

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

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1 Demographic Characteristics

*note - restricted to: - pre (selected) > post (waste) - time to eat is not NA and is > 0 - pre (selected) is not NA - post (waste) is not NA - missing data for any covariates used in models (age not included in models)

Table 1: Demographic Characteristics and Variables of Interest

Group	Characteristic	Full Sample		School Type				p-value
		N	Overall	N	Elementary	Middle School	High School	
	Gender	2,369		2,369				0.7
	F		1,100 (46%)		342 (45%)	336 (47%)	422 (47%)	
	M		1,269 (54%)		413 (55%)	381 (53%)	475 (53%)	
	Grade	2,369	7.1 (3.1)	2,369	3.3 (1.3)	7.0 (0.8)	10.4 (1.1)	<0.001
	Age, yr	2,274	12.2 (3.2)	2,274	8.5 (1.4)	12.2 (1.0)	15.6 (1.3)	<0.001
	Unknown		95		0	0	95	
	Race/Ethnicity	2,369		2,369				<0.001
	Hispanic or Latino		1,498 (63%)		439 (58%)	458 (64%)	601 (67%)	
	White		557 (24%)		184 (24%)	153 (21%)	220 (25%)	
	Other		180 (7.6%)		71 (9.4%)	64 (8.9%)	45 (5.0%)	
	Black or African American		134 (5.7%)		61 (8.1%)	42 (5.9%)	31 (3.5%)	
	Free-Reduced Lunch	2,369		2,369				<0.001
	Free/Reduced		1,875 (79%)		562 (74%)	589 (82%)	724 (81%)	
	Paid		494 (21%)		193 (26%)	128 (18%)	173 (19%)	
	F/V Selected	2,369		2,369				<0.001
	N		352 (15%)		6 (0.8%)	101 (14%)	245 (27%)	
	Y		2,017 (85%)		749 (99%)	616 (86%)	652 (73%)	
	Lunch Period	2,369	27.8 (9.6)	2,369	23.7 (9.1)	24.8 (7.7)	33.7 (8.3)	<0.001
	Time in Line	2,369	5.3 (3.2)	2,369	5.6 (3.4)	4.5 (2.7)	5.7 (3.2)	<0.001
	F/V Consumed Any	2,017		2,017				0.025
	N		243 (12%)		78 (10%)	68 (11%)	97 (15%)	
	Y		1,774 (88%)		671 (90%)	548 (89%)	555 (85%)	
	F/V Self-Served, g	2,017	136.9 (70.6)	2,017	121.7 (64.6)	152.9 (72.9)	139.3 (71.5)	<0.001
	Lunch Period	2,017	26.9 (9.7)	2,017	23.8 (9.1)	23.9 (7.6)	33.4 (8.9)	<0.001
	Time in Line	2,017	5.3 (3.2)	2,017	5.6 (3.4)	4.6 (2.8)	5.7 (3.1)	<0.001
	Eating Duration	2,017	10.6 (4.1)	2,017	10.3 (4.1)	9.9 (3.3)	11.7 (4.6)	<0.001
	F/V Consumed, g	2,017	57.5 (55.3)	2,017	43.4 (49.4)	66.6 (56.2)	65.2 (57.5)	<0.001
	F/V Waste, g	2,017	79.5 (66.7)	2,017	78.4 (56.3)	86.4 (75.2)	74.1 (68.8)	0.002
	F/V Percent Waste (post/pre), %	2,017	56.3 (35.1)	2,017	65.0 (31.7)	52.7 (35.8)	49.6 (36.0)	<0.001

¹ n (%); Mean (SD)

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

*intake data means and standard deviations restricted to those who selected F/V. Means for consumed restricted to those with FV consumption > 0 is in text with that model.

Negative eating duration values:

```
salad_bar_dat[!is.na(salad_bar_dat[["time_to_eat"]]) & salad_bar_dat[["time_to_eat"]] < 0, "time_to_eat"]
```

[1] -0.4

1.1 Follow-up Tests by School Type

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

1.1.1 gender

Pearson's Chi-squared test

```
data: xtabs(~school_type + gender, data = salad_bar_dat_use)
X-squared = 0.57945, df = 2, p-value = 0.7485
```

1.1.2 age

Anova Table (Type III tests)

Response: age

	Sum Sq	Df	F value	Pr(>F)
(Intercept)	54625	1	34920	< 2.2e-16 ***
school_type	19832	2	6339	< 2.2e-16 ***
Residuals	3553	2271		

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	0.0634	2271	-112.597	<.0001
Elementary - Middle School	-3.69	0.0652	2271	-56.567	<.0001
High School - Middle School	3.45	0.0643	2271	53.699	<.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 = 35.559, df = 6, p-value = 3.358e-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 = 15.394, df = 2, p-value = 0.0004543
```

1.1.5 fruit/veg selected

Pearson's Chi-squared test

