



Relationships Between Water Sipping Microstructure and Food Intake in Adults

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INTRODUCTION

- Drinking water during meals is a common yet understudied component of eating behavior¹. Meal microstructure research has established that the way people eat, not just how much, meaningfully predicts food intake².
- This study examined whether natural water sipping behaviors such as sip number, sip patterning (SP, temporal sip regularity), sip latency (time between sips), sip size (g), and sip-to-bite ratio (SBR) predict:
 - Food intake (FI; g),
 - Eating rate (ER; g/min)
 - Meal duration (MD, min).

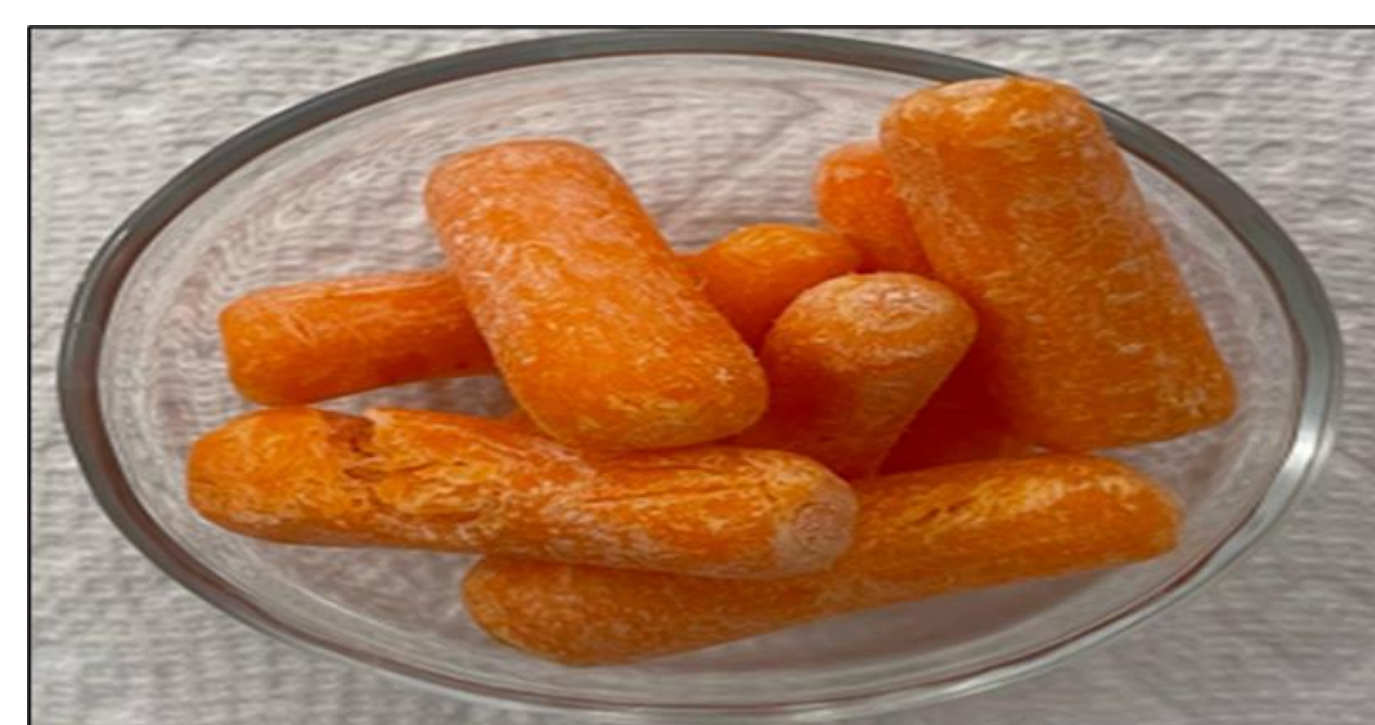
METHODS

- Sample Size: 30 healthy adults (one individualized visit)
- Procedure:
 - Standardized 4-course ad libitum lunch
 - Video-recorded for frame-by-frame coding
- Measures:
 - Sip metrics: sip number, sip patterning (SP), sip latency, sip size, sip-to-bite ratio (SBR)
- Outcomes:
 - FI (g),
 - ER (g/min)
 - MD (min)
- Analysis:
 - Multiple linear regression (adjusted for sex, BMI)
 - Pearson & Spearman correlations

