Salad Bar Study: Rurality and Fruit and Vegetable Paper (Jepson)

Contents

1 Demographic Characteristics

Table 1: Demographic Characteristics

		Full Sample		Urban vs Rural			
Group	Characteristic	N	Overall	Urban, N = 2,092	non-Urban, N = 740	p-value	N
	Gender	2,832				0.4	
	F		1,328 (47%)	972 (46%)	356 (48%)		
	M		1,504 (53%)	1,120 (54%)	384 (52%)		
	Grade	2,832	6.9 (3.3)	6.8 (3.2)	7.1 (3.4)	0.041	
	Age, yr	2,732	12.0 (3.3)	11.8 (3.2)	12.3 (3.4)	<0.001	
	Unknown		100	100	0		
	Race/Ethnicity	2,832				0.011	
	Hispanic or Latino		1,751 (62%)	1,321 (63%)	430 (58%)		
	White		713 (25%)	512 (24%)	201 (27%)		
	Other		208 (7.3%)	137 (6.5%)	71 (9.6%)		
	Black or African American		160 (5.6%)	122 (5.8%)	38 (5.1%)		
	Free-Reduced Lunch	2,832				<0.001	
	Free/Reduced		2,273 (80%)	1,622 (78%)	651 (88%)		
	Paid		559 (20%)	470 (22%)	89 (12%)		
	F/V Selected	2,832				<0.001	
	N		399 (14%)	326 (16%)	73 (9.9%)		
	Y		2,433 (86%)	1,766 (84%)	667 (90%)		
	Rurality	2,832					
	Rural		740 (26%)				
	Suburb		335 (12%)				
	Urban		1,757 (62%)				
	Percent Rural, county	2,832	8.9 (10.3)	4.3 (5.8)	21.9 (9.2)	<0.001	
	Lunch Period	2,832	27.8 (9.5)	28.8 (10.1)	25.0 (6.5)	<0.001	
	F/V Consumed Any	2,433				0.2	2,433
	N		309 (13%)	214 (12%)	95 (14%)		
	Y		2,124 (87%)	1,552 (88%)	572 (86%)		
	F/V Self-Served, g	2,433	135.8 (68.9)	133.7 (73.1)	141.4 (55.8)	<0.001	2,433
	Time in Line	2,350	5.4 (4.4)	5.4 (4.9)	5.5 (2.6)	<0.001	2,350
	Unknown		83	37	46		
	Eating Duration	2,018	10.6 (4.1)	10.7 (4.2)	10.3 (3.7)	0.3	2,018
	Unknown		415	252	163		
	F/V Consumed, g	2,433	58.1 (54.9)	54.8 (54.0)	66.8 (56.4)	<0.001	2,433
	F/V Waste, g	2,433	77.7 (65.7)	78.9 (67.9)	74.6 (59.6)	0.8	2,433
	F/V Percent Waste (post/pre), %	2,433	55.8 (35.3)	56.8 (35.2)	53.3 (35.7)	0.082	2,433

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

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

1.1 Gender

```
    Pearson's Chi-squared test with Yates' continuity correction

data:  xtabs(~rurality2 + gender, data = salad_bar_dat_use)
X-squared = 0.53003, df = 1, p-value = 0.4666
```

1.2 age

```
    Welch Two Sample t-test

data:  age by rurality2
t = 3.5908, df = 1257.7, p-value = 0.0003423
alternative hypothesis: true difference in means between group non-Urban and group Urban is not equal to
95 percent confidence interval:
 0.2369962 0.8078480
sample estimates:
mean in group non-Urban     mean in group Urban
               12.33919                11.81677
```

1.3 grade

```
    Welch Two Sample t-test

data:  grade by rurality2
t = 1.9238, df = 1242.1, p-value = 0.05461
alternative hypothesis: true difference in means between group non-Urban and group Urban is not equal to
95 percent confidence interval:
 -0.005425267  0.553598489
sample estimates:
mean in group non-Urban     mean in group Urban
               7.059459                6.785373
```

1.4 race/ethnicity

```
    Pearson's Chi-squared test

data:  xtabs(~rurality2 + race_ethnicity, data = salad_bar_dat_use)
X-squared = 11.186, df = 3, p-value = 0.01076

           race_ethnicity
rurality2   Hispanic or Latino White Other Black or African American
  non-Urban                430   201    71                       38
  Urban                   1321   512   137                      122
```

1.5 free-reduced lunch

```
    Pearson's Chi-squared test with Yates' continuity correction
```

```
data:  xtabs(~rurality2 + paid_free_reduced, data = salad_bar_dat_use)
X-squared = 36.948, df = 1, p-value = 1.213e-09
```

```
           paid_free_reduced
rurality2   Free/Reduced Paid
  non-Urban          651   89
  Urban             1622  470
```

1.6 fruit/veg selected

```
    Pearson's Chi-squared test with Yates' continuity correction

data:  xtabs(~rurality2 + fv_selected, data = salad_bar_dat_use)
X-squared = 14.299, df = 1, p-value = 0.000156
```

1.7 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) 86.1331  1 34.107 7.386e-11 ***
rurality2    0.1246  1 34.359    0.7262
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$emmeans
 rurality2 emmean    SE   df lower.CL upper.CL
 non-Urban    141 15.23 34.1      110      172
 Urban        135  8.72 35.1      117      153

Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE   df t.ratio p.value
 (non-Urban) - Urban      6.2 17.6 34.4   0.353  0.7262

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

1.8 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) 86.3843  1 32.879 1.014e-10 ***
rurality2    1.0417  1 33.365    0.3148
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$emmeans
 rurality2 emmean   SE   df lower.CL upper.CL
 non-Urban   66.2 7.12 32.9     51.7     80.7
 Urban       57.8 4.14 34.9     49.3     66.2

Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE   df t.ratio p.value
 (non-Urban) - Urban     8.41 8.24 33.4   1.021  0.3148

