Salad Bar Study: Christina - Time to Eat and Fruit and Vegetable Intake

Contents

1 Demographic Characteristics

*note: restricted to complete data (no missing for time to eat or other intake variables - happy to revisit imputation)

Table 1: Demographic Characteristics and Variables of Interest

		Full Sample		School Type				
Group	**Characteristic**	**N**	**Overall**	**N**	**Elementary**	**High School**	**Middle School**	**p-value**
	Gender	2,415		2,415				0.7
	F		1,120 (46%)		342 (45%)	427 (47%)	351 (46%)	
	M		1,295 (54%)		411 (55%)	476 (53%)	408 (54%)	
	Unknown		7		5	2	0	
	Grade	2,422	7.1 (3.1)	2,422	3.3 (1.3)	10.4 (1.1)	7.0 (0.8)	<0.001
	Age, yr	2,323	12.2 (3.2)	2,323	8.5 (1.4)	15.6 (1.3)	12.2 (1.0)	<0.001
	Unknown		99		4	95	0	
	Race/Ethnicity	2,350		2,350				<0.001
	Hispanic or Latino		1,490 (63%)		440 (58%)	601 (67%)	449 (64%)	
	White		552 (23%)		184 (24%)	220 (25%)	148 (21%)	
	Other		176 (7.5%)		70 (9.3%)	45 (5.0%)	61 (8.7%)	
	Black or African American		132 (5.6%)		60 (8.0%)	31 (3.5%)	41 (5.9%)	
	Unknown		72		4	8	60	
	Free-Reduced Lunch	2,417		2,417				0.008
	Free/Reduced		1,881 (78%)		562 (75%)	732 (81%)	587 (77%)	
	Paid		536 (22%)		192 (25%)	173 (19%)	171 (23%)	
	Unknown		5		4	0	1	
	F/V Selected	2,422		2,422				<0.001
	N		379 (16%)		6 (0.8%)	245 (27%)	128 (17%)	
	Y		2,043 (84%)		752 (99%)	660 (73%)	631 (83%)	
	F/V Self-Served, g	2,043	136.1 (70.6)	2,043	121.6 (64.3)	139.1 (71.3)	150.3 (73.7)	<0.001
	F/V Consumed, g	2,043	58.3 (54.9)	2,043	43.7 (49.2)	65.3 (57.4)	68.3 (55.0)	<0.001
	F/V Waste, g	2,043	77.8 (66.0)	2,043	77.9 (55.8)	73.8 (68.7)	82.0 (73.8)	0.006
	F/V Percent Waste (post/pre), %	2,043	55.4 (34.9)	2,043	64.6 (31.7)	49.5 (36.0)	50.6 (35.1)	<0.001
	Lunch Period	1,925	28.4 (12.3)	1,925	24.0 (9.7)	32.4 (9.2)	28.8 (15.6)	<0.001
	Unknown		118		118	0	0	
	Eating Duration	2,043	10.6 (6.5)	2,043	10.0 (8.7)	11.8 (4.7)	10.0 (4.7)	<0.001

[1] n (%); Mean (SD)

[2] Pearson's Chi-squared test; Kruskal-Wallis rank sum test

1.1 Follow-up Tests by School Type

1.1.1 gender

```
    Pearson's Chi-squared test

data:  xtabs(~school_type + gender, data = salad_bar_dat_use)
X-squared = 0.58416, df = 2, p-value = 0.7467
```

1.1.2 age

```
Anova Table (Type III tests)

Response: age
            Sum Sq   Df F value    Pr(>F)
(Intercept)  54477    1 35190.0 < 2.2e-16 ***
school_type  19892    2  6424.7 < 2.2e-16 ***
Residuals     3592 2320
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	-7.14	0.0630	2320	-113.353	<.0001
Elementary - Middle School	-3.73	0.0640	2320	-58.354	<.0001
High School - Middle School	3.40	0.0629	2320	54.153	<.0001

