Can Information Enhanced with Nudges Mitigate the Rise of Childhood Obesity in the Global South?

Online Appendix

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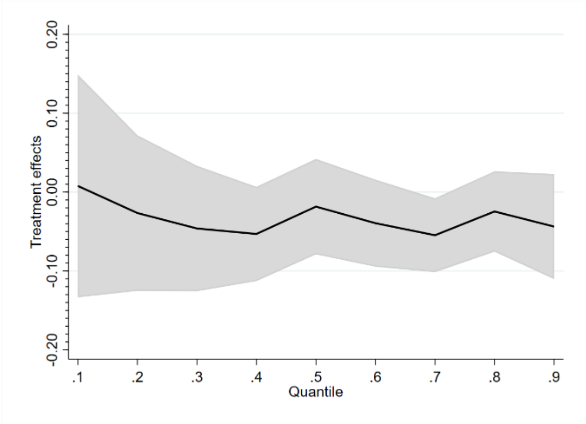
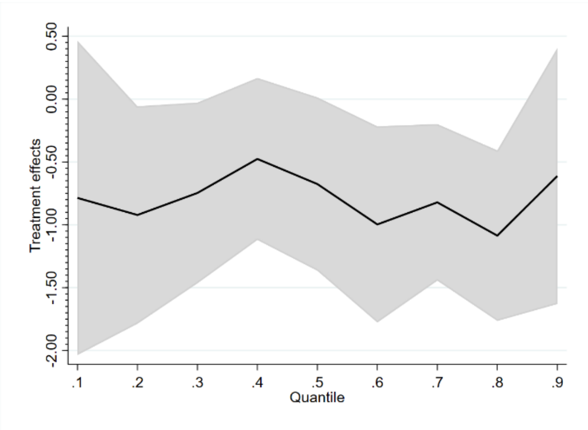
Appendix Figure 1: Quantile regressions involving anthropometric measures

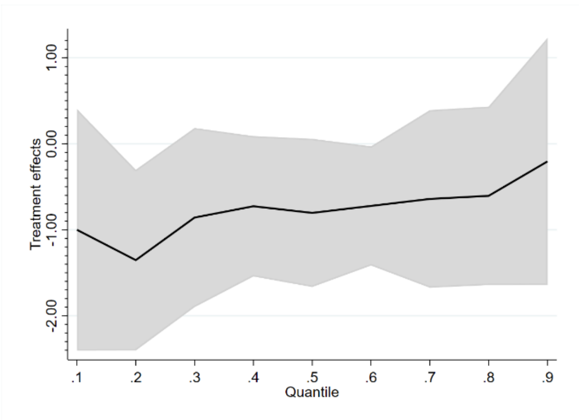
Panel A: BMI z-scores



Panel B: Body Fat (in %)



Panel C: Waist Circumference (in cm)



Note: All covariates included. 2000 bootstrap replications.

Table A1: Attrition

	(1) Control	(2) Treatment	(3) P-value	(4) Q-value
Panel A: Observations (anthropometrics and snack choice)				
Baseline	364	362	n/a	
Follow-up	354	343	n/a	
Panel B: Missings at baseline				
Anthropometrics	0.032	0.035	0.83	0.83
Snack choice	0.034	0.037	0.83	0.83
Survey	0.08	0.112	0.13	0.39
Panel C: Missings at follow-up				
Anthropometrics	0.061	0.085	0.20	0.20
Snack choice	0.061	0.085	0.20	0.20
Survey	0.093	0.131	0.10	0.20
Panel D: Attrition (In baseline, but not follow-up)				
Anthropometrics	0.058	0.072	0.45	0.60
Snack choice	0.058	0.069	0.54	0.60
Survey	0.045	0.053	0.60	0.60

Note: Q-values by horizontal dividers.

Table A2: Predicting missings

	(1)	(2)	(3)	(4)	(5)	(6)
Missing follow-up info:	Anthropometrics		Snack choice (cookie=1, fruit=0)		Survey	
Treatment	0.017	0.015	0.017	0.015	0.027	0.030
	(0.014)	(0.015)	(0.014)	(0.015)	(0.020)	(0.020)
Male child	0.010	0.012	0.010	0.012	0.029	0.027
	(0.014)	(0.016)	(0.014)	(0.016)	(0.019)	(0.021)
Age in years	-0.007	-0.003	-0.007	-0.003	-0.010	-0.010
	(0.009)	(0.011)	(0.009)	(0.011)	(0.012)	(0.013)
Baseline:						
BMI z-score		0.001		0.001		0.003
		(0.007)		(0.007)		(0.010)
Body fat (in%)		0.001		0.001		-0.000
		(0.002)		(0.002)		(0.003)
Waist (in cm)		-0.001		-0.001		-0.000
		(0.003)		(0.003)		(0.004)
Snack choice (cookie=1, fruit=0)		0.015		0.015		0.015
		(0.015)		(0.015)		(0.020)
R2 (adjusted)	0.000	-0.005	0.000	-0.005	0.003	-0.001
N	723	701	723	701	723	701

Note: Constant not shown. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A3: Predicting attrition

	(1)	(2)	(3)	(4)	(5)	(6)
Attrition in:	Anthropometrics		Snack choice (cookie=1, fruit=0)		Survey	
Treatment	0.015	0.015	0.015	0.015	0.009	0.012
	(0.014)	(0.015)	(0.014)	(0.015)	(0.017)	(0.017)
Male child	0.008	0.012	0.008	0.012	0.009	0.018
	(0.014)	(0.016)	(0.014)	(0.016)	(0.016)	(0.018)
Age in years	-0.006	-0.003	-0.006	-0.003	-0.003	0.000
	(0.009)	(0.011)	(0.009)	(0.011)	(0.010)	(0.012)
Baseline:						
BMI z-score		0.001		0.001		0.001
		(0.007)		(0.007)		(0.008)
Body fat (in%)		0.001		0.001		0.002
		(0.002)		(0.002)		(0.002)
Waist (in cm)		-0.001		-0.001		-0.002
		(0.003)		(0.003)		(0.004)
Snack choice (cookie=1, fruit=0)		0.015		0.015		0.018
		(0.015)		(0.015)		(0.017)
R2 (adjusted)	-0.001	-0.005	-0.001	-0.005	-0.003	-0.005
N	723	701	723	701	723	701

Note: Constant not shown. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A4: Descriptive statistics at baseline

	(1) Overall	(2) Control	(3) Treatment	(4) P-value	(5) Q-value
Child age (in months)	103.158	103.204	103.111	0.88	0.90
Male child	0.577	0.591	0.564	0.44	0.90
Maternal age	37.956	37.993	37.92	0.84	0.90
Maternal height (in m)	1.563	1.562	1.565	0.40	0.90
Maternal education level	1.379	1.385	1.373	0.76	0.90
Mother works	0.876	0.879	0.873	0.68	0.90
Family size	4.366	4.407	4.324	0.58	0.90
Nr. of bedrooms	2.544	2.522	2.565	0.72	0.90
Owns house	0.832	0.841	0.823	0.43	0.90
Survey respondent is parent	0.956	0.956	0.956	0.90	0.90

Note: 726 observations corresponding to Table A1, Panel A, Baseline. Missing observations are imputed with the sample mean. The balancing tests in column 4 control for this imputation with a missing obervation dummy in line with the regression specifications used in the analysis as described in the text.

