R01-FBS: Task EF x Risk Status Paper

Contents

1 Participant Characteristics (Demographics Database)

Table 1: Demographic Characteristics

Characteristic	Low Risk, N = 53	High Risk, N = 40	Test Statistic	p-value
Age, yr	7.8 (0.7)	7.8 (0.6)	0.44	0.7
Sex			1.2	0.3
Male	30 (57%)	18 (45%)		
Female	23 (43%)	22 (55%)		
Ethnicity				>0.9
Hispanic/Lantinx	0 (0%)	0 (0%)		
Not Hispanic/Lantinx	53 (100%)	40 (100%)		
Race				0.3
Asian	3 (5.7%)	0 (0%)		
Black/AA	0 (0%)	0 (0%)		
White/Caucasian	50 (94%)	40 (100%)		
Income			10	0.006
< $51,000	4 (7.7%)	8 (21%)		
>$100,000	26 (50%)	7 (18%)		
$51,000 - $100,000	22 (42%)	23 (61%)		
Unknown	1	2		
Mother's Education				0.008
> Bachelor Degree	23 (44%)	6 (15%)		
AA/Technical Degree	3 (5.8%)	7 (18%)		
Bachelor Degree	23 (44%)	21 (52%)		
High School/GED	3 (5.8%)	6 (15%)		
Unknown	1	0		
Father's Education				<0.001
> Bachelor Degree	29 (55%)	4 (11%)		
AA/Technical Degree	3 (5.7%)	11 (31%)		
Bachelor Degree	15 (28%)	14 (40%)		
High School/GED	6 (11%)	5 (14%)		
Other/NA	0 (0%)	1 (2.9%)		
Unknown	0	5		
BMI %tile	41.7 (23.9)	55.7 (23.6)	-2.8	0.006
Total Body Fat %	27.1 (3.8)	30.6 (4.3)	-4.1	<0.001
Total Fat Mass	6,818.7 (1,419.0)	8,127.7 (1,833.3)	-3.7	<0.001
Visceral Fat Mass	157.2 (51.7)	161.2 (55.2)	-0.36	0.7
Lean Fat Mass	17,420.5 (2,574.3)	17,337.7 (2,130.0)	0.17	0.9
IQ	116.1 (16.4)	110.4 (10.8)	1.7	0.085
Unknown	11	13		

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

[2] Welch Two Sample t-test; Pearson's Chi-squared test; Fisher's exact test

1.1 income

```
    Pearson's Chi-squared test

data:  xtabs(~risk_status_mom + income, data = covar_demo)
X-squared = 10.368, df = 2, p-value = 0.005605
```

1.2 mom education

```
    Fisher's Exact Test for Count Data

data:  xtabs(~risk_status_mom + mom_ed, data = covar_demo)
p-value = 0.008449
alternative hypothesis: two.sided
```

1.3 bmi percentile

```
    Welch Two Sample t-test

data:  bmi_percentile by risk_status_mom
t = -2.8098, df = 84.587, p-value = 0.006157
alternative hypothesis: true difference in means between group Low Risk and group High Risk is not equal
95 percent confidence interval:
 -23.873036  -4.086775
sample estimates:
 mean in group Low Risk mean in group High Risk
               41.73509                55.71500
```

1.4 percent body fat

```
    Welch Two Sample t-test

data:  dxa_total_body_perc_fat by risk_status_mom
t = -4.136, df = 77.38, p-value = 8.899e-05
alternative hypothesis: true difference in means between group Low Risk and group High Risk is not equal
95 percent confidence interval:
 -5.272136 -1.845600
sample estimates:
 mean in group Low Risk mean in group High Risk
               27.08113                30.64000
```

2 Effect of Risk Status

2.1 Go-NoGo

Table 2: Go-NoGo Performance Summary

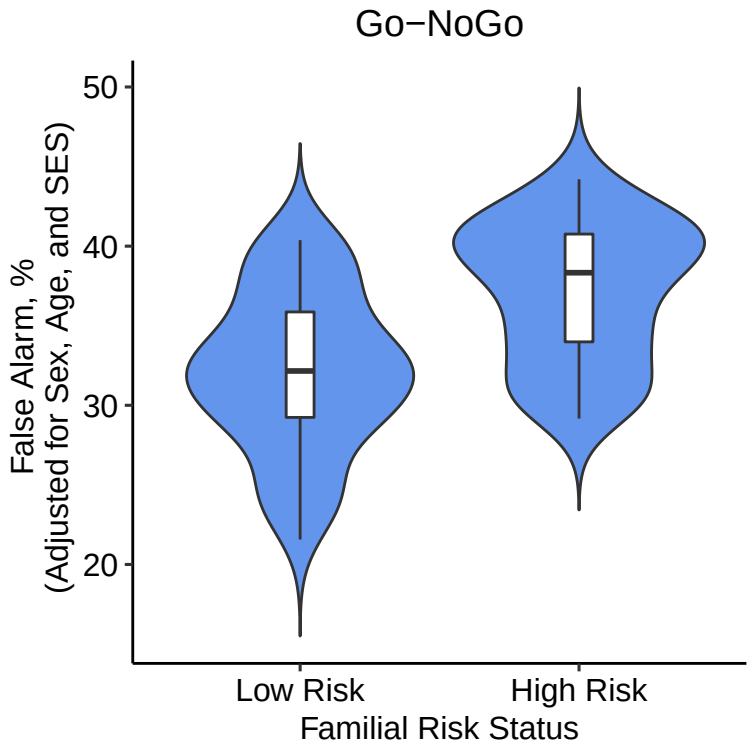
Characteristic	Low Risk, N = 53	High Risk, N = 39
Missed, N	4.6 (5.2)	3.9 (3.7)
False Alarm, N	16.0 (8.2)	18.9 (7.9)
Missed, %	3.1 (3.5)	2.6 (2.5)
False Alarm, %	32.0 (16.4)	37.8 (15.7)
Mean Hit RT, ms	543.6 (60.9)	544.9 (61.6)
Mean False Alarm RT, ms	432.5 (53.2)	426.6 (53.9)
d', loglinear	2.5 (0.7)	2.3 (0.6)

[1] Mean (SD)

2.1.1 Percent False Alarms

Table 3: Go-NoGo Percent False Alarms

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	53.906	22.840	2.360	0.021
mom_edAA/Technical Degree	3.097	6.475	0.478	0.634
mom_edBachelor Degree	-0.255	4.039	-0.063	0.950
mom_edHigh School/GED	-2.799	7.983	-0.351	0.727
income>$100,000	5.961	6.929	0.860	0.392
income$51,000 - $100,000	-0.945	6.137	-0.154	0.878
sexFemale	-6.111	3.595	-1.700	0.093
age_yr	-2.776	2.778	-0.999	0.321
risk_status_momHigh Risk	7.766	3.842	2.021	0.047



There was a significant effect of familial obesity risk such that children with high risk had a false alarm percentage that was 7.8 points higher than those with low risk. SES, age, and sex were not associated with false alarm percentage.

2.1.2 Percent Hits

Table 4: Go-NoGo - Percent Hits

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	93.843	4.581	20.484	0.000
mom_edAA/Technical Degree	2.066	1.299	1.591	0.116
mom_edBachelor Degree	1.015	0.810	1.253	0.214
mom_edHigh School/GED	-0.770	1.601	-0.481	0.632
income>$100,000	-1.324	1.390	-0.952	0.344
income$51,000 - $100,000	-1.598	1.231	-1.298	0.198
sexFemale	0.926	0.721	1.284	0.203
age_yr	0.439	0.557	0.788	0.433
risk_status_momHigh Risk	-0.075	0.771	-0.097	0.923

Correct responses to go stimuli did not differ by risk status, age, sex, or SES.

2.1.3 Go Reaction Time

Table 5: Go-NoGo - Go Reaction Time

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	771.113	86.643	8.900	0.000
mom_edAA/Technical Degree	-21.783	24.561	-0.887	0.378
mom_edBachelor Degree	-21.430	15.322	-1.399	0.166
mom_edHigh School/GED	-24.738	30.282	-0.817	0.416
income>$100,000	-26.475	26.284	-1.007	0.317
income$51,000 - $100,000	-16.345	23.279	-0.702	0.485
sexFemale	16.386	13.637	1.202	0.233
age_yr	-25.797	10.539	-2.448	0.017
risk_status_momHigh Risk	3.206	14.575	0.220	0.826

Correct responses to go stimuli did not differ by risk status, sex, or SES. However, older children responded more quickly than younger children.

2.1.4 d'

Table 6: Go-NoGo - d'

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	1.384	0.950	1.457	0.149
mom_edAA/Technical Degree	0.141	0.269	0.523	0.603
mom_edBachelor Degree	0.068	0.168	0.402	0.689
mom_edHigh School/GED	-0.082	0.332	-0.248	0.805
income>$100,000	-0.292	0.288	-1.013	0.314
income$51,000 - $100,000	-0.131	0.255	-0.513	0.610
sexFemale	0.272	0.150	1.820	0.073
age_yr	0.149	0.116	1.287	0.202
risk_status_momHigh Risk	-0.263	0.160	-1.645	0.104

Sensitivity indexed by d' did not differ by risk status, age, sex, or SES.

2.2 Stop-Signal Task

Table 7: Stop-Signal Task Performance Summary: Risk Status across all trials

Characteristic	Low Risk, N = 48	High Risk, N = 34
race horse		
0	3 (6.2%)	6 (18%)
1	45 (94%)	28 (82%)
Go RT, ms	655.5 (105.8)	646.7 (130.5)
L/R Response Error, N	5.3 (8.0)	5.1 (5.7)
Misses, N	2.9 (4.0)	4.9 (6.9)
SSD, ms	303.3 (86.8)	255.0 (89.7)
SSRT - Mean Method, ms	350.9 (61.9)	377.8 (85.5)
SSRT - Integration Method, ms	313.6 (82.0)	375.9 (124.4)

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

Table 8: Stop-Signal Task Performance Summary: Risk Status by Energy Density Condition

	Low ED		High ED	
Characteristic	Low Risk, N = 30	High Risk, N = 25	Low Risk, N = 30	High Risk, N = 25
Go RT, ms	673.6 (115.2)	668.9 (144.3)	677.1 (95.7)	656.5 (139.1)
L/R Response Error, N	2.6 (3.9)	2.3 (2.1)	1.6 (2.0)	2.3 (2.2)
Misses, N	1.6 (2.8)	2.9 (4.1)	1.3 (1.7)	2.4 (4.0)
SSD, ms	326.4 (97.1)	283.8 (98.9)	324.4 (77.9)	266.6 (87.1)
SSRT - Mean Method, ms	342.3 (49.2)	378.2 (92.5)	347.7 (49.3)	386.4 (92.5)
SSRT - Integration Method, ms	299.4 (70.1)	367.6 (174.6)	294.8 (46.0)	373.1 (111.5)

[1] Mean (SD)

Table 9: Stop-Signal Task Performance Summary: Risk Status by Portion Size Condition

	Small PS		Large PS	
Characteristic	Low Risk, N = 33	High Risk, N = 25	Low Risk, N = 33	High Risk, N = 25
Go RT, ms	664.1 (112.5)	664.8 (139.9)	672.4 (117.9)	666.0 (142.9)
L/R Response Error, N	2.4 (3.4)	1.9 (1.7)	1.8 (2.9)	2.8 (2.4)
Misses, N	1.8 (3.1)	2.9 (4.4)	1.5 (2.0)	2.4 (3.8)
SSD, ms	304.6 (95.9)	272.7 (90.0)	322.6 (92.0)	288.2 (86.6)
SSRT - Mean Method, ms	355.0 (53.5)	381.4 (92.3)	346.2 (60.4)	373.0 (90.2)
SSRT - Integration Method, ms	309.8 (66.4)	375.3 (121.6)	307.3 (67.9)	345.5 (113.8)