```
P value adjustment: tukey method for comparing a family of 3 estimates
```

1.1.3 race/ethnicity

```
    Pearson's Chi-squared test

data:  xtabs(~school_type + race_ethnicity, data = salad_bar_dat_use)
X-squared = 34.095, df = 6, p-value = 6.45e-06
```

1.1.4 free-reduced lunch

```
    Pearson's Chi-squared test

data:  xtabs(~school_type + paid_free_reduced, data = salad_bar_dat_use)
X-squared = 9.6983, df = 2, p-value = 0.007835
```

1.1.5 fruit/veg selected

```
    Pearson's Chi-squared test

data:  xtabs(~school_type + fv_selected, data = salad_bar_dat_use)
```

```
X-squared = 217.08, df = 2, p-value < 2.2e-16
```

1.1.6 fruit/veg amount selected

```
Anova Table (Type III tests)

Response: fv_pre
             Sum Sq   Df  F value    Pr(>F)
(Intercept) 11028533    1 1685.413 < 2.2e-16 ***
school_type   264832    2   20.236 1.924e-09 ***
Residuals   15828770 2419
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

 contrast                    estimate   SE   df t.ratio p.value
 Elementary - High School       19.15 3.98 2419   4.809  <.0001
 Elementary - Middle School     -4.33 4.15 2419  -1.043  0.5496
 High School - Middle School   -23.49 3.98 2419  -5.899  <.0001

P value adjustment: tukey method for comparing a family of 3 estimates
```

1.1.7 fruit/veg consumed

```
Anova Table (Type III tests)

Response: fv_consumed
             Sum Sq   Df F value    Pr(>F)
(Intercept) 1424771    1 481.113 < 2.2e-16 ***
school_type   71673    2  12.101 5.897e-06 ***
Residuals   7163645 2419
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

 contrast                    estimate   SE   df t.ratio p.value
 Elementary - High School       -4.30 2.68 2419  -1.606  0.2433
 Elementary - Middle School    -13.43 2.79 2419  -4.805  <.0001
 High School - Middle School    -9.12 2.68 2419  -3.406  0.0019

P value adjustment: tukey method for comparing a family of 3 estimates
```

1.1.8 fruit/veg waste

```
Anova Table (Type III tests)

Response: fv_post
             Sum Sq   Df  F value    Pr(>F)
(Intercept)  4525344    1 1032.082 < 2.2e-16 ***
school_type   233991    2   26.683  3.45e-12 ***
Residuals   10606531 2419
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

 contrast                    estimate   SE   df t.ratio p.value
```

```
 Elementary - High School       23.46 3.26 2419   7.195  <.0001
 Elementary - Middle School      9.09 3.40 2419   2.674  0.0206
 High School - Middle School   -14.36 3.26 2419  -4.407  <.0001

P value adjustment: tukey method for comparing a family of 3 estimates
```

1.1.9 fruit/veg waste proportion

*restricted to selected only

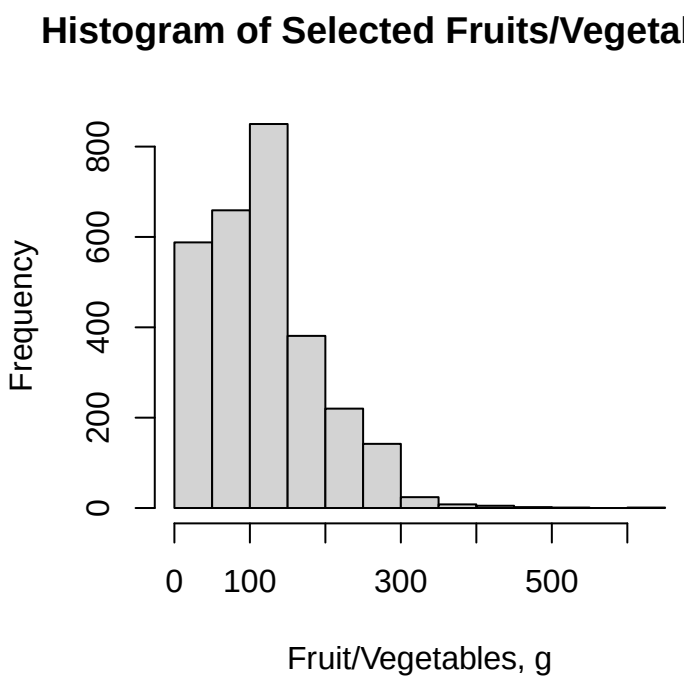
```
Anova Table (Type III tests)

