

Food responsiveness indirectly affects children's meal intake by influencing the number of switches between foods



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Background

- Food Responsiveness (FR) is an appetitive trait denoting a child's susceptibility to the hedonic qualities of food¹
- FR has been positively associated with both overconsumption and obesity, yet how FR facilitates excess intake is not known²
- One possibility is that FR delays sensory specific satiation (SSS) at a meal by encouraging switching between food items to maximize flavor exposure and eating pleasure³
- Greater food switching might increase exposure to different sensory properties, which should delay SSS and lead to increased total intake



Objective

- The objective of this study was to determine whether FR will be related to greater intake through its association with increased switching between different food items at a meal

Hypotheses

- H1.** FR would be positively associated with number of switches between food items at a multi-item meal
- H2.** FR would be related to greater total meal intake through its association with increased switching

Methods

- Preliminary analysis from an ongoing longitudinal study designed to identify neural and cognitive predictors of pre-adolescent weight gain
- Parents reported FR using the Children's Eating Behavior Questionnaire (CEBQ)⁴
- Children consumed 4 multi-item test-meals that varied by portion size across different; only the baseline meal condition used in the current analysis
- Bites of food were coded in Noldus Observer XT v14
 - Cohen's kappa (κ) = 0.78
- Food switches were assessed by summing alterations between bites of different foods within a meal
- The direct and indirect associations were tested using linear regressions and were adjusted for BMI% and pre-meal hunger.

Meal Design



◀ **Figure 1.** Meals consisted of macaroni and cheese (270g, 459kcal), chicken nuggets (100g, 250kcal), grapes (200g, 140kcal), broccoli (180g, 180kcal), ketchup (48g, 56kcal), and water (8oz). Water was not included in the analyses.