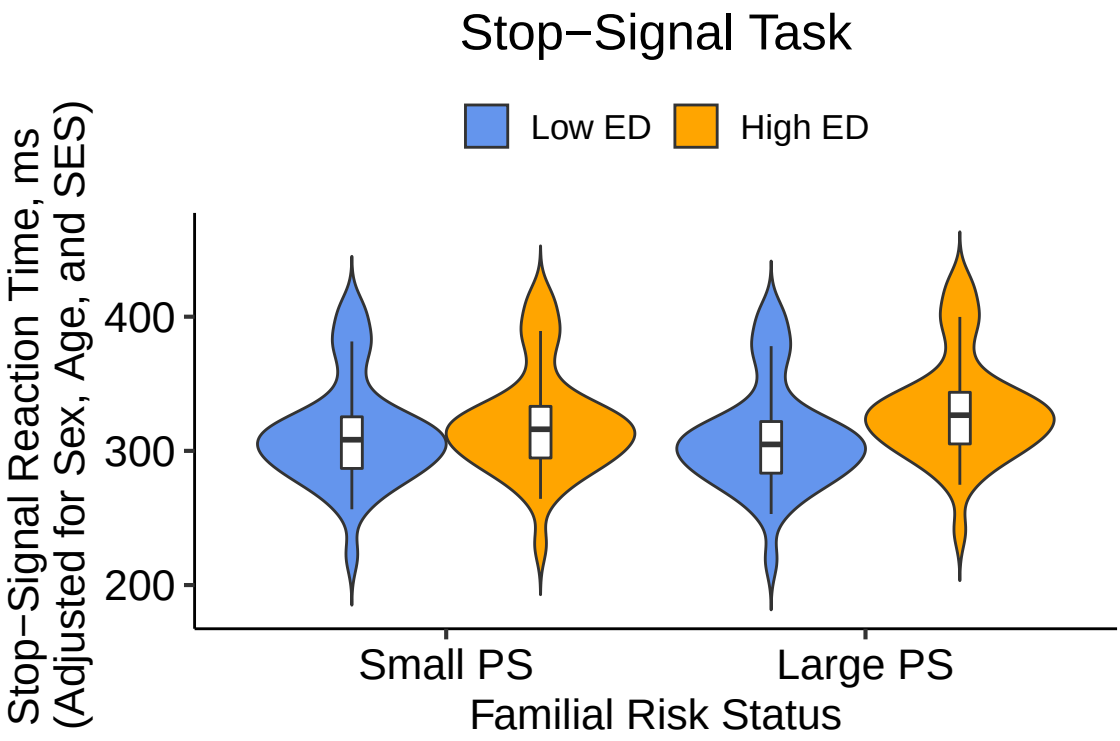
[1] Mean (SD)

2.2.1 Stop Signal Reaction Time

Table 10: Stop-Signal Task SSRT - ED x PS

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	498.188	142.863	32.66	3.487	0.001
mom_edAA/Technical Degree	45.098	44.200	32.00	1.020	0.315
mom_edBachelor Degree	11.662	24.830	32.00	0.470	0.642
mom_edHigh School/GED	-61.251	40.577	32.00	-1.509	0.141
income>$100,000	-72.180	37.009	32.00	-1.950	0.060
income$51,000 - $100,000	-40.158	33.421	32.00	-1.202	0.238
sexFemale	18.812	20.916	32.00	0.899	0.375
age_yr	-19.723	18.130	32.00	-1.088	0.285
PSLarge PS	-3.502	23.531	117.00	-0.149	0.882
EDHigh ED	7.794	23.531	117.00	0.331	0.741
PSLarge PS:EDHigh ED	13.989	33.278	117.00	0.420	0.675

2.2.1.1 Design

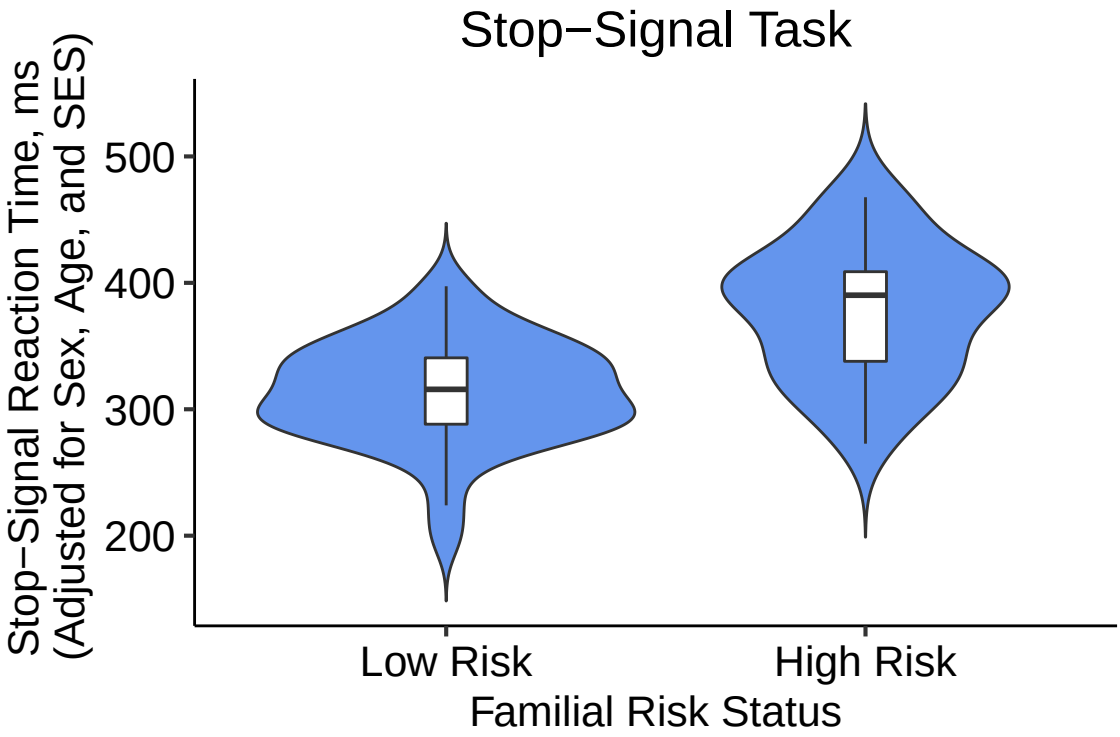


No effect of energy density, portion size, or interaction.

Table 11: Stop-Signal Task SSRT - Risk Status

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	668.116	164.378	4.065	0.000
mom_edAA/Technical Degree	51.718	50.279	1.029	0.308
mom_edBachelor Degree	-24.764	28.895	-0.857	0.395
mom_edHigh School/GED	-82.236	55.160	-1.491	0.141
income>$100,000	5.889	50.927	0.116	0.908
income$51,000 - $100,000	-6.496	47.774	-0.136	0.892
sexFemale	13.796	24.482	0.564	0.575
age_yr	-44.512	20.017	-2.224	0.030
risk_status_momHigh Risk	69.065	27.516	2.510	0.015

2.2.1.2 Overall



Across all trials, there was a significant effect of familial obesity risk on stop-signal reaction time (SSRT). SSRT was slower (worse) in children with high risk compared to those with low risk. Additionally, older children were showed faster SSRT. There was no association with sex or SES.

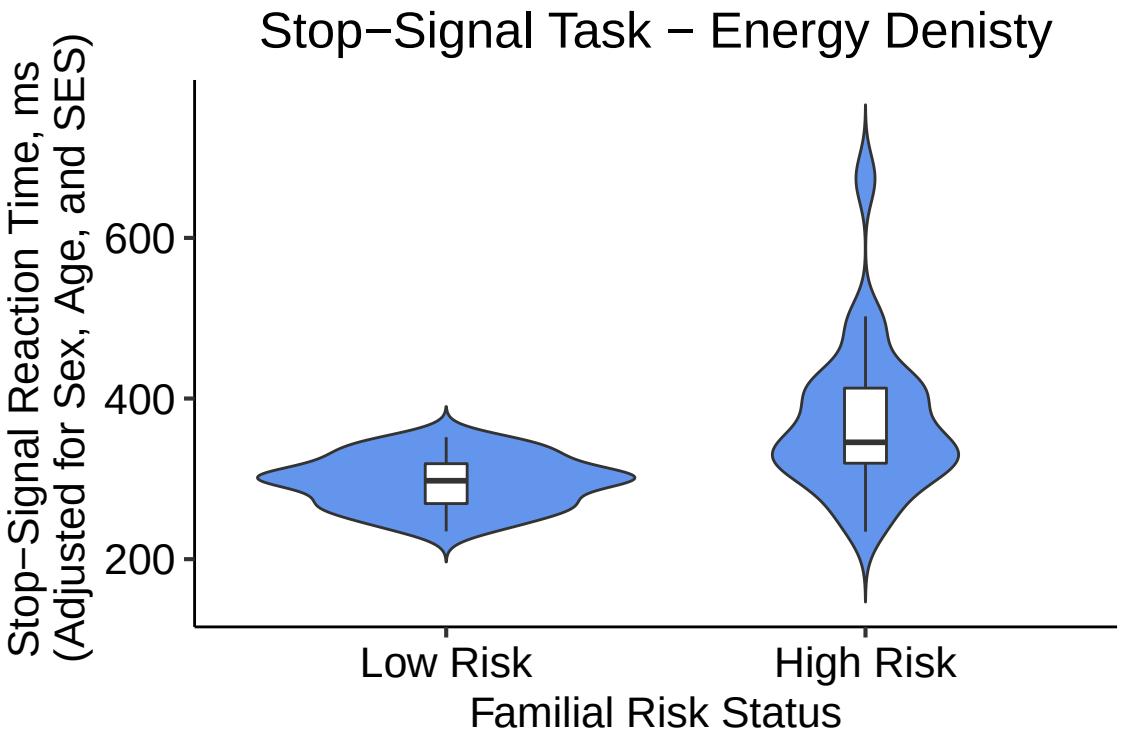
```
$emmeans
 risk_status_mom emmean   SE df lower.CL upper.CL
 Low Risk           315 20.1 60      274      355
 High Risk          384 22.3 60      339      428

Results are averaged over the levels of: mom_ed, income, sex
```

```
Confidence level used: 0.95

$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk    -69.1 27.5 60  -2.510  0.0148

Results are averaged over the levels of: mom_ed, income, sex

 age_yr age_yr.trend SE df t.ratio p.value
   7.78        -44.5 20 60  -2.224  0.0299

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
```

Table 12: Stop-Signal Task SSRT - ED x Risk Status

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	652.049	175.664	43.308	3.712	0.001
mom_edAA/Technical Degree	47.054	56.412	43.000	0.834	0.409
mom_edBachelor Degree	-52.936	31.424	43.000	-1.685	0.099
mom_edHigh School/GED	-105.585	53.747	43.000	-1.964	0.056
income>$100,000	-18.289	49.114	43.000	-0.372	0.711
income$51,000 - $100,000	-26.808	44.968	43.000	-0.596	0.554
sexFemale	-3.391	26.491	43.000	-0.128	0.899
age_yr	-39.442	21.795	43.000	-1.810	0.077
EDHigh ED	-1.467	20.974	50.000	-0.070	0.945
risk_status_momHigh Risk	85.698	32.568	67.892	2.631	0.011
EDHigh ED:risk_status_momHigh Risk	10.145	31.537	50.000	0.322	0.749

2.2.1.3 Energy Density Trials



SSRT was slower (worse) in children with high risk compared to those with low risk.

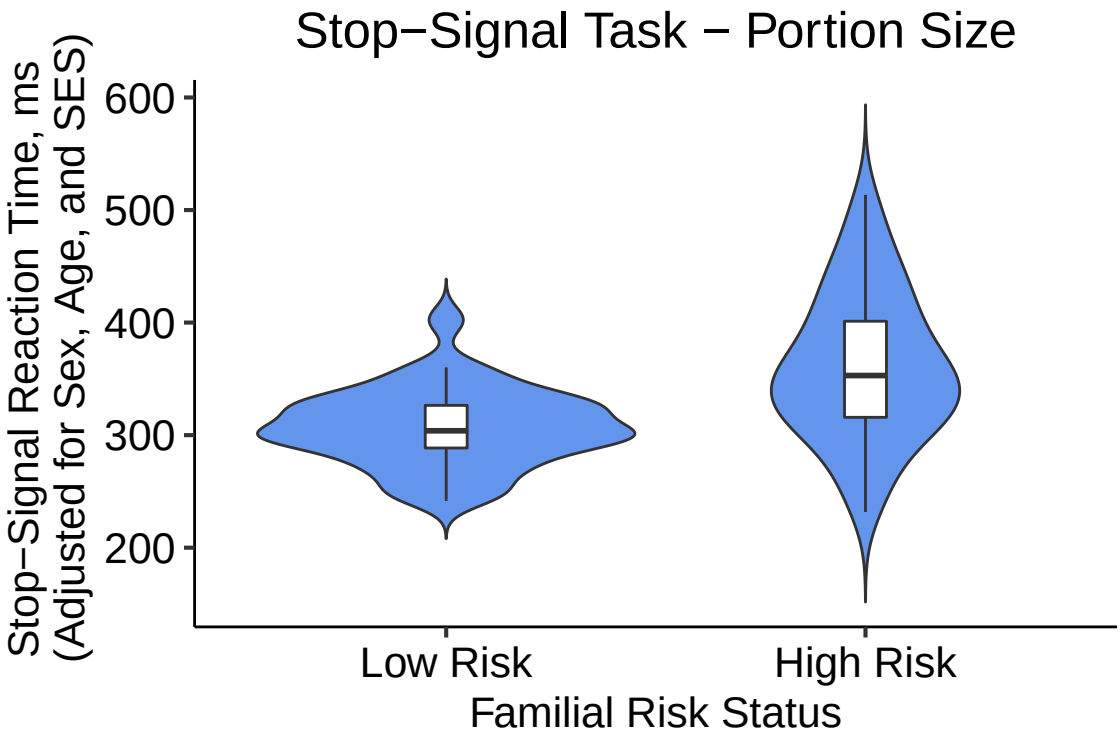
```
$emmeans
 risk_status_mom emmean   SE df lower.CL upper.CL
 Low Risk           301 22.4 43      256      346
 High Risk          392 22.6 43      346      438

Results are averaged over the levels of: mom_ed, income, sex, ED
```

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

$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk    -90.8 28.5 43  -3.185  0.0027

Results are averaged over the levels of: mom_ed, income, sex, ED
Degrees-of-freedom method: kenward-roger

$emmeans
 ED      emmean   SE   df lower.CL upper.CL
 Low ED     345 19.1 60.3      307      383
 High ED    348 19.1 60.3      310      387

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast         estimate   SE df t.ratio p.value
 Low ED - High ED    -3.61 15.8 50  -0.229  0.8201

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
```

Table 13: Stop-Signal Task SSRT - PS x Risk Status

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	562.167	145.687	45.369	3.859	0.000
mom_edAA/Technical Degree	-36.399	46.014	45.000	-0.791	0.433
mom_edBachelor Degree	-28.541	26.029	45.000	-1.097	0.279
mom_edHigh School/GED	-99.459	46.569	45.000	-2.136	0.038
income>$100,000	-27.560	42.456	45.000	-0.649	0.520
income$51,000 - $100,000	-11.140	38.657	45.000	-0.288	0.775
sexFemale	13.745	22.132	45.000	0.621	0.538
age_yr	-28.772	18.028	45.000	-1.596	0.117
PSLarge PS	5.808	18.604	52.000	0.312	0.756
risk_status_momHigh Risk	78.080	27.484	75.372	2.841	0.006
PSLarge PS:risk_status_momHigh Risk	-34.724	28.507	52.000	-1.218	0.229

2.2.1.4 Portion Size Trials



SSRT was slower (worse) in children with high risk compared to those with low risk.