Table A5a: Treatment take up

	(1) Card	(2) Scale	(3) Consultation	(4) Commitments
Treatment group mean, regression sample	*0.48*	*0.84*	*0.63*	*2.55*
Baseline predictors:				
BMI z-score	0.069	0.034	0.077	-0.051
	(0.084)	(0.057)	(0.076)	(0.353)
Waist (in cm)	-0.006	-0.004	-0.006	-0.020
	(0.007)	(0.005)	(0.006)	(0.028)
Body fat (in %)	0.002	0.006	0.008	0.067**
	(0.008)	(0.005)	(0.008)	(0.034)
Snack choice (cookie=1, fruit=0)	-0.039	0.054	0.090	0.553**
	(0.060)	(0.042)	(0.057)	(0.258)
Perceived healthiness of child's diet	-0.030	0.014	0.017	0.092
	(0.062)	(0.043)	(0.059)	(0.273)
Perceived healthiness of child's current weight	0.027	-0.046	0.035	0.342
	(0.076)	(0.052)	(0.073)	(0.320)
Child age (in months)	-0.001	0.001	0.000	0.005
	(0.003)	(0.003)	(0.003)	(0.014)
Male child	0.048	0.030	0.038	0.296
	(0.071)	(0.052)	(0.066)	(0.310)
Maternal education level	0.051	-0.026	0.047	0.259
	(0.045)	(0.033)	(0.042)	(0.194)
R2 (adjusted)	-0.011	0.018	0.019	0.019
N	326	326	326	326

Note: Constant, missing age and education indicators not shown. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A5b: Treatment take up by gender

	Boys				Girls			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Card	Scale	Consultation	Commitments	Card	Scale	Consultation	Commitments
Treatment group mean, regression sample	*0.51*	*0.85*	*0.65*	*2.60*	*0.45*	*0.83*	*0.61*	*2.49*
Baseline predictors:								
BMI z-score	0.140	0.104	-0.008	-0.620	-0.108	-0.071	0.152	0.590
	(0.112)	(0.077)	(0.102)	(0.478)	(0.141)	(0.090)	(0.123)	(0.545)
Waist (in cm)	-0.005	-0.011*	-0.005	-0.005	-0.004	0.004	-0.007	-0.042
	(0.010)	(0.006)	(0.008)	(0.037)	(0.011)	(0.007)	(0.009)	(0.042)
Body fat (in %)	-0.005	0.008	0.015	0.116**	0.019	0.006	0.005	0.020
	(0.011)	(0.008)	(0.010)	(0.046)	(0.013)	(0.009)	(0.012)	(0.055)
Snack choice (cookie=1, fruit=0)	-0.066	0.011	0.030	0.316	-0.030	0.086	0.130	0.713*
	(0.081)	(0.049)	(0.077)	(0.355)	(0.093)	(0.074)	(0.090)	(0.406)
Perceived healthiness of child's diet	-0.080	0.038	0.028	0.091	0.095	-0.003	-0.003	0.014
	(0.084)	(0.050)	(0.079)	(0.374)	(0.096)	(0.073)	(0.092)	(0.431)
Perceived healthiness of child's current weight	0.042	-0.078	0.083	0.512	0.071	0.006	-0.039	0.126
	(0.100)	(0.054)	(0.100)	(0.438)	(0.117)	(0.089)	(0.106)	(0.476)
Child age (in months)	-0.006	0.001	-0.004	-0.015	0.008	0.001	0.004	0.021
	(0.005)	(0.004)	(0.004)	(0.020)	(0.005)	(0.004)	(0.004)	(0.020)
Maternal education level	0.125**	-0.058	0.006	0.186	-0.030	0.005	0.116	0.380
	(0.054)	(0.038)	(0.052)	(0.253)	(0.070)	(0.060)	(0.070)	(0.323)
R2 (adjusted)	0.038	0.058	-0.001	0.008	-0.005	-0.012	0.031	0.004
N	183	184	185	186	143	144	145	146

Note: Constant, missing age and education indicators not shown. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A6: Type of goal and gender (sample of parents setting any goal)

	(1) Physical Activity goal	(2) Dietary goal
Treatment group mean, regression sample	*0.83*	*0.96*
Baseline predictors:		
BMI z-score	-0.066	0.009
	(0.083)	(0.051)
Waist (in cm)	-0.006	0.007
	(0.006)	(0.006)
Body fat (in %)	0.012	-0.008**
	(0.008)	(0.004)
Snack choice (cookie=1, fruit=0)	0.060	0.029
	(0.060)	(0.036)
Perceived healthiness of child's diet	-0.035	-0.021
	(0.063)	(0.030)
Perceived healthiness of child's current weight	-0.082	0.015
	(0.062)	(0.040)
Child age (in months)	-0.001	-0.002
	(0.003)	(0.002)
Male child	0.167**	-0.054*
	(0.067)	(0.031)
Maternal education level	-0.025	0.013
	(0.036)	(0.019)
R2 (adjusted)	0.008	0.009
N	205	205

Note: Constant, missing age and education indicators not shown. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A7: Anthropometrics and snack choice without and with covariates

	(1) BMI z-score	(2) Overweight or obese	(3) Obese	(4) Waist (in cm)	(5) Body fat (in %)	(6) Average effect (1 to 5)	(7) Snack choice (cookie=1, fruit=0)
Control mean	*2.28*	*0.96*	*0.64*	*75.43*	*35.93*		*0.46*
Panel A: No covariates							
Treatment	-0.029	-0.031*	0.001	-0.491	-0.729	-0.073	-0.049
	(0.061)	(0.018)	(0.036)	(0.596)	(0.501)	(0.065)	(0.038)
Q-value	0.79	0.37	0.98	0.68	0.37		
N	695	695	695	697	697		697
Panel B: No covariates, reduced sample							
Treatment	-0.042	-0.034*	-0.012	-0.449	-0.773	-0.085	-0.053
	(0.062)	(0.018)	(0.037)	(0.606)	(0.509)	(0.066)	(0.038)
Q-value	0.62	0.29	0.74	0.62	0.32		
N	675	675	675	676	678		677
Panel C: All covariates, reduced sample							
Treatment	-0.036	-0.030**	0.018	-0.613*	-0.832***	-0.073**	-0.049
	(0.027)	(0.015)	(0.025)	(0.327)	(0.278)	(0.033)	(0.036)
Q-value	0.22	0.10	0.47	0.10	0.02		
N	675	675	675	676	678		677

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 5 as preregistered.

Table A8: Anthropometrics and snack choice (clustering standard errors at class level)

	(1) BMI z-score	(2) Overweight or obese	(3) Obese	(4) Waist (in cm)	(5) Body fat (in %)	(6) Snack choice (cookie=1, fruit=0)
Overall						
Treatment	-0.036	-0.030**	0.018	-0.613*	-0.832***	-0.049
	(0.028)	(0.015)	(0.022)	(0.326)	(0.276)	(0.033)
N	675	675	675	676	678	677
Boys						
Treatment	0.031	-0.011	0.047	-0.162	-0.200	-0.045
	(0.039)	(0.015)	(0.034)	(0.407)	(0.366)	(0.042)
N	390	390	390	392	393	392
Girls						
Treatment	-0.126***	-0.058**	-0.034	-1.065**	-1.712***	-0.050
	(0.038)	(0.027)	(0.033)	(0.462)	(0.391)	(0.056)
N	285	285	285	284	285	285

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Clustered standard errors in brackets below estimates. All covariates, reduced sample. Q-values are calculated over columns 1 to 5 as preregistered.

