Stability of Meal Microstructure in Youth

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Introduction

Eating behaviors (e.g., bites) within a meal, termed meal microstructure, have been used to understand the control of food intake

However, the stability of within-meal microstructure patterns is unclear

Here, we tested the hypotheses that within-meal patterns of cumulative bites and inter-bite-intervals (IBIs) would be more similar within-person (WP) than between-person (BP) in youth 4-17 years

Participants

14 youth participated in a 3-session repeated-measures study
9 youth completed >1 session (WP sample)

		Full sample (N=14)	WP sample (N=9)
Age in years, Mean (SD)		12.77 (4.43)	12.15 (4.75)
Sex, N	Male	6	6
	Female	8	3
Body Mass Index, Mean (SD)		21.34 (4.86)	19.56 (3.67)

Video-recorded meal paradigms

Meals consisted of mac and cheese, apples, and carrots and were consumed *ad libitum*

Screenshot from a video-recorded meal

The start and end of each bite were manually coded from videos

Characterization of within-meal microstructure patterns

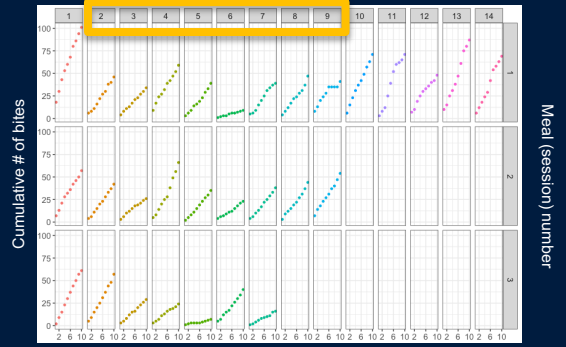
Cumulative number of bites and average IBIs were sampled every 10% of each meal (i.e., each meal was divided into 10 intervals of equal duration)

- This enabled comparing meal microstructure patterns across meals of variable durations
- The cumulative number of bites at an interval reflects the total number of bites taken so far in the meal
- The average IBI at an interval* reflects the average duration between the start of each bite in the interval and the end of the preceding bite

*For intervals with no bites, the average IBI was set equal to the duration of the interval

Within-meal cumulative bite and inter-bite-interval patterns were more similar across meals consumed by the same youth relative to meals consumed by different youths

Cumulative Bite Patterns by Participant



Cumulative bite patterns were more similar WP than BP in 89% (n=8) of youth

Inter-bite-interval Patterns by Participant

IBI patterns were more similar WP than BP in 78% (n=7) of youth

Orange boxes highlight participants with WP error (i.e., WP RMSE) < BP error (i.e., BP RMSE)

Assessing pattern similarity across meals

Root meet square error (RMSE) was computed between cumulative bite patterns and IBI patterns for each pair of meals

Lower RMSE indicates greater similarity between patterns

For each participant with >1 session, average RMSE for WP and BP comparisons were computed

- BP comparisons included meals consumed by all participants

Results

		Cumulative bite pattern RMSE		IBI pattern RMSE	
Participant	# of Sessions	WP	BP	WP	BP
1	3	32.00	15.01	**3.08**	**12.93**
2	3	**2.88**	**13.34**	**1.68**	**5.56**
3	3	**4.15**	**14.98**	**4.38**	**5.38**
4	3	**7.08**	**15.32**	**3.73**	**16.66**
5	3	**2.05**	**25.95**	**1.07**	**7.50**
6	3	**8.46**	**11.50**	9.94	4.54
7	3	**3.19**	**20.85**	**3.54**	**9.16**
8	2	**1.70**	**11.89**	**2.94**	**4.90**
9	2	**6.05**	**13.00**	25.18	4.63
Mean (SD)	--	7.51 (9.47)	15.76(4.71)	6.17 (7.57)	7.92 (4.28)

Bold indicate WP < BP RMSE

On average, for participants with >1 session, RMSE for cumulative bite and IBI patterns were lower WP than BP

Within-meal cumulative bite patterns and IBI patterns are displayed graphically in the middle panel

Conclusions

These data suggest that patterns of meal microstructure are relatively stable within youth

Future research should assess the stability of these measures in larger samples and determine how they relate to individual differences (e.g., age, energy intake)

Contact and Support

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