# GETTING TO THE HEART-FOOD CRAVING: CARDIAC VARIABILITY PREDICTS FOOD CRAVING IN ADOLESCENTS

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Background

Food Craving

Top-down regulation

Parasympathetic nervous system

Heart Rate Variability (HRV)
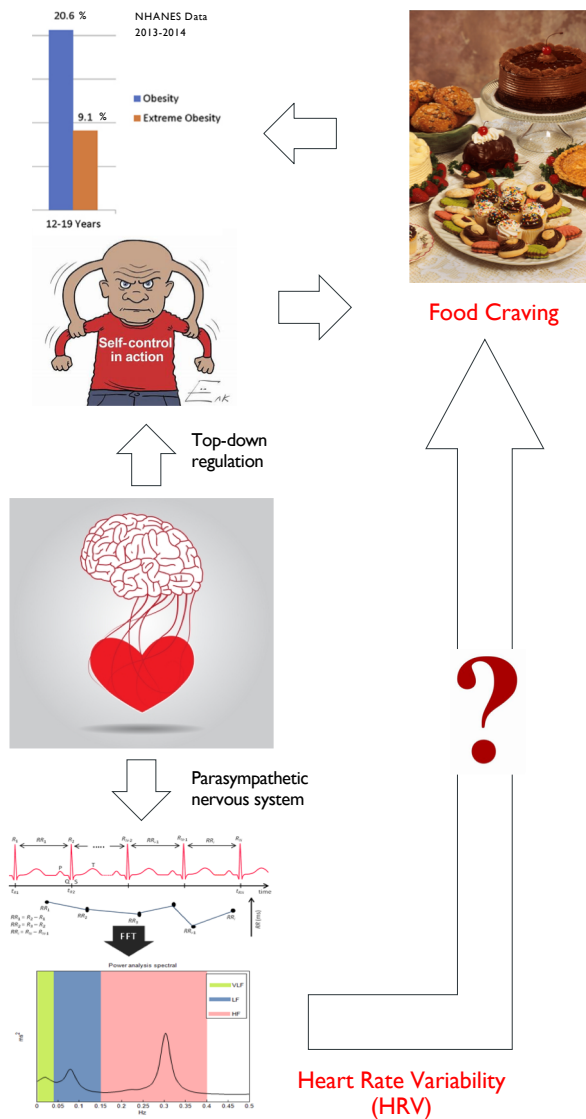
Background (cont)

1. HF-HRV reflects parasympathetic activity and is a bio-marker for top-down self-regulation in adults and in youth (Holzman et al. 2017).
2. Frequent food craving was associated with reduced eating-related self-regulation such as unsuccessful dieting or binge eating (Meule et al. 2011).
3. HRV decreases with age in general but the relation may alter at the onset of puberty (Faulkner, 2003). However, HRV studies in adolescents are lacking.
4. The goal of the study was to examine the HRV correlates with sex and age in adolescents, and to determine the association of HRV with food craving.
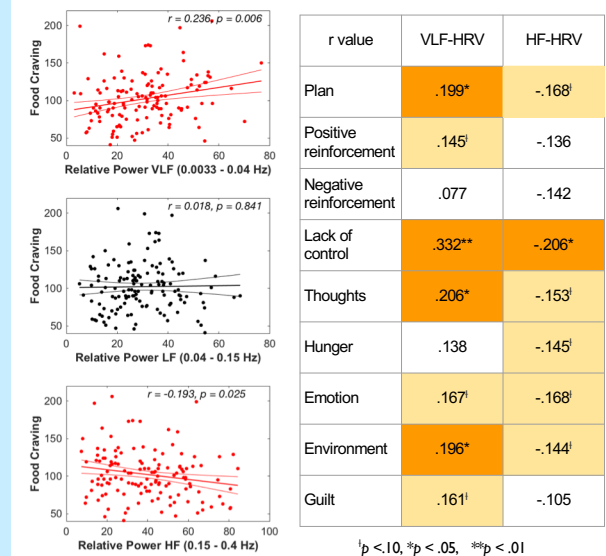
Method

- Adolescents 10-17 yrs
  - n= 134, female = 68, mean age =13.68, 70.7% Caucasian.
- ECG
  - Measured during a 7-min Resting state while sitting.
  - Inter Beat Intervals (IBIs) were generated and noise removed by an in-house program, (Bornemann & Wu, manuscript in preparation).
  - Relative powers of HF, LF, and VLF were extracted using Artiifact (Kaufmann, Sutterlin, Schulz, 2011)
- Questionnaire
  - Food Craving Questionnaire -Trait (Cepeda-Benito, et al, 2000), with 9 subscales.
  - Puberty Development Scale (Peterson, et al 1988)

Results

r value	Sex (0-male, 1-female)	Age	Puberty
Mean RR	-.154[i]	.252**	.200*
Median RR	-.158[i]	.244**	.196*
SDNN	-.141	-.087	-.096
RMSSD	-.081	-.159[i]	-.200*
NN50	.042	-.225**	-.227**
PNN50	-.067	-.143	-.166[i]
VLF%	-.051	.224**	.195*
LF%	-.036	.046	.091
HF%	.064	-.202*	-.212*

Results (cont)

r value	VLF-HRV	HF-HRV
Plan	.199*	-.168[i]
Positive reinforcement	.145[i]	-.136
Negative reinforcement	.077	-.142
Lack of control	.332**	-.206*
Thoughts	.206*	-.153[i]
Hunger	.138	-.145[i]
Emotion	.167[i]	-.168[i]
Environment	.196*	-.144[i]
Guilt	.161[i]	-.105

[i] $p < .10$, * $p < .05$, ** $p < .01$

Results Summary	Discussion
Adolescent girls have a trend level lower RR, or faster HR than boys.	Consistent with study in adolescents (Sharma,et al. 2015).
HRV time domain characteristic NN50 decreases with age and puberty.	Consistent with study in adults (Review see Shaffer et al 2017)
HRV frequency domain: VLF% increases with age and puberty; HF% decreases with age and puberty.	Consistent with study in across life span (Abhishekh et al 2013)
VLF% is positively associated with food craving.	New!
HF% is negatively associated with food craving.	New and Predicted!
VLF% and HF% are mostly strongly related to several subscales including "loss of control".	New!

Conclusions

→ In adolescents, higher HF HRV was associated with lower food craving, especially via a lower level of loss of control.
→ Higher VLF HRV was associated with higher food craving, especially via a higher level of loss of control.
→ LF HRV does not predict food craving.

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