```
$emmeans
 risk_status_mom emmean   SE df lower.CL upper.CL
 Low Risk           294 18.1 45      258      331
 High Risk          355 20.4 45      314      396

Results are averaged over the levels of: mom_ed, income, sex, PS
```

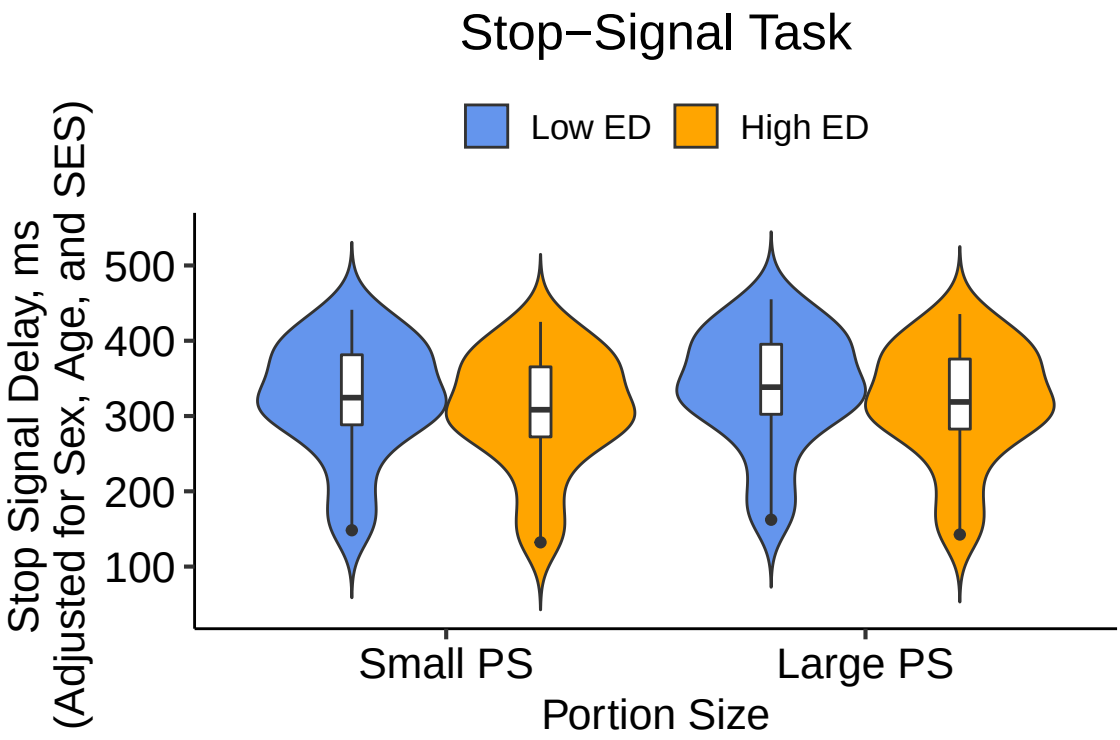
```
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk    -60.7 23.5 45  -2.584  0.0131

Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger

$emmeans
 PS       emmean   SE   df lower.CL upper.CL
 Small PS    330 16.9 64.1      297      364
 Large PS    319 16.9 64.1      285      352

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE df t.ratio p.value
 Small PS - Large PS     11.6 14.3 52   0.811  0.4213

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
```

2.2.2 Stop Signal Delay

Table 14: Stop-Signal Task SSD - ED x PS

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	228.237	183.535	32.118	1.244	0.223
mom_edAA/Technical Degree	-100.066	57.022	32.000	-1.755	0.089
mom_edBachelor Degree	-39.245	32.032	32.000	-1.225	0.229
mom_edHigh School/GED	-5.423	52.348	32.000	-0.104	0.918
income>$100,000	36.098	47.744	32.000	0.756	0.455
income$51,000 - $100,000	17.549	43.116	32.000	0.407	0.687
sexFemale	36.847	26.984	32.000	1.366	0.182
age_yr	10.464	23.390	32.000	0.447	0.658
PSLarge PS	13.964	12.832	117.000	1.088	0.279
EDHigh ED	-16.042	12.832	117.000	-1.250	0.214
PSLarge PS:EDHigh ED	-3.600	18.148	117.000	-0.198	0.843

2.2.2.1 Design



No effect of portion size or interaction. A trend for an effect of energy density such that there was a lower SSD (worse) for high ED compared to low ED blocks.

```
$emmeans
 ED      emmean   SE   df lower.CL upper.CL
 Low ED     316 18.5 36.2      279      354
```

```
 High ED    298 18.5 36.2      261      336

Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast         estimate   SE  df t.ratio p.value
 Low ED - High ED     17.8 9.07 117   1.966  0.0516

Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger
```

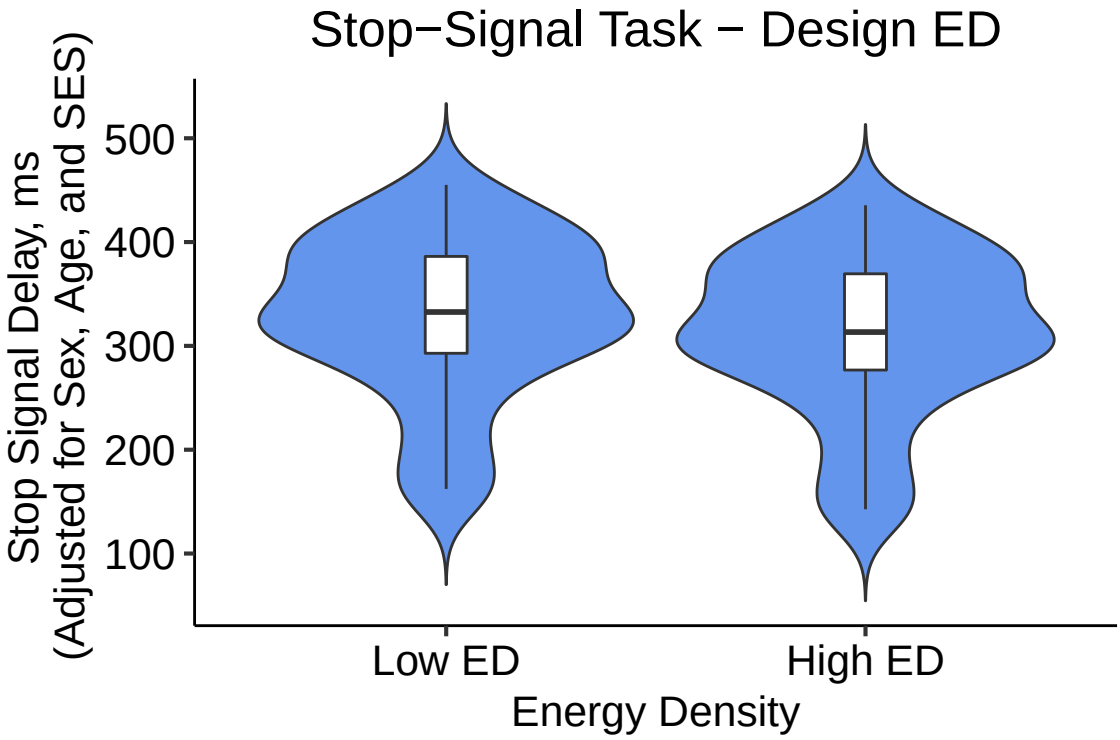
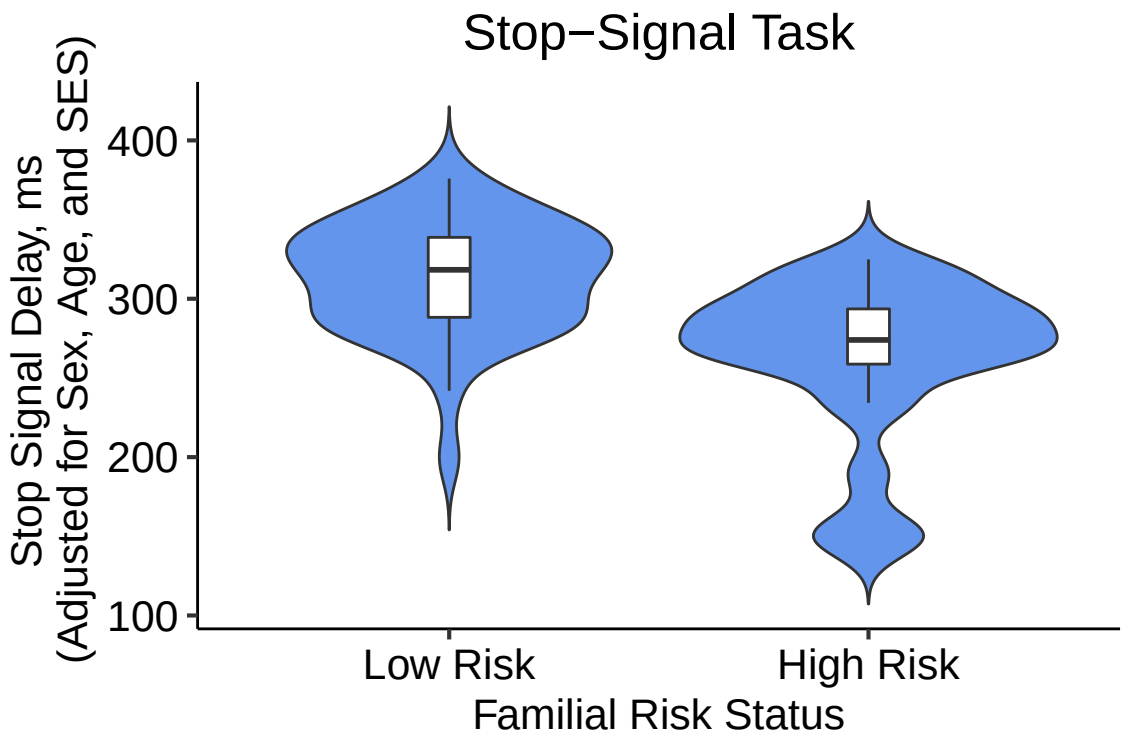


Table 15: Stop-Signal Task SSD - Risk Status

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	156.277	135.022	1.157	0.252
mom_edAA/Technical Degree	-101.175	41.300	-2.450	0.017
mom_edBachelor Degree	-9.519	23.734	-0.401	0.690
mom_edHigh School/GED	29.141	45.309	0.643	0.523
income>$100,000	1.571	41.832	0.038	0.970
income$51,000 - $100,000	14.707	39.243	0.375	0.709
sexFemale	39.853	20.110	1.982	0.052
age_yr	17.845	16.442	1.085	0.282
risk_status_momHigh Risk	-52.107	22.602	-2.305	0.025

2.2.2.2 All Trials



Main effect of risk status such that children at high risk have shorter stop signal delays (worse) than children at low risk.

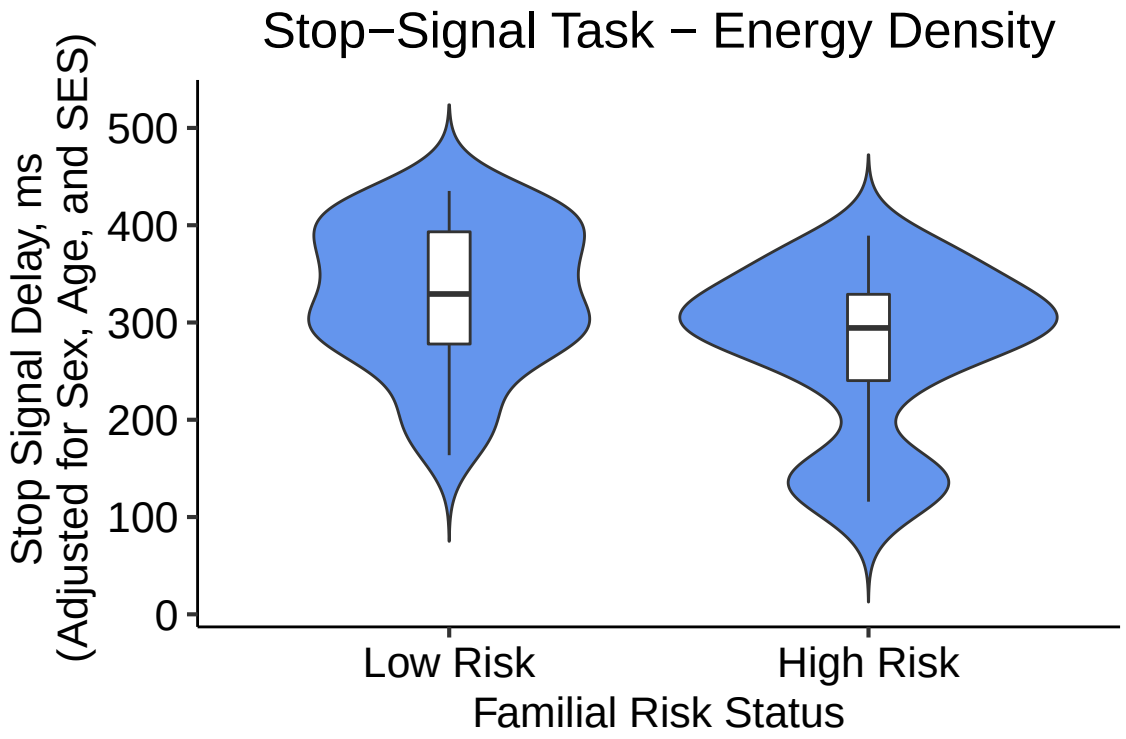
```
$emmeans
 risk_status_mom emmean   SE df lower.CL upper.CL
 Low Risk           300 16.5 60      267      333
 High Risk          248 18.3 60      211      285