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

1.9 fruit/veg waste

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

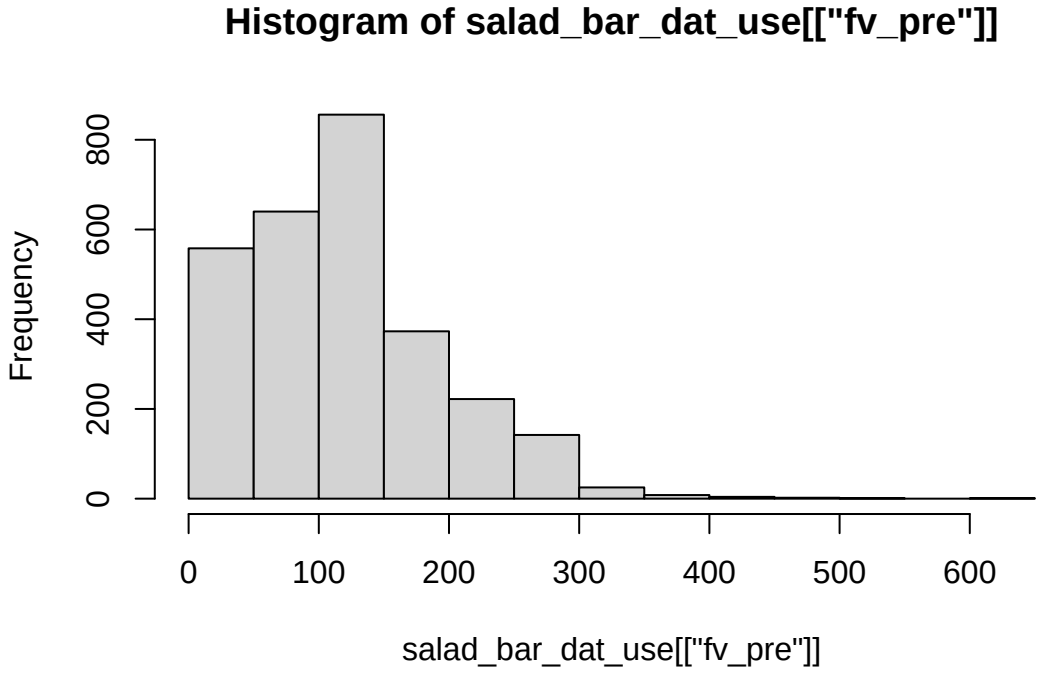
```
Response: fv_post
                 F Df Df.res   Pr(>F)
(Intercept) 30.6031  1 33.923 3.52e-06 ***
rurality2    0.0083  1 34.219   0.9278
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$emmeans
 rurality2 emmean    SE   df lower.CL upper.CL
 non-Urban   75.3 13.62 33.9     47.6    103.0
 Urban       76.8  7.81 35.1     60.9     92.6

Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE   df t.ratio p.value
 (non-Urban) - Urban    -1.43 15.7 34.2  -0.091  0.9278

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

1.10 fruit/veg waste proportion

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

Response: fv_prop_waste
                 F Df Df.res    Pr(>F)
(Intercept) 99.4777  1 33.224 1.606e-11 ***
rurality2    0.0254  1 33.657    0.8742
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$emmeans
 rurality2 emmean   SE   df lower.CL upper.CL
 non-Urban   53.6 5.38 33.2     42.7     64.6
 Urban       54.6 3.11 35.0     48.3     60.9

Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE   df t.ratio p.value
 (non-Urban) - Urban   -0.991 6.21 33.7  -0.160  0.8742

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

2 Rurality Models - 2 category

2.1 Fruit/Vegetable Self-Served



-mean and sd for participants that selected F/V

```
[1] 135.8027
```

```
[1] 68.88898
```

2.1.1 Overall model

```
Call:
mixed_model(fixed = fv_pre ~ school_type + race_ethnicity + paid_free_reduced +
    lunch_dur + rurality2, random = ~1 | school_name, data = salad_bar_dat_use,
    family = zi.negative.binomial(), zi_fixed = ~school_type +
        race_ethnicity + paid_free_reduced + lunch_dur + rurality2,
    zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2832
Number of Groups: 37

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

Fit statistics:
   log.Lik      AIC     BIC
 -13634.48 27312.96 27348.4
```

```
Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.3219
zi_(Intercept)  2.1477 -0.2900

Fixed effects:
                                       Estimate Std.Err z-value p-value
(Intercept)                              4.9108  0.1373 35.7565 < 1e-04
school_typeMiddle School                 0.1438  0.1319  1.0901 0.27569
school_typeHigh School                   0.1278  0.1333  0.9584 0.33787
race_ethnicityWhite                      0.0189  0.0253  0.7468 0.45519
race_ethnicityOther                      0.0421  0.0324  1.2964 0.19482
race_ethnicityBlack or African American -0.0343  0.0360 -0.9523 0.34092
paid_free_reducedPaid                   -0.0471  0.0287 -1.6386 0.10131
lunch_dur                               -0.0024  0.0018 -1.3288 0.18392
rurality2Urban                          -0.0942  0.1254 -0.7516 0.45228

Zero-part coefficients:
                                       Estimate Std.Err z-value    p-value
(Intercept)                            -7.4245  1.2539 -5.9213    < 1e-04
school_typeMiddle School                4.2040  1.2060  3.4859 0.00049042
school_typeHigh School                  5.1145  1.2373  4.1335    < 1e-04
race_ethnicityWhite                     0.4522  0.1860  2.4310 0.01505737
race_ethnicityOther                    -0.0220  0.2892 -0.0761 0.93933326
race_ethnicityBlack or African American 0.4129  0.3340  1.2362 0.21639815
paid_free_reducedPaid                   0.4554  0.2088  2.1810 0.02918630
lunch_dur                               0.0156  0.0146  1.0717 0.28385960
rurality2Urban                         -0.0627  0.9457 -0.0663 0.94712686

log(dispersion) parameter:
  Estimate Std.Err
     1.937  0.0304

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.1.1.1 irr

```
                                         [,1]
(Intercept)                       135.7449596
school_typeMiddle School            1.1546643
school_typeHigh School              1.1363116
race_ethnicityWhite                 1.0190963
race_ethnicityOther                 1.0429589
race_ethnicityBlack or African American 0.9663113
```

```
paid_free_reducedPaid                     0.9540308
lunch_dur                                 0.9975761
rurality2Urban                            0.9100687
```