FOUR-COURSE MEAL



1st Course



2nd Course



3rd Course



4th Course

RESULTS

Table 1: Demographics N=30

Characteristic	Category	%
Sex	Female	63.3%
	Male	36.7%
Race/Ethnicity	Hispanic/Latino	46.7%
	White	30.0%
	Black or African American	13.3%
	Mixed	6.7%
	Asian	3.3%
Age, M (SD)	—	27.1 (7.8) years
BMI, M (SD)	—	27.1 (4.8) kg/m ²
Self-Reported Eating Rate	Very Slow	3.3%
	Slow	10.0%
	Medium	36.7%
	Fast	36.7%
	Very Fast	13.3%

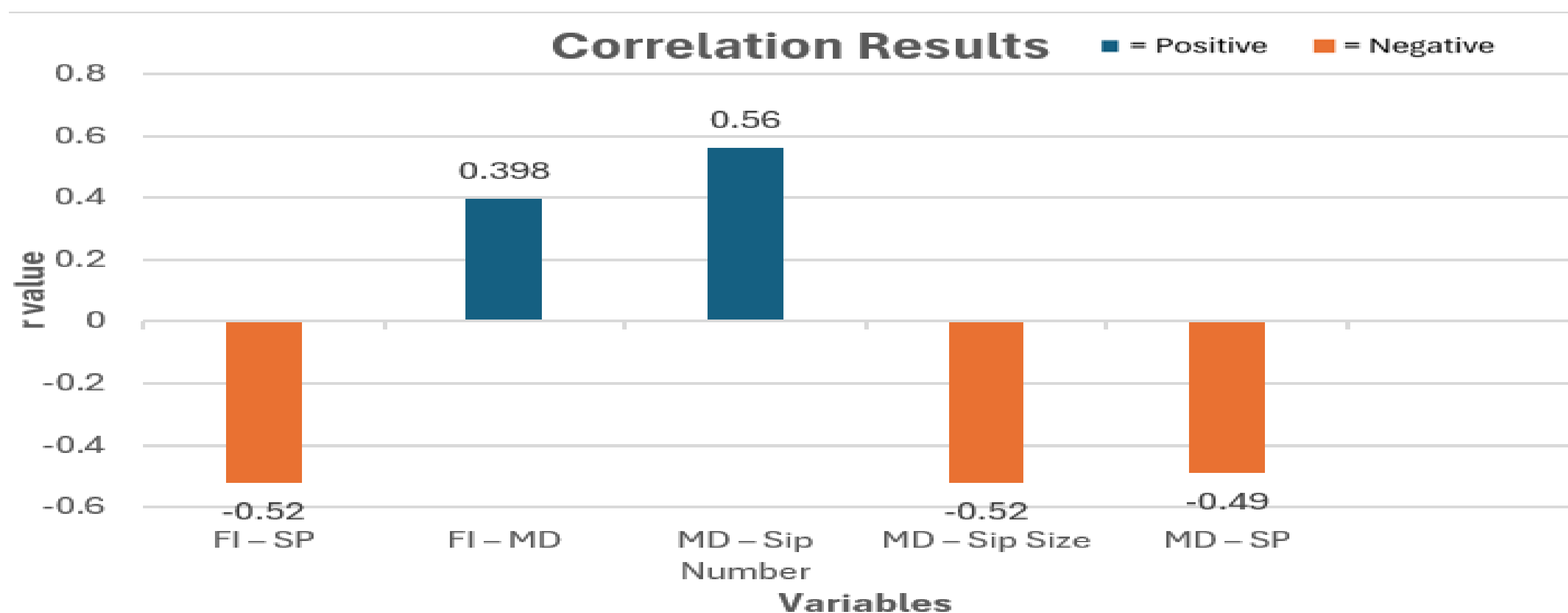


Figure 1: Correlation of FI & MD with sip metrics (p<.001)