Results are averaged over the levels of: mom_ed, income, sex
Confidence level used: 0.95
```

```
$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk     52.1 22.6 60   2.305  0.0246

Results are averaged over the levels of: mom_ed, income, sex
```

Table 16: Stop-Signal Task SSD - Risk Status x ED

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	179.451	165.393	43.096	1.085	0.284
mom_edAA/Technical Degree	-64.496	53.179	43.000	-1.213	0.232
mom_edBachelor Degree	3.666	29.623	43.000	0.124	0.902
mom_edHigh School/GED	44.748	50.667	43.000	0.883	0.382
income>$100,000	9.070	46.299	43.000	0.196	0.846
income$51,000 - $100,000	18.598	42.390	43.000	0.439	0.663
sexFemale	56.130	24.972	43.000	2.248	0.030
age_yr	14.287	20.546	43.000	0.695	0.491
EDHigh ED	-4.775	11.059	50.000	-0.432	0.668
risk_status_momHigh Risk	-59.444	28.120	51.230	-2.114	0.039
EDHigh ED:risk_status_momHigh Risk	-15.299	16.629	50.000	-0.920	0.362

2.2.2.3 Energy Density Trials



Main effect of risk status such that children at high risk have shorter stop signal delays (worse) than children at low risk. Boys also have shorter stop signal delays than girls.

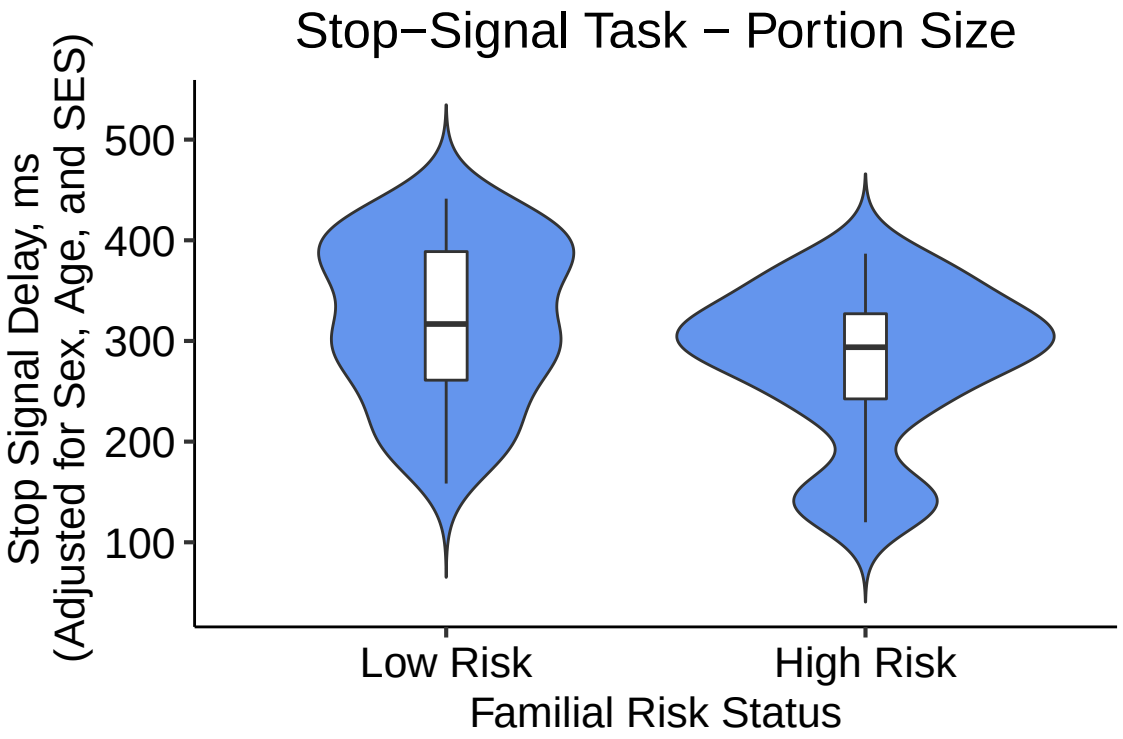
```
$emmeans
 risk_status_mom emmean   SE df lower.CL upper.CL
 Low Risk           321 21.1 43      278      363
 High Risk          254 21.3 43      211      297
```

```
Results are averaged over the levels of: mom_ed, income, sex, ED
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk     67.1 26.9 43   2.498  0.0164

Results are averaged over the levels of: mom_ed, income, sex, ED
Degrees-of-freedom method: kenward-roger

$emmeans
 ED      emmean   SE   df lower.CL upper.CL
 Low ED     294 16.9 48.5      260      328
 High ED    281 16.9 48.5      247      315

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast         estimate   SE df t.ratio p.value
 Low ED - High ED     12.4 8.31 50   1.494  0.1414

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
```

Table 17: Stop-Signal Task SSD - Risk Status x PS

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	179.797	161.060	45.104	1.116	0.270
mom_edAA/Technical Degree	-75.372	50.944	45.000	-1.480	0.146
mom_edBachelor Degree	-7.256	28.818	45.000	-0.252	0.802
mom_edHigh School/GED	38.690	51.558	45.000	0.750	0.457
income>$100,000	15.141	47.004	45.000	0.322	0.749
income$51,000 - $100,000	11.721	42.798	45.000	0.274	0.785
sexFemale	50.047	24.503	45.000	2.043	0.047
age_yr	13.766	19.959	45.000	0.690	0.494
PSLarge PS	14.587	10.952	52.000	1.332	0.189
risk_status_momHigh Risk	-58.315	27.337	54.338	-2.133	0.037
PSLarge PS:risk_status_momHigh Risk	2.101	16.781	52.000	0.125	0.901

2.2.2.4 Portion Size Trials



Main effect of risk status such that children at high risk have shorter stop signal delays (worse) than children at low risk. Boys also have shorter stop signal delays than girls.

```
$emmeans
 risk_status_mom emmean   SE df lower.CL upper.CL
 Low Risk           317 20.1 45      277      358
 High Risk          260 22.6 45      214      305
```

```
Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast             estimate SE df t.ratio p.value
 Low Risk - High Risk     57.3 26 45   2.201  0.0329

Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger

$emmeans
 PS       emmean   SE   df lower.CL upper.CL
 Small PS    281 17.4 50.5      246      316
 Large PS    296 17.4 50.5      261      331

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE df t.ratio p.value
 Small PS - Large PS    -15.6 8.39 52  -1.864  0.0680

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger

$emmeans
 sex    emmean   SE df lower.CL upper.CL
 Male      264 22.0 45      219      308
 Female    314 19.8 45      274      353

Results are averaged over the levels of: mom_ed, income, PS, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast      estimate   SE df t.ratio p.value
 Male - Female      -50 24.5 45  -2.043  0.0470

Results are averaged over the levels of: mom_ed, income, PS, risk_status_mom
Degrees-of-freedom method: kenward-roger
```

2.3 N-back

Table 18: Nback Performance Summary

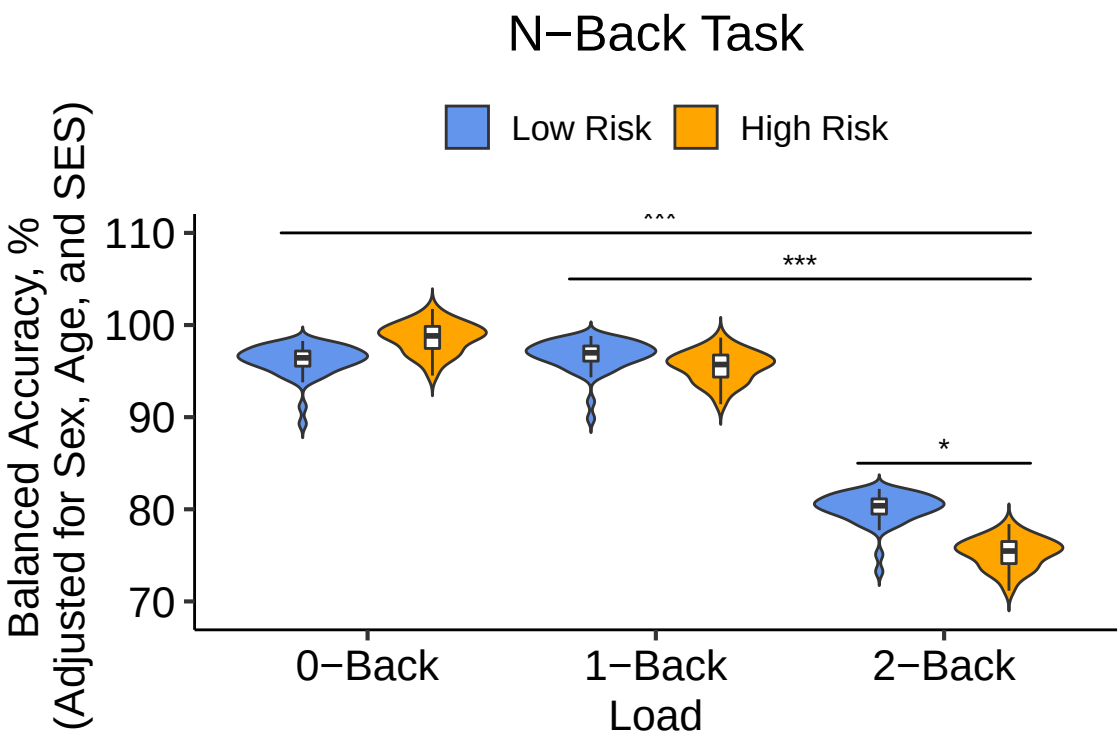
	0-Back		1-Back		2-Back	
Characteristic	Low Risk, N = 50	High Risk, N = 37	Low Risk, N = 50	High Risk, N = 37	Low Risk, N = 50	High Risk, N =
Hits, N	15.5 (1.6)	15.9 (0.3)	15.2 (1.2)	14.7 (1.8)	10.1 (3.2)	8.7 (3.5)
Hits, %	97.1 (8.8)	99.3 (2.0)	95.1 (7.4)	91.7 (11.0)	62.9 (19.8)	54.4 (21.7)
False Alarm, N	2.0 (6.2)	0.9 (1.2)	0.7 (1.2)	0.5 (0.7)	0.8 (1.2)	1.7 (4.1)
False Alarm, %	4.6 (14.4)	2.1 (2.8)	1.6 (2.8)	1.2 (1.5)	1.9 (2.7)	3.9 (9.2)
Ballanced Acc, %	96.2 (10.3)	98.6 (1.6)	96.7 (4.0)	95.3 (5.4)	80.5 (9.8)	75.2 (10.8)
Target RT, ms	634.5 (93.9)	633.6 (68.1)	739.7 (119.4)	767.3 (98.1)	810.5 (188.1)	871.7 (184.9)

[1] Mean (SD)

2.3.1 Ballanced Accuracy

Table 19: Nback Balanced Accuracy - Risk Status x Load

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	91.899	7.717	76.026	11.908	0.000
mom_edAA/Technical Degree	-3.262	2.137	74.000	-1.527	0.131
mom_edBachelor Degree	0.455	1.331	74.000	0.342	0.733
mom_edHigh School/GED	0.172	2.459	74.000	0.070	0.944
income>$100,000	2.137	2.234	74.000	0.957	0.342
income$51,000 - $100,000	2.149	2.011	74.000	1.069	0.289
sexFemale	-0.917	1.169	74.000	-0.785	0.435
age_yr	0.339	0.949	74.000	0.358	0.722
block1-Back	0.549	1.551	162.000	0.354	0.724
block2-Back	-16.052	1.551	162.000	-10.352	0.000
risk_status_momHigh Risk	3.104	1.853	218.046	1.675	0.095
block1-Back:risk_status_momHigh Risk	-3.658	2.388	162.000	-1.532	0.128
block2-Back:risk_status_momHigh Risk	-7.300	2.388	162.000	-3.057	0.003



Interaction between risk and load shows that children at high familial risk for obesity perform worse at the highest working memory load compared to children at low risk.