Table A9: Spillover analysis using friends

	(1) BMI z-score	(2) Overweight or obese	(3) Obese	(4) Waist (in cm)	(5) Body fat (in %)	(6) Snack choice (cookie=1, fruit=0)
Panel A: Baseline estimates, all covariates						
Treatment	-0.036	-0.030*	0.018	-0.613*	-0.832***	-0.049
	(0.027)	(0.015)	(0.025)	(0.327)	(0.278)	(0.036)
N	675	675	675	676	678	677
Panel B: Controlling for the proportion of treated friends and treated befriended parents						
Treatment	-0.043	-0.030*	0.019	-0.719**	-0.901***	-0.042
	(0.027)	(0.015)	(0.025)	(0.327)	(0.279)	(0.036)
N	675	675	675	676	678	677
Panel C: Dropping control children with treated friends						
Treatment	-0.035	-0.024	0.032	-0.935**	-0.859**	-0.063
	(0.033)	(0.017)	(0.031)	(0.392)	(0.350)	(0.043)
N	510	510	510	511	513	512
Panel D: Dropping control children with treated befriended parents						
Treatment	-0.036	-0.033**	0.018	-0.755**	-0.845***	-0.036
	(0.028)	(0.016)	(0.026)	(0.345)	(0.289)	(0.038)
N	610	610	610	611	613	612
Panel E: Dropping control children with treated friends and befriended parents						
Treatment	-0.038	-0.028	0.025	-1.058***	-0.857**	-0.050
	(0.033)	(0.018)	(0.031)	(0.408)	(0.349)	(0.044)
N	497	497	497	498	500	499

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A10: Pure control school

	(1)	(2)	(3)	P-value		
	Control	Treatment	Pure Control	(1) vs. (2)	(1) vs. (3)	(2) vs. (3)
Child age (in months)	103.139	102.903	103.817	0.77	0.58	0.46
Male child	0.59	0.565	0.62	0.47	0.59	0.31
BMI z-score	2.319	2.318	2.329	0.99	0.91	0.90
Overweight or obese	0.948	0.942	0.979	0.74	0.10	0.06
Obese	0.67	0.631	0.663	0.27	0.90	0.56
Waist (in cm)	72.781	72.953	71.499	0.75	0.09	0.06
Body fat (in %)	34.935	34.974	35.777	0.94	0.21	0.23
Snack choice (cookie=1, fruit=0)	0.632	0.644	0.418	0.74	0.00	0.00

Table A11: Spillover analysis using pure control school

	(1) BMI z-score	(2) Overweight or obese	(3) Obese	(4) Waist (in cm)	(5) Body fat (in %)	(6) Snack choice (cookie=1, fruit=0)
Panel A: Baseline estimates, all covariates						
Treatment	-0.036	-0.030*	0.018	-0.613*	-0.832***	-0.049
	(0.027)	(0.015)	(0.025)	(0.327)	(0.278)	(0.036)
N	675	675	675	676	678	677
Panel B: Including pure control children						
Treatment	-0.038	-0.032**	0.011	-0.872***	-0.733***	-0.064*
	(0.025)	(0.015)	(0.024)	(0.309)	(0.258)	(0.034)
N	764	764	764	769	769	769

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A12: Treatment intensity

	(1) BMI z-score	(2) Overweight or obese	(3) Obese	(4) Waist (in cm)	(5) Body fat (in %)	(6) Snack choice (cookie=1, fruit=0)
Overall						
Control mean	*2.28*	*0.96*	*0.64*	*75.43*	*35.93*	*0.46*
Treatment intensity	-0.008*	-0.006**	0.003	-0.106**	-0.130***	-0.002
	(0.004)	(0.003)	(0.004)	(0.051)	(0.044)	(0.006)
N	675	675	675	676	678	677
Boys						
Control mean	*2.50*	*0.98*	*0.74*	*77.07*	*35.85*	*0.53*
Treatment intensity	0.001	-0.004*	0.003	-0.103	-0.032	0.002
	(0.006)	(0.002)	(0.005)	(0.065)	(0.061)	(0.008)
N	390	390	390	392	393	392
Girls						
Control mean	*1.95*	*0.92*	*0.50*	*73.01*	*36.04*	*0.37*
Treatment intensity	-0.020***	-0.009*	0.000	-0.101	-0.272***	-0.006
	(0.006)	(0.005)	(0.007)	(0.085)	(0.063)	(0.009)
N	285	285	285	284	285	285

Note: All covariates included. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates.

Table A13a: Expenditures without and with covariates

	(1)	(2)	(3)	(4)
	Past 30 days, spending on (log)			
	Sweet snacks	Salty snacks	Soft drinks	Average effect (in SD)
Control mean	*0.36*	*0.24*	*0.19*	
Panel A: No covariates				
Treatment	-0.014	-0.049	-0.036	-0.079
	(0.043)	(0.037)	(0.034)	(0.074)
Q-value	0.74	0.42	0.42	
N	466	463	461	
Panel B: No covariates, reduced sample				
Treatment	-0.011	-0.058	-0.031	-0.079
	(0.049)	(0.042)	(0.038)	(0.085)
Q-value	0.83	0.50	0.62	
N	383	382	376	
Panel C: All covariates, reduced sample				
Treatment	-0.022	-0.059	-0.021	-0.080
	(0.048)	(0.040)	(0.037)	(0.080)
Q-value	0.64	0.43	0.64	
N	383	382	376	

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 3 as preregistered.

Table A13b: Expenditures with covariates by gender

	(1)	(2)	(3)	(4)
	Past 30 days, spending on (log)			
	Sweet snacks	Salty snacks	Soft drinks	Average effect (in SD)
Boys				
Control mean	*0.36*	*0.26*	*0.22*	
Treatment	-0.025	-0.068	-0.063	-0.121
	(0.065)	(0.053)	(0.049)	(0.102)
Q-value	0.70	0.30	0.30	
N	219	219	216	
Girls				
Control mean	*0.38*	*0.27*	*0.18*	
Treatment	-0.014	-0.05	0.032	-0.017
	(0.070)	(0.060)	(0.054)	(0.120)
Q-value	0.84	0.84	0.84	
N	164	163	160	

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 3 as preregistered.

Table A14: Zero or missing responses

Zero or missings=1, otherwise=0 (at follow-up):	(1) Control	(2) Treatment	(3) P-value	(4) Q-value
Children are born to be fat	0.433	0.377	0.15	0.55
Vegetables needed each day (in g, log)	0.67	0.699	0.41	0.55
Fruits needed each day (in g, log)	0.643	0.678	0.35	0.55
Calories needed each day (log)	0.81	0.81	1.00	1.00
Past 30 days, nr. of:				
Meals in “western style” fast-food or pizza place	0.471	0.442	0.45	0.90
Ready to eat food meals from grocery store	0.444	0.433	0.76	0.91
Frozen meals/pizzas	0.746	0.819	0.02	0.13
Past 7 days, nr. of days:				
Consumed soft drinks	0.608	0.647	0.30	0.90
Consumed fruit	0.5	0.5	1.00	1.00
Consumed green vegetables	0.532	0.518	0.72	0.91
Past 30 days, spending on (log)				
Sweet snacks	0.57	0.617	0.22	0.49
Salty snacks	0.62	0.656	0.33	0.49
Soft drinks	0.67	0.687	0.63	0.63
Past 7 days, nr. of:				
Hours TV, video games, other electronic devices	0.032	0.052	0.20	0.60
Days physically active for a total of at least 20 minutes	0.231	0.224	0.83	0.83
Days walking/biking for at least 10 minutes	0.249	0.273	0.47	0.71

Note: 668 observations corresponding to the sample of parents who answered the survey at follow-up. Q-values by family of indicators as indicated by horizontal dividers.