2.1.1.2 or

```
                                                [,1]
(Intercept)                                5.964591e-04
school_typeMiddle School                   6.695579e+01
school_typeHigh School                     1.664252e+02
race_ethnicityWhite                        1.571690e+00
race_ethnicityOther                        9.782323e-01
race_ethnicityBlack or African American    1.511202e+00
paid_free_reducedPaid                      1.576740e+00
lunch_dur                                  1.015725e+00
rurality2Urban                             9.392132e-01
```

2.1.2 Rurality x Gender

```
Call:
mixed_model(fixed = fv_pre ~ school_type + race_ethnicity + paid_free_reduced +
    lunch_dur + gender * rurality2, random = ~1 | school_name,
    data = salad_bar_dat_use, family = zi.negative.binomial(),
    zi_fixed = ~school_type + race_ethnicity + paid_free_reduced +
        lunch_dur + gender * rurality2, zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2832
Number of Groups: 37

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

Fit statistics:
   log.Lik      AIC      BIC
 -13628.18 27308.35 27350.24

Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.3234
zi_(Intercept)  2.1556 -0.2920

Fixed effects:
                                       Estimate Std.Err z-value  p-value
(Intercept)                              4.9093  0.1387 35.4044  < 1e-04
school_typeMiddle School                 0.1386  0.1326  1.0452 0.295951
school_typeHigh School                   0.1230  0.1340  0.9181 0.358542
race_ethnicityWhite                      0.0212  0.0253  0.8379 0.402065
race_ethnicityOther                      0.0418  0.0324  1.2887 0.197513
race_ethnicityBlack or African American -0.0395  0.0360 -1.0975 0.272436
paid_free_reducedPaid                   -0.0478  0.0287 -1.6637 0.096176
lunch_dur                               -0.0022  0.0018 -1.2266 0.219972
genderM                                 -0.0025  0.0305 -0.0825 0.934276
rurality2Urban                          -0.0777  0.1274 -0.6099 0.541924
genderM:rurality2Urban                  -0.0311  0.0359 -0.8673 0.385795

Zero-part coefficients:
                                       Estimate Std.Err z-value    p-value
(Intercept)                            -7.2573  1.2619 -5.7512    < 1e-04
school_typeMiddle School                4.2306  1.2088  3.4999 0.00046544
school_typeHigh School                  5.1234  1.2414  4.1271    < 1e-04
race_ethnicityWhite                     0.4489  0.1869  2.4022 0.01629752
race_ethnicityOther                    -0.0193  0.2881 -0.0671 0.94650859
race_ethnicityBlack or African American 0.4069  0.3347  1.2157 0.22409191
paid_free_reducedPaid                   0.4551  0.2103  2.1639 0.03047138
lunch_dur                               0.0160  0.0147  1.0889 0.27621870
genderM                                -0.3821  0.2751 -1.3890 0.16483911
```

```
rurality2Urban                            -0.5158  0.9632 -0.5355 0.59231908
genderM:rurality2Urban                     0.8333  0.3202  2.6022 0.00926354

log(dispersion) parameter:
  Estimate Std.Err
    1.9384  0.0304

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.1.2.1 Zero model Marginal means

```
$emmeans
rurality2 = non-Urban:
 gender emmean    SE  df asymp.LCL asymp.UCL
 F       -3.26 0.854 Inf     -4.93     -1.58
 M       -3.64 0.855 Inf     -5.31     -1.96

rurality2 = Urban:
 gender emmean    SE  df asymp.LCL asymp.UCL
 F       -3.77 0.554 Inf     -4.86     -2.69
 M       -3.32 0.548 Inf     -4.40     -2.25

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced
Results are given on the log (not the response) scale.
Confidence level used: 0.95

$contrasts
rurality2 = non-Urban:
 contrast estimate    SE  df z.ratio p.value
 F - M       0.382 0.275 Inf   1.389  0.1648

rurality2 = Urban:
 contrast estimate    SE  df z.ratio p.value
 F - M      -0.451 0.165 Inf  -2.732  0.0063

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced
Results are given on the log (not the response) scale.
```

2.1.2.2 irr

```
                                        [,1]
(Intercept)                      135.5494699
school_typeMiddle School           1.1486316
school_typeHigh School             1.1308970
race_ethnicityWhite                1.0214516
race_ethnicityOther                1.0426511
```

```
race_ethnicityBlack or African American   0.9613126
paid_free_reducedPaid                     0.9532997
lunch_dur                                 0.9977594
genderM                                   0.9974891
rurality2Urban                            0.9252489
genderM:rurality2Urban                    0.9693764
```

2.1.2.3 or

```
                                            [,1]
(Intercept)                          7.050307e-04
school_typeMiddle School             6.875994e+01
school_typeHigh School               1.678989e+02
race_ethnicityWhite                  1.566517e+00
race_ethnicityOther                  9.808585e-01
race_ethnicityBlack or African American 1.502130e+00
paid_free_reducedPaid                1.576281e+00
lunch_dur                            1.016115e+00
genderM                              6.824360e-01
rurality2Urban                       5.970297e-01
genderM:rurality2Urban               2.300968e+00
```

2.1.3 Rurality x Eating Duration

```
Call:
mixed_model(fixed = fv_pre ~ school_type + race_ethnicity + paid_free_reduced +
    lunch_dur + time_to_eat_c * rurality2, random = ~1 | school_name,
    data = salad_bar_dat_use, family = zi.negative.binomial(),
    zi_fixed = ~school_type + race_ethnicity + paid_free_reduced +
        lunch_dur + time_to_eat_c * rurality2, zi_random = ~1 |
        school_name)

Data Descriptives:
Number of Observations: 2370
Number of Groups: 36

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

Fit statistics:
  log.Lik     AIC      BIC
 -11298.1 22648.2 22689.37

Random effects covariance matrix:
               StdDev    Corr
(Intercept)    0.3178
zi_(Intercept) 2.2487 -0.2804

Fixed effects:
                                    Estimate Std.Err z-value  p-value
```