```
$emmeans
 block  emmean   SE  df lower.CL upper.CL
 0-Back   96.4 1.01 191     94.4     98.4
 1-Back   95.1 1.01 191     93.1     97.1
```

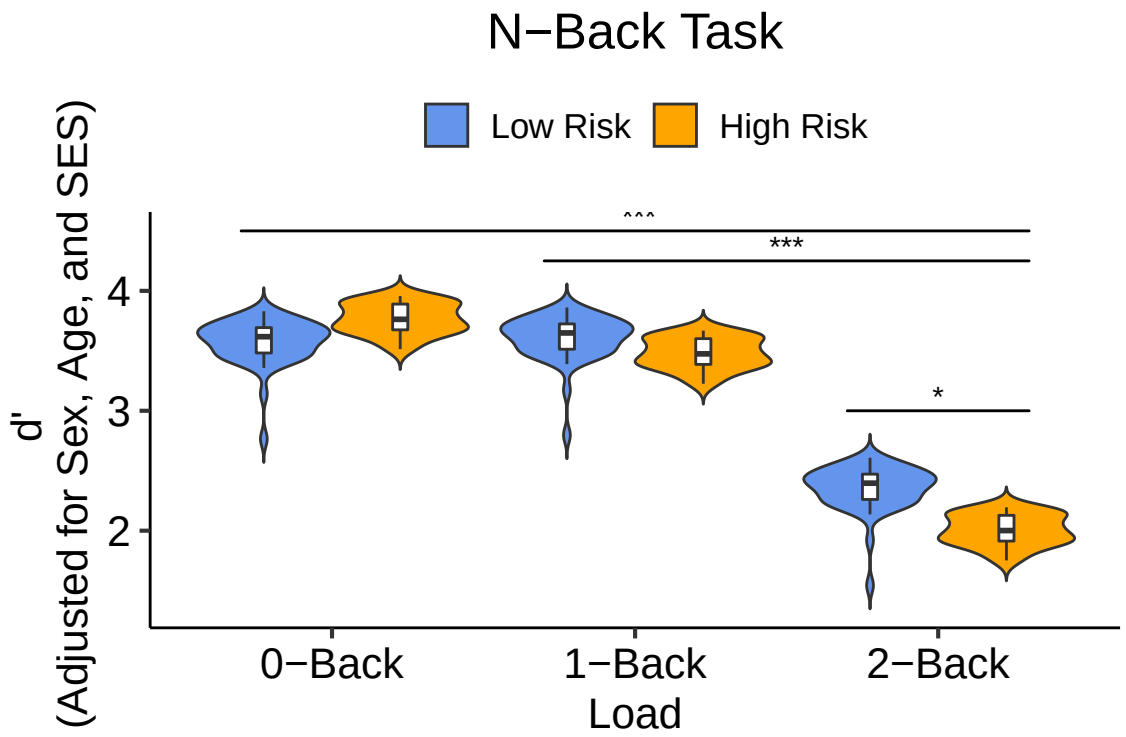
```
 2-Back   76.7 1.01 191     74.7     78.7

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE  df t.ratio p.value
 (0-Back) - (1-Back)     1.28 1.19 162   1.072  0.2854
 (0-Back) - (2-Back)    19.70 1.19 162  16.501  <.0001
 (1-Back) - (2-Back)    18.42 1.19 162  15.429  <.0001

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger

$emmeans
 risk_status_mom emmean    SE df lower.CL upper.CL
 Low Risk          89.7 0.952 74     87.8     91.6
 High Risk         89.1 0.983 74     87.2     91.1

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk    0.549 1.24 74   0.443  0.6592

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger

$emmeans
 block  risk_status_mom emmean   SE  df lower.CL upper.CL
 0-Back Low Risk          94.9 1.31 194     92.3     97.4
 1-Back Low Risk          95.4 1.31 194     92.8     98.0
 2-Back Low Risk          78.8 1.31 194     76.2     81.4
 0-Back High Risk         98.0 1.44 213     95.1    100.8
 1-Back High Risk         94.8 1.44 213     92.0     97.7
 2-Back High Risk         74.6 1.44 213     71.8     77.4

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast                                estimate   SE  df t.ratio p.value
 (0-Back Low Risk) - (1-Back Low Risk)    -0.54908 1.55 162  -0.354  0.7237
 (0-Back Low Risk) - (2-Back Low Risk)    16.05248 1.55 162  10.352  <.0001
 (0-Back Low Risk) - (0-Back High Risk)   -3.10395 1.85 218  -1.675  0.0954
 (0-Back Low Risk) - (1-Back High Risk)    0.00482 1.85 218   0.003  0.9979
 (0-Back Low Risk) - (2-Back High Risk)   20.24836 1.85 218  10.924  <.0001
 (1-Back Low Risk) - (2-Back Low Risk)    16.60156 1.55 162  10.706  <.0001
```

```
 (1-Back Low Risk) - (0-Back High Risk)   -2.55487 1.85 218  -1.378  0.1695
 (1-Back Low Risk) - (1-Back High Risk)    0.55390 1.85 218   0.299  0.7653
 (1-Back Low Risk) - (2-Back High Risk)   20.79745 1.85 218  11.221  <.0001
 (2-Back Low Risk) - (0-Back High Risk)  -19.15643 1.85 218 -10.335  <.0001
 (2-Back Low Risk) - (1-Back High Risk)  -16.04766 1.85 218  -8.658  <.0001
 (2-Back Low Risk) - (2-Back High Risk)    4.19588 1.85 218   2.264  0.0246
 (0-Back High Risk) - (1-Back High Risk)   3.10877 1.82 162   1.712  0.0888
 (0-Back High Risk) - (2-Back High Risk)  23.35231 1.82 162  12.859  <.0001
 (1-Back High Risk) - (2-Back High Risk)  20.24354 1.82 162  11.147  <.0001

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
```

2.3.2 d'

Table 20: Nback Balanced Accuracy - Risk Status x Load

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	3.435	0.660	75.724	5.202	0.000
mom_edAA/Technical Degree	-0.222	0.183	74.000	-1.214	0.229
mom_edBachelor Degree	0.031	0.114	74.000	0.276	0.784
mom_edHigh School/GED	0.021	0.211	74.000	0.100	0.921
income>$100,000	0.116	0.191	74.000	0.605	0.547
income$51,000 - $100,000	0.139	0.172	74.000	0.808	0.422
sexFemale	0.003	0.100	74.000	0.035	0.972
age_yr	0.003	0.081	74.000	0.034	0.973
block1-Back	0.031	0.123	162.000	0.255	0.799
block2-Back	-1.222	0.123	162.000	-9.972	0.000
risk_status_momHigh Risk	0.216	0.152	207.117	1.419	0.158
block1-Back:risk_status_momHigh Risk	-0.319	0.189	162.000	-1.693	0.092
block2-Back:risk_status_momHigh Risk	-0.540	0.189	162.000	-2.863	0.005



Interaction between risk and load shows that children at high familial risk for obesity perform worse at the highest working memory load compared to children at low risk.

```
$emmeans
 block  risk_status_mom emmean    SE  df lower.CL upper.CL
 0-Back Low Risk          3.50 0.108 181     3.29     3.71
 1-Back Low Risk          3.53 0.108 181     3.32     3.74
```

```
 2-Back Low Risk          2.28 0.108 181     2.07     2.49
 0-Back High Risk         3.72 0.118 201     3.48     3.95
 1-Back High Risk         3.43 0.118 201     3.20     3.66
 2-Back High Risk         1.95 0.118 201     1.72     2.19

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast                                estimate    SE  df t.ratio p.value
 (0-Back Low Risk) - (1-Back Low Risk)    -0.0313 0.123 162  -0.255  0.7990
 (0-Back Low Risk) - (2-Back Low Risk)     1.2217 0.123 162   9.972  <.0001
 (0-Back Low Risk) - (0-Back High Risk)   -0.2157 0.152 207  -1.419  0.1575
 (0-Back Low Risk) - (1-Back High Risk)    0.0725 0.152 207   0.477  0.6338
 (0-Back Low Risk) - (2-Back High Risk)    1.5461 0.152 207  10.168  <.0001
 (1-Back Low Risk) - (2-Back Low Risk)     1.2530 0.123 162  10.227  <.0001
 (1-Back Low Risk) - (0-Back High Risk)   -0.1844 0.152 207  -1.213  0.2265
 (1-Back Low Risk) - (1-Back High Risk)    0.1038 0.152 207   0.683  0.4956
 (1-Back Low Risk) - (2-Back High Risk)    1.5773 0.152 207  10.374  <.0001
 (2-Back Low Risk) - (0-Back High Risk)   -1.4374 0.152 207  -9.453  <.0001
 (2-Back Low Risk) - (1-Back High Risk)   -1.1492 0.152 207  -7.558  <.0001
 (2-Back Low Risk) - (2-Back High Risk)    0.3244 0.152 207   2.133  0.0341
 (0-Back High Risk) - (1-Back High Risk)   0.2882 0.143 162   2.009  0.0462
 (0-Back High Risk) - (2-Back High Risk)   1.7618 0.143 162  12.280  <.0001
 (1-Back High Risk) - (2-Back High Risk)   1.4735 0.143 162  10.271  <.0001

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger

$emmeans
 block  emmean     SE  df lower.CL upper.CL
 0-Back   3.61 0.0838 178     3.44     3.77
 1-Back   3.48 0.0838 178     3.31     3.65
 2-Back   2.12 0.0838 178     1.95     2.28

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate     SE  df t.ratio p.value
 (0-Back) - (1-Back)    0.128 0.0943 162   1.362  0.1751
 (0-Back) - (2-Back)    1.492 0.0943 162  15.814  <.0001
 (1-Back) - (2-Back)    1.363 0.0943 162  14.452  <.0001

