	1.00 (ref)	1.00 (ref)
≥1 skips	84 (40.6)	99 (47.8)	24 (12.0)	1.03 (0.93, 1.14)	1.04 (0.94, 1.15)	1.04 (0.94, 1.15)
<i>P</i> -value				0.54	0.44	0.41
<b>Overall achievement</b>						
Never skipped	696 (40.6)	810 (47.3)	208 (12.1)	1.00 (ref)	1.00 (ref)	1.00 (ref)
≥1 skips	83 (40.9)	97 (47.8)	23 (11.3)	1.05 (0.95, 1.17)	1.05 (0.95, 1.17)	1.04 (0.94, 1.14)
<i>P</i> -value				0.33	0.32	0.46

<sup>1</sup> Comparisons are to other children of the same grade level. Below average = below/far below average; Above average = above/far above average.

<sup>2</sup> Model 1: adjusted for sex and age at time of the parent interview.

<sup>3</sup> Model 2: adjusted for sex, age at time of the parent interview and SES (measured at Wave 3).

<sup>4</sup> Model 3: Model 2 plus the following additional covariates *reading progress* – smoking status of primary caregiver; *mathematics progress* – financial hardship, two-parent home, teacher reported pro-social behavior; *overall achievement* – financial hardship, two-parent home, smoking status of primary caregiver, self-reported health of primary caregiver, teacher reported prosocial behavior.

**Table S3. Cross-sectional associations between skipping breakfast aged 8-9 years and teacher-reported behavior aged 8-9 years (N=1952)**

Behavior subscale and category of skipping breakfast	n	Mean ± SD <sup>1</sup>	Model 1 <sup>2</sup>	Model 2 <sup>3</sup>	Model 3 <sup>4</sup>
			Diff (95% CI) <sup>5</sup>	Diff (95% CI) <sup>5</sup>	Diff (95% CI) <sup>5</sup>
Internalizing problems					
Never skipped	1726	2.47 ± 3.28	0 (ref)	0 (ref)	0 (ref)
≥1 skips	206	2.86 ± 4.41	0.10 (-0.47, 0.67)	0.04 (-0.50, 0.57)	0.13 (-0.65, 0.38)
P-value			0.73	0.90	0.61
Externalizing problems					
Never skipped	1726	3.47 ± 4.42	0 (ref)	0 (ref)	0 (ref)
≥1 skips	206	3.75 ± 5.00	0.24 (-1.75, 2.23)	-0.16 (-1.92, 1.60)	-0.89 (-2.48, 0.69)
P-value			0.81	0.86	0.24
Prosocial behavior					
Never skipped	1743	7.66 ± 2.44	0 (ref)	0 (ref)	---- <sup>6</sup>
≥1 skips	209	7.37 ± 2.47	-0.21 (-0.46, 0.04)	-0.17 (-0.41, 0.07)	---- <sup>6</sup>
P-value			0.10	0.16	

<sup>1</sup> Values are the unadjusted mean ± SD score for the three scales of the Strengths and Difficulties Questionnaire. Better behavior is indicated by lower scores for internalizing problems (range 0 – 18) and externalizing problems (range 0 – 20) and higher scores for prosocial behavior (range 0 – 10).

<sup>2</sup> Model 1: adjusted for sex and age at interview.

<sup>3</sup> Model 2: adjusted for sex, age at interview and SES (measured at Wave 3)

<sup>4</sup> Model 3: Model 2 plus additional adjustments for *internalizing problems* – two-parent home, financial hardship, self-reported health of primary caregiver, reading progress; *externalizing problems* – two-parent home, financial hardship, self-reported health of primary caregiver, reading progress.

<sup>5</sup> Differences between breakfast skippers and breakfast eaters were calculated using linear regression.

<sup>6</sup> There was no model 3 for prosocial behavior as none of the additional covariates changed the coefficient of the covariate for skipping breakfast by at least 10%.