Table A15a: Knowledge outcomes without and with covariates

	(1) Children are born to be fat (strongly disagree or disagree=1, otherwise=0)	(2) Vegetables needed each day (in g, log)	(3) Fruits needed each day (in g, log)	(4) Calories needed each day (log)	(5) Average effect (in SD)
Control mean	*0.67*	*5.09*	*5.07*	*6.71*	
Panel A: No covariates					
Treatment	0.021	0.051	-0.044	0.089	-0.009
	(0.039)	(0.186)	(0.164)	(0.195)	(0.076)
Q-value	0.79	0.79	0.79	0.79	
N	586	214	228	127	
Panel B: No covariates, reduced sample					
Treatment	0.015	0.150	0.007	0.026	0.032
	(0.039)	(0.198)	(0.169)	(0.207)	(0.077)
Q-value	0.97	0.97	0.97	0.97	
N	563	169	176	91	
Panel C: All covariates, reduced sample					
Treatment	0.018	0.110	-0.038	0.164	-0.016
	(0.038)	(0.207)	(0.181)	(0.216)	(0.075)
Q-value	0.84	0.84	0.84	0.84	
N	563	169	176	91	

Note: Effect in column 4 enters negatively into the average effect calculation. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 4 as preregistered.

Table A15b: Knowledge outcomes with covariates by gender

	(1) Children are born to be fat (strongly disagree or disagree=1, otherwise=0)	(2) Vegetables needed each day (in g, log)	(3) Fruits needed each day (in g, log)	(4) Calories needed each day (log)	(5) Average effect (in SD)
Boys					
Control mean	*0.66*	*5.24*	*5.14*	*6.84*	
Treatment	0.028	0.114	0.041	0.048	0.037
	(0.051)	(0.225)	(0.209)	(0.241)	(0.090)
Q-value	0.85	0.85	0.85	0.85	
N	318	102	108	56	
Girls					
Control mean	*0.67*	*4.86*	*4.96*	*6.49*	
Treatment	-0.020	0.295	-0.082	0.248	-0.031
	(0.057)	(0.355)	(0.341)	(0.392)	(0.121)
Q-value	0.81	0.81	0.81	0.81	
N	245	67	68	35	

Note: Effect in column 4 enters negatively into the average effect calculation. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 4 as preregistered.

Table A16a: Exercise without and with covariates

	(1)	(2)	(3)	(4)
		Past 7 days		
	Hours TV, video games, other electronic devices	Days physically active for a total of at least 20 minutes	Days walking/biking for at least 10 minutes	Average effect (in SD)
Control mean	*15.17*	*2.83*	*2.58*	
Panel A: No covariates				
Treatment	-0.933	0.019	0.051	0.036
	(0.956)	(0.181)	(0.186)	(0.052)
Q-value	0.92	0.92	0.92	
N	642	623	634	
Panel B: No covariates, reduced sample				
Treatment	-0.947	0.004	0.122	0.045
	(0.984)	(0.184)	(0.190)	(0.053)
Q-value	0.78	0.98	0.78	
N	618	600	605	
Panel C: All covariates, reduced sample				
Treatment	-0.774	-0.033	0.120	0.034
	(0.995)	(0.179)	(0.188)	(0.052)
Q-value	0.78	0.85	0.78	
N	618	600	605	

Note: Effects in column 1 enter positively into the average effect calculation. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 3 as preregistered.

Table A16b: Exercise with covariates by gender

	(1)	(2)	(3)	(4)
		Past 7 days		
	Hours TV, video games, other electronic devices	Days physically active for a total of at least 20 minutes	Days walking/biking for at least 10 minutes	Average effect (in SD)
Boys				
Control mean	*15.46*	*2.97*	*2.58*	
Treatment	-0.061	-0.051	-0.044	-0.012
	(1.291)	(0.249)	(0.256)	(0.067)
Q-value	0.96	0.96	0.96	
N	353	346	346	
Girls				
Control mean	*14.75*	*2.61*	*2.59*	
Treatment	-1.860	-0.063	0.420	0.102
	(1.577)	(0.254)	(0.286)	(0.079)
Q-value	0.36	0.80	0.36	
N	265	254	259	

Note: Effects in column 1 enter positively into the average effect calculation. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 3 as preregistered.

Table A17: Predicting missings (second follow up)

	(1)	(2)	(3)	(4)	(5)	(6)
Missing follow-up info:	Full		Boys		Girls	
Treatment	0.000	0.001	0.026	0.023	-0.036	-0.028
	(0.016)	(0.016)	(0.022)	(0.022)	(0.023)	(0.023)
Male child	0.007	0.030				
	(0.016)	(0.018)				
Age in years	-0.032**	-0.040**	-0.024	-0.044	-0.046*	-0.041
	(0.015)	(0.019)	(0.021)	(0.027)	(0.024)	(0.026)
Age-ineligible for school transfer	-0.973***	-0.969***	-0.952***	-0.954***	-1.003***	-0.992***
	(0.023)	(0.023)	(0.034)	(0.035)	(0.030)	(0.030)
Baseline:						
BMI z-score		-0.046*		-0.055*		-0.038
		(0.023)		(0.032)		(0.037)
Body fat (in%)		0.003		0.002		0.004
		(0.002)		(0.003)		(0.003)
Waist (in cm)		0.001		0.003		-0.000
		(0.002)		(0.003)		(0.002)
R2 (adjusted)	0.82	0.82	0.80	0.80	0.85	0.85
N	723	700	420	406	303	294

Note: Constant not shown. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Dummy variable "Age-ineligible for school transfer" takes on a value of 1 for all children born after January 1, 2010.

Table A18: Anthropometrics (longer term, second follow-up) without and with covariates

	(1) BMI z-score	(2) Overweight or obese	(3) Obese	(4) Waist (in cm)	(5) Body fat (in %)	(6) Average effect (in SD)
Control mean	*2.21*	*0.95*	*0.63*	*79.62*	*36.83*	
Panel A: No covariates						
Treatment	0.002	0.005	0.028	-0.579	-0.327	-0.009
	(0.069)	(0.020)	(0.046)	(0.760)	(0.594)	(0.079)
Q-value	0.98	0.98	0.97	0.97	0.97	
N	430	430	430	430	430	
Panel B: No covariates, reduced sample						
Treatment	-0.011	0.005	0.019	-0.592	-0.427	-0.020
	(0.070)	(0.020)	(0.047)	(0.768)	(0.601)	(0.080)
Q-value	0.88	0.88	0.88	0.88	0.88	
N	420	420	420	419	421	
Panel C: All covariates, reduced sample						
Treatment	0.034	0.004	0.044	-0.217	-0.175	0.020
	(0.038)	(0.018)	(0.038)	(0.495)	(0.418)	(0.047)
Q-value	0.83	0.83	0.83	0.83	0.83	
N	420	420	420	419	421	

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 5 as preregistered.

