

# Ghrelin amplifies hedonic drive and food reward signaling in binge eating disorder



Corinna Schulz<sup>1</sup>, Jacob Schwab<sup>1</sup>, Dana J. Wentz<sup>1</sup>, Monja P. Neuser<sup>1</sup>, Manfred Hallschmid<sup>1</sup>, Jennifer Svaldi<sup>1</sup> & Nils B. Kroemer<sup>2</sup>

<sup>1</sup>University of Tübingen, Tübingen, Germany, <sup>2</sup>University of Bonn, Bonn, Germany

## Introduction

Homeostatic signals alter our urges (“wanting”). Ghrelin is an orexigenic gastro-intestinal hormone that:

- risers upon fasting and drops after meals [1]
- increases motivation to work for rewards [2]
- increases brain activity in food and reward related regions [3,4]



Meta-analysis [4]:



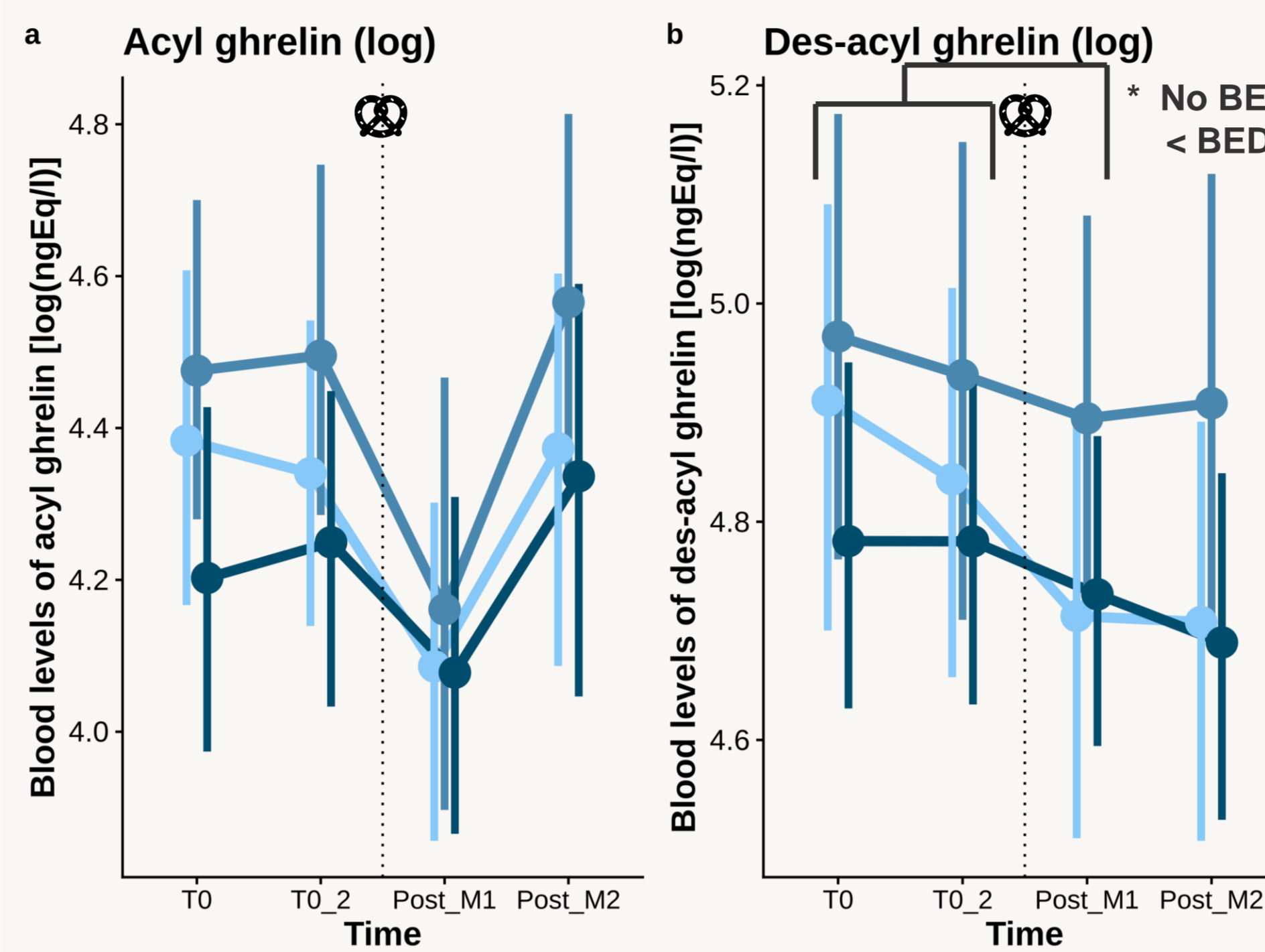
**Binge eating disorder (BED):**

- large amounts of food in short time
- accompanied with sense of loss of control over eating

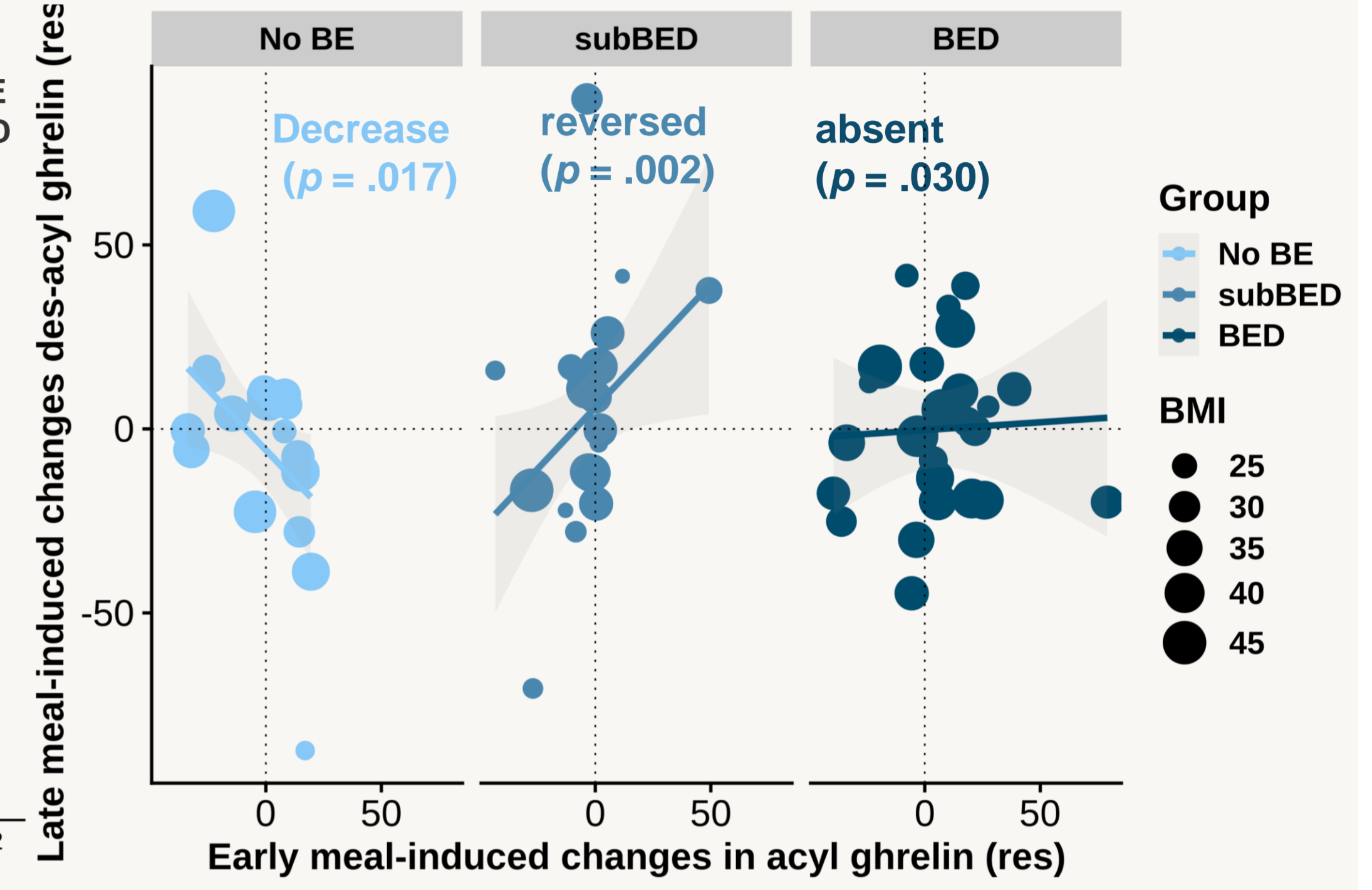
**Does ghrelin affect the motivation for food rewards and the pathophysiology of binge eating disorder (BED)?**