```
(Intercept)                                4.8963  0.1504 32.5577  < 1e-04
school_typeMiddle School                   0.1375  0.1358  1.0122 0.311452
school_typeHigh School                     0.1031  0.1373  0.7508 0.452771
race_ethnicityWhite                        0.0139  0.0282  0.4925 0.622364
race_ethnicityOther                        0.0279  0.0341  0.8193 0.412617
race_ethnicityBlack or African American   -0.0273  0.0391 -0.6989 0.484589
paid_free_reducedPaid                     -0.0538  0.0307 -1.7520 0.079781
lunch_dur                                 -0.0016  0.0021 -0.7347 0.462516
time_to_eat_c                             -0.0005  0.0050 -0.0967 0.922958
rurality2Urban                            -0.0827  0.1309 -0.6320 0.527382
time_to_eat_c:rurality2Urban               0.0045  0.0057  0.7999 0.423762

Zero-part coefficients:
                                          Estimate Std.Err z-value    p-value
(Intercept)                               -7.2200  1.3460 -5.3639    < 1e-04
school_typeMiddle School                   3.8327  1.2655  3.0286 0.00245672
school_typeHigh School                     4.9029  1.2953  3.7851 0.00015364
race_ethnicityWhite                        0.4179  0.2060  2.0287 0.04248615
race_ethnicityOther                       -0.1900  0.3227 -0.5889 0.55591769
race_ethnicityBlack or African American    0.6595  0.3640  1.8120 0.06997921
paid_free_reducedPaid                      0.5688  0.2364  2.4058 0.01613703
lunch_dur                                  0.0213  0.0149  1.4321 0.15210187
time_to_eat_c                              0.0248  0.0428  0.5789 0.56266591
rurality2Urban                            -0.2805  1.0110 -0.2775 0.78139006
time_to_eat_c:rurality2Urban              -0.1531  0.0484 -3.1610 0.00157251

log(dispersion) parameter:
  Estimate Std.Err
    1.9792  0.0332

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.1.3.1 irr

```
                                           [,1]
(Intercept)                          133.7929722
school_typeMiddle School               1.1473685
school_typeHigh School                 1.1085738
race_ethnicityWhite                    1.0139874
race_ethnicityOther                    1.0283040
race_ethnicityBlack or African American   0.9730282
paid_free_reducedPaid                  0.9475881
lunch_dur                              0.9984269
time_to_eat_c                          0.9995207
rurality2Urban                         0.9206168
```

```
time_to_eat_c:rurality2Urban              1.0045307
```

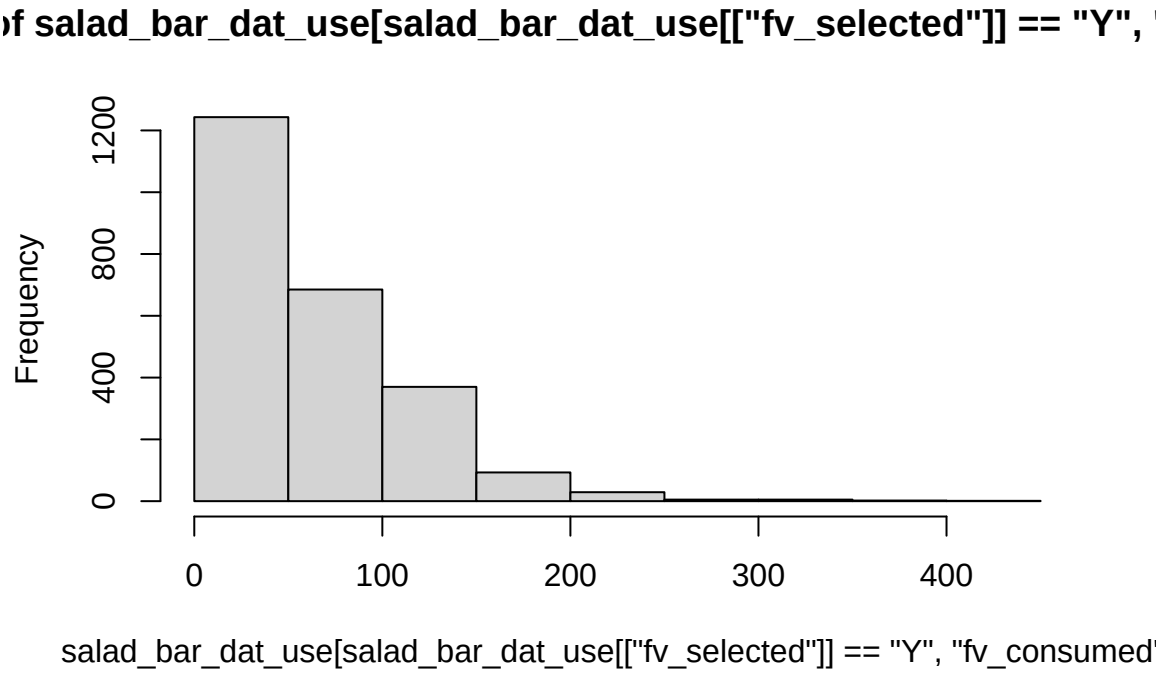
2.1.3.2 Zero model Marginal Slopes

```
$emtrends
 rurality2 time_to_eat_c.trend     SE  df z.ratio p.value
 non-Urban              0.0248 0.0428 Inf   0.579  0.5627
 Urban                 -0.1283 0.0227 Inf  -5.654  <.0001

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced

$contrasts
 contrast            estimate     SE  df z.ratio p.value
 (non-Urban) - Urban    0.153 0.0484 Inf   3.161  0.0016

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced
```

2.1.3.3 or

```
                                            [,1]
(Intercept)                          7.318158e-04
school_typeMiddle School             4.618729e+01
school_typeHigh School               1.346836e+02
race_ethnicityWhite                  1.518792e+00
race_ethnicityOther                  8.269248e-01
race_ethnicityBlack or African American 1.933858e+00
paid_free_reducedPaid                1.766080e+00
lunch_dur                            1.021576e+00
time_to_eat_c                        1.025063e+00
rurality2Urban                       7.553693e-01
time_to_eat_c:rurality2Urban         8.580424e-01
```