```
data: xtabs(~school_type + fv_selected, data = salad_bar_dat_use)
X-squared = 228.37, df = 2, p-value < 2.2e-16
```

1.1.6 lunch duration

Type III Analysis of Variance Table with Satterthwaite's method

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
school_type	217.97	108.99	2	33.165	6.9873	0.002936 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	-11.51	3.24	33.0	-3.551	0.0033
Elementary - Middle School	-2.52	3.25	33.2	-0.778	0.7191
High School - Middle School	8.98	3.23	32.7	2.779	0.0237

Degrees-of-freedom method: kenward-roger

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

1.1.7 time to eat

Analysis of Deviance Table (Type III Wald F tests with Kenward-Roger df)

Response: time_to_eat

	F	Df	Df.res	Pr(>F)
(Intercept)	346.7029	1	31.892	<2e-16 ***
school_type	1.8761	2	32.013	0.1696

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	-1.147	0.754	31.2	-1.520	0.2954
Elementary - Middle School	0.197	0.768	32.7	0.256	0.9645
High School - Middle School	1.344	0.753	32.1	1.783	0.1912

Degrees-of-freedom method: kenward-roger

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

1.1.8 fruit/veg amount selected

Analysis of Deviance Table (Type III Wald F tests with Kenward-Roger df)

Response: fv_pre

	F	Df	Df.res	Pr(>F)
(Intercept)	85.9538	1	32.164	1.33e-10 ***
school_type	0.6189	2	32.439	0.5448

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	-12.03	19.2	32.1	-0.626	0.8068

Elementary - Middle School	-21.44	19.3	32.6	-1.110	0.5150
High School - Middle School	-9.41	19.2	32.6	-0.490	0.8764

Degrees-of-freedom method: kenward-roger

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

1.1.9 fruit/veg consumed

Analysis of Deviance Table (Type III Wald F tests with Kenward-Roger df)

Response: fv_consumed

	F	Df	Df.res	Pr(>F)
(Intercept)	54.1494	1	29.709	3.592e-08 ***
school_type	3.6329	2	31.078	0.03821 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	-22.3	8.79	30.5	-2.534	0.0427
Elementary - Middle School	-18.3	8.91	31.0	-2.053	0.1166
High School - Middle School	4.0	8.89	31.8	0.449	0.8951

Degrees-of-freedom method: kenward-roger

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

1.1.10 fruit/veg waste

Analysis of Deviance Table (Type III Wald F tests with Kenward-Roger df)

Response: fv_post

	F	Df	Df.res	Pr(>F)
(Intercept)	44.2277	1	31.787	1.73e-07 ***
school_type	0.5834	2	32.269	0.5638

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	12.69	17.1	31.9	0.743	0.7399
Elementary - Middle School	-5.23	17.2	32.5	-0.304	0.9504
High School - Middle School	-17.92	17.1	32.5	-1.048	0.5523

Degrees-of-freedom method: kenward-roger

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

1.1.11 fruit/veg waste proportion

*restricted to selected only

Analysis of Deviance Table (Type III Wald F tests with Kenward-Roger df)

Response: fv_prop_waste

	F	Df	Df.res	Pr(>F)
--	---	----	--------	--------

```
(Intercept) 199.6413  1 30.280 7.192e-15 ***
school_type  3.7703  2 31.457  0.03406 *
```

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

contrast	estimate	SE	df	t.ratio	p.value
Elementary - High School	17.57	6.42	30.9	2.736	0.0269
Elementary - Middle School	10.19	6.50	31.5	1.568	0.2740
High School - Middle School	-7.38	6.47	32.1	-1.140	0.4970

```
Degrees-of-freedom method: kenward-roger
```

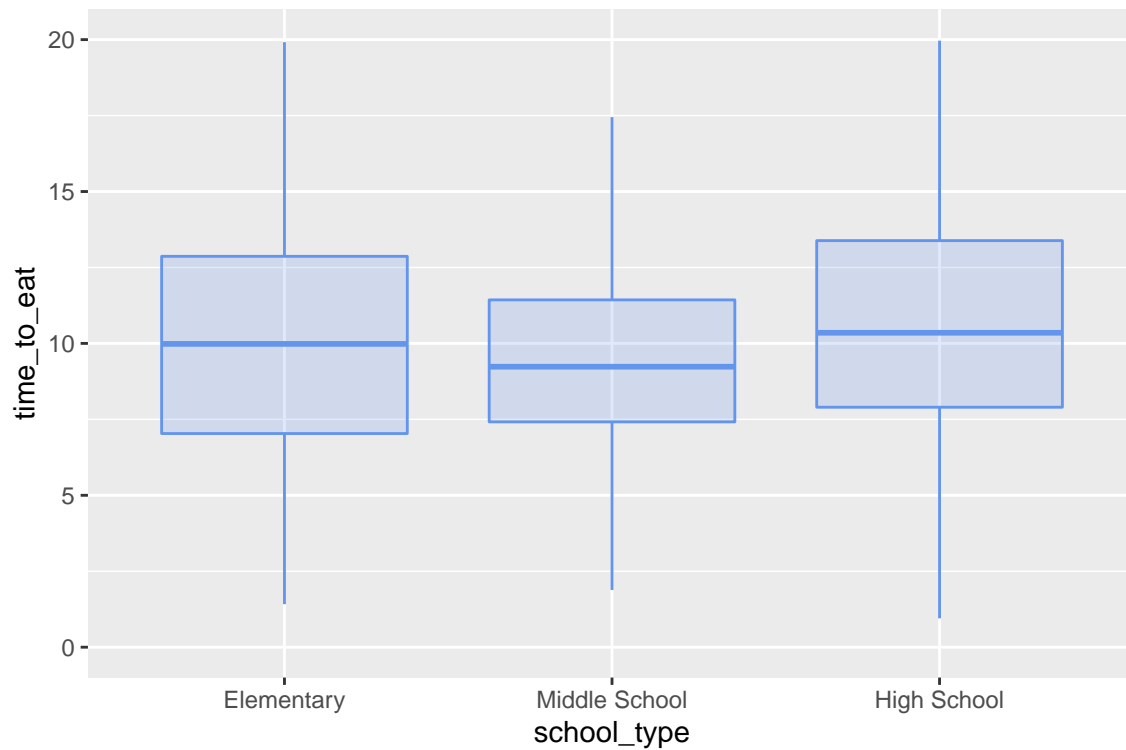
```
P value adjustment: tukey method for comparing a family of 3 estimates
```

2 Association between TTE and Lunch Duration

Pearson's product-moment correlation