Results are averaged over the levels of: mom_ed, income, sex, risk_status_mom
Degrees-of-freedom method: kenward-roger
```

3 Effect of Total Body Fat Percentage

3.1 Go-NoGo

3.1.1 Percent False Alarms

Table 21: Go-NoGo Percent False Alarms - Body Fat Percentage

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	44.029	26.885	1.638	0.105
mom_edAA/Technical Degree	5.348	6.477	0.826	0.411
mom_edBachelor Degree	1.316	4.018	0.328	0.744
mom_edHigh School/GED	-2.863	8.260	-0.347	0.730
income>$100,000	3.060	6.908	0.443	0.659
income$51,000 - $100,000	-1.736	6.241	-0.278	0.782
sexFemale	-5.970	3.924	-1.521	0.132
age_yr	-2.632	2.843	-0.926	0.357
dxa_total_body_perc_fat	0.434	0.446	0.972	0.334

3.1.2 Percent Hits

Table 22: Go-NoGo - Percent Hits - Body Fat Percentage

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	94.783	5.286	17.932	0.000
mom_edAA/Technical Degree	2.111	1.273	1.657	0.101
mom_edBachelor Degree	1.023	0.790	1.295	0.199
mom_edHigh School/GED	-0.670	1.624	-0.412	0.681
income>$100,000	-1.297	1.358	-0.955	0.342
income$51,000 - $100,000	-1.598	1.227	-1.302	0.197
sexFemale	1.028	0.772	1.333	0.187
age_yr	0.422	0.559	0.755	0.452
dxa_total_body_perc_fat	-0.032	0.088	-0.365	0.716

Correct responses to go stimuli did not differ by risk status, age, sex, or SES.

3.1.3 Go Reaction Time

Table 23: Go-NoGo - Go Reaction Time

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	776.690	100.069	7.762	0.000
mom_edAA/Technical Degree	-20.090	24.109	-0.833	0.407
mom_edBachelor Degree	-20.516	14.954	-1.372	0.174
mom_edHigh School/GED	-23.621	30.746	-0.768	0.445
income>$100,000	-27.689	25.712	-1.077	0.285
income$51,000 - $100,000	-16.752	23.228	-0.721	0.473
sexFemale	17.626	14.607	1.207	0.231
age_yr	-25.916	10.581	-2.449	0.017
dxa_total_body_perc_fat	-0.139	1.660	-0.084	0.934

3.1.4 d'

Table 24: Go-NoGo - d'

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	1.707	1.111	1.536	0.128
mom_edAA/Technical Degree	0.064	0.268	0.238	0.813
mom_edBachelor Degree	0.014	0.166	0.084	0.933
mom_edHigh School/GED	-0.082	0.341	-0.239	0.812
income>$100,000	-0.194	0.286	-0.678	0.500
income$51,000 - $100,000	-0.104	0.258	-0.403	0.688
sexFemale	0.266	0.162	1.640	0.105
age_yr	0.144	0.118	1.226	0.224
dxa_total_body_perc_fat	-0.014	0.018	-0.777	0.440

3.2 Stop-Signal Task

3.2.1 Stop Signal Reaction Time

Table 25: Stop-Signal Task SSRT - Body Fat Percentage

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	502.206	206.079	2.437	0.018
mom_edAA/Technical Degree	76.204	50.563	1.507	0.137
mom_edBachelor Degree	-2.917	28.659	-0.102	0.919
mom_edHigh School/GED	-71.793	57.289	-1.253	0.215
income>$100,000	-6.392	52.543	-0.122	0.904
income$51,000 - $100,000	-3.815	49.405	-0.077	0.939
sexFemale	14.367	26.955	0.533	0.596
age_yr	-37.897	21.108	-1.795	0.078
dxa_total_body_perc_fat	4.551	3.260	1.396	0.168

3.2.1.1 Overall

3.2.2 Energy Density Trials

Table 26: Stop-Signal Task SSRT - ED x Body Fat Percentage

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	551.769	187.720	43.148	2.939	0.005
mom_edAA/Technical Degree	94.737	57.930	43.000	1.635	0.109
mom_edBachelor Degree	-22.832	32.019	43.000	-0.713	0.480
mom_edHigh School/GED	-94.068	58.300	43.000	-1.614	0.114
income>$100,000	-36.382	52.690	43.000	-0.690	0.494
income$51,000 - $100,000	-22.773	48.370	43.000	-0.471	0.640
sexFemale	-2.417	30.618	43.000	-0.079	0.937
age_yr	-23.624	23.446	43.000	-1.008	0.319
EDHigh ED	2.882	15.541	50.000	0.185	0.854
bfp_center	7.758	3.991	64.205	1.944	0.056
EDHigh ED:bfp_center	-3.423	3.603	50.000	-0.950	0.347

```
 bfp_center bfp_center.trend   SE df t.ratio p.value
    -0.0406             6.05 3.56 43   1.698  0.0968

Results are averaged over the levels of: mom_ed, income, sex, ED
Degrees-of-freedom method: kenward-roger

$emmeans
 ED      emmean   SE   df lower.CL upper.CL
 Low ED     342 20.3 57.5      301      383
```

```
 High ED    345 20.3 57.5      304      386

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast         estimate   SE df t.ratio p.value
 Low ED - High ED    -3.02 15.5 50  -0.194  0.8467

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
```

3.2.3 Portion Size Trials

Table 27: Stop-Signal Task SSRT - PS x Body Fat Percentage

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	512.847	153.224	45.195	3.347	0.002
mom_edAA/Technical Degree	-30.682	47.800	45.000	-0.642	0.524
mom_edBachelor Degree	-14.543	26.247	45.000	-0.554	0.582
mom_edHigh School/GED	-97.409	49.128	45.000	-1.983	0.054
income>$100,000	-38.401	44.106	45.000	-0.871	0.389
income$51,000 - $100,000	-12.132	40.269	45.000	-0.301	0.765
sexFemale	12.510	24.867	45.000	0.503	0.617
age_yr	-18.626	19.268	45.000	-0.967	0.339
PSLarge PS	-8.906	14.255	52.000	-0.625	0.535
bfp_center	5.662	3.284	70.126	1.724	0.089
PSLarge PS:bfp_center	-1.728	3.132	52.000	-0.552	0.583

```
 bfp_center bfp_center.trend   SE df t.ratio p.value
     0.0436             4.8 2.89 45   1.662  0.1035

Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger

$emmeans
 PS       emmean   SE   df lower.CL upper.CL
 Small PS    322 17.4 62.8      287      357
 Large PS    313 17.4 62.8      278      348

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

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

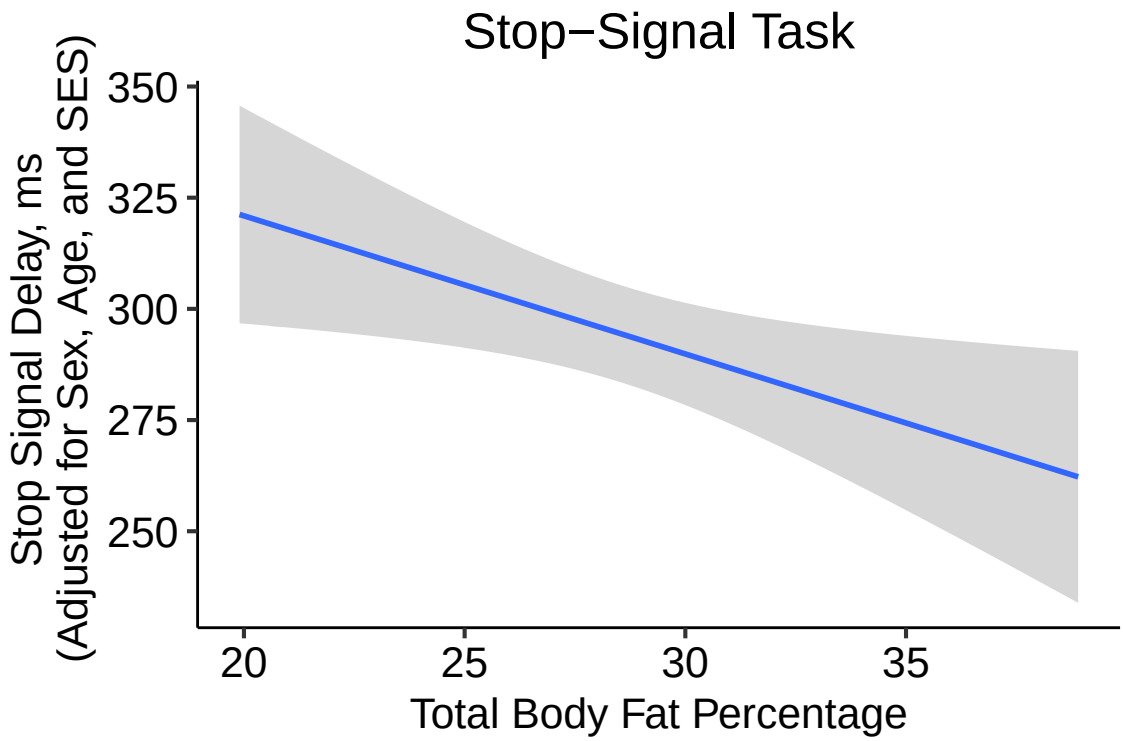
```
 Small PS - Large PS     8.98 14.3 52   0.630  0.5314

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
```

3.2.4 Stop Signal Delay

Table 28: Stop-Signal Task SSD - Body Fat Percentage

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	343.930	165.397	2.079	0.042
mom_edAA/Technical Degree	-116.200	40.582	-2.863	0.006
mom_edBachelor Degree	-26.438	23.001	-1.149	0.255
mom_edHigh School/GED	28.045	45.979	0.610	0.544
income>$100,000	11.667	42.170	0.277	0.783
income$51,000 - $100,000	13.165	39.652	0.332	0.741
sexFemale	45.588	21.634	2.107	0.039
age_yr	10.650	16.941	0.629	0.532
dxa_total_body_perc_fat	-5.183	2.616	-1.981	0.052

3.2.4.1 Overall



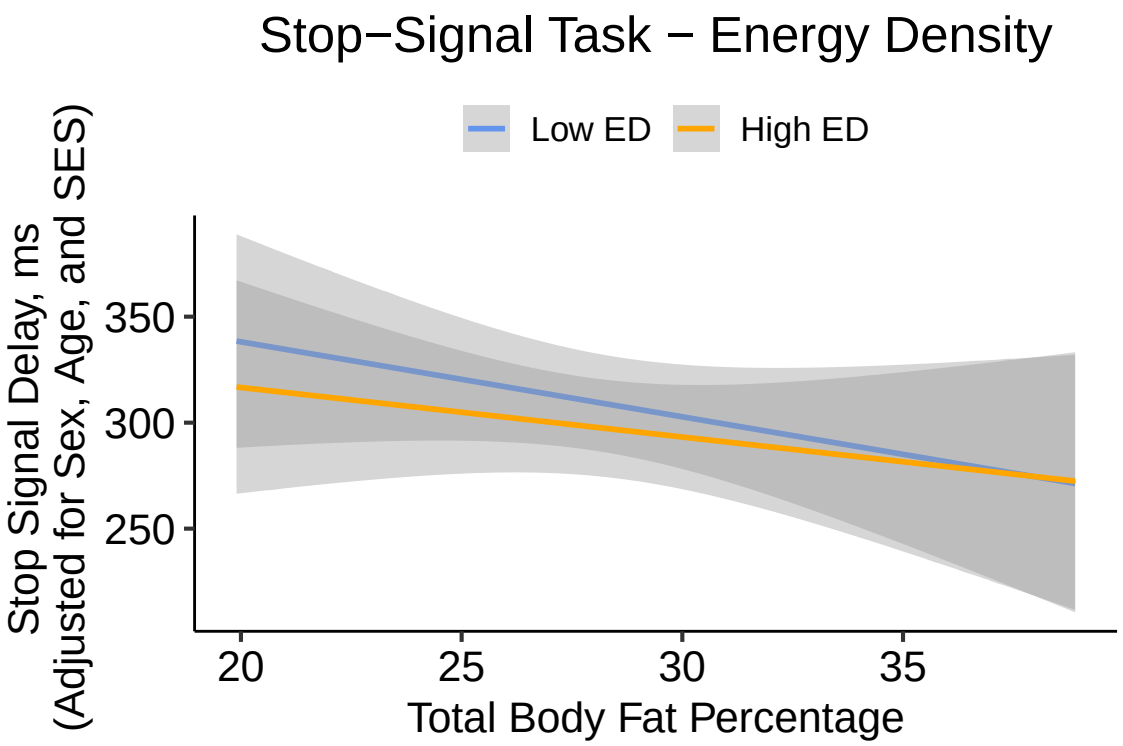
There was an effect of of body fat percentage such that higher body fat percentage was associated with shorter stop signal delays (worse).