2.2 Fruit/Vegetable Consumed



-mean and sd for participants that selected F/V and consumed > 0 g F/V

[1] 66.55038 [1] 53.7929

2.2.1 Overall model

```
Call:
mixed_model(fixed = fv_consumed ~ school_type + race_ethnicity +
    paid_free_reduced + lunch_dur + rurality2, random = ~1 |
    school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==
    "Y", ], family = zi.negative.binomial(), zi_fixed = ~school_type +
    race_ethnicity + paid_free_reduced + lunch_dur + rurality2,
    zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2433
Number of Groups: 37

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

Fit statistics:
   log.Lik      AIC      BIC
 -11782.57 23609.14 23644.58

Random effects covariance matrix:
```

```
                StdDev    Corr
(Intercept)     0.2960
zi_(Intercept)  0.5925  0.1874

Fixed effects:
                                        Estimate Std.Err z-value    p-value
(Intercept)                               4.0600  0.1562 25.9856    < 1e-04
school_typeMiddle School                  0.3814  0.1304  2.9257 0.00343693
school_typeHigh School                    0.4919  0.1371  3.5868 0.00033478
race_ethnicityWhite                       0.0625  0.0626  0.9996 0.31748933
race_ethnicityOther                       0.2105  0.0814  2.5872 0.00967593
race_ethnicityBlack or African American   0.1031  0.0901  1.1439 0.25267472
paid_free_reducedPaid                    -0.0714  0.0692 -1.0312 0.30246972
lunch_dur                                -0.0030  0.0041 -0.7276 0.46684813
rurality2Urban                           -0.1508  0.1242 -1.2140 0.22473501

Zero-part coefficients:
                                        Estimate Std.Err z-value p-value
(Intercept)                             -2.3084  0.3728 -6.1921 < 1e-04
school_typeMiddle School                 0.2453  0.3000  0.8177 0.41351
school_typeHigh School                   0.4128  0.3196  1.2919 0.19640
race_ethnicityWhite                      0.1245  0.1937  0.6424 0.52064
race_ethnicityOther                      0.2505  0.2513  0.9968 0.31887
race_ethnicityBlack or African American  0.4171  0.2748  1.5178 0.12906
paid_free_reducedPaid                    0.1140  0.2230  0.5110 0.60934
lunch_dur                                0.0014  0.0110  0.1306 0.89610
rurality2Urban                          -0.1801  0.2798 -0.6436 0.51985

log(dispersion) parameter:
  Estimate Std.Err
    0.2197  0.0329

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.2.1.1 irr

```
                                         [,1]
(Intercept)                          57.9730256
school_typeMiddle School              1.4643632
school_typeHigh School                1.6353966
race_ethnicityWhite                   1.0645381
race_ethnicityOther                   1.2342991
race_ethnicityBlack or African American  1.1085981
paid_free_reducedPaid                 0.9310910
lunch_dur                             0.9970188
```

```
rurality2Urban                             0.8599936
```

2.2.1.2 or

```
                                              [,1]
(Intercept)                               0.0994196
school_typeMiddle School                  1.2780075
school_typeHigh School                    1.5111103
race_ethnicityWhite                       1.1325318
race_ethnicityOther                       1.2846609
race_ethnicityBlack or African American   1.5175054
paid_free_reducedPaid                     1.1207090
lunch_dur                                 1.0014407
rurality2Urban                            0.8352105
```

2.2.2 Rurality x Gender

```
Call:
mixed_model(fixed = fv_consumed ~ school_type + race_ethnicity +
    paid_free_reduced + lunch_dur + gender * rurality2, random = ~1 |
    school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==
    "Y", ], family = zi.negative.binomial(), zi_fixed = ~school_type +
    race_ethnicity + paid_free_reduced + lunch_dur + gender *
    rurality2, zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2433
Number of Groups: 37

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

Fit statistics:
   log.Lik      AIC      BIC
 -11780.72 23613.44 23655.32

Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.2957
zi_(Intercept)  0.5930  0.1884

Fixed effects:
                                        Estimate Std.Err z-value    p-value
(Intercept)                               4.0146  0.1601 25.0743    < 1e-04
school_typeMiddle School                  0.3811  0.1303  2.9257 0.00343686
school_typeHigh School                    0.4960  0.1371  3.6188 0.00029597
race_ethnicityWhite                       0.0582  0.0626  0.9300 0.35235871
race_ethnicityOther                       0.2059  0.0814  2.5308 0.01137871
race_ethnicityBlack or African American   0.1051  0.0902  1.1650 0.24400877
paid_free_reducedPaid                    -0.0742  0.0692 -1.0710 0.28414800
```

```
lunch_dur                                -0.0034  0.0041 -0.8160 0.41452093
genderM                                   0.1018  0.0764  1.3327 0.18264634
rurality2Urban                           -0.1169  0.1329 -0.8794 0.37918055
genderM:rurality2Urban                   -0.0590  0.0897 -0.6577 0.51074800

Zero-part coefficients:
                                        Estimate Std.Err z-value p-value
(Intercept)                              -2.2646  0.3889 -5.8233 < 1e-04
school_typeMiddle School                  0.2529  0.3002  0.8423 0.39960
school_typeHigh School                    0.4167  0.3198  1.3032 0.19249
race_ethnicityWhite                       0.1195  0.1939  0.6162 0.53773
race_ethnicityOther                       0.2392  0.2518  0.9503 0.34198
race_ethnicityBlack or African American   0.4252  0.2745  1.5491 0.12137
paid_free_reducedPaid                     0.1090  0.2233  0.4882 0.62542
lunch_dur                                 0.0011  0.0110  0.0986 0.92144
genderM                                  -0.0694  0.2370 -0.2926 0.76983
rurality2Urban                           -0.3045  0.3183 -0.9567 0.33872
genderM:rurality2Urban                    0.2390  0.2876  0.8312 0.40586

log(dispersion) parameter:
  Estimate Std.Err
    0.2212  0.0329

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.2.2.1 irr

```
                                         [,1]
(Intercept)                        55.4012436
school_typeMiddle School            1.4638795
school_typeHigh School              1.6421838
race_ethnicityWhite                 1.0599169
race_ethnicityOther                 1.2286303
race_ethnicityBlack or African American  1.1108159
paid_free_reducedPaid               0.9285201
lunch_dur                           0.9966532
genderM                             1.1071078
rurality2Urban                      0.8896678
genderM:rurality2Urban              0.9427048
```