Table A19: Diet without and with covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Past 30 days			Past 7 days			
	Meals in "western style" fast-food or pizza place	Ready to eat food meals from grocery store	Frozen meals/pizzas	Consumed soft drinks	Consumed fruit	Consumed green vegetables	Average effect (in SD)
Control mean	*1.29*	*3.13*	*0.68*	*1.73*	*4.05*	*4.83*	
Panel A: No covariates							
Treatment	-0.069	-0.194	-0.228*	-0.320	0.202	0.265	-0.085**
	(0.145)	(0.363)	(0.125)	(0.199)	(0.293)	(0.373)	(0.043)
Q-value	0.63	0.63	0.32	0.32	0.63	0.63	
N	648	636	632	406	366	352	
Panel B: No covariates, reduced sample							
Treatment	-0.121	-0.213	-0.236*	-0.314	0.152	0.282	-0.088**
	(0.147)	(0.359)	(0.130)	(0.200)	(0.296)	(0.375)	(0.044)
Q-value	0.61	0.61	0.35	0.35	0.61	0.61	
N	621	612	605	394	354	338	
Panel C: All covariates, reduced sample							
Treatment	-0.143	-0.308	-0.212*	-0.343*	0.216	0.296	-0.098**
	(0.140)	(0.359)	(0.128)	(0.189)	(0.281)	(0.339)	(0.040)
Q-value	0.44	0.44	0.30	0.30	0.44	0.44	
N	621	612	605	394	354	338	

Note: Effects in columns 5 and 6 enter negatively into the average effect calculation. *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 6 as preregistered.

Table A20: Perceptions without and with covariates

	(1) Perceived healthiness of child's diet (excellent or very good=1, otherwise=0)	(2) Perceived healthiness of child's current weight (healthy=1, no=0)	(3) Average effect (in SD)
Control mean	*0.34*	*0.74*	
Panel A: No covariates			
Treatment	-0.072**	-0.007	-0.084
	(0.036)	(0.034)	(0.057)
Q-value	0.09	0.84	
N	659	661	
Panel B: No covariates, reduced sample			
Treatment	-0.084**	-0.012	-0.103*
	(0.036)	(0.035)	(0.058)
Q-value	0.04	0.72	
N	634	637	
Panel C: All covariates, reduced sample			
Treatment	-0.083**	-0.039	-0.132**
	(0.036)	(0.034)	(0.054)
Q-value	0.04	0.24	
N	634	637	

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. Robust standard errors in brackets below estimates. Q-values are calculated over columns 1 to 2 as preregistered.

Online Appendix A – Additional Background Information and Review of the Literature

A large literature in economics has studied the complex link between economic development and health (Weil 2014). Seminal papers in this literature typically consider measures of population health such as life expectancy, mortality, or height (Acemoglu and Johnson 2007; Strauss and Thomas 1998). Developing countries have made remarkable progress on these fronts with, for example, child mortality and stunting rates roughly halving between 1990 and 2018 in lower and middle-income countries (World Bank 2020a; World Bank 2020b). However, the composition of disease burdens in developing countries is currently in flux. With rising income levels and increased participation in a now globalized economy, developing countries have started witnessing widespread changes in work, lifestyle, and dietary intake patterns along with broader shifts in social and living conditions. These trends have been accompanied by an increase in lifestyle diseases that are typically observed in developed counties. Chief among them is obesity, a public health problem of global dimensions, with its worldwide prevalence having almost increased by a factor of three since 1975 (WHO 2020a). Obesity raises the risk of many noncommunicable diseases (e.g. diabetes, cardiovascular disease, certain cancers) that could substantially increase medical care use and expenditure (Biener, Cawley and Meyerhoefer 2020; Black, Hughes and Jones 2018; Cawley and Meyerhoefer 2012; Doherty et al. 2017; Kinge and Morris 2018) and lead to lost economic productivity and lower the growth potential of countries that are on a steady path of industrialization (Tremmel et al. 2017).

There is a large literature in economics that has studied obesity's economic costs, drivers, and mitigators (Cawley, 2004, 2010, 2015; Currie et al. 2010; Kling, Liebman and Katz 2007; Ludwig et al. 2011; García-Pérez 2016; Allcott et al. 2019), but the majority of that body of work has focused on high-income countries. One obvious explanation for this scholarship gap is that adult obesity rates in developing countries have historically been low and are still well below 10% in many of them (WHO 2017). Recent economic studies have focused on obesity in upper-middle income countries and have revealed elevated obesity levels in the adult population (Giuntella, Rieger and Rotunno 2020; Deschenes et al. 2020; Prina and Royer 2014). However, there is a shortage of economic studies in poorer nations, even though profound anthropometric changes are visible among the youngest demographic group in low- and middle-income countries. The lion's share of overweight and obese children of the world now live in developing countries, with overweight rates growing at a much faster pace compared to rich countries (WHO 2020b). These developments are taking many policymakers by surprise although they were long foreseen. Over a quarter of a century ago, for example, Popkin (1993, 1994, 1999) coined the term *"nutrition transition"* and forewarned of the emerging public health emergency in low-income countries that we are now witnessing, urging scholars and policymakers at that time to *"learn from the lessons of higher income countries and try to direct the nutrition transitions in more healthy directions"* (Popkin 1994, p. 285).

Policymakers and resources in developing countries are still largely geared towards battling undernutrition of children. About 24% of children under the age of five in low- and middle-income countries were stunted in 2019, down from 45% in 1990 (World Bank 2020b). Of course, overnutrition and undernutrition require different policy responses because of the different underlying causes. For instance, much of the variation in stunting can be explained by health and disease environments that call for public investments in nutritional supplements, safe water, and sanitation,[1] while overweight and obesity are more strongly linked to food environments as well as individual risky health behaviors and dietary choices, perceptions, and social norms (Prina and Royer 2014; Blanchflower, van Landeghem and Oswald 2009), and lend themselves at least to some extent to pro-health individual and behavioral interventions (Cawley 2015; Popkin 2002; Downs and Lowenstein 2011). Therefore, when thinking about potentially effective interventions to reduce the risk of overweight and obesity, it is important for policymakers to consider actions that can lead to healthier diet and behavior modifications among individuals.

[1] For instance, Spears (2013) documents a substantial effect of open defecation on height-for-age. Also see Hoddinott et al. (2013) for a review of various interventions and their returns.

Our study reduces the scholarship gap in the economics of obesity in lower- and middle-income countries by conducting a randomized controlled trial (RCT) that is powered to detect modest anthropometric changes. The nutrition-focused information intervention was designed and implemented with the goal of informing policymakers who are considering potential policy actions to combat increases in childhood obesity rates in the Global South. Our study context is timely and informative for two main reasons:

First, only 2 in 100 Vietnamese adults were obese in 2016, which is the lowest rate among countries for which data are available from the World Health Organization (WHO 2017). However, patterns among youth are foreshadowing a very different anthropometric future. Vietnam is a physically inactive country (Vuong et al 2018)[2], the share of its primary school children who meet physical activity recommendations is low (To et al 2020),[3] and it is witnessing dramatic nutrition and body weight transitions. From 2000 to 2017, the child stunting rate fell from 43.2% to 23.8% (World Bank 2020b).[4] Meanwhile, childhood obesity rates have increased dramatically over the last decade in urban pockets of Vietnam and especially in HCMC (Mai et al. 2020a; Mai et al. 2020b, Nam et al. 2020).