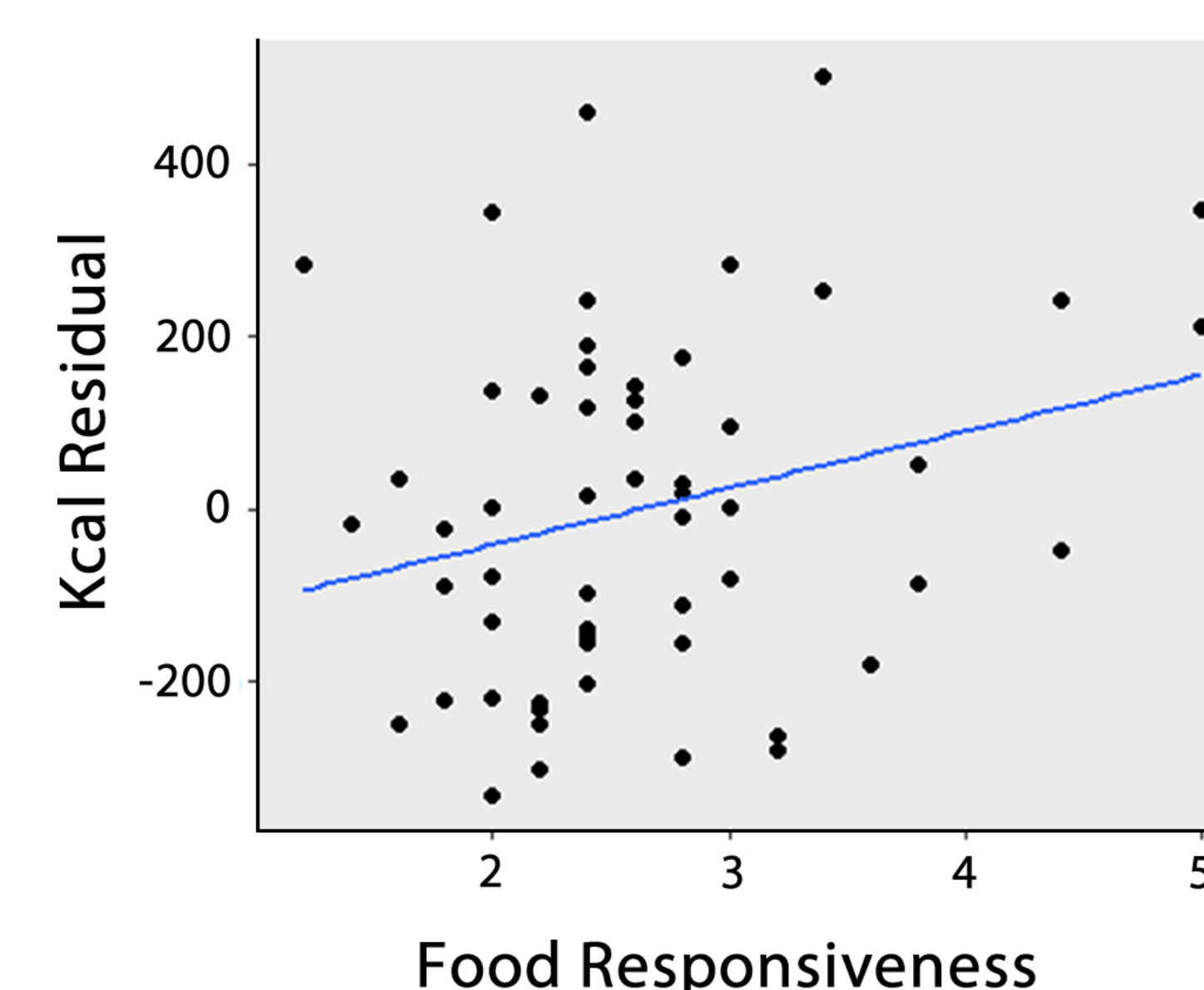
Participants

Characteristic	Mean $\pm$ SD	Range	Characteristic	N	%
Age (years)	7.9 $\pm$ 0.6	7 – 9	Sex		
BMI Percentile	48.2 $\pm$ 24.4	4 – 88	Male	23	39.7
CEBQ-FR	2.6 $\pm$ 0.8	1-5	Female	35	60.3
Pre-meal hunger, VAS (mm)	42.0 $\pm$ 37.6	0-150	Race		
Intake (grams)	310.0 $\pm$ 132.2	62-676	Asian	1	1.7
Intake (kcal)	491.8 $\pm$ 214.0	79-1026	White	56	96.6
Food Switches	9.8 $\pm$ 7.7	0-33	Did not Answer	1	1.7

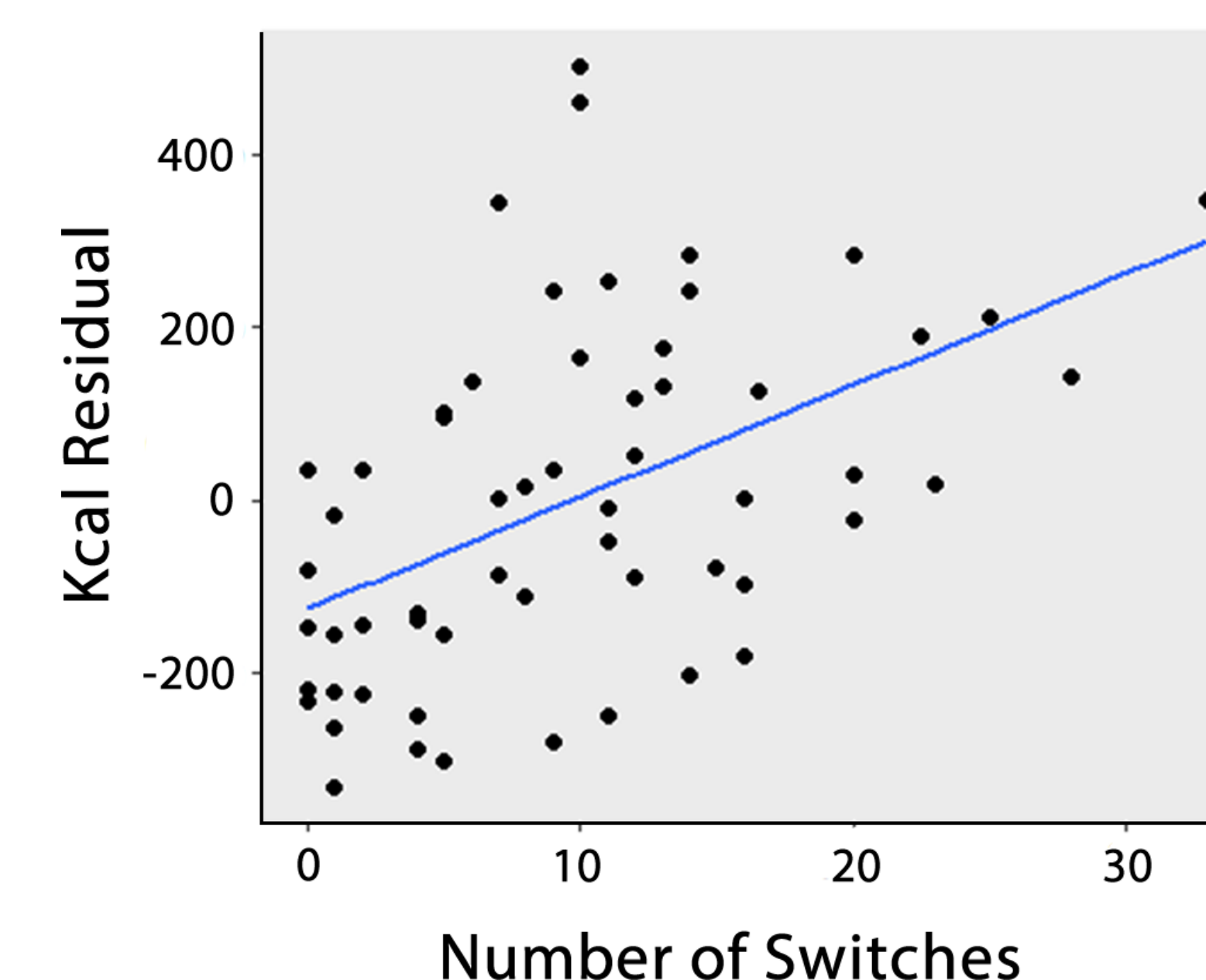
Table 1: Descriptive statistics for the participants (n=58 SD=standard deviation).