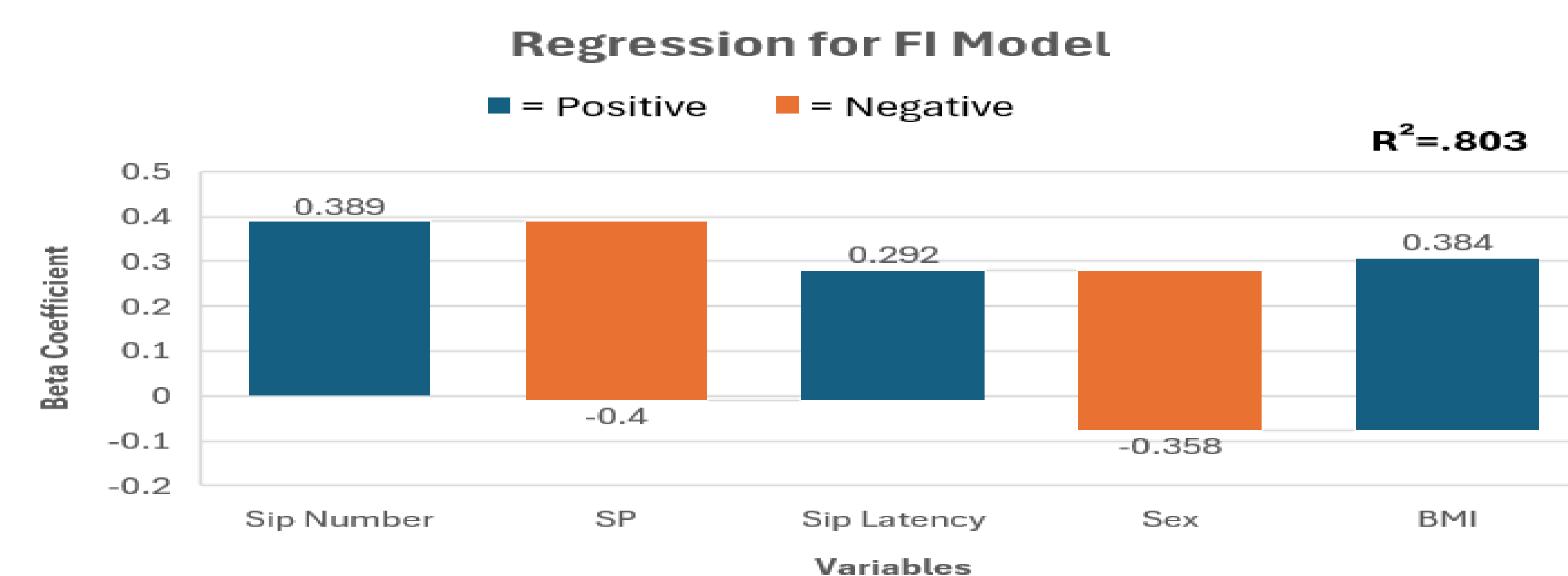


Figure 2: Regression of FI with Sip Metrics, Sex, and BMI (All p<.001)