Second, standard risk factors linked to these recent body weight increases (e.g. insufficient physical activity, calorie-dense processed food intake, etc.) are exacerbated by unhealthy social norms and beliefs. As in other Asian countries, in Vietnam, beliefs about health and nutrition that have been passed down over centuries can induce unhealthy nutrition and body weight transitions for children (Gupta et al. 2012).[5] Based on qualitative interviews with parents and experts in

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[2] Vuong et al. (2018) note that, using data on 717,527 anonymous users from 111 countries, a Stanford study in 2017 found that the average user walked 4,961 steps. Vietnamese users on average walked 3,643 steps, which placed Vietnam within the bottom 10 of the rankings.
[3] To et al. (2020) indicate that, in 2016, only 18% of fifth-grade school children in HCMC met physical activity recommendations.
[4] Over the same period Vietnam recorded average GDP per capita growth rates of 5.4% per annum (World Bank 2020c).
[5] Focus group discussions conducted among the mothers of 1,800 Asian Indian school children (9-18 years old) revealed that it is common for mothers to say *"[a] child with chubby cheeks is healthy, not fat"* and that *"[m]ost of the obesity in children is baby fat, which would eventually go away"* (Gupta et al. 2012, p.57).

Vietnam, Ehlert (2019, p.119) cites an editor of a women's magazine who summarizes the thinking of many Vietnamese parents: *"The standard of a healthy child in our country is that of the fat child. When two mothers come together, they just care about how many kgs the child has. They don't care whether they [the children] are healthy or sick. Just how much food [the child eats] or how tall it is."*

In light of the fast-moving unhealthy nutrition transition occurring in Vietnam and across the developing world, our paper makes four main contributions to the literature:

First, we provide urgently needed evidence on obesity prevention and management in lower- and middle-income countries in the presence of adverse child body weight norms and low adult obesity rates. Causal evidence concerning the prevention of obesity predominantly comes from high-income countries and to some extent from upper-middle income countries (e.g. Mexico, Brazil)[6] that have moved beyond the initial stages of the nutrition transition and already feature high obesity rates in the general population.[7] In development economics, for instance, obesity is not yet a widely studied subject. One of the leading field outlets, the *Journal of Development Economics*, has thus far published only one article on obesity (and its relation to air pollution exposure in China) (Deschenes et al. 2020),[8] while papers on childhood undernutrition are plentiful. Similarly, Ash et al. (2017) systematically reviewed family-based childhood obesity prevention studies and found that 112 of the 119 studies they reviewed were conducted in the developed world (Ash et al. 2017).[9] This is problematic because growth patterns, nutrition literacy, information gaps, and social norms regarding ideal weight status vary widely across space (Jaacks

[6] Adult obesity rates in Mexico and Brazil were 28.9% and 22.1% in 2016 (based on a BMI above or equal to 30, age standardized, data from WHO, 2017).
[7] For an overview of the literature in economics, please see Cawley (2010, 2015). Also see systematic reviews by Ells et al. (2018), Calvert et al. (2019), Liu et al. (2019), Ash et al. (2017), Dudley et al. (2015), Skar et al. (2015), and Verstraeten et al. (2012).
[8] We searched the online archive of the journal with the keyword obesity [29 August 2020].
[9] A similar pattern arose in combined systematic reviews. Ells et al. (2018, p. 1823) note that, based on their comprehensive review of six Cochrane reviews, *"[m]ost of the evidence was derived from high-income countries and published in the last two decades."*

et al. 2017), and it is thus unclear how policy-relevant evidence from developed nations carries over to less developed regions of the world.[10]

Second, we implement a behaviorally augmented and integrated way of providing nutrition and health information to parents, which involves goal setting with soft commitment during a fluid conversation featuring probing questions by nutritionists rather than unilateral information provision. In pursuit of maximizing the effectiveness of the healthy lifestyle information provided to parents during the nutritionist consultation, we sent parents personalized baseline BMI-for-age report cards to contextualize discussions with nutritionists, SMS reminders of the goals they set with nutritionists, and weight scales to track the success of their efforts toward reaching those goals and to monitor their children's weight status over time. This type of information intervention, which is enhanced with pro-health nudges, echoes a body of evidence from developed countries that *"multi-component behaviour changing interventions may be beneficial"* (Ells et al. 2018, p. 1823) and *"considerable research remains to be done to determine ways of making information […] more effective in changing behavior"* (Cawley 2015, p.264).

Third, our study features outcome data that are rarely collected in surveys: (i) we measure body fat percentage, waist circumference, along with standard measures of body fat including BMI (Cawley 2015); (ii) we capture the impact on child behavior as observed in a food choice experiment in the absence of their parents; and (iii) we investigate the impacts on parental perceptions regarding their child's weight status and diet quality that may proxy social norms that have the potential to set children on an unhealthy nutrition transition.

Fourth, we contribute to the literature concerning the durability of information interventions with an analysis of the longer run effect of our obesity-prevention intervention. Upon completion of the main intervention study and 22 months after our nutrition counselling intervention began, we collected a second follow-up round of anthropometric measures, a contribution in itself in a

[10] See Hirvonen (2020) for a systematic assessment of how top health economics publications (unlike actual disease burdens) are concerningly concentrated on high-income countries.

developing country setting, given that even within high-income settings, relatively few studies examine effects beyond 12 months (see for instance, Staniford et al. 2012). This allows us to assess the short and longer run benefits of our intervention.

Our findings and study relate to a literature in health economics examining the effects of information provision via BMI report cards on children's anthropometric outcomes and parental knowledge and perceptions (e.g. in Mexico, see Prina and Royer 2014; in New York City, see Almond, Lee and Schwartz 2016), as well as a literature in behavioral economics on information- and incentive-based approaches to improve children's food choices (Angelucci et al. 2019; Belot, James and Nolen, 2016; Just and Price 2013; Lai, List and Samek 2020; List and Samek 2015; Samek 2019), and the particularly impactful role that parental involvement plays in boosting healthy food choices (Charness et al. 2020). We also add to emerging evidence in the public health literature suggesting that soft commitment devices alongside diet-related behavioral interventions (like the approach used in our study) may bring about anthropometric improvements at least in the short run (Coupe et al. 2019). Our findings thus also contribute to the literature on the dynamics of social norms in economics more broadly (Bursztyn, González, and Yanagizawa-Drott 2020; Young, 2015) and the literature related to obesity more specifically (Blanchflower, van Landeghem, and Oswald 2009; Strulik 2014).

Online Appendix B – Commitment Form Offered to Parents

During the consultation with the nutritionist on *[DATE]*, you agreed to improve your child's diet and weight status. We would like to remind you of the goals you have selected in the Commitment Form below. This commitment is voluntary. If you still intend to keep your intention to fulfill the goals, please sign the Commitment Form.

Following the nutritionist's advice and tips, we committed to the following goals:

1. ____
2. ____
3. ____

…

We commit to do our best to achieve the goals from this moment.