## Results

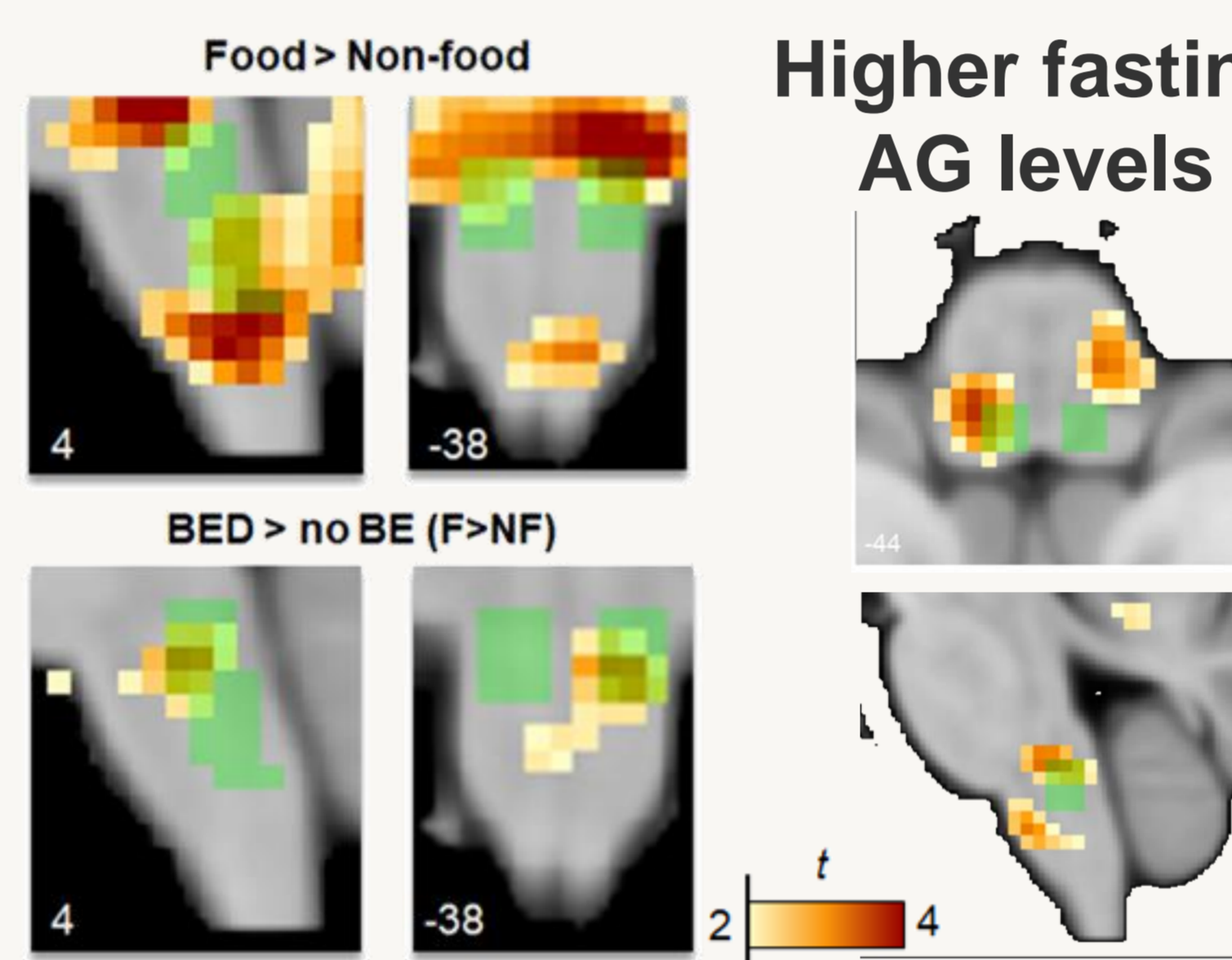
### Reduced early meal-induced decrease in DAG in BED