Response: fv_prop_waste
             Sum Sq   Df  F value    Pr(>F)
(Intercept) 3140369    1 2688.725 < 2.2e-16 ***
school_type  101553    2   43.474 < 2.2e-16 ***
Residuals   2382673 2040
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

 contrast                    estimate   SE   df t.ratio p.value
 Elementary - High School       15.16 1.82 2040   8.317  <.0001
 Elementary - Middle School     13.99 1.85 2040   7.580  <.0001
 High School - Middle School    -1.18 1.90 2040  -0.618  0.8102

P value adjustment: tukey method for comparing a family of 3 estimates
```

2 Fruit/Vegetable Selected



Total Sample Sizes: Full N = 2226, Elementary N = 630, Middle School N = 699, High School N = 897

Table 2: Fruit/Veg Selected - Count Model

	all_irr	all_se	all_p	E_irr	E_se	E_p	M_irr	M_se	M_p	H_irr	H_se	H_p
(intercept)	117.801	1.102	0.000	149.755	1.210	0.000	73.406	1.231	0.000	130.974	1.225	0.000
grade	1.015	1.008	0.060	0.993	1.011	0.556	1.071	1.020	0.001	1.027	1.017	0.113
gender, M	0.977	1.019	0.212	1.006	1.028	0.818	0.963	1.030	0.216	0.961	1.037	0.271
white	1.018	1.031	0.565	1.029	1.047	0.520	0.971	1.050	0.554	1.061	1.064	0.340
other	1.051	1.037	0.168	1.192	1.051	0.000	0.947	1.059	0.345	0.964	1.085	0.648
Black/AA	0.974	1.043	0.539	0.897	1.057	0.047	1.127	1.068	0.069	0.899	1.114	0.324
Paid Lunch	0.935	1.036	0.053	0.945	1.045	0.200	0.969	1.058	0.583	0.847	1.100	0.081
Lunch Dur	1.000	1.002	0.978	0.992	1.007	0.209	1.005	1.002	0.029	0.994	1.004	0.093
Time to Eat	1.003	1.001	0.060	1.005	1.002	0.005	0.999	1.003	0.654	1.000	1.004	0.961

Elementary Schools - Mean selected = 130.76 g (not including zeros). Each 10 more minutes spent eating (i.e., time to eat) is associated with a 5% increase in grams of F/V selected relative to mean (for those that chose F/V) - over 1 week this equates to 32 g increase of F/V selected

Overall Model, Middle and Hight Schools - Time to Eat is non-significant for grams of F/V selected (for those that chose F/V)

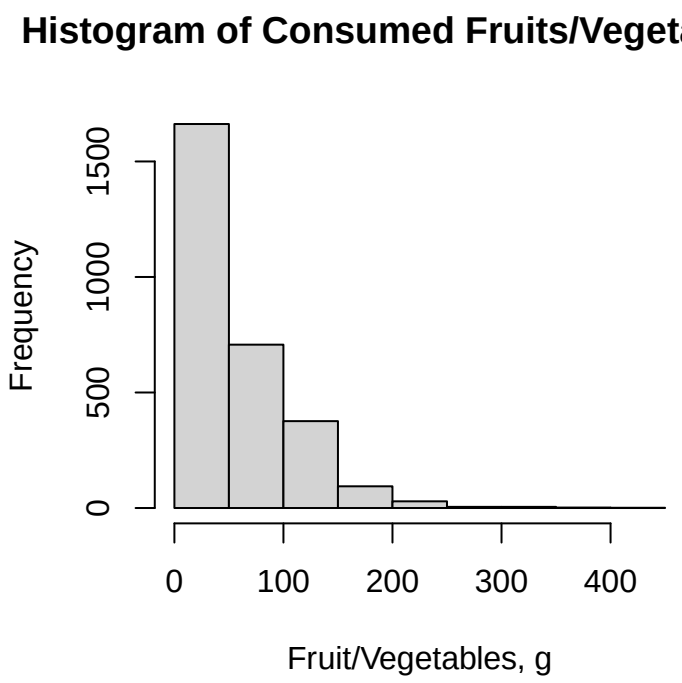
Table 3: Fruit/Veg Selected - Zero Model

	all_or	all_se	all_p	E_or	E_se	E_p	M_irr	M_se	M_p	H_or	H_se	H_p