Signature of parent or caregiver:

Name…………………………………………. Signature……………………………………

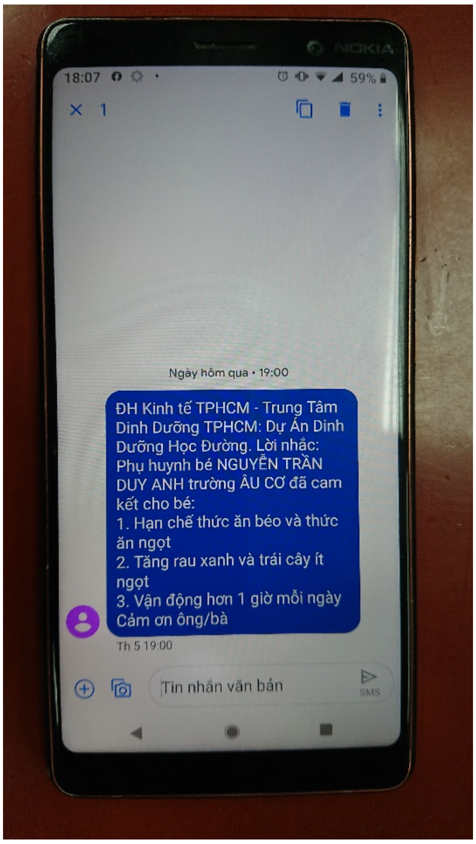
Date…………………………

Nutritionist's signature:

Name………………………..….….………. Signature…………………………………

Date…………………………

Online Appendix C – SMS Reminder Sent to Parents



<u>Translation (example):</u>

University of Economics Ho Chi Minh City – HCMC Nutrition Center: School Nutrition Project.

Reminder: Parents of the student Nguyen Tran Duy Anh have committed to the following goals for their kid:

1. Limit fatty and sugary foods
2. Increase vegetable and fruit intake
3. Encourage your child to do physical activities more than 1 hour per day

Thank you.

Online Appendix D – Snack Choice Experiment Performed in Schools

Enumerator follows these instructions:

- A fruit and cookie are placed on a tray.
- Ask the child to either choose one fruit or one cookie that she or he wants to eat at this moment.
- Enumerator tells the child that she or he should not keep the fruit or cookie for themselves or share it with other kids. The child should eat it before the interview ends.
- Enumerator records the choice of the child.
- Give fruit or cookie to the child.
- Observe and record whether or not the food item is consumed.

Online Appendix E – Analysis of Missing Data and Attrition

Table A1 displays the number of observations and missing data points across the two first rounds of data collection. Panel A displays the number of observations with measured anthropometrics *and* recorded snack choices (our principal measured outcomes of interest). Although our overall target was 720 observations with 360 in treatment schools and 360 in control schools distributed across a total of six schools, we oversampled in practice and ended up with 362 in treatment schools and 364 in control schools (anthropometrics and snack choice observations). In the follow up, the number of available observations dropped to 343 (↓ by 5.2%) treatment children and to 354 control children (↓ by 2.7%). These 697 observations (control and treated) are well distributed across schools 1-6: 112 (49% treated), 115 (49% treated), 117 (50% treated), 112 (50% treated), 110 (47% treated), and 131 (50% treated) observations, respectively. Panel B and C show the specific proportions of samples missing information on anthropometric measures, snack choices, and parental survey measures for the baseline and follow-up period, respectively. In Panel B, missing baseline data are statistically balanced across treatment and control children. Shares that are missing anthropometrics and snack choices are below 4%. Although the share of treated parents who failed to complete our survey was higher (11.2%) than that of control parents (8%), the difference was not statistically significant. In Panel C, the proportions of missing observations increase slightly in the follow up as one would expect over time. That said, Panel D displays balanced attrition rates (defined as being observed at baseline but not in the follow-up) that are below 10% for all measures.

Although missing data are well balanced and low in proportion, we further check if missingness and attrition are unrelated to observables (unregistered analysis). Table A2 shows results from regressions of the likelihood of missing measurements at follow-up (anthropometrics, snack choice and survey) on treatment, child observables (gender, age), and key outcome measures at baseline. Table A3 swaps these dependent variables for related attrition indicators. We find no evidence of systematic missingness or attrition in our data. As pre-registered, given that baseline data missingness is well balanced by treatment status and attrition is below 10%, we make no adjustments (e.g. Lee bounds) that would be required in the case of substantial and systematic missingness.

Online Appendix F – Unconditional Regression Results

Estimated treatment impacts on anthropometric outcomes in linear regression models that contain only a constant and treatment dummy can be found in Table A7.[11] Panels A and B present unconditional differences in means, the former estimated on the full sample and the latter estimated on the reduced sample for which information on lagged dependent variables and the set of socio-economic covariates is available. Panel C shows impacts conditional on the respective baseline dependent variable and the set of socio-economic covariates and corresponds to the main analysis discussed in the manuscript (Table 2). The final column of the table presents the average impact across columns that was estimated per panel in a seemingly unrelated regression (SUR) framework using standardized outcomes.

The unconditional estimates point to reductions in BMI-for-age, the likelihood of being overweight or obese, waist circumference, and body fat percentage. Except for the likelihood of being overweight or obese, point estimates are statistically insignificant. The average effect points to a reduction of 0.07 standard deviations. The likelihood of being overweight or obese is reduced by 3.1pp or by 3.4% relative to the control group mean of 0.96. Panel B estimated on the reduced sample points to similar patterns.

As we discussed in our main text, we make gains in statistical precision once covariates are included in Panel C. Point estimates, however, remain stable between panels. Not one pair of coefficients in Panels A and C differs statistically when we test for this formally within a SUR framework (p-values are available on request and included in the replication do-file).

Lagged dependent variables rather than the socio-economic covariates are mostly responsible for gains in statistical precision. When we include just this one covariate per model, coefficients are comparable to Panel C: -0.040 (p-value=0.15) for BMI-for-age, -0.032 (p-value=0.04) for the likelihood of being overweight or obese, 0.014 (p-value=0.59) for the

[11] Unconditional regression results involving other outcome variables can be found in Tables A13a and 13b (expenditures), Tables 15a and 15b (knowledge), Tables A16a and 16b (exercise), Table A18 (longer run anthropometrics), Table A19 (diet), and Table A20 (perceptions).

likelihood of being obese, -0.620 (p-value=0.06) for waist circumference, -0.838 (p-value=0.00) for body fat percentage.

Online Appendix G – Quantile Regression Results for Anthropometric Outcomes

We provide quantile regression estimates [0.1;0.9] in the case of continuous anthropometric outcomes. In our main analysis (Table 2), we found that the intervention significantly reduced the likelihood of being overweight or obese, but had a statistically insignificant effect on the probability of obesity. These patterns suggest some possibly heterogenous effects along the BMI distribution. Appendix Figure 1 further delves into the effects across the distribution of BMI, waist circumference, and body fat percentage using quantile regressions (all covariates are included but not shown). Panel A suggests no strong trend across the BMI distribution, with only the effect at quantile 70 being significant at the 10% level. Panel B suggests effects on body fat percentage at the 10% significance level or better for quantiles 20, 30, 50, 60, 70 and 80. However, no clear trend is visible. Panel C displays larger absolute effects on waist circumference among the lower quantiles, which are significant at the 10% level or better at quantiles 20 to 60. Overall, these distributional patterns point to nontrivial and comparable reductions in waist circumference and body fat percentage.