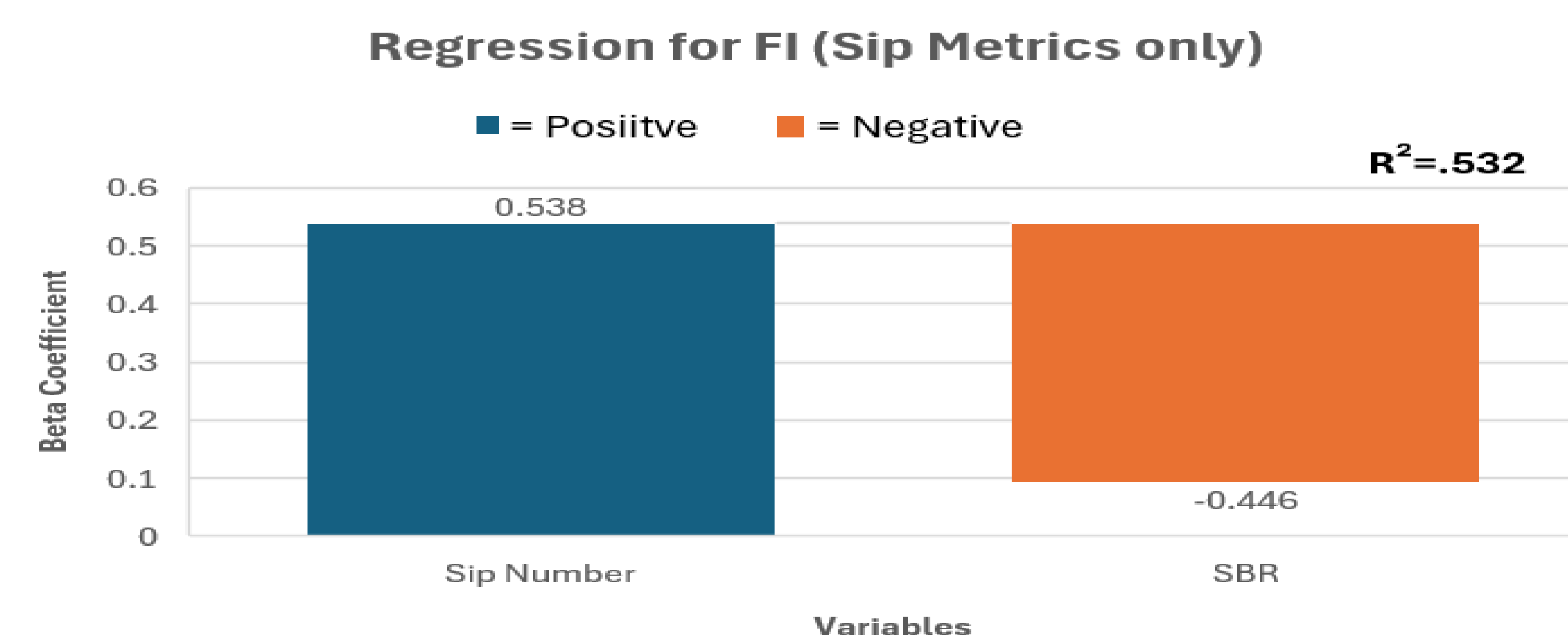


Figure 3: Regression for FI with Sip Metrics only (All p<.003)