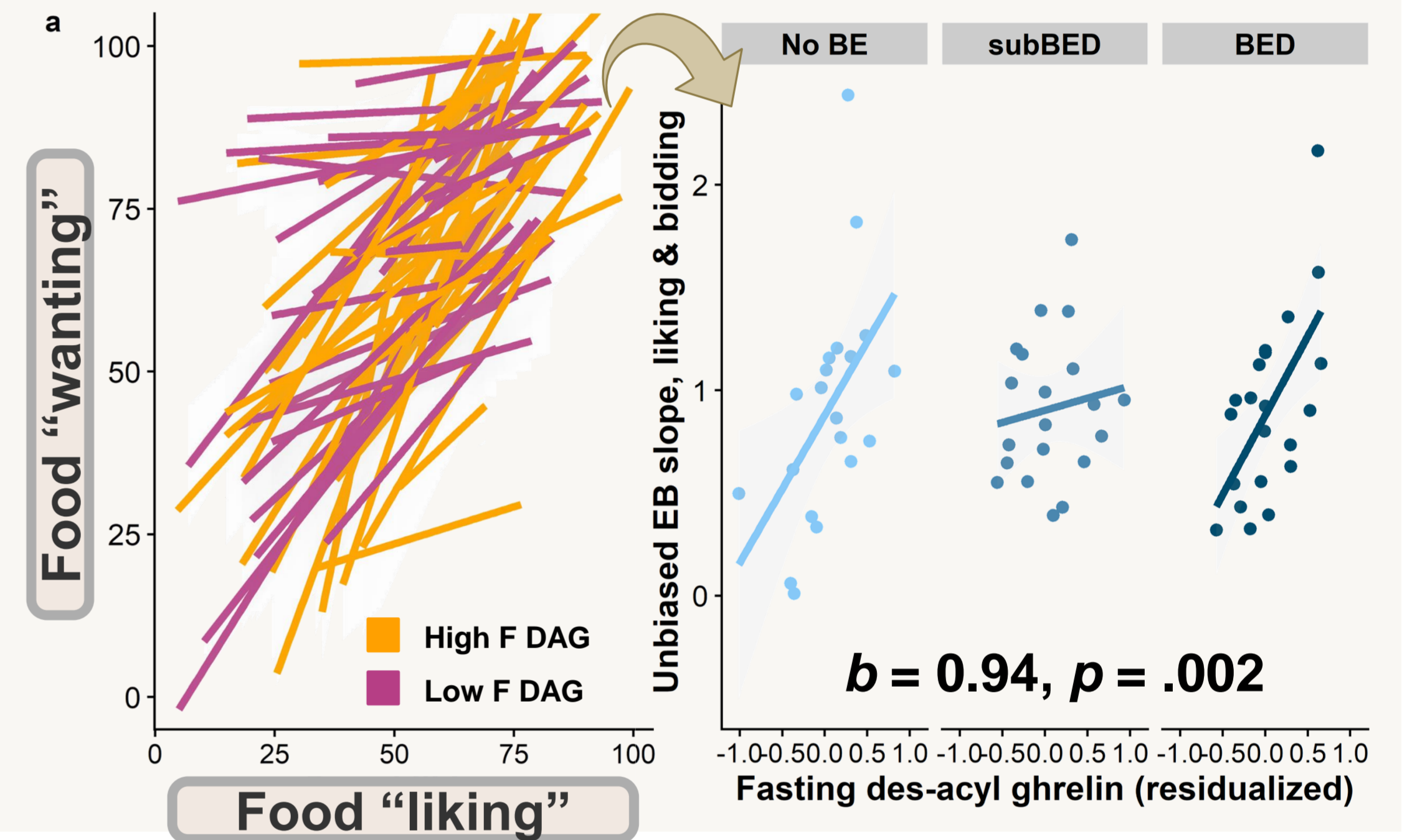
### Dysregulated correspondence between early AG and late DAG changes in BED



### Greater responses to food in the NTS in BED & greater responses in the NTS with higher fasting AG



### Higher fasting DAG increased willingness to work for preferred food: “hedonic tuning”