Online Appendix H – Robustness and Sensitivity Checks

Adjusting for Spillovers Among Friends

While the treatment was targeted at parents and took place outside of schools (via phone and with information and equipment sent to homes), one may be concerned about spillovers between treated and control children, which would likely work against us finding health improvements. It was not feasible for us to do a cluster RCT, as the expected small effect sizes would have required an excessively high number of schools. To explore the importance of spillovers, we pre-registered the following two-fold strategy. First, we asked treated and control children about their five best friends at school in the baseline survey. We also asked parents about the top five parents with whom they interact. We use these data to adjust for connections between control and treatment individuals or exclude connected treatment and control subjects. Second, we also have a "pure control" school in which no kids received the treatment package. This allows us to conduct additional robustness checks and sensitivity analyses regarding the importance of treatment spillover effects. We compare outcomes between control children and "pure control" children and qualitatively gauge the sensitivity of baseline estimates to excluding and including "pure control" children. Clearly, this analysis is only suggestive in nature and does not leverage proper experimental variation (a cluster RCT would be needed to do this).

We begin by subjecting our main results (Table 2) to robustness checks adjusting for child and parental friendship networks (Table A9). Control children could change their behavior in response to seeing treated children change their behavior. This would induce a bias towards zero in, for example, the absolute treatment effect on the processed snack choice. Each child (parent) was asked to name his/her five best friends (befriended parents).[12] So, in the first instance, we simply *control* for each child's proportion of treated friends and parents. Compare Panel A with our baseline results and Panel B that includes these two additional controls. The point estimates

[12] The total number of friends and befriended parents are statistically balanced by treatment status at conventional levels (unreported, see replication do-file).

associated with BMI-for-age, obesity, and snack choice are very similar in magnitude and remain insignificant. Notably, the point estimate associated with the likelihood of being overweight or obese is identical in size (-3pp) and remains significant. Taken together, these results are suggestive of no spillovers between treated and untreated children. However, we do see slight increases in the (absolute) effect sizes associated with waist circumference and body fat percentage that are significantly different from each other (tests for differences in effect size have p-values=0.02 and 0.07, respectively in a SUR framework), which hint at the presence of spillovers between treated and control children.

Hence to further investigate the importance of treatment spillovers, we *drop* all control children with treated friends in Panel C. Again, treatment effects on waist circumference and body fat percentage increase in absolute magnitude, pointing again to the existence of spillovers between treated and control children. However, the point estimates are now statistically indistinguishable when testing in a SUR framework (both p-values are above the 10% threshold).

The treatment was targeted at parents and there may be spillovers between treated and control parents. In Panel D we drop control children with any befriended treated parents. Effects on BMI-for-age, obesity, and snack choice remain insignificant. The effect on the likelihood of being overweight or obese remains similar in size (-3.3pp) and significant. The effects on waist circumference and body fat percentage again increase in absolute terms; however, the effect sizes are not significantly different. The final Panel E drops control observations with treated friends and befriended parents. The only effect that is significantly different from the main result in Panel A is the case of waist circumference (p-value=0.05, in a SUR model).

In sum, comparisons of Panel A to Panels B-E reveal remarkable stability in estimated treatment effect sizes, with the exception of waist circumference. If significant treatment spillovers were at play, we would expect sensitivity in the estimates across the board. Notably, body fat percentage, which is measured with a professional body composition analyzer does not appreciably change across the different approaches to investigate potential spillovers. We therefore conclude that our treatment effects are subject to little to no attenuation bias due to treatment spillovers.

Pure Control School

As pre-registered, we perform an additional qualitative examination with respect to spillover effects using pure control school children. Three caveats are important: First, this sample was limited to just one school with 100 observations.[13] Second, we rely on between-school variation with a small effective sample size. Third, the school on our initial list failed to cooperate and we had to pick a replacement school. This new pure control was picked based on the observation that it had similar basic characteristics as the other schools used in the main analysis (public school, similar urban area and size). In other words, this is not a cluster RCT.

Table A10 displays general balance in our principal outcome variables with this additional control group. Three imbalances arise in that children in the pure control school have slimmer waists and feature higher overweight rates (both significant at the 10% level) and were much less likely to pick the processed food in the choice experiment (significant at the 1% level) than treated children. The imbalances, while unfortunate, are perhaps not surprising given that we compare just one pure control school to treated kids in six other schools (the effective sample size is thus seven). We adjust for these differences by including lagged depenent variables in all regression analyses.

Table A11 features two panels. Panel A repeats our baseline estimates. Panel B adds in pure control children to the model. In Panel B, we would expect coefficients to become larger in absolute size since the potential for spillovers is lowered with the addition of pure control school children in the control group. The effects on BMI-for-age and obesity remain insignificant, only slightly increasing and falling in absolute magnitude, respectively. These effect differences are not significant within a SUR model. The effect on the likelihood of being overweight or obese is statistically and economically similar. The effect on waist circumference also remains significant and grows significantly in magnitude (p-value=0.00). The effect on body fat percentage lessens but

[13] The target was 80 children but in practice we surveyed 100.

insignificantly so. The snack choice effect becomes significant and is larger in absolute terms (but the effect size difference is not significant). Again, given the lack of uniformity in (absolute) increases across anthropometric models, we conclude that our treatment effects are subject to little to no attenuation bias due to treatment spillovers.

Online Appendix I – Treatment Intensity Index

In this section, we move beyond intention-to-treat estimates with a treatment dummy and correlate a "treatment intensity" index with our main outcome variables (anthropometrics and snack choice). This index is the sum of the number of commitments set, reporting receipt of an SMS reminder (0/1), reporting receipt of a child BMI-for-age report card (0/1), reporting receipt of a weight scale (0/1), and participation in the nutrition consultation (0/1). This correlational analysis in the overall sample reported in Table A12 is in line with our intention-to-treat estimates shown in Table 2. Treatment intensity is negatively correlated with BMI-for-age, the likelihood of being overweight or obese, waist circumference, and body fat percentage. There is no significant association of the treatment intensity index with the likelihood of obesity nor snack choice. As an example, moving from no treatment to the max of the index (10) is associated with reduced BMI-for-age, the likelihood of being overweight or obese, waist circumference, and body fat percentage by 0.08 standard deviations, 6pp, 1.06cm, and 1.30pp, respectively. Consistent with our main analysis, the estimated correlations of the treatment intensity index are concentrated among girls (see lower portion of Table A12).

Online Appendix J – Exploring the "Extensive Margin" of Unhealthy Food Expenditures

An important caveat of the analysis of expenditures on sweet snacks, salty snacks, and soft drinks is that the sample sizes are low. Many parents did not respond to these expenditure questions and/or reported zeros. For example, as shown in Table A14, 67% (69%) of control (treated) parents report zero or missing spending on soft drinks. Therefore, we explored the effect of the treatment on missing data points and zeros, which could plausibly reflect treatment effects along the "extensive margin" (exploratory and unregistered analysis). The proportion of zero/missing observations is statistically similar across the large set of indicators (as it was at baseline, results unreported and available upon request). The average absolute difference is 2pp. The only significant difference concerns the likelihood of reporting any frozen meals, with treated parents being 7pp less likely to report such meals. That said, the difference is insignificant when adjusting for multiple hypothesis testing via q-values.

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