Characteristic	N	%
Total Combined Income		
Less than \$50,000	8	13.8
\$50,000-\$100,000	29	50.0
\$100,000+	19	32.8
Did not answer	2	3.4

Results



► **Figure 3.** There is a positive association between intake (controlled for premeal hunger and BMI%) and number of food switches (B=0.44, p<0.01)



◀ **Figure 2.** There is a positive association between intake (controlled for premeal hunger and BMI%) and food responsiveness (B= 0.40, p<0.01).

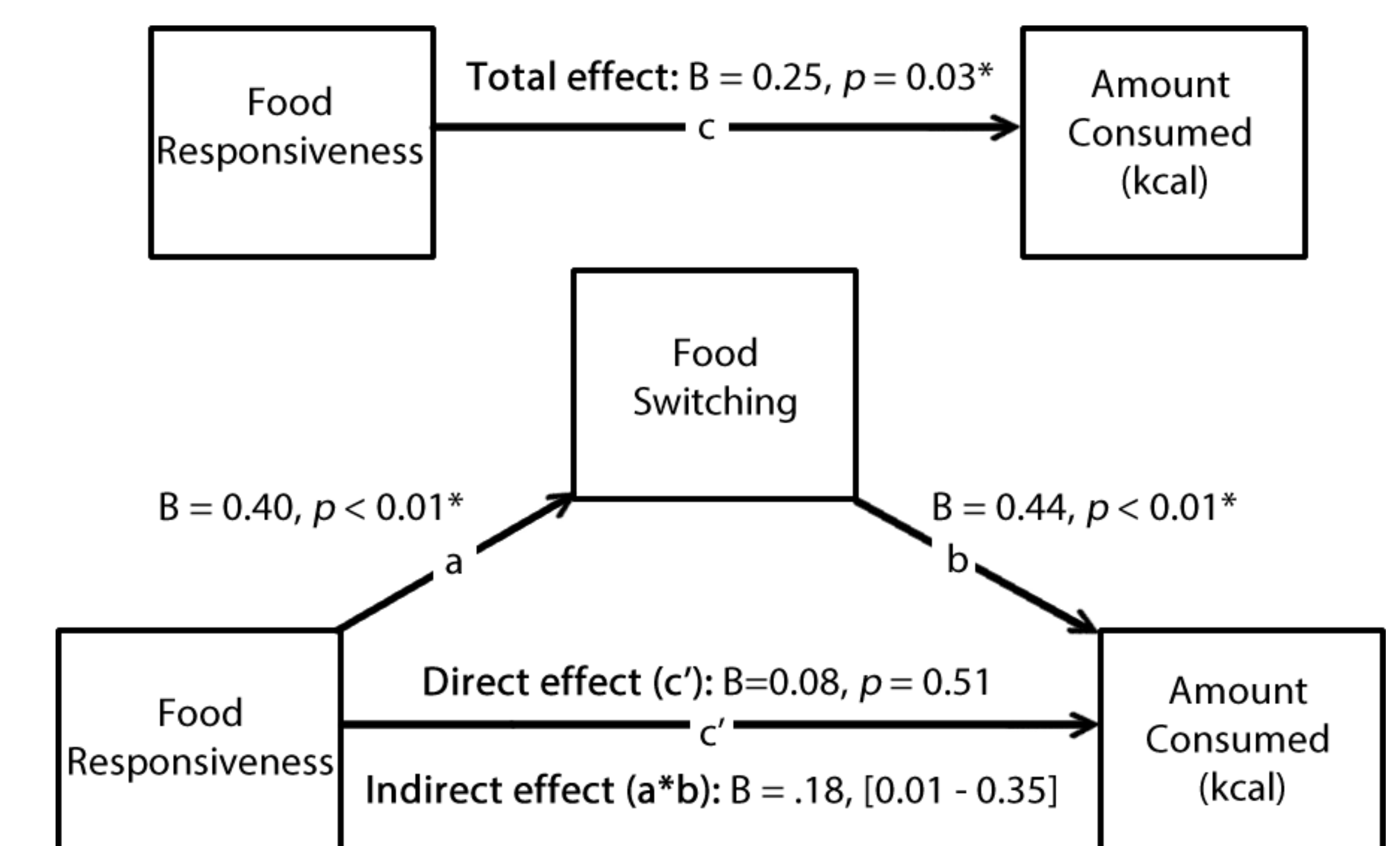
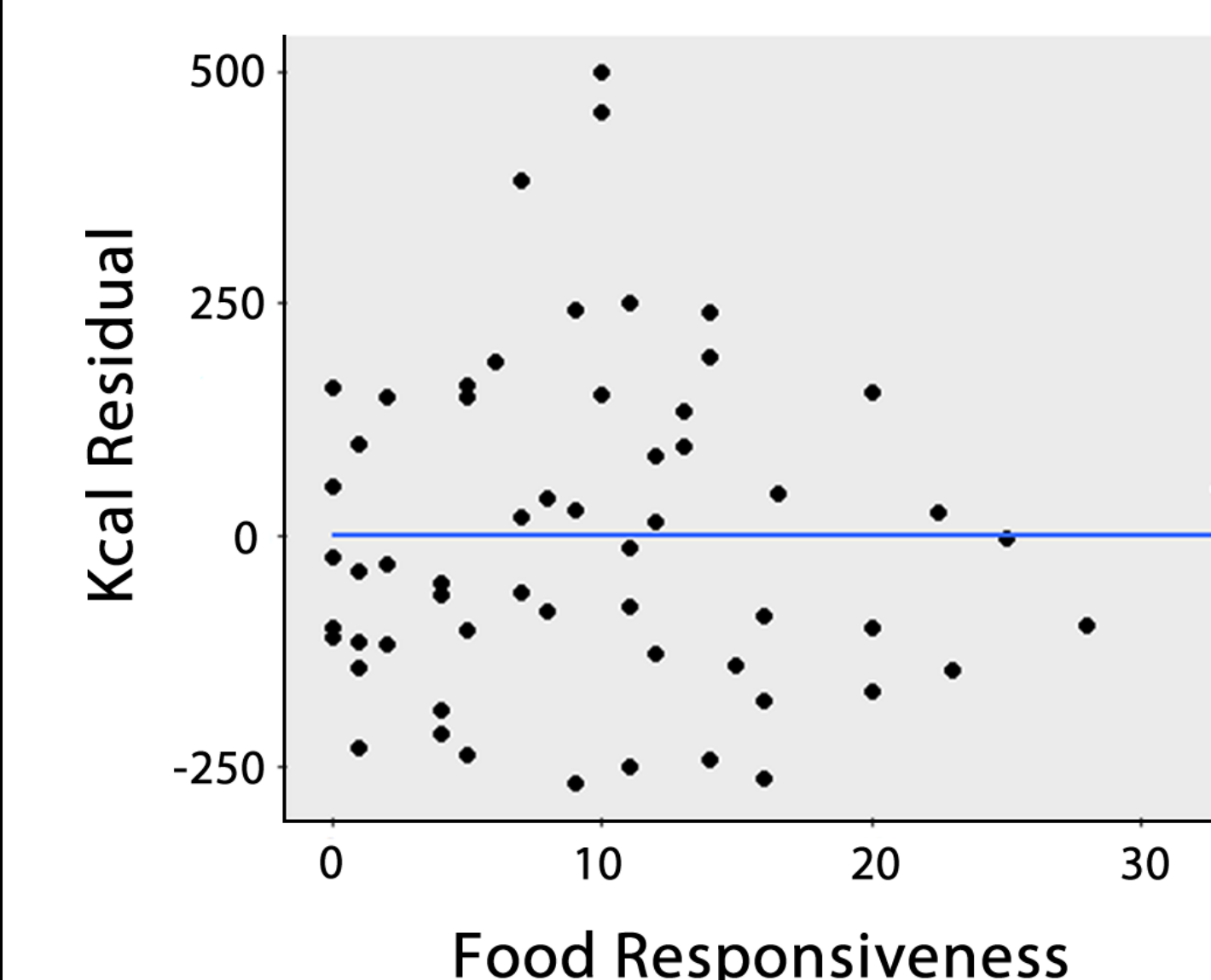


Figure 4. Model showing the indirect association of food responsiveness on intake through food switching.



◀ **Figure 5.** After adjusting for the effect of switching, FR no longer had a significant direct effect on intake

- All relationships remained significant when analyzing intake in grams

Conclusions

- The results are consistent with the theoretical mechanism that FR increases intake through its impact on the tendency to switch between different foods in a meal
- Structuring meals to reduce switching (e.g., limiting variety of high energy-dense foods) may lower meal intake, particularly for children with high food responsiveness
- Future studies should directly assess the effects of food switching on SSS to help establish causality and directionality

References

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