```
data: salad_bar_dat_use[["time_to_eat"]] and salad_bar_dat_use[["lunch_dur"]]
t = 1.5492, df = 2367, p-value = 0.1215
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.008456398  0.072006624
sample estimates:
      cor
0.03182668
```

There is no association between time to eat and lunch duration for the whole sample ($r = 0.03$, $p = 0.172$).



3 Fruit/Vegetable Selected

Histogram of Selected Fruits/Vegetables,



3.1 Overall

	Estimate	Std. Error	df	t value
(Intercept)	8.522	0.700	174.302	12.178
grade	-0.014	0.063	397.128	-0.217
genderM	-0.479	0.161	2334.094	-2.984
race_ethnicityWhite	-0.334	0.249	2342.535	-1.345
race_ethnicityOther	0.335	0.322	2354.711	1.039
race_ethnicityBlack or African American	-0.164	0.361	2353.143	-0.454
paid_free_reducedPaid	0.294	0.269	2273.815	1.091
lunch_dur	0.064	0.018	670.700	3.530
fv_pre	0.005	0.001	2271.704	3.589
Pr(> t)				
(Intercept)	0.000			
grade	0.829			
genderM	0.003			
race_ethnicityWhite	0.179			
race_ethnicityOther	0.299			
race_ethnicityBlack or African American	0.650			
paid_free_reducedPaid	0.275			
lunch_dur	0.000			
fv_pre	0.000			

3.2 Elementary

Histogram of Selected Fruits/Vegetables,



	Estimate	Std. Error	df	t value
(Intercept)	8.017	1.262	36.254	6.351
grade	-0.350	0.093	738.644	-3.779
genderM	-0.474	0.240	735.848	-1.973
race_ethnicityWhite	0.058	0.370	743.174	0.158
race_ethnicityOther	0.290	0.440	737.130	0.659
race_ethnicityBlack or African American	0.084	0.469	738.857	0.180
paid_free_reducedPaid	0.235	0.345	742.409	0.682
lunch_dur	0.113	0.032	569.280	3.571
fv_pre	0.006	0.003	745.999	2.435
	Pr(> t)			
(Intercept)	0.000			
grade	0.000			
genderM	0.049			
race_ethnicityWhite	0.875			
race_ethnicityOther	0.510			
race_ethnicityBlack or African American	0.857			
paid_free_reducedPaid	0.496			
lunch_dur	0.000			
fv_pre	0.015			

3.3 Middle School

Histogram of Selected Fruits/Vegetables,



	Estimate	Std. Error	df	t value
(Intercept)	8.870	1.377	277.432	6.443
grade	0.117	0.157	705.807	0.744
genderM	-0.177	0.248	703.429	-0.711
race_ethnicityWhite	-0.316	0.383	671.056	-0.824
race_ethnicityOther	0.031	0.480	705.404	0.066
race_ethnicityBlack or African American	-0.537	0.536	707.755	-1.001
paid_free_reducedPaid	0.103	0.426	624.551	0.241
lunch_dur	0.009	0.029	132.309	0.306
fv_pre	0.001	0.002	562.063	0.703
	Pr(> t)			
(Intercept)	0.000			
grade	0.457			
genderM	0.477			
race_ethnicityWhite	0.410			
race_ethnicityOther	0.948			
race_ethnicityBlack or African American	0.317			
paid_free_reducedPaid	0.809			
lunch_dur	0.760			
fv_pre	0.482			

3.4 High School

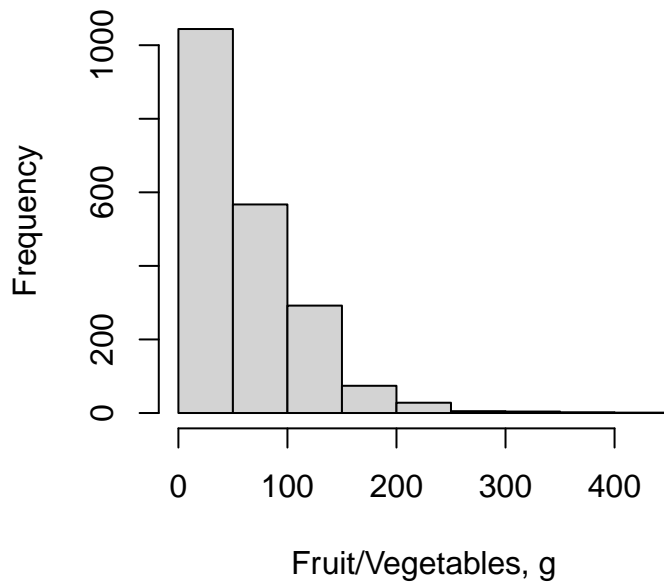
Histogram of Selected Fruits/Vegetables,



	Estimate	Std. Error	df	t value
(Intercept)	5.834	1.652	542.397	3.532
grade	0.266	0.147	814.817	1.812
genderM	-0.725	0.315	885.262	-2.302
race_ethnicityWhite	-0.704	0.478	736.151	-1.472
race_ethnicityOther	0.676	0.731	882.778	0.926
race_ethnicityBlack or African American	-0.076	0.873	887.092	-0.087
paid_free_reducedPaid	0.559	0.579	254.281	0.965
lunch_dur	0.076	0.027	53.193	2.787
fv_pre	0.005	0.002	808.772	2.409
Pr(> t)				
(Intercept)	0.000			
grade	0.070			
genderM	0.022			
race_ethnicityWhite	0.142			
race_ethnicityOther	0.355			
race_ethnicityBlack or African American	0.931			
paid_free_reducedPaid	0.335			
lunch_dur	0.007			
fv_pre	0.016			

4 Fruit/Vegetable Consumed

Histogram of Consumed Fruits/Vegetables



-mean and sd for participants that consumed F/V

```
[1] 65.39177
```

```
[1] 54.37011
```

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

4.1 Overall

Call:

```
mixed_model(fixed = fv_consumed ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==  
  "Y", ], family = zi.negative.binomial(), zi_fixed = ~grade +  
  gender + race_ethnicity + paid_free_reduced + lunch_dur +  
  time_to_eat, zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 2017

Number of Groups: 36

Model:

family: zero-inflated negative binomial
link: log

Fit statistics:

log.Lik	AIC	BIC
-9744.07	19532.14	19566.98

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.3005	
zi_(Intercept)	0.6843	0.1530

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	3.4169	0.1632	20.9380	< 1e-04
grade	0.0587	0.0150	3.9062	< 1e-04
genderM	0.1072	0.0440	2.4386	0.0147431
race_ethnicityWhite	0.0368	0.0704	0.5225	0.6013536
race_ethnicityOther	0.2442	0.0871	2.8033	0.0050581
race_ethnicityBlack or African American	0.1540	0.0984	1.5651	0.1175705
paid_free_reducedPaid	-0.0848	0.0749	-1.1326	0.2573745
lunch_dur	-0.0032	0.0046	-0.7041	0.4813462
time_to_eat	0.0305	0.0061	4.9577	< 1e-04

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-1.5583	0.4661	-3.3431	0.00082853
grade	0.0233	0.0468	0.4965	0.61956449
genderM	-0.1326	0.1538	-0.8622	0.38860077
race_ethnicityWhite	0.1904	0.2321	0.8206	0.41186744
race_ethnicityOther	0.3995	0.2751	1.4523	0.14640913
race_ethnicityBlack or African American	0.3221	0.3230	0.9971	0.31869656
paid_free_reducedPaid	0.1092	0.2596	0.4208	0.67391683
lunch_dur	0.0084	0.0129	0.6528	0.51389271
time_to_eat	-0.1026	0.0232	-4.4225	< 1e-04

log(dispersion) parameter:

Estimate	Std.Err
0.2332	0.0361

Integration:

method: adaptive Gauss-Hermite quadrature rule

quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton

converged: TRUE

4.1.1 IRR

	[,1]
(Intercept)	0.2105035
grade	1.0235261
genderM	0.8758023

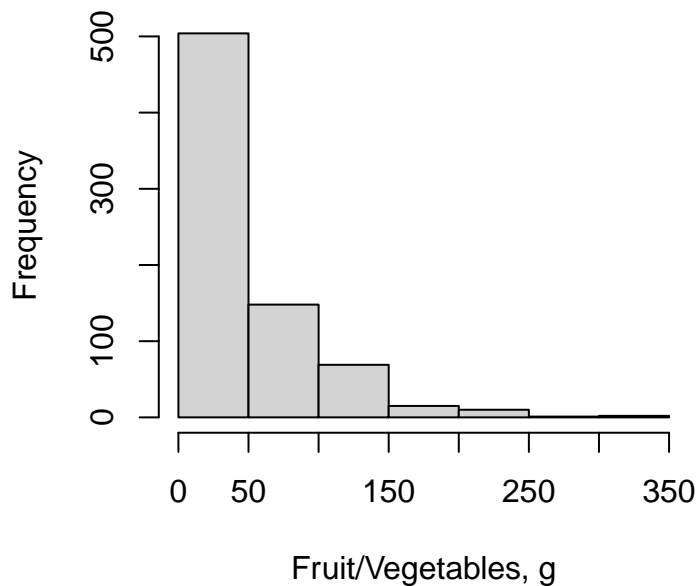
race_ethnicityWhite	1.2097755
race_ethnicityOther	1.4910833
race_ethnicityBlack or African American	1.3800261
paid_free_reducedPaid	1.1154296
lunch_dur	1.0084779
time_to_eat	0.9024934

4.1.2 OR

	[,1]
(Intercept)	30.4740707
grade	1.0604055
genderM	1.1131966
race_ethnicityWhite	1.0374888
race_ethnicityOther	1.2766420
race_ethnicityBlack or African American	1.1665310
paid_free_reducedPaid	0.9186679
lunch_dur	0.9967788
time_to_eat	1.0309214

4.2 Elementary

Histogram of Consumed Fruits/Vegetables



-mean and sd for participants that consumed F/V

```
[1] 48.40089
```

```
[1] 0
```

Call:

```
mixed_model(fixed = fv_consumed ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==  
  "Y" & salad_bar_dat_use$school_type == "Elementary", ], family = zi.negative.binomial(),  
  zi_fixed = ~grade + gender + race_ethnicity + paid_free_reduced +  
  lunch_dur + time_to_eat, zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 749

Number of Groups: 12

Model:

family: zero-inflated negative binomial

link: log

Fit statistics:

log.Lik	AIC	BIC
-3435.307	6914.613	6925.281

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.3996	
zi_(Intercept)	0.4349	0.9285

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	3.4270	0.3144	10.8985	< 1e-04
grade	0.0155	0.0316	0.4897	0.624344
genderM	0.1754	0.0808	2.1714	0.029899
race_ethnicityWhite	0.0354	0.1229	0.2882	0.773192
race_ethnicityOther	0.2124	0.1479	1.4365	0.150854
race_ethnicityBlack or African American	-0.0860	0.1569	-0.5479	0.583729
paid_free_reducedPaid	-0.0996	0.1161	-0.8582	0.390803
lunch_dur	-0.0124	0.0088	-1.4062	0.159676
time_to_eat	0.0506	0.0125	4.0295	< 1e-04

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-0.4289	0.9677	-0.4433	0.657578
grade	-0.0914	0.1222	-0.7475	0.454776
genderM	0.1268	0.3265	0.3883	0.697774
race_ethnicityWhite	0.1693	0.4427	0.3826	0.702043
race_ethnicityOther	0.4395	0.4996	0.8797	0.379036
race_ethnicityBlack or African American	0.4136	0.5578	0.7415	0.458374
paid_free_reducedPaid	0.2515	0.4205	0.5980	0.549807
lunch_dur	-0.0455	0.0298	-1.5289	0.126287
time_to_eat	-0.1028	0.0452	-2.2755	0.022878

log(dispersion) parameter:

Estimate	Std.Err
-0.0255	0.0639

Integration:

method: adaptive Gauss-Hermite quadrature rule

quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton

converged: TRUE

4.2.1 IRR

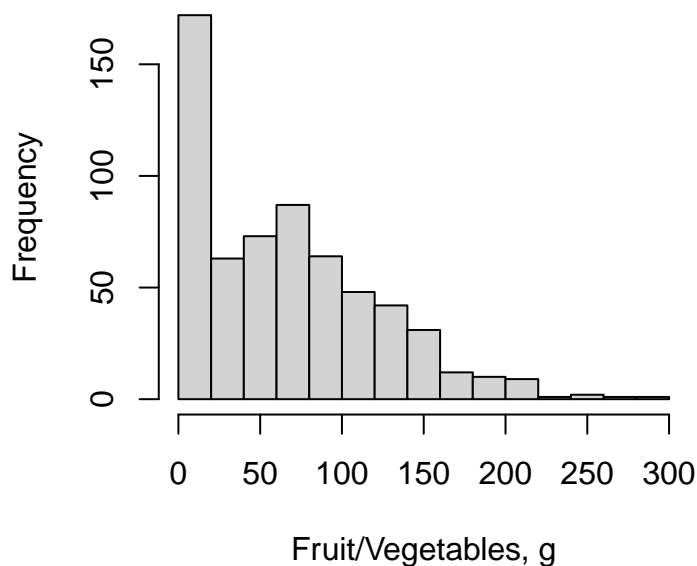
	[,1]
(Intercept)	0.6512001
grade	0.9126923
genderM	1.1351731
race_ethnicityWhite	1.1845262
race_ethnicityOther	1.5519640
race_ethnicityBlack or African American	1.5122330
paid_free_reducedPaid	1.2859331
lunch_dur	0.9555210
time_to_eat	0.9023387

4.2.2 OR

	[,1]
(Intercept)	30.7843919
grade	1.0156132
genderM	1.1917511
race_ethnicityWhite	1.0360589
race_ethnicityOther	1.2366532
race_ethnicityBlack or African American	0.9176227
paid_free_reducedPaid	0.9051634
lunch_dur	0.9876837
time_to_eat	1.0518556

4.3 Middle School

Histogram of Consumed Fruits/Vegetables



-mean and sd for participants that consumed F/V