2.2.2.2 or

```
                                     [,1]
(Intercept)                     0.1038766
school_typeMiddle School        1.2877081
school_typeHigh School          1.5169854
```

```
race_ethnicityWhite                       1.1269255
race_ethnicityOther                       1.2702946
race_ethnicityBlack or African American 1.5298453
paid_free_reducedPaid                     1.1151877
lunch_dur                                 1.0010885
genderM                                   0.9329963
rurality2Urban                            0.7374588
genderM:rurality2Urban                    1.2700004
```

2.2.3 Rurality x Eating Duration

```
Call:
mixed_model(fixed = fv_consumed ~ school_type + race_ethnicity +
    paid_free_reduced + lunch_dur + time_to_eat_c * rurality2,
    random = ~1 | school_name, data = salad_bar_dat_use[salad_bar_dat_use$fv_selected ==
        "Y", ], family = zi.negative.binomial(), zi_fixed = ~school_type +
        race_ethnicity + paid_free_reduced + lunch_dur + time_to_eat_c *
        rurality2, zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2018
Number of Groups: 36

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

Fit statistics:
   log.Lik      AIC     BIC
 -9748.964 19549.93 19591.1

Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.2916
zi_(Intercept)  0.6435  0.1744

Fixed effects:
                                        Estimate Std.Err z-value    p-value
(Intercept)                               3.9594  0.1753 22.5844    < 1e-04
school_typeMiddle School                  0.4388  0.1383  3.1724 0.00151199
school_typeHigh School                    0.4875  0.1457  3.3453 0.00082188
race_ethnicityWhite                       0.0363  0.0704  0.5153 0.60631877
race_ethnicityOther                       0.2326  0.0868  2.6790 0.00738403
race_ethnicityBlack or African American   0.1416  0.0985  1.4376 0.15054225
paid_free_reducedPaid                    -0.0768  0.0748 -1.0262 0.30482030
lunch_dur                                -0.0017  0.0047 -0.3576 0.72067997
time_to_eat_c                             0.0432  0.0135  3.2015 0.00136718
rurality2Urban                           -0.1377  0.1316 -1.0468 0.29520604
time_to_eat_c:rurality2Urban             -0.0179  0.0151 -1.1881 0.23480415

Zero-part coefficients:
```

```
                                     Estimate Std.Err z-value  p-value
(Intercept)                           -2.6068  0.4574 -5.6998  < 1e-04
school_typeMiddle School               0.1911  0.3495  0.5468 0.584482
school_typeHigh School                 0.5406  0.3703  1.4598 0.144346
race_ethnicityWhite                    0.2083  0.2312  0.9008 0.367716
race_ethnicityOther                    0.4043  0.2744  1.4732 0.140697
race_ethnicityBlack or African American  0.3530  0.3240  1.0894 0.275994
paid_free_reducedPaid                  0.1077  0.2593  0.4152 0.677978
lunch_dur                              0.0036  0.0129  0.2773 0.781541
time_to_eat_c                         -0.1073  0.0444 -2.4145 0.015756
rurality2Urban                        -0.0633  0.3274 -0.1932 0.846774
time_to_eat_c:rurality2Urban           0.0081  0.0514  0.1565 0.875603

log(dispersion) parameter:
  Estimate Std.Err
    0.2291  0.0361

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.2.3.1 irr

```
                                          [,1]
(Intercept)                         52.4249103
school_typeMiddle School             1.5508014
school_typeHigh School               1.6282696
race_ethnicityWhite                  1.0369294
race_ethnicityOther                  1.2618991
race_ethnicityBlack or African American  1.1520757
paid_free_reducedPaid                0.9260843
lunch_dur                            0.9983081
time_to_eat_c                        1.0441108
rurality2Urban                       0.8713307
time_to_eat_c:rurality2Urban         0.9822182
```

2.2.3.2 Zero model Marginal Slopes

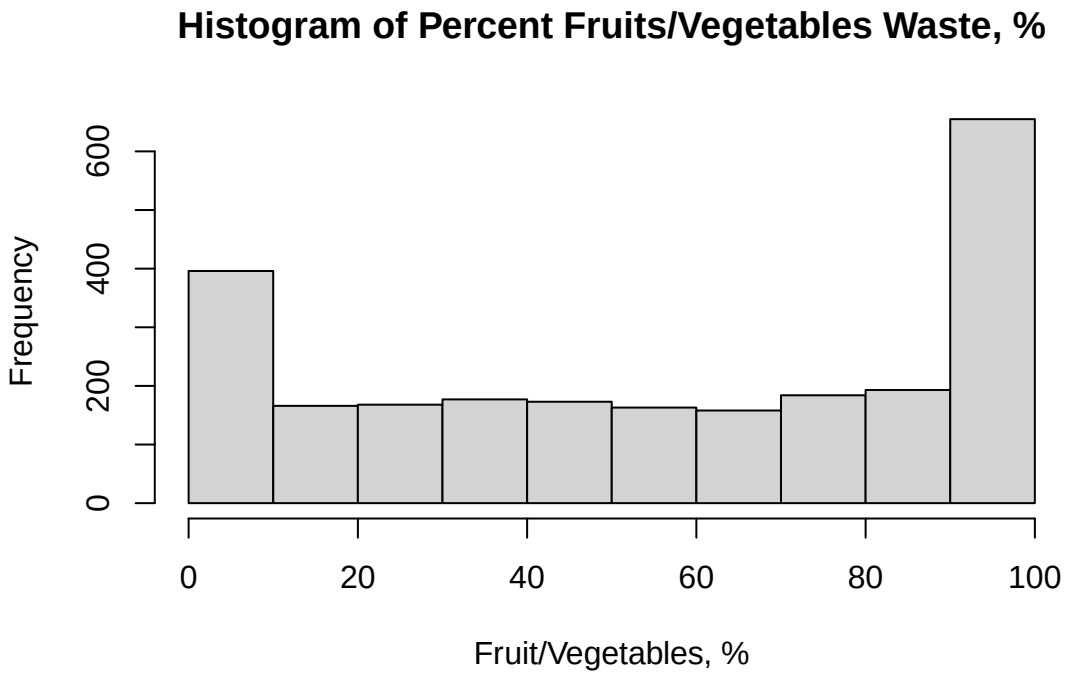
```
$emtrends
 rurality2 time_to_eat_c.trend     SE  df z.ratio p.value
 non-Urban             -0.1073 0.0444 Inf  -2.415  0.0158
 Urban                 -0.0993 0.0265 Inf  -3.749  0.0002

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced

$contrasts
 contrast            estimate     SE  df z.ratio p.value
 (non-Urban) - Urban -0.00805 0.0514 Inf  -0.157  0.8756
```

```
Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced
```

2.2.3.3 or

```
                                             [,1]
(Intercept)                            0.07376831
school_typeMiddle School               1.21063347
school_typeHigh School                 1.71697863
race_ethnicityWhite                    1.23153926
race_ethnicityOther                    1.49822908
race_ethnicityBlack or African American 1.42326212
paid_free_reducedPaid                  1.11367574
lunch_dur                              1.00357746
time_to_eat_c                          0.89823803
rurality2Urban                         0.93868621
time_to_eat_c:rurality2Urban           1.00808663
```

2.3 Fruit/Vegetable Propor2tion Waste



-mean and sd for participants that selected F/V and consumed > 0 g F/V

```
[1] 53.99989
```

```
[1] 30.99347
```

2.3.1 Overall model

```
Call:
mixed_model(fixed = fv_prop_waste ~ school_type + race_ethnicity +
    paid_free_reduced + lunch_dur + rurality2, 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 = ~school_type + race_ethnicity + paid_free_reduced +
        lunch_dur + rurality2, zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2124
Number of Groups: 37

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

Fit statistics:
   log.Lik     AIC      BIC
 -9885.301 19814.6 19850.04
```

```
Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.2550
zi_(Intercept)  1.3053 -0.6688

Fixed effects:
                                       Estimate Std.Err z-value   p-value
(Intercept)                              4.0998  0.1271 32.2694   < 1e-04
school_typeMiddle School                -0.2329  0.1107 -2.1045 0.0353333
school_typeHigh School                  -0.3069  0.1157 -2.6515 0.0080137
race_ethnicityWhite                     -0.0074  0.0463 -0.1590 0.8736879
race_ethnicityOther                     -0.1579  0.0640 -2.4666 0.0136404
race_ethnicityBlack or African American -0.1100  0.0694 -1.5841 0.1131807
paid_free_reducedPaid                   -0.0072  0.0530 -0.1352 0.8924693
lunch_dur                               -0.0012  0.0030 -0.4006 0.6887467
rurality2Urban                           0.0350  0.1055  0.3320 0.7399005

Zero-part coefficients:
                                       Estimate Std.Err z-value   p-value
(Intercept)                             -4.3748  0.7541 -5.8013   < 1e-04
school_typeMiddle School                 0.3010  0.6191  0.4862 0.6268054
school_typeHigh School                   1.1803  0.6372  1.8525 0.0639593
race_ethnicityWhite                     -0.1362  0.2857 -0.4766 0.6336506
race_ethnicityOther                      0.9237  0.2889  3.1973 0.0013871
race_ethnicityBlack or African American  0.6637  0.3530  1.8801 0.0600962
paid_free_reducedPaid                    0.2329  0.2971  0.7839 0.4331185
lunch_dur                                0.0214  0.0203  1.0530 0.2923338
rurality2Urban                           0.3186  0.5808  0.5487 0.5832430

log(dispersion) parameter:
  Estimate Std.Err
    0.8919  0.0335

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.3.1.1 irr

```
                                        [,1]
(Intercept)                         60.3297294
school_typeMiddle School             0.7922468
school_typeHigh School               0.7357404
race_ethnicityWhite                  0.9926690
race_ethnicityOther                  0.8539429
race_ethnicityBlack or African American  0.8958411
paid_free_reducedPaid                0.9928676
```

```
lunch_dur                                 0.9987867
rurality2Urban                            1.0356358
```

2.3.1.2 or

```
                                                [,1]
(Intercept)                               0.01259017
school_typeMiddle School                  1.35125343
school_typeHigh School                    3.25548030
race_ethnicityWhite                       0.87270199
race_ethnicityOther                       2.51871171
race_ethnicityBlack or African American   1.94204682
paid_free_reducedPaid                     1.26225643
lunch_dur                                 1.02162819
rurality2Urban                            1.37524448
```

2.3.2 Rurality x Gender

```
Call:
mixed_model(fixed = fv_prop_waste ~ school_type + race_ethnicity +
    paid_free_reduced + lunch_dur + gender * rurality2, 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 = ~school_type + race_ethnicity + paid_free_reduced +
        lunch_dur + gender * rurality2, zi_random = ~1 | school_name)

Data Descriptives:
Number of Observations: 2124
Number of Groups: 37

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

Fit statistics:
   log.Lik      AIC      BIC
 -9876.684 19805.37 19847.25

Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.2584
zi_(Intercept)  1.3010 -0.6694

Fixed effects:
                                      Estimate Std.Err z-value   p-value
(Intercept)                             4.1776  0.1308 31.9335   < 1e-04
school_typeMiddle School               -0.2317  0.1120 -2.0683 0.0386105
school_typeHigh School                 -0.3131  0.1170 -2.6758 0.0074555
race_ethnicityWhite                    -0.0100  0.0463 -0.2166 0.8285577
race_ethnicityOther                    -0.1620  0.0639 -2.5349 0.0112475
race_ethnicityBlack or African American -0.1096  0.0693 -1.5820 0.1136599
paid_free_reducedPaid                   0.0026  0.0529  0.0482 0.9615259
lunch_dur                              -0.0005  0.0030 -0.1730 0.8626902
genderM                                -0.1874  0.0573 -3.2723 0.0010669
rurality2Urban                         -0.0486  0.1123 -0.4333 0.6647985
genderM:rurality2Urban                  0.1607  0.0673  2.3866 0.0170041

Zero-part coefficients:
                                      Estimate Std.Err z-value   p-value
(Intercept)                            -4.5500  0.7829 -5.8117   < 1e-04
school_typeMiddle School                0.3157  0.6172  0.5115 0.6089686
school_typeHigh School                  1.2227  0.6355  1.9241 0.0543446
race_ethnicityWhite                    -0.1697  0.2864 -0.5924 0.5535716
race_ethnicityOther                     0.8875  0.2897  3.0638 0.0021852
race_ethnicityBlack or African American  0.6772  0.3543  1.9115 0.0559431
paid_free_reducedPaid                   0.2221  0.2968  0.7484 0.4542293
lunch_dur                               0.0176  0.0203  0.8644 0.3873887
```

```
genderM                                   0.4624  0.3727  1.2404 0.2148170
rurality2Urban                            0.3697  0.6359  0.5813 0.5610069
genderM:rurality2Urban                   -0.0450  0.4227 -0.1065 0.9151745

log(dispersion) parameter:
  Estimate Std.Err
    0.8984  0.0336

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.3.2.1 irr