RESULTS

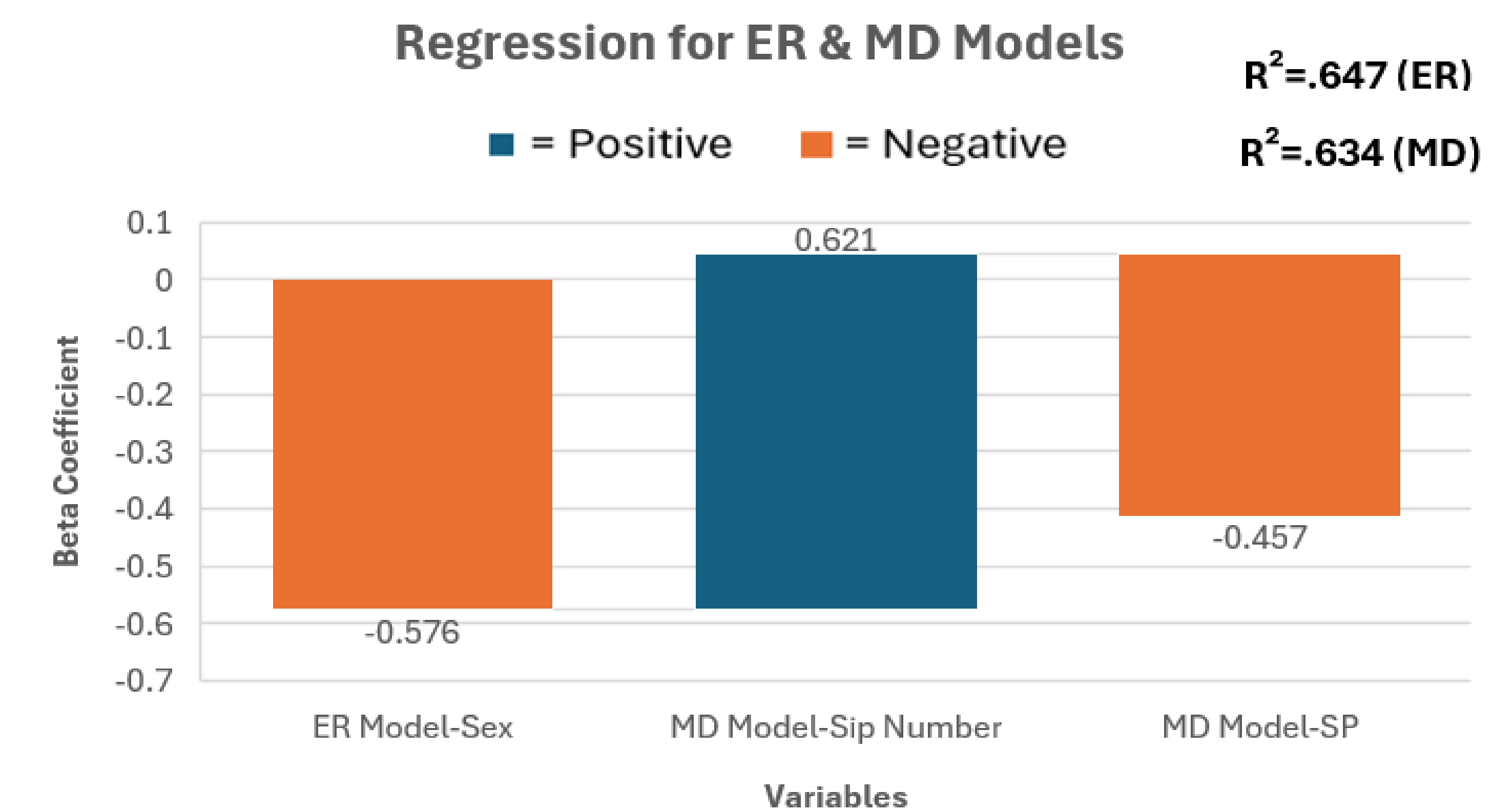


Figure 4: Regression of Eating Rate and Meal Duration with Sip Metrics, Sex, and BMI (p<.001)

DISCUSSION AND CONCLUSION

- Sip number strongly predicts FI and MD
- More irregular sip patterning (SP) predicts lower FI
- Higher SBR predicts lower FI → potential behavioral marker
- Sex differences: females ate less and more slowly
- Sip metrics may inform interventions targeting eating rate

REFERENCES

1. Cunningham, P. M., Roe, L. S., Keller, K. L., & Rolls, B. J. (2023). Switching between bites of food and sips of water is related to food intake across meals varying in portion size. *Appetite*, 182, 106443. <https://doi.org/10.1016/j.appet.2022.106443>
2. DellaValle, D. M., Roe, L. S., & Rolls, B. J. (2005). Does the consumption of caloric and non-caloric beverages with a meal affect energy intake? *Appetite*, 44(2), 187–193. <https://doi.org/10.1016/j.appet.2004.11.003>

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