(intercept)	0.030	2.181	0.000	0.077	15.044	0.344	0.009	4.604	0.002	1.401	3.487	0.787
grade	1.009	1.077	0.904	1.225	1.483	0.606	1.212	1.184	0.257	0.852	1.103	0.103
gender, M	1.252	1.164	0.140	2.591	2.563	0.312	0.981	1.289	0.940	1.459	1.223	0.059
white	1.464	1.225	0.060	4.581	2.815	0.142	0.962	1.422	0.911	1.842	1.307	0.022
other	0.774	1.372	0.419	0.000	Inf	0.998	0.575	1.685	0.289	1.002	1.531	0.997
Black/AA	1.811	1.428	0.095	0.000	Inf	0.998	1.458	1.707	0.482	2.581	1.674	0.066
Paid Lunch	1.595	1.259	0.043	0.274	3.394	0.290	3.238	1.442	0.001	1.226	1.402	0.546
Lunch Dur	1.012	1.012	0.303	0.786	1.111	0.021	1.027	1.015	0.071	1.003	1.019	0.882
Time to Eat	0.959	1.015	0.005	1.007	1.046	0.882	0.979	1.023	0.365	0.919	1.022	0.000

Overall Model and High Schools - For each minute less time children spent eating, there was a 4% (overall model) and 8% (high school) decrease in odds of NOT selecting F/V (i.e., longer time spent eating -> greater chance of selecting F/V)

Elementary and Middle Schools - The odds of choosing NO F/V is not significantly associated with time to eat

3 Fruit/Vegetable Consumed



Total Sample Sizes: Full N = 2226, Elementary N = 630, Middle School N = 699, High School N = 897

Table 4: Fruit/Veg Consumed - Count Model

	all_irr	all_se	all_p	E_irr	E_se	E_p	M_irr	M_se	M_p	H_irr	H_se	H_p
(intercept)	35.163	1.168	0.000	60.522	1.443	0.000	20.450	1.468	0.000	27.633	1.449	0.000
grade	1.046	1.015	0.003	0.989	1.036	0.753	1.117	1.050	0.024	1.075	1.033	0.024
gender, M	1.129	1.046	0.008	1.252	1.094	0.012	1.122	1.078	0.125	1.022	1.073	0.755
white	1.029	1.077	0.695	0.976	1.153	0.866	0.990	1.127	0.932	1.157	1.122	0.205
other	1.288	1.093	0.005	1.266	1.175	0.144	1.260	1.151	0.103	1.218	1.179	0.234
Black/AA	1.176	1.107	0.111	0.900	1.190	0.546	1.391	1.176	0.042	1.288	1.240	0.238
Paid Lunch	0.976	1.084	0.762	1.045	1.147	0.748	1.087	1.149	0.551	0.745	1.151	0.037
Lunch Dur	1.002	1.004	0.502	0.979	1.012	0.090	1.008	1.004	0.028	1.002	1.005	0.622
Time to Eat	1.013	1.004	0.000	1.016	1.006	0.006	1.008	1.006	0.244	1.015	1.008	0.050

Overall Model: mean consumed = 50.85 g, Each 10 more minutes spent eating (i.e., time to eat) is associated with a 13% increase in grams of F/V consumed relative to mean (for those that chose F/V) - over 1 week this equates to 33 g increase of F/V consumed

Elementary: mean consumed = 47.07 g, Each 10 more minutes spent eating (i.e., time to eat) is associated with a 16% increase in grams of F/V consumed relative to mean (for those that chose F/V) - over 1 week this equates to 37.5 g increase of F/V consumed

High Schools: mean consumed = 47.40 g, Each 10 more minutes spent eating (i.e., time to eat) is associated with a 8% increase in grams of F/V consumed relative to mean (for those that chose F/V) - over 1 week this equates to 19 g increase of F/V consumed

Middle Schools - Time to Eat is non-significant for grams of F/V consumed (for those that selected some F/V)

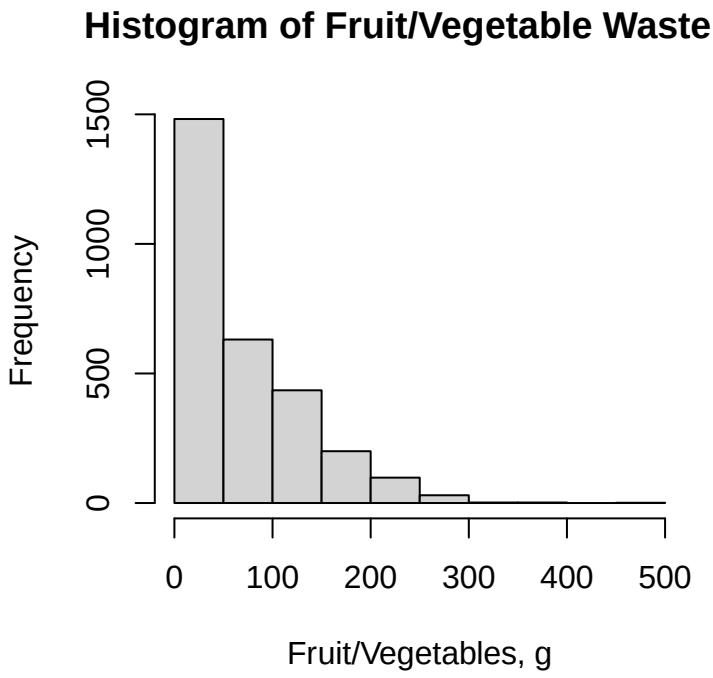
Table 5: Fruit/Veg Consumed - Zero Model

	all_or	all_se	all_p	E_or	E_se	E_p	M_irr	M_se	M_p	H_or	H_se	H_p
(intercept)	0.138	1.662	0.000	0.444	3.031	0.464	0.089	3.333	0.045	2.016	2.575	0.458
grade	1.041	1.053	0.440	0.974	1.143	0.849	1.052	1.149	0.717	0.903	1.083	0.204
gender, M	1.059	1.127	0.636	1.374	1.445	0.387	0.939	1.239	0.768	1.103	1.182	0.557
white	1.398	1.186	0.050	1.213	1.594	0.679	1.046	1.346	0.878	1.711	1.267	0.024
other	1.023	1.270	0.924	0.963	1.809	0.950	0.737	1.536	0.477	1.300	1.420	0.456
Black/AA	1.570	1.306	0.092	1.172	2.063	0.827	1.250	1.567	0.619	2.440	1.553	0.043
Paid Lunch	1.380	1.219	0.105	1.179	1.553	0.707	1.914	1.387	0.047	1.327	1.385	0.385
Lunch Dur	1.016	1.010	0.086	0.918	1.051	0.084	1.026	1.013	0.036	1.010	1.016	0.523
Time to Eat	0.953	1.013	0.000	0.988	1.016	0.452	0.969	1.024	0.182	0.916	1.019	0.000

High Schools - For each minute longer of time to eat, there is 5% (overall model) and 8% (high school) lower odds of consuming NO F/V

Overall Model, Elementary, and Middle Schools - The odds of consuming NO F/V is not significantly associated with time to eat

4 Fruit/Vegetable Waste



Total Sample Sizes: Full N = 2226, Elementary N = 630, Middle School N = 699, High School N = 897

Table 6: Fruit/Veg Waste - Count Model

	all_irr	all_se	all_p	E_irr	E_se	E_p	M_irr	M_se	M_p	H_irr	H_se	H_p
(intercept)	100.585	1.174	0.000	89.927	1.298	0.000	88.411	1.498	0.000	105.425	1.454	0.000
grade	1.003	1.014	0.812	1.003	1.019	0.888	1.046	1.046	0.320	0.980	1.031	0.520
gender, M	0.901	1.036	0.003	0.929	1.048	0.118	0.861	1.075	0.038	0.925	1.067	0.227
white	0.981	1.059	0.738	1.057	1.081	0.482	0.904	1.116	0.357	1.016	1.116	0.887
other	0.933	1.074	0.330	1.083	1.090	0.352	0.757	1.150	0.047	0.911	1.172	0.560
Black/AA	0.915	1.085	0.274	0.968	1.101	0.736	0.863	1.168	0.343	0.915	1.226	0.664
Paid Lunch	0.930	1.070	0.279	0.898	1.078	0.153	0.881	1.141	0.334	1.358	1.237	0.151
Lunch Dur	0.993	1.004	0.041	0.999	1.009	0.885	0.995	1.006	0.333	0.994	1.007	0.371
Time to Eat	0.997	1.003	0.292	1.001	1.003	0.709	0.983	1.009	0.065	0.991	1.007	0.196

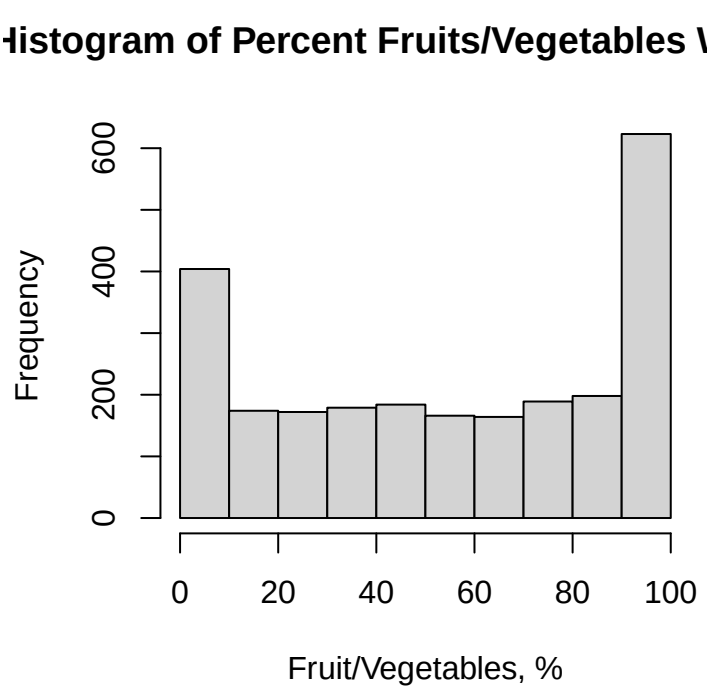
Overall Model, Elementary, Middle, and High Schools - For those that chose some F/V, time to eat is non-significant for grams of F/V wasted

Table 7: Fruit/Veg Waste - Zero Model

	all_or	all_se	all_p	E_or	E_se	E_p	M_irr	M_se	M_p	H_or	H_se	H_p
(intercept)	0.047	1.852	0.000	0.045	4.259	0.032	0.055	3.916	0.034	1.132	2.921	0.908
grade	1.060	1.059	0.305	1.202	1.145	0.173	1.005	1.165	0.975	0.910	1.089	0.265
gender, M	1.467	1.139	0.003	1.735	1.451	0.139	1.050	1.259	0.830	1.772	1.195	0.001
white	1.158	1.207	0.435	1.706	1.761	0.345	0.768	1.408	0.439	1.436	1.288	0.153
other	1.495	1.273	0.095	0.980	1.758	0.971	1.654	1.513	0.224	1.675	1.459	0.173
Black/AA	1.946	1.332	0.020	2.625	1.704	0.070	0.890	1.662	0.818	3.483	1.685	0.017
Paid Lunch	1.647	1.240	0.020	0.536	1.980	0.361	3.171	1.426	0.001	1.324	1.385	0.389
Lunch Dur	1.010	1.010	0.336	0.936	1.052	0.200	1.023	1.014	0.091	0.993	1.019	0.710
Time to Eat	0.991	1.011	0.420	1.012	1.025	0.641	0.978	1.023	0.350	0.984	1.019	0.388

Overall Model, Elementary, Middle, and High Schools - The odds of wasting NO F/V is not significantly associated with time to eat

5 Fruit/Vegetable Percent Waste



Total Sample Sizes: Full N = 2226, Elementary N = 630, Middle School N = 699, High School N = 897

Table 8: Fruit/Veg Percent Waste - Count Model

	all_irr	all_se	all_p	E_irr	E_se	E_p	M_irr	M_se	M_p	H_irr	H_se	H_p
(intercept)	90.649	1.105	0.000	69.200	1.116	0.000	106.911	1.390	0.000	93.785	1.346	0.000
grade	0.979	1.010	0.024	0.990	1.016	0.547	0.969	1.041	0.418	0.978	1.026	0.394
gender, M	0.901	1.031	0.001	0.933	1.044	0.106	0.850	1.065	0.010	0.903	1.058	0.068
white	1.025	1.051	0.621	1.034	1.070	0.627	1.021	1.103	0.826	1.083	1.097	0.389
other	0.887	1.064	0.055	0.938	1.080	0.410	0.798	1.132	0.069	0.933	1.148	0.618
Black/AA	0.927	1.074	0.283	1.003	1.088	0.967	0.760	1.146	0.043	1.073	1.191	0.688
Paid Lunch	0.958	1.059	0.453	0.976	1.066	0.705	0.934	1.120	0.547	1.092	1.153	0.537
Lunch Dur	0.994	1.002	0.010	1.004	1.003	0.225	0.992	1.004	0.065	0.994	1.006	0.299
Time to Eat	0.994	1.002	0.011	0.996	1.002	0.068	0.989	1.008	0.182	0.986	1.006	0.027

Overall Model: mean percent wasted = 55.11%, Each 10 more minutes spent eating (i.e., time to eat) is associated with a decrease of 6% wasted relative to mean (for those that chose F/V) - over 1 week this equates to a decrease in percent waste of 16.5%.

High Schools: mean percent wasted = 49.61%, Each 10 more minutes spent eating (i.e., time to eat) is

associated with a decrease of 14% waste relative to mean (for those that chose F/V) - over 1 week this equates to a decrease in percent waste of 35%.

Elementary, and Middle Schools - Time to eat is non-significant for grams of percent F/V waste (for those that selected F/V)

Table 9: Fruit/Veg Percent Waste - Zero Model

	all_or	all_se	all_p	E_or	E_se	E_p	M_irr	M_se	M_p	H_or	H_se	H_p
(intercept)	0.006	2.113	0.000	0.011	5.871	0.010	0.103	8.989	0.301	0.029	7.121	0.071
grade	1.131	1.067	0.061	1.176	1.155	0.261	0.771	1.303	0.326	1.033	1.140	0.805
gender, M	1.716	1.210	0.005	1.742	1.498	0.169	1.168	1.445	0.674	2.123	1.323	0.007
white	0.528	1.415	0.066	1.042	2.004	0.953	0.321	2.096	0.125	0.644	1.632	0.369
other	2.319	1.350	0.005	1.062	1.775	0.917	4.341	1.716	0.007	3.161	1.669	0.025
Black/AA	1.958	1.456	0.074	2.779	1.716	0.058	0.327	3.360	0.357	3.522	2.111	0.092
Paid Lunch	1.916	1.401	0.054	0.840	2.226	0.828	2.479	1.935	0.169	2.134	1.639	0.125
Lunch Dur	1.016	1.015	0.297	0.985	1.061	0.802	1.012	1.022	0.583	0.989	1.045	0.809
Time to Eat	1.028	1.018	0.110	1.019	1.035	0.579	0.987	1.033	0.677	1.061	1.025	0.021

High Schools - For each minute longer of time to eat, there is 6% greater odds of wasting ZERO percent of F/V selected (for those that selected F/V)

Overall Model, Elementary, and Middle Schools - The odds of wasting ZERO percent F/V is not significantly associated with children's time to eat

6 Supplemental Information – Complete vs Missing Time to Eat

6.1 Demographic Characteristics

Table 10: Demographic Characteristics and Variables of Interest

		Full Sample		Time to Eat Data			
Group	**Characteristic**	**N**	**Overall**	**N**	**Complete**	**Missing**	**p-value**
	Gender	2,415		2,874			0.14
	F		1,120 (46%)		1,120 (46%)	230 (50%)	
	M		1,295 (54%)		1,295 (54%)	229 (50%)	
	Unknown		7		7	0	
	Grade	2,422	7.1 (3.1)	2,881	7.1 (3.1)	5.7 (3.5)	<0.001
	Age, yr	2,323	12.2 (3.2)	2,777	12.2 (3.2)	10.9 (3.5)	<0.001
	Unknown		99		99	5	
	Race/Ethnicity	2,350		2,804			<0.001
	Hispanic or Latino		1,490 (63%)		1,490 (63%)	248 (55%)	
	White		552 (23%)		552 (23%)	149 (33%)	
	Other		176 (7.5%)		176 (7.5%)	28 (6.2%)	
	Black or African American		132 (5.6%)		132 (5.6%)	29 (6.4%)	
	Unknown		72		72	5	
	Free-Reduced Lunch	2,417		2,875			<0.001
	Free/Reduced		1,881 (78%)		1,881 (78%)	395 (86%)	
	Paid		536 (22%)		536 (22%)	63 (14%)	
	Unknown		5		5	1	
	F/V Selected	2,422		2,881			0.006
	N		379 (16%)		379 (16%)	49 (11%)	
	Y		2,043 (84%)		2,043 (84%)	410 (89%)	
	F/V Self-Served, g	2,043	136.1 (70.6)	2,453	136.1 (70.6)	132.7 (58.8)	>0.9
	F/V Consumed, g	2,043	58.3 (54.9)	2,453	58.3 (54.9)	62.4 (52.7)	0.072
	F/V Waste, g	2,043	77.8 (66.0)	2,453	77.8 (66.0)	70.3 (60.5)	0.070
	F/V Percent Waste (post/pre), %	2,043	55.4 (34.9)	2,453	55.4 (34.9)	52.7 (36.1)	0.3
	Lunch Period	1,925	28.4 (12.3)	2,329	28.4 (12.3)	24.8 (7.2)	<0.001
	Unknown		118		118	6	
	Eating Duration	2,043	10.6 (6.5)				

[1] n (%); Mean (SD)

[2] Pearson's Chi-squared test; Wilcoxon rank sum test