3.2.4.2 Energy Density Trials

Table 29: Stop-Signal Task SSD - Body Fat Percentage x ED

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	266.333	165.836	43.054	1.606	0.116
mom_edAA/Technical Degree	-96.110	51.204	43.000	-1.877	0.067
mom_edBachelor Degree	-17.471	28.302	43.000	-0.617	0.540
mom_edHigh School/GED	47.224	51.532	43.000	0.916	0.365
income>$100,000	24.248	46.573	43.000	0.521	0.605
income$51,000 - $100,000	16.907	42.754	43.000	0.395	0.694
sexFemale	66.397	27.063	43.000	2.453	0.018
age_yr	-0.045	20.724	43.000	-0.002	0.998
EDHigh ED	-11.493	8.297	50.000	-1.385	0.172
bfp_center	-7.882	3.292	51.020	-2.394	0.020
EDHigh ED:bfp_center	1.201	1.924	50.000	0.624	0.535

```
 bfp_center bfp_center.trend   SE df t.ratio p.value
    -0.0406            -7.28 3.15 43  -2.313  0.0256

Results are averaged over the levels of: mom_ed, income, sex, ED
Degrees-of-freedom method: kenward-roger

$emmeans
 ED      emmean   SE   df lower.CL upper.CL
 Low ED     297 17.1 48.4      262      331
 High ED    285 17.1 48.4      251      319

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast         estimate  SE df t.ratio p.value
 Low ED - High ED     11.5 8.3 50   1.391  0.1703

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
```



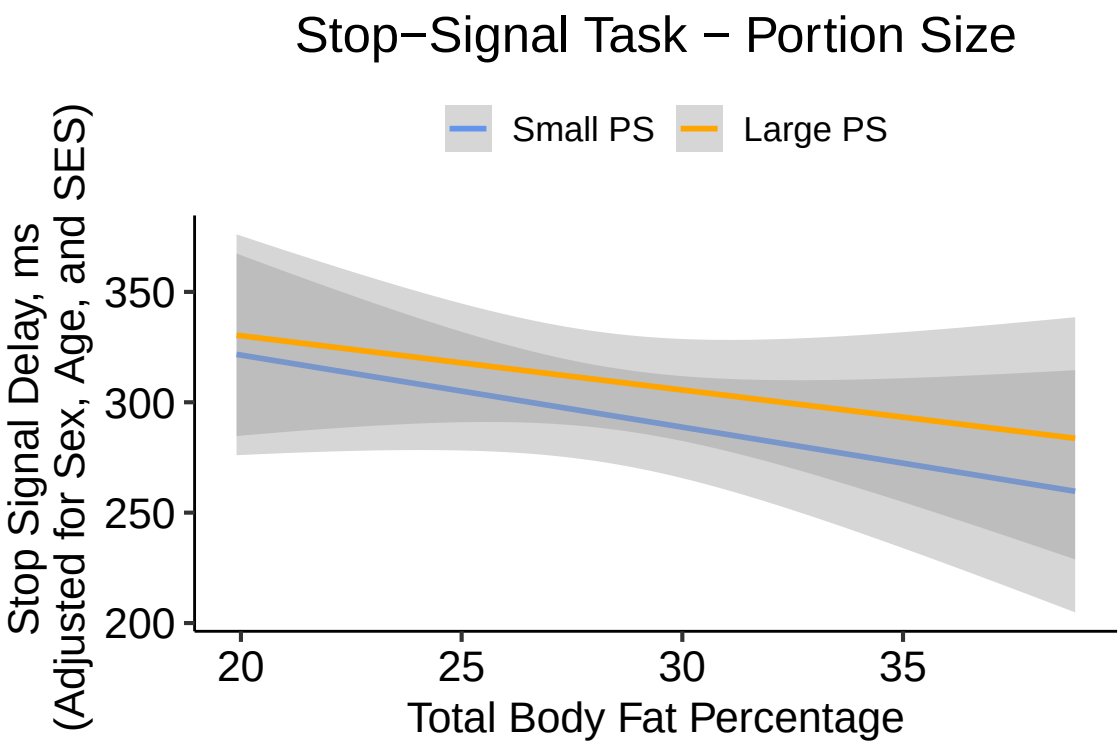
There was no interaction between energy density and body fat percentage. There was, however, an effect of energy density and an effect of body fat percentage. Children had shorter stop signal delays (worse) during high energy dense blocks compared to low energy density blocks. Higher body fat percentage was associated with shorter stop signal delays (worse).

Table 30: Stop-Signal Task SSD - Body Fat Percentage x PS

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	245.057	164.891	45.057	1.486	0.144
mom_edAA/Technical Degree	-78.078	51.479	45.000	-1.517	0.136
mom_edBachelor Degree	-19.506	28.267	45.000	-0.690	0.494
mom_edHigh School/GED	42.825	52.909	45.000	0.809	0.423
income>$100,000	26.385	47.501	45.000	0.555	0.581
income$51,000 - $100,000	13.937	43.369	45.000	0.321	0.749
sexFemale	57.258	26.781	45.000	2.138	0.038
age_yr	1.919	20.752	45.000	0.092	0.927
PSLarge PS	15.446	8.284	52.000	1.865	0.068
bfp_center	-6.372	3.239	52.707	-1.967	0.054
PSLarge PS:bfp_center	0.806	1.820	52.000	0.443	0.660

3.2.4.3 Portion Size Trials

```
 bfp_center bfp_center.trend   SE df t.ratio p.value
     0.0436            -5.97 3.11 45  -1.920  0.0612

Results are averaged over the levels of: mom_ed, income, sex, PS
Degrees-of-freedom method: kenward-roger

$emmeans
 PS       emmean   SE   df lower.CL upper.CL
 Small PS    288 17.6 50.3      253      323
 Large PS    304 17.6 50.3      268      339

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE df t.ratio p.value
 Small PS - Large PS    -15.5 8.28 52  -1.869  0.0673

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
```



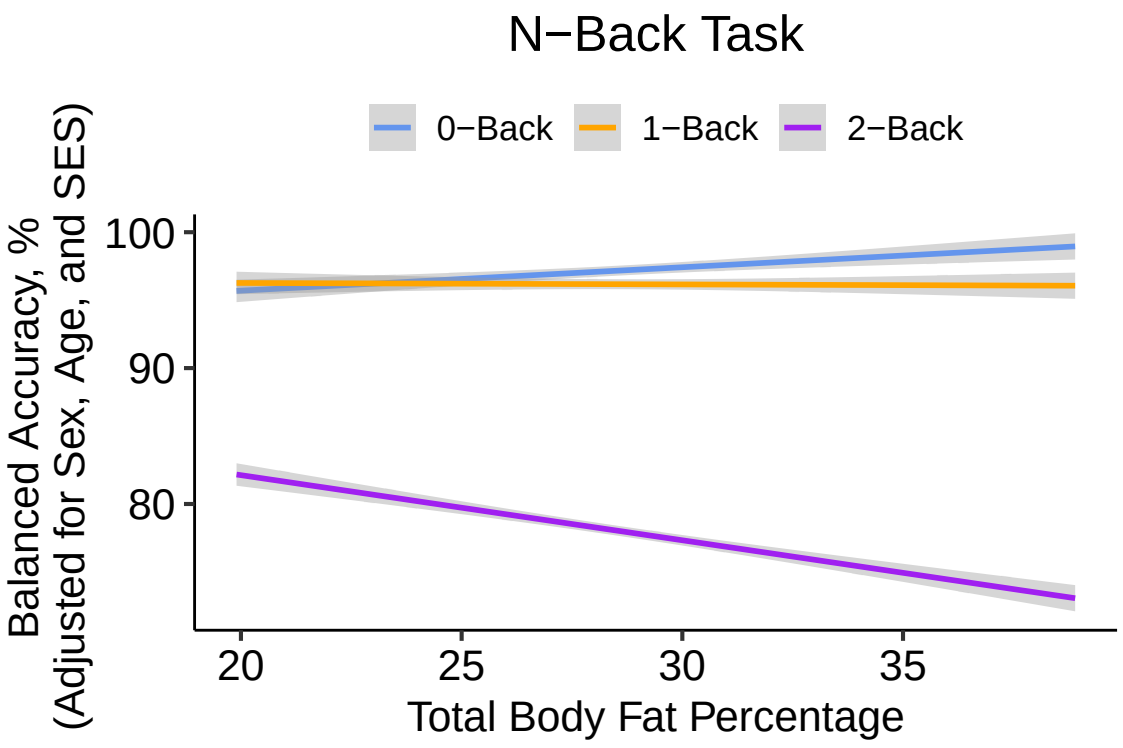
There was no interaction between portion size and body fat percentage. There was, however, an effect of portion size and an effect of body fat percentage. Children had longer stop signal delays (better) during blocks where 80% of stop trials were large portion compared to small portion. Higher body fat percentage was associated with shorter stop signal delays (worse).

3.3 N-back

3.3.1 Ballanced Accuracy

Table 31: Nback Balanced Accuracy - Body Fat Percentage x Load

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	93.461	7.685	75.199	12.161	0.000
mom_edAA/Technical Degree	-3.366	2.092	74.000	-1.609	0.112
mom_edBachelor Degree	0.380	1.304	74.000	0.291	0.772
mom_edHigh School/GED	0.300	2.493	74.000	0.120	0.905
income>$100,000	2.380	2.219	74.000	1.073	0.287
income$51,000 - $100,000	2.253	2.019	74.000	1.116	0.268
sexFemale	-0.744	1.267	74.000	-0.588	0.559
age_yr	0.281	0.961	74.000	0.292	0.771
block1-Back	-0.986	1.192	162.003	-0.828	0.409
block2-Back	-19.106	1.192	162.003	-16.030	0.000
bfp_center	0.201	0.219	216.262	0.919	0.359
block1-Back:bfp_center	-0.183	0.280	162.003	-0.653	0.515
block2-Back:bfp_center	-0.651	0.280	162.003	-2.325	0.021



Interaction between total body fat percentage and load shows that higher body fat percentages are associated with worse working memory at the highest load (2-back)

```
$emmeans
 block  emmean   SE  df lower.CL upper.CL
```

```
 0-Back   96.2 1.01 191     94.2     98.2
 1-Back   95.2 1.01 191     93.2     97.2
 2-Back   77.0 1.01 191     75.0     79.0

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate   SE  df t.ratio p.value
 (0-Back) - (1-Back)    0.993 1.19 162   0.834  0.6828
 (0-Back) - (2-Back)   19.131 1.19 162  16.052  <.0001
 (1-Back) - (2-Back)   18.137 1.19 162  15.218  <.0001

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
P value adjustment: tukey method for comparing a family of 3 estimates

 block  bfp_center bfp_center.trend    SE  df t.ratio p.value
 0-Back     0.0381           0.2011 0.219 216   0.919  0.3592
 1-Back     0.0381           0.0181 0.219 216   0.083  0.9343
 2-Back     0.0381          -0.4503 0.219 216  -2.058  0.0408

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
```

3.3.2 d'

Table 32: Nback Balanced Accuracy - Body Fat Percentage x Load

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	3.544	0.659	75.041	5.381	0.000
mom_edAA/Technical Degree	-0.240	0.179	74.000	-1.335	0.186
mom_edBachelor Degree	0.020	0.112	74.000	0.177	0.860
mom_edHigh School/GED	0.027	0.214	74.000	0.124	0.901
income>$100,000	0.143	0.190	74.000	0.753	0.454
income$51,000 - $100,000	0.149	0.173	74.000	0.859	0.393
sexFemale	0.015	0.109	74.000	0.137	0.891
age_yr	-0.001	0.082	74.000	-0.017	0.986
block1-Back	-0.103	0.095	162.000	-1.083	0.281
block2-Back	-1.449	0.095	162.000	-15.208	0.000
bfp_center	0.003	0.018	206.521	0.163	0.871
block1-Back:bfp_center	-0.009	0.022	162.000	-0.389	0.697
block2-Back:bfp_center	-0.021	0.022	162.000	-0.951	0.343

```
$emmeans
 block  emmean     SE  df lower.CL upper.CL
 0-Back   3.59 0.0843 179     3.42     3.76
 1-Back   3.49 0.0843 179     3.32     3.65
 2-Back   2.14 0.0843 179     1.97     2.31

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast            estimate     SE  df t.ratio p.value
 (0-Back) - (1-Back)    0.103 0.0953 162   1.086  0.5239
 (0-Back) - (2-Back)    1.449 0.0953 162  15.217  <.0001
 (1-Back) - (2-Back)    1.346 0.0953 162  14.131  <.0001

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
P value adjustment: tukey method for comparing a family of 3 estimates

 bfp_center bfp_center.trend     SE df t.ratio p.value
     0.0381         -0.00706 0.0126 74  -0.559  0.5780

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger
```

4 Exploratory Analyses: relative impact of risk and body fat percentage

4.1 Go-NoGo

4.1.1 Percent False Alarms

Table 33: Go-NoGo Percent False Alarms - Body Fat Percentage + Risk Status

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	49.377	26.691	1.850	0.068
mom_edAA/Technical Degree	2.917	6.534	0.446	0.657
mom_edBachelor Degree	-0.272	4.062	-0.067	0.947
mom_edHigh School/GED	-3.270	8.152	-0.401	0.689
income>$100,000	5.797	6.985	0.830	0.409
income$51,000 - $100,000	-0.959	6.172	-0.155	0.877
sexFemale	-6.586	3.887	-1.695	0.094
age_yr	-2.694	2.805	-0.961	0.340
risk_status_momHigh Risk	7.310	4.099	1.783	0.078
dxa_total_body_perc_fat	0.156	0.467	0.333	0.740

4.2 Stop-Signal Task

4.2.1 Stop Signal Reaction Time

Table 34: Stop-Signal Task SSRT - Body Fat Percentage + Risk Status

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	583.055	203.472	2.866	0.006
mom_edAA/Technical Degree	50.080	50.537	0.991	0.326
mom_edBachelor Degree	-22.290	29.219	-0.763	0.449
mom_edHigh School/GED	-88.884	56.161	-1.583	0.119
income>$100,000	3.842	51.216	0.075	0.940
income$51,000 - $100,000	-6.790	47.972	-0.142	0.888
sexFemale	6.941	26.386	0.263	0.793
age_yr	-41.441	20.552	-2.016	0.048
dxa_total_body_perc_fat	2.373	3.320	0.715	0.478
risk_status_momHigh Risk	62.789	28.990	2.166	0.034