```
                                          [,1]
(Intercept)                         65.2100045
school_typeMiddle School             0.7932185
school_typeHigh School               0.7311714
race_ethnicityWhite                  0.9900333
race_ethnicityOther                  0.8504625
race_ethnicityBlack or African American  0.8961671
paid_free_reducedPaid                1.0025560
lunch_dur                            0.9994741
genderM                              0.8291208
rurality2Urban                       0.9525250
genderM:rurality2Urban               1.1742975
```

2.3.2.2 or

```
                                          [,1]
(Intercept)                         0.01056711
school_typeMiddle School            1.37123589
school_typeHigh School              3.39630975
race_ethnicityWhite                 0.84393217
race_ethnicityOther                 2.42911792
race_ethnicityBlack or African American 1.96834267
paid_free_reducedPaid               1.24870637
lunch_dur                           1.01772118
genderM                             1.58782587
rurality2Urban                      1.44729327
genderM:rurality2Urban              0.95597795
```

2.3.3 Rurality x Eating Duration

```
Call:
mixed_model(fixed = fv_prop_waste ~ school_type + race_ethnicity +
    paid_free_reduced + lunch_dur + time_to_eat_c * rurality2,
    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 = ~school_type + race_ethnicity + paid_free_reduced +
        lunch_dur + time_to_eat_c * rurality2, zi_random = ~1 |
        school_name)

Data Descriptives:
Number of Observations: 1775
Number of Groups: 36

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

Fit statistics:
   log.Lik      AIC      BIC
 -8197.889 16447.78 16488.95

Random effects covariance matrix:
                StdDev    Corr
(Intercept)     0.2129
zi_(Intercept)  1.2872 -0.7373

Fixed effects:
                                       Estimate Std.Err z-value    p-value
(Intercept)                              4.2328  0.1248 33.9070    < 1e-04
school_typeMiddle School                -0.2768  0.1010 -2.7407 0.00613046
school_typeHigh School                  -0.2885  0.1059 -2.7252 0.00642545
race_ethnicityWhite                      0.0303  0.0495  0.6114 0.54091494
race_ethnicityOther                     -0.1846  0.0654 -2.8221 0.00477127
race_ethnicityBlack or African American -0.1236  0.0724 -1.7077 0.08769204
paid_free_reducedPaid                   -0.0133  0.0540 -0.2470 0.80489489
lunch_dur                               -0.0054  0.0032 -1.6980 0.08950837
time_to_eat_c                           -0.0421  0.0086 -4.9176    < 1e-04
rurality2Urban                           0.0630  0.0963  0.6544 0.51287294
time_to_eat_c:rurality2Urban             0.0360  0.0098  3.6736 0.00023911

Zero-part coefficients:
                                       Estimate Std.Err z-value   p-value
(Intercept)                            -4.6301  0.8546 -5.4181   < 1e-04
school_typeMiddle School                0.2703  0.6636  0.4073 0.6837601
school_typeHigh School                  0.9796  0.6922  1.4152 0.1570132
race_ethnicityWhite                    -0.1595  0.3145 -0.5070 0.6121789
race_ethnicityOther                     0.9251  0.2981  3.1029 0.0019161
race_ethnicityBlack or African American 0.5821  0.3682  1.5807 0.1139412
paid_free_reducedPaid                   0.2646  0.3090  0.8565 0.3917202
```

```
lunch_dur                                0.0346  0.0240  1.4366 0.1508176
time_to_eat_c                            0.0438  0.0564  0.7773 0.4369583
rurality2Urban                           0.3071  0.6172  0.4975 0.6188322
time_to_eat_c:rurality2Urban            -0.0222  0.0606 -0.3657 0.7145529

log(dispersion) parameter:
  Estimate Std.Err
     1.007  0.0371

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

Optimization:
method: hybrid EM and quasi-Newton
converged: TRUE
```

2.3.3.1 Count model Marginal Slopes

```
$emtrends
 rurality2 time_to_eat_c.trend      SE  df z.ratio p.value
 non-Urban            -0.04208 0.00856 Inf  -4.918  <.0001
 Urban                -0.00611 0.00474 Inf  -1.289  0.1975

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced

$contrasts
 contrast            estimate      SE  df z.ratio p.value
 (non-Urban) - Urban   -0.036 0.00979 Inf  -3.674  0.0002

Results are averaged over the levels of: school_type, race_ethnicity, paid_free_reduced
```

2.3.3.2 irr

```
                                        [,1]
(Intercept)                       68.9119689
school_typeMiddle School           0.7582376
school_typeHigh School             0.7494083
race_ethnicityWhite                1.0307283
race_ethnicityOther                0.8313990
race_ethnicityBlack or African American  0.8837123
paid_free_reducedPaid              0.9867456
lunch_dur                          0.9946182
time_to_eat_c                      0.9587949
rurality2Urban                     1.0650205
time_to_eat_c:rurality2Urban       1.0366277
```

2.3.3.3 or

```
                                         [,1]
(Intercept)                       0.009753697
school_typeMiddle School          1.310375408
```

```
school_typeHigh School                  2.663270818
race_ethnicityWhite                     0.852606647
race_ethnicityOther                     2.522129158
race_ethnicityBlack or African American 1.789758550
paid_free_reducedPaid                   1.302970820
lunch_dur                               1.035155231
time_to_eat_c                           1.044818512
rurality2Urban                          1.359448390
time_to_eat_c:rurality2Urban            0.978064123
```