```
[1] 74.84307
```

```
[1] 54.13259
```

Call:

```
mixed_model(fixed = fv_consumed ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==  
  "Y" & salad_bar_dat_use$school_type == "Middle School", ],  
  family = zi.negative.binomial(), zi_fixed = ~grade + gender +  
  race_ethnicity + paid_free_reduced + lunch_dur + time_to_eat,  
  zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 616

Number of Groups: 12

Model:

```
family: zero-inflated negative binomial  
link: log
```

Fit statistics:

log.Lik	AIC	BIC
-3076.799	6197.598	6208.266

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.2365	
zi_(Intercept)	0.6013	-0.8728

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	2.9598	0.4247	6.9686	< 1e-04
grade	0.1157	0.0495	2.3363	0.019476
genderM	0.1237	0.0751	1.6477	0.099422
race_ethnicityWhite	-0.0577	0.1210	-0.4765	0.633731
race_ethnicityOther	0.2229	0.1426	1.5627	0.118133
race_ethnicityBlack or African American	0.4109	0.1626	2.5268	0.011509
paid_free_reducedPaid	0.0529	0.1387	0.3816	0.702773
lunch_dur	0.0018	0.0077	0.2335	0.815345
time_to_eat	0.0311	0.0121	2.5687	0.010207

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-1.9138	1.4390	-1.3300	0.183532
grade	-0.1150	0.1779	-0.6462	0.518140
genderM	-0.0696	0.2828	-0.2461	0.805579
race_ethnicityWhite	0.1218	0.3927	0.3103	0.756363
race_ethnicityOther	0.2355	0.5027	0.4685	0.639449
race_ethnicityBlack or African American	-0.0011	0.5906	-0.0019	0.998498
paid_free_reducedPaid	-0.1103	0.4562	-0.2418	0.808899
lunch_dur	0.0595	0.0242	2.4558	0.014057
time_to_eat	-0.0984	0.0471	-2.0879	0.036808

log(dispersion) parameter:

Estimate	Std.Err
0.364	0.0628

Integration:

method: adaptive Gauss-Hermite quadrature rule

quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton

converged: TRUE

4.3.1 IRR

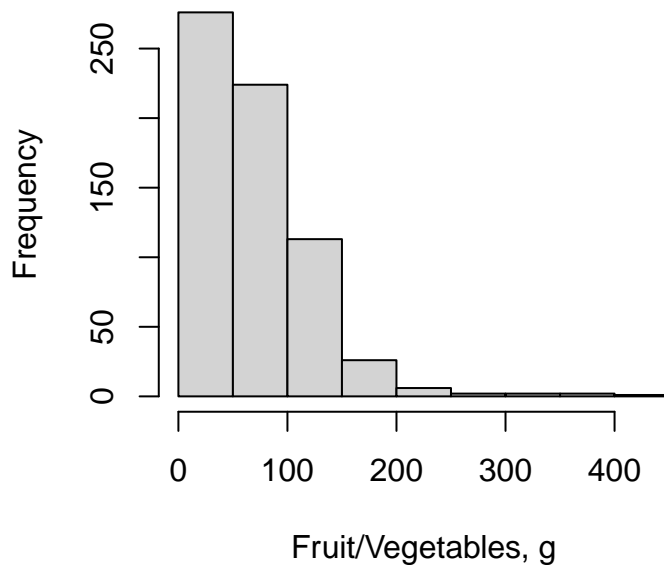
	[,1]
(Intercept)	0.1475122
grade	0.8913978
genderM	0.9327563
race_ethnicityWhite	1.1295846
race_ethnicityOther	1.2655461
race_ethnicityBlack or African American	0.9988888
paid_free_reducedPaid	0.8955366
lunch_dur	1.0613235
time_to_eat	0.9062708

4.3.2 OR

	[,1]
(Intercept)	19.2932706
grade	1.1227015
genderM	1.1317019
race_ethnicityWhite	0.9439655
race_ethnicityOther	1.2496623
race_ethnicityBlack or African American	1.5081521
paid_free_reducedPaid	1.0543572
lunch_dur	1.0017969
time_to_eat	1.0315388

4.4 High School

Histogram of Consumed Fruits/Vegetables



-mean and sd for participants that consumed F/V

```
[1] 65.20552
```

```
[1] 57.46868
```

Call:

```
mixed_model(fixed = fv_consumed ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==  
  "Y" & salad_bar_dat_use$school_type == "High School", ],  
  family = zi.negative.binomial(), zi_fixed = ~grade + gender +  
  race_ethnicity + paid_free_reduced + lunch_dur + time_to_eat,  
  zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 652

Number of Groups: 12

Model:

```
family: zero-inflated negative binomial  
link: log
```

Fit statistics:

log.Lik	AIC	BIC
-3183.798	6411.597	6422.265

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.0906	
zi_(Intercept)	0.7317	-0.1799

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	3.4447	0.3740	9.2101	< 1e-04
grade	0.0720	0.0321	2.2426	0.024923
genderM	0.0208	0.0700	0.2971	0.766411
race_ethnicityWhite	0.1958	0.1155	1.6957	0.089939
race_ethnicityOther	0.2236	0.1656	1.3507	0.176803
race_ethnicityBlack or African American	0.2442	0.2163	1.1290	0.258907
paid_free_reducedPaid	-0.2199	0.1394	-1.5775	0.114688
lunch_dur	-0.0029	0.0052	-0.5532	0.580104
time_to_eat	0.0162	0.0081	2.0001	0.045493

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-0.9231	1.2098	-0.7630	0.4454722
grade	0.0338	0.1145	0.2949	0.7680934
genderM	-0.3680	0.2433	-1.5125	0.1304135
race_ethnicityWhite	0.2400	0.3836	0.6257	0.5315215
race_ethnicityOther	0.5325	0.4662	1.1423	0.2533245
race_ethnicityBlack or African American	0.5934	0.6396	0.9279	0.3534797
paid_free_reducedPaid	-0.1929	0.6067	-0.3180	0.7504960
lunch_dur	-0.0042	0.0195	-0.2182	0.8272622
time_to_eat	-0.1054	0.0327	-3.2175	0.0012931

log(dispersion) parameter:

Estimate	Std.Err
0.4549	0.0615

Integration:

method: adaptive Gauss-Hermite quadrature rule
quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton
converged: TRUE

4.4.1 IRR

	[,1]
(Intercept)	0.3972965
grade	1.0343515
genderM	0.6920972
race_ethnicityWhite	1.2712934
race_ethnicityOther	1.7032431
race_ethnicityBlack or African American	1.8102048
paid_free_reducedPaid	0.8245423
lunch_dur	0.9957618

time_to_eat	0.9000012
-------------	-----------

4.4.2 OR

	[,1]
(Intercept)	31.3330496
grade	1.0746213
genderM	1.0210273
race_ethnicityWhite	1.2163148
race_ethnicityOther	1.2505981
race_ethnicityBlack or African American	1.2766146
paid_free_reducedPaid	0.8026330
lunch_dur	0.9971233
time_to_eat	1.0162881

5 Fruit/Vegetable Percent Waste

histogram of Percent Fruits/Vegetables Was



5.1 Overall

-mean and sd for participants that wasted some F/V but not 100%

```
[1] 55.39093
```

```
[1] 30.44688
```

Call:

```
mixed_model(fixed = fv_prop_waste ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==  
  "Y" & salad_bar_dat_use$fv_prop_waste < 100, ], family = zi.negative.binomial(),  
  zi_fixed = ~grade + gender + race_ethnicity + paid_free_reduced +  
  lunch_dur + time_to_eat, zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 1774

Number of Groups: 36

Model:

family: zero-inflated negative binomial
link: log

Fit statistics:

log.Lik	AIC	BIC
-8193.533	16431.07	16465.9

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.2265	
zi_(Intercept)	1.2853	-0.6368

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	4.4531	0.1162	38.3369	< 1e-04
grade	-0.0276	0.0103	-2.6829	0.00729948
genderM	-0.1088	0.0316	-3.4424	0.00057660
race_ethnicityWhite	0.0304	0.0497	0.6108	0.54136062
race_ethnicityOther	-0.1711	0.0655	-2.6132	0.00896969
race_ethnicityBlack or African American	-0.1093	0.0725	-1.5084	0.13146399
paid_free_reducedPaid	0.0116	0.0545	0.2130	0.83131415
lunch_dur	-0.0039	0.0031	-1.2473	0.21227434
time_to_eat	-0.0147	0.0042	-3.5218	0.00042867

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-5.3141	0.7693	-6.9077	< 1e-04
grade	0.0705	0.0627	1.1238	0.2610882
genderM	0.4765	0.1874	2.5431	0.0109876
race_ethnicityWhite	-0.2225	0.3143	-0.7080	0.4789306
race_ethnicityOther	0.8876	0.2996	2.9631	0.0030453
race_ethnicityBlack or African American	0.6080	0.3707	1.6400	0.1009998
paid_free_reducedPaid	0.2548	0.3086	0.8257	0.4089933
lunch_dur	0.0436	0.0226	1.9280	0.0538526
time_to_eat	0.0317	0.0210	1.5117	0.1306036

log(dispersion) parameter:

Estimate	Std.Err
1.0059	0.0371

Integration:

method: adaptive Gauss-Hermite quadrature rule

quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton

converged: TRUE

5.1.1 IRR

	[,1]
(Intercept)	0.004921635
grade	1.073034003
genderM	1.610432501
race_ethnicityWhite	0.800480521
race_ethnicityOther	2.429389127
race_ethnicityBlack or African American	1.836796262
paid_free_reducedPaid	1.290225209

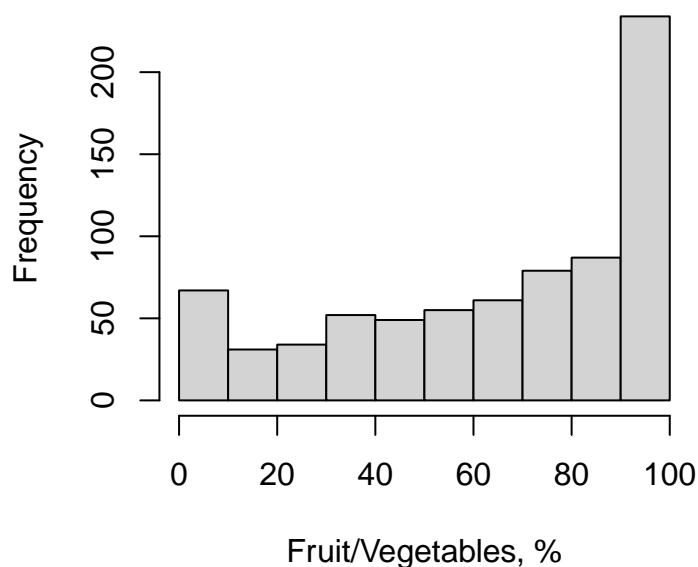
lunch_dur	1.044552440
time_to_eat	1.032251780

5.1.2 OR

	[,1]
(Intercept)	85.8937968
grade	0.9727505
genderM	0.8969426
race_ethnicityWhite	1.0308366
race_ethnicityOther	0.8427063
race_ethnicityBlack or African American	0.8964752
paid_free_reducedPaid	1.0116725
lunch_dur	0.9960816
time_to_eat	0.9854565

5.2 Elementary

Histogram of Percent Fruits/Vegetables Was



-mean and sd for participants that wasted some F/V but not 100%

```
[1] 100
```

```
[1] 27.74745
```

Call:

```
mixed_model(fixed = fv_prop_waste ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$school_type ==  
  "Elementary" & salad_bar_dat_use$fv_selected == "Y" & salad_bar_dat_use$fv_prop_waste <  
  100, ], family = zi.negative.binomial(), zi_fixed = ~grade +  
  gender + race_ethnicity + paid_free_reduced + lunch_dur +  
  time_to_eat, zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 671

Number of Groups: 12

Model:

family: zero-inflated negative binomial
link: log

Fit statistics:

log.Lik	AIC	BIC
-3183.878	6411.757	6422.425

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.0801	
zi_(Intercept)	1.2869	-0.3920

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	4.2812	0.1290	33.1817	< 1e-04
grade	-0.0091	0.0158	-0.5739	0.5660289
genderM	-0.0662	0.0416	-1.5933	0.1111036
race_ethnicityWhite	0.0182	0.0619	0.2934	0.7692083
race_ethnicityOther	-0.0630	0.0764	-0.8240	0.4099674
race_ethnicityBlack or African American	-0.0287	0.0838	-0.3428	0.7317594
paid_free_reducedPaid	0.0377	0.0582	0.6481	0.5168989
lunch_dur	0.0047	0.0034	1.3572	0.1747254
time_to_eat	-0.0177	0.0060	-2.9616	0.0030604

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-4.9520	1.4301	-3.4626	0.00053493
grade	0.1645	0.1314	1.2514	0.21080061
genderM	0.4403	0.3652	1.2056	0.22798179
race_ethnicityWhite	0.6998	0.5136	1.3626	0.17302268
race_ethnicityOther	0.0764	0.5722	0.1335	0.89378933
race_ethnicityBlack or African American	0.8986	0.5185	1.7331	0.08308152
paid_free_reducedPaid	-0.6770	0.6240	-1.0850	0.27790048
lunch_dur	0.0076	0.0447	0.1711	0.86416872
time_to_eat	0.0360	0.0516	0.6969	0.48587549

log(dispersion) parameter:

Estimate	Std.Err
1.3869	0.0607

Integration:

method: adaptive Gauss-Hermite quadrature rule
quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton
converged: TRUE

5.2.1 IRR

	[,1]
(Intercept)	0.007069318
grade	1.178747486
genderM	1.553195784
race_ethnicityWhite	2.013430668
race_ethnicityOther	1.079386140
race_ethnicityBlack or African American	2.456185119
paid_free_reducedPaid	0.508121676
lunch_dur	1.007668157

time_to_eat	1.036624197
-------------	-------------

5.2.2 OR

	[,1]
(Intercept)	72.3247305
grade	0.9909527
genderM	0.9359398
race_ethnicityWhite	1.0183262
race_ethnicityOther	0.9389663
race_ethnicityBlack or African American	0.9716990
paid_free_reducedPaid	1.0384621
lunch_dur	1.0046708
time_to_eat	0.9824571

5.3 Middle School

Histogram of Percent Fruits/Vegetables Was



-mean and sd for participants that wasted some F/V but not 100%

```
[1] 50.82084
```

```
[1] 31.95659
```

Call:

```
mixed_model(fixed = fv_prop_waste ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$school_type ==  
  "Middle School" & salad_bar_dat_use$fv_selected == "Y" &  
  salad_bar_dat_use$fv_prop_waste < 100, ], family = zi.negative.binomial(),  
  zi_fixed = ~grade + gender + race_ethnicity + paid_free_reduced +  
  lunch_dur + time_to_eat, zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 548

Number of Groups: 12

Model:

```
family: zero-inflated negative binomial  
link: log
```

Fit statistics:

log.Lik	AIC	BIC
-2533.249	5110.497	5121.165

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.2810	
zi_(Intercept)	1.5580	-0.6376

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	4.4048	0.3681	11.9647	< 1e-04
grade	-0.0167	0.0420	-0.3973	0.691171
genderM	-0.1720	0.0661	-2.6031	0.009239
race_ethnicityWhite	0.0512	0.1058	0.4836	0.628654
race_ethnicityOther	-0.3404	0.1327	-2.5649	0.010321
race_ethnicityBlack or African American	-0.3341	0.1412	-2.3667	0.017948
paid_free_reducedPaid	-0.0373	0.1194	-0.3124	0.754744
lunch_dur	-0.0038	0.0078	-0.4908	0.623564
time_to_eat	-0.0207	0.0100	-2.0711	0.038350

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-2.3658	2.2387	-1.0568	0.290617
grade	-0.3679	0.2511	-1.4651	0.142907
genderM	-0.0351	0.3812	-0.0920	0.926676
race_ethnicityWhite	-1.0193	0.7561	-1.3481	0.177627
race_ethnicityOther	1.6814	0.5688	2.9562	0.003115
race_ethnicityBlack or African American	-1.2629	1.3353	-0.9458	0.344264
paid_free_reducedPaid	0.5524	0.6756	0.8177	0.413550
lunch_dur	0.0872	0.0548	1.5910	0.111619
time_to_eat	-0.0826	0.0680	-1.2160	0.223998

log(dispersion) parameter:

Estimate	Std.Err
0.7319	0.066

Integration:

method: adaptive Gauss-Hermite quadrature rule

quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton

converged: TRUE

5.3.1 IRR

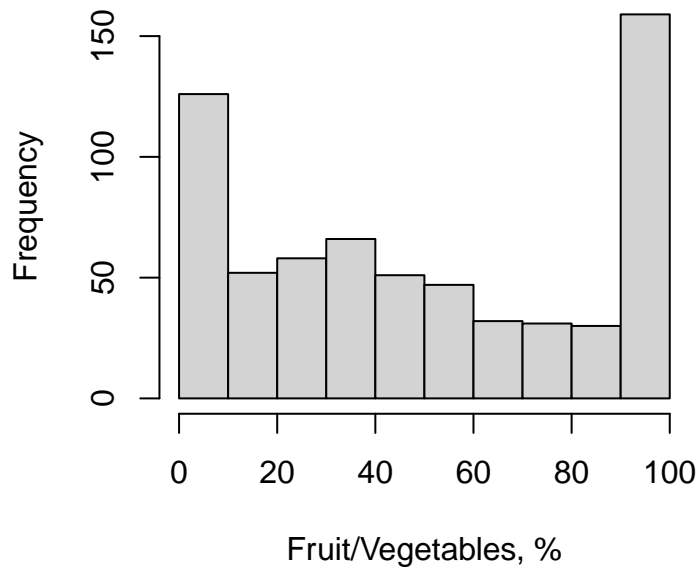
	[,1]
(Intercept)	0.09387426
grade	0.69219926
genderM	0.96552591
race_ethnicityWhite	0.36085048
race_ethnicityOther	5.37290070
race_ethnicityBlack or African American	0.28284544
paid_free_reducedPaid	1.73740541
lunch_dur	1.09109321
time_to_eat	0.92068424

5.3.2 OR

	[,1]
(Intercept)	81.8421086
grade	0.9834450
genderM	0.8419593
race_ethnicityWhite	1.0524826
race_ethnicityOther	0.7114942
race_ethnicityBlack or African American	0.7159560
paid_free_reducedPaid	0.9633808
lunch_dur	0.9961726
time_to_eat	0.9794887

5.4 High School

Histogram of Percent Fruits/Vegetables Was



-mean and sd for participants that wasted some F/V but not 100%

```
[1] 47.67042
```

```
[1] 28.94252
```

Call:

```
mixed_model(fixed = fv_prop_waste ~ grade + gender + race_ethnicity +  
  paid_free_reduced + lunch_dur + time_to_eat, random = ~1 |  
  school_name, data = salad_bar_dat_use[salad_bar_dat_use$school_type ==  
  "High School" & salad_bar_dat_use$fv_selected == "Y" & salad_bar_dat_use$fv_prop_waste <  
  100, ], family = zi.negative.binomial(), zi_fixed = ~grade +  
  gender + race_ethnicity + paid_free_reduced + lunch_dur +  
  time_to_eat, zi_random = ~1 | school_name)
```

Data Descriptives:

Number of Observations: 555

Number of Groups: 12

Model:

```
family: zero-inflated negative binomial  
link: log
```

Fit statistics:

log.Lik	AIC	BIC
-2416.392	4876.784	4887.452

Random effects covariance matrix:

	StdDev	Corr
(Intercept)	0.1969	
zi_(Intercept)	0.8980	-0.9408

Fixed effects:

	Estimate	Std.Err	z-value	p-value
(Intercept)	4.5344	0.3349	13.5406	< 1e-04
grade	-0.0180	0.0286	-0.6309	0.528097
genderM	-0.0926	0.0611	-1.5141	0.129997
race_ethnicityWhite	0.0500	0.1023	0.4886	0.625146
race_ethnicityOther	-0.2279	0.1725	-1.3215	0.186324
race_ethnicityBlack or African American	0.0321	0.2097	0.1530	0.878388
paid_free_reducedPaid	0.0664	0.1558	0.4258	0.670251
lunch_dur	-0.0110	0.0061	-1.8078	0.070634
time_to_eat	-0.0128	0.0069	-1.8542	0.063716

Zero-part coefficients:

	Estimate	Std.Err	z-value	p-value
(Intercept)	-4.8839	1.7871	-2.7328	0.0062799
grade	0.0231	0.1330	0.1740	0.8618398
genderM	0.7229	0.2823	2.5602	0.0104613
race_ethnicityWhite	-0.3184	0.4899	-0.6500	0.5157007
race_ethnicityOther	1.1813	0.5216	2.2649	0.0235165
race_ethnicityBlack or African American	1.3117	0.7653	1.7140	0.0865292
paid_free_reducedPaid	0.8390	0.5047	1.6622	0.0964800
lunch_dur	0.0399	0.0340	1.1744	0.2402523
time_to_eat	0.0504	0.0259	1.9449	0.0517820

log(dispersion) parameter:

Estimate	Std.Err
0.9194	0.0685

Integration:

method: adaptive Gauss-Hermite quadrature rule
quadrature points: 11

Optimization:

method: hybrid EM and quasi-Newton
converged: TRUE

5.4.1 IRR

	[,1]
(Intercept)	0.007567665
grade	1.023412967
genderM	2.060312163
race_ethnicityWhite	0.727289858
race_ethnicityOther	3.258672997
race_ethnicityBlack or African American	3.712643671
paid_free_reducedPaid	2.313965968
lunch_dur	1.040724550

time_to_eat	1.051642513
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5.4.2 OR

	[,1]
(Intercept)	93.1635446
grade	0.9821149
genderM	0.9115709
race_ethnicityWhite	1.0512607
race_ethnicityOther	0.7961759
race_ethnicityBlack or African American	1.0326016
paid_free_reducedPaid	1.0686079
lunch_dur	0.9891016
time_to_eat	0.9872801

6 Supplemental Information – Complete vs Missing Time to Eat

6.1 Demographic Characteristics

Table 2: Demographic Characteristics and Variables of Interest

Group	Characteristic	Full Sample		Time to Eat Data			p-value
		N	Overall	N	Complete	Missing	
	Gender	2,369		2,916			0.3
	F		1,100 (46%)		1,130 (46%)	232 (49%)	
	M		1,269 (54%)		1,312 (54%)	242 (51%)	
	Unknown				7	0	
	Grade	2,369	7.1 (3.1)	2,923	7.1 (3.1)	5.6 (3.5)	<0.001
	Age, yr	2,274	12.2 (3.2)	2,819	12.2 (3.2)	10.8 (3.5)	<0.001
	Unknown		95		99	5	
	Race/Ethnicity	2,369		2,846			<0.001
	Hispanic or Latino		1,498 (63%)		1,502 (63%)	256 (55%)	
	White		557 (24%)		560 (24%)	156 (33%)	
	Other		180 (7.6%)		180 (7.6%)	29 (6.2%)	
	Black or African American		134 (5.7%)		135 (5.7%)	28 (6.0%)	
	Unknown				72	5	
	Free-Reduced Lunch	2,369		2,916			<0.001
	Free/Reduced		1,875 (79%)		1,897 (78%)	407 (86%)	
	Paid		494 (21%)		547 (22%)	65 (14%)	
	Unknown				5	2	
	F/V Selected	2,369		2,923			0.004
	N		352 (15%)		377 (15%)	49 (10%)	
	Y		2,017 (85%)		2,072 (85%)	425 (90%)	
	Lunch Period	2,369	27.8 (9.6)				
	Time in Line	2,369	5.3 (3.2)				
	Lunch duration			2,917	28.0 (9.5)	27.9 (8.9)	0.7
	Unknown				0	6	
	F/V Consumed Any	2,017					
	N		243 (12%)				
	Y		1,774 (88%)				
	F/V Self-Served, g	2,017	136.9 (70.6)	2,497	136.3 (70.4)	130.5 (59.5)	0.5
	Lunch Period	2,017	26.9 (9.7)	2,493	27.0 (9.7)	27.0 (8.8)	0.5
	Unknown				0	4	
	Time in Line	2,017	5.3 (3.2)				
	Eating Duration	2,017	10.6 (4.1)				
	F/V Consumed, g	2,017	57.5 (55.3)	2,497	57.5 (54.9)	60.2 (53.1)	0.3
	F/V Waste, g	2,017	79.5 (66.7)	2,497	78.9 (66.5)	70.4 (60.0)	0.043
	F/V Percent Waste (post/pre), %	2,017	56.3 (35.1)	2,497	56.0 (35.0)	54.4 (36.6)	0.7

¹ n (%); Mean (SD)

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