4.2.1.1 Overall

4.2.2 Energy Density Trials

Table 35: Stop-Signal Task SSRT - ED + Body Fat Percentage + Risk Status

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	633.014	177.965	42.16	3.557	0.001
mom_edAA/Technical Degree	48.601	56.759	42.00	0.856	0.397
mom_edBachelor Degree	-51.092	31.696	42.00	-1.612	0.114
mom_edHigh School/GED	-112.659	54.899	42.00	-2.052	0.046
income>$100,000	-21.219	49.544	42.00	-0.428	0.671
income$51,000 - $100,000	-27.402	45.220	42.00	-0.606	0.548
sexFemale	-11.397	28.796	42.00	-0.396	0.694
age_yr	-36.098	22.386	42.00	-1.612	0.114
EDHigh ED	3.020	15.525	51.00	0.195	0.847
bfp_center	2.606	3.564	42.00	0.731	0.469
risk_status_momHigh Risk	82.736	30.685	42.00	2.696	0.010

4.2.3 Portion Size Trials

Table 36: Stop-Signal Task SSRT - PS + Body Fat Percentage + Risk Status

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	470.062	183.367	44.131	2.564	0.014
mom_edAA/Technical Degree	-39.473	46.243	44.000	-0.854	0.398
mom_edBachelor Degree	-28.114	26.091	44.000	-1.078	0.287
mom_edHigh School/GED	-107.786	47.588	44.000	-2.265	0.028
income>$100,000	-30.376	42.665	44.000	-0.712	0.480
income$51,000 - $100,000	-13.078	38.802	44.000	-0.337	0.738
sexFemale	5.035	24.219	44.000	0.208	0.836
age_yr	-24.264	18.756	44.000	-1.294	0.203
PSLarge PS	-8.981	14.160	53.000	-0.634	0.529
dxa_total_body_perc_fat	2.651	2.960	44.000	0.896	0.375
risk_status_momHigh Risk	53.023	25.070	44.000	2.115	0.040

4.2.4 Stop Signal Delay

Table 37: Stop-Signal Task SSD - Body Fat Percentage + Risk Status

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	289.493	165.216	1.752	0.085
mom_edAA/Technical Degree	-98.610	41.035	-2.403	0.019
mom_edBachelor Degree	-13.394	23.725	-0.565	0.575
mom_edHigh School/GED	39.552	45.602	0.867	0.389
income>$100,000	4.776	41.587	0.115	0.909
income$51,000 - $100,000	15.168	38.953	0.389	0.698
sexFemale	50.588	21.425	2.361	0.022
age_yr	13.037	16.688	0.781	0.438
dxa_total_body_perc_fat	-3.717	2.696	-1.379	0.173
risk_status_momHigh Risk	-42.277	23.540	-1.796	0.078

4.2.4.1 Overall

4.2.4.2 Energy Density Trials

Table 38: Stop-Signal Task SSD - ED + Body Fat Percentage + Risk Status

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	362.164	198.810	42.036	1.822	0.076
mom_edAA/Technical Degree	-67.554	52.336	42.000	-1.291	0.204
mom_edBachelor Degree	0.020	29.226	42.000	0.001	0.999
mom_edHigh School/GED	58.731	50.621	42.000	1.160	0.253
income>$100,000	14.862	45.683	42.000	0.325	0.747
income$51,000 - $100,000	19.773	41.696	42.000	0.474	0.638
sexFemale	71.955	26.552	42.000	2.710	0.010
age_yr	7.676	20.642	42.000	0.372	0.712
EDHigh ED	-11.541	8.247	51.000	-1.400	0.168
risk_status_momHigh Risk	-51.209	28.294	42.000	-1.810	0.077
dxa_total_body_perc_fat	-5.152	3.286	42.000	-1.568	0.124

Table 39: Stop-Signal Task SSD - PS + Body Fat Percentage + Risk Status

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	334.604	201.071	44.037	1.664	0.103
mom_edAA/Technical Degree	-70.575	50.735	44.000	-1.391	0.171
mom_edBachelor Degree	-7.922	28.625	44.000	-0.277	0.783
mom_edHigh School/GED	51.682	52.211	44.000	0.990	0.328
income>$100,000	19.535	46.810	44.000	0.417	0.678
income$51,000 - $100,000	14.745	42.572	44.000	0.346	0.731
sexFemale	63.639	26.572	44.000	2.395	0.021
age_yr	6.731	20.578	44.000	0.327	0.745
PSLarge PS	15.481	8.220	53.000	1.883	0.065
risk_status_momHigh Risk	-45.258	27.505	44.000	-1.645	0.107
dxa_total_body_perc_fat	-4.137	3.248	44.000	-1.274	0.209

4.2.4.3 Portion Size Trials

4.3 N-back

4.3.1 Ballanced Accuracy

Table 40: Nback Balanced Accuracy - Body Fat Percentage x Load + Risk Status x Load

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	92.300	7.783	75.081	11.859	0.000
mom_edAA/Technical Degree	-3.239	2.150	73.000	-1.506	0.136
mom_edBachelor Degree	0.458	1.339	73.000	0.342	0.733
mom_edHigh School/GED	0.360	2.517	73.000	0.143	0.887
income>$100,000	2.263	2.269	73.000	0.998	0.322
income$51,000 - $100,000	2.233	2.033	73.000	1.098	0.276
sexFemale	-0.715	1.278	73.000	-0.560	0.577
age_yr	0.276	0.968	73.000	0.285	0.777
block1-Back	0.506	1.595	160.000	0.317	0.752
block2-Back	-16.558	1.595	160.000	-10.380	0.000
risk_status_momHigh Risk	2.821	1.975	216.676	1.428	0.155
bfp_center	0.081	0.232	213.592	0.350	0.727
block1-Back:risk_status_momHigh Risk	-3.551	2.559	160.000	-1.388	0.167
block2-Back:risk_status_momHigh Risk	-6.065	2.559	160.000	-2.370	0.019
block1-Back:bfp_center	-0.034	0.297	160.000	-0.115	0.908
block2-Back:bfp_center	-0.397	0.297	160.000	-1.338	0.183

```
$emmeans
 risk_status_mom emmean    SE df lower.CL upper.CL
 Low Risk          89.6 0.968 73     87.7     91.6
 High Risk         89.2 1.025 73     87.2     91.3

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast             estimate   SE df t.ratio p.value
 Low Risk - High Risk    0.384 1.31 73   0.293  0.7704

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger

$emmeans
 block  risk_status_mom emmean   SE  df lower.CL upper.CL
 0-Back Low Risk          95.0 1.34 193     92.3     97.6
 1-Back Low Risk          95.5 1.34 193     92.9     98.1
 2-Back Low Risk          78.4 1.34 193     75.8     81.1
 0-Back High Risk         97.8 1.50 210     94.9    100.8
 1-Back High Risk         94.8 1.50 210     91.8     97.7
```

```
 2-Back High Risk         75.2 1.50 210     72.2     78.1

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast                                  estimate   SE  df t.ratio p.value
 (0-Back Low Risk) - (1-Back Low Risk)       -0.504 1.60 160  -0.316  0.7528
 (0-Back Low Risk) - (2-Back Low Risk)       16.573 1.60 160  10.372  <.0001
 (0-Back Low Risk) - (0-Back High Risk)      -2.821 1.98 217  -1.428  0.1547
 (0-Back Low Risk) - (1-Back High Risk)       0.226 1.92 210   0.118  0.9065
 (0-Back Low Risk) - (2-Back High Risk)      19.817 1.92 210  10.310  <.0001
 (1-Back Low Risk) - (2-Back Low Risk)       17.078 1.60 160  10.687  <.0001
 (1-Back Low Risk) - (0-Back High Risk)      -2.317 1.92 210  -1.205  0.2294
 (1-Back Low Risk) - (1-Back High Risk)       0.730 1.98 217   0.370  0.7120
 (1-Back Low Risk) - (2-Back High Risk)      20.321 1.92 210  10.572  <.0001
 (2-Back Low Risk) - (0-Back High Risk)     -19.395 1.92 210 -10.091  <.0001
 (2-Back Low Risk) - (1-Back High Risk)     -16.347 1.92 210  -8.505  <.0001
 (2-Back Low Risk) - (2-Back High Risk)       3.243 1.98 217   1.642  0.1021
 (0-Back High Risk) - (1-Back High Risk)      3.047 1.89 160   1.611  0.1092
 (0-Back High Risk) - (2-Back High Risk)     22.638 1.89 160  11.966  <.0001
 (1-Back High Risk) - (2-Back High Risk)     19.591 1.89 160  10.355  <.0001

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger

 bfp_center bfp_center.trend    SE df t.ratio p.value
     0.0381          -0.0628 0.156 73  -0.402  0.6887

Results are averaged over the levels of: mom_ed, income, sex, block, risk_status_mom
Degrees-of-freedom method: kenward-roger
```

4.3.2 d'

Table 41: Nback Balanced Accuracy - Body Fat Percentage x Load + Risk Status x Load

	Estimate	Std. Error	df	t value	Pr(>|t|)
(Intercept)	3.449	0.666	74.794	5.179	0.000
mom_edAA/Technical Degree	-0.220	0.184	73.000	-1.196	0.235
mom_edBachelor Degree	0.032	0.115	73.000	0.276	0.783
mom_edHigh School/GED	0.036	0.216	73.000	0.166	0.869
income>$100,000	0.126	0.194	73.000	0.646	0.520
income$51,000 - $100,000	0.146	0.174	73.000	0.837	0.406
sexFemale	0.019	0.109	73.000	0.176	0.861
age_yr	-0.002	0.083	73.000	-0.027	0.979
block1-Back	0.038	0.127	160.000	0.300	0.764
block2-Back	-1.220	0.127	160.000	-9.614	0.000
risk_status_momHigh Risk	0.236	0.163	207.070	1.450	0.149
bfp_center	-0.007	0.019	203.450	-0.378	0.706
block1-Back:risk_status_momHigh Risk	-0.336	0.204	160.000	-1.652	0.101
block2-Back:risk_status_momHigh Risk	-0.545	0.204	160.000	-2.677	0.008
block1-Back:bfp_center	0.005	0.024	160.000	0.227	0.821
block2-Back:bfp_center	0.002	0.024	160.000	0.065	0.948

```
$emmeans
 risk_status_mom emmean     SE df lower.CL upper.CL
 Low Risk          3.10 0.0829 73     2.93     3.26
 High Risk         3.04 0.0878 73     2.87     3.22

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast             estimate    SE df t.ratio p.value
 Low Risk - High Risk    0.058 0.112 73   0.516  0.6074

Results are averaged over the levels of: mom_ed, income, sex, block
Degrees-of-freedom method: kenward-roger

$emmeans
 block  risk_status_mom emmean    SE  df lower.CL upper.CL
 0-Back Low Risk          3.49 0.111 181     3.27     3.71
 1-Back Low Risk          3.53 0.111 181     3.31     3.75
 2-Back Low Risk          2.27 0.111 181     2.06     2.49
 0-Back High Risk         3.73 0.123 199     3.49     3.97
 1-Back High Risk         3.43 0.123 199     3.19     3.67
 2-Back High Risk         1.96 0.123 199     1.72     2.21
```

```
Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger
Confidence level used: 0.95

$contrasts
 contrast                                estimate    SE  df t.ratio p.value
 (0-Back Low Risk) - (1-Back Low Risk)    -0.0383 0.127 160  -0.301  0.7636
 (0-Back Low Risk) - (2-Back Low Risk)     1.2197 0.127 160   9.597  <.0001
 (0-Back Low Risk) - (0-Back High Risk)   -0.2357 0.163 207  -1.450  0.1485
 (0-Back Low Risk) - (1-Back High Risk)    0.0622 0.158 200   0.392  0.6952
 (0-Back Low Risk) - (2-Back High Risk)    1.5288 0.158 200   9.649  <.0001
 (1-Back Low Risk) - (2-Back Low Risk)     1.2580 0.127 160   9.899  <.0001
 (1-Back Low Risk) - (0-Back High Risk)   -0.1974 0.158 200  -1.246  0.2142
 (1-Back Low Risk) - (1-Back High Risk)    0.1005 0.163 207   0.618  0.5373
 (1-Back Low Risk) - (2-Back High Risk)    1.5671 0.158 200   9.890  <.0001
 (2-Back Low Risk) - (0-Back High Risk)   -1.4554 0.158 200  -9.185  <.0001
 (2-Back Low Risk) - (1-Back High Risk)   -1.1575 0.158 200  -7.305  <.0001
 (2-Back Low Risk) - (2-Back High Risk)    0.3091 0.163 207   1.902  0.0586
 (0-Back High Risk) - (1-Back High Risk)   0.2979 0.150 160   1.980  0.0494
 (0-Back High Risk) - (2-Back High Risk)   1.7645 0.150 160  11.727  <.0001
 (1-Back High Risk) - (2-Back High Risk)   1.4667 0.150 160   9.748  <.0001

Results are averaged over the levels of: mom_ed, income, sex
Degrees-of-freedom method: kenward-roger

 bfp_center bfp_center.trend     SE df t.ratio p.value
     0.0381         -0.00491 0.0134 73  -0.367  0.7145

Results are averaged over the levels of: mom_ed, income, sex, block, risk_status_mom
Degrees-of-freedom method: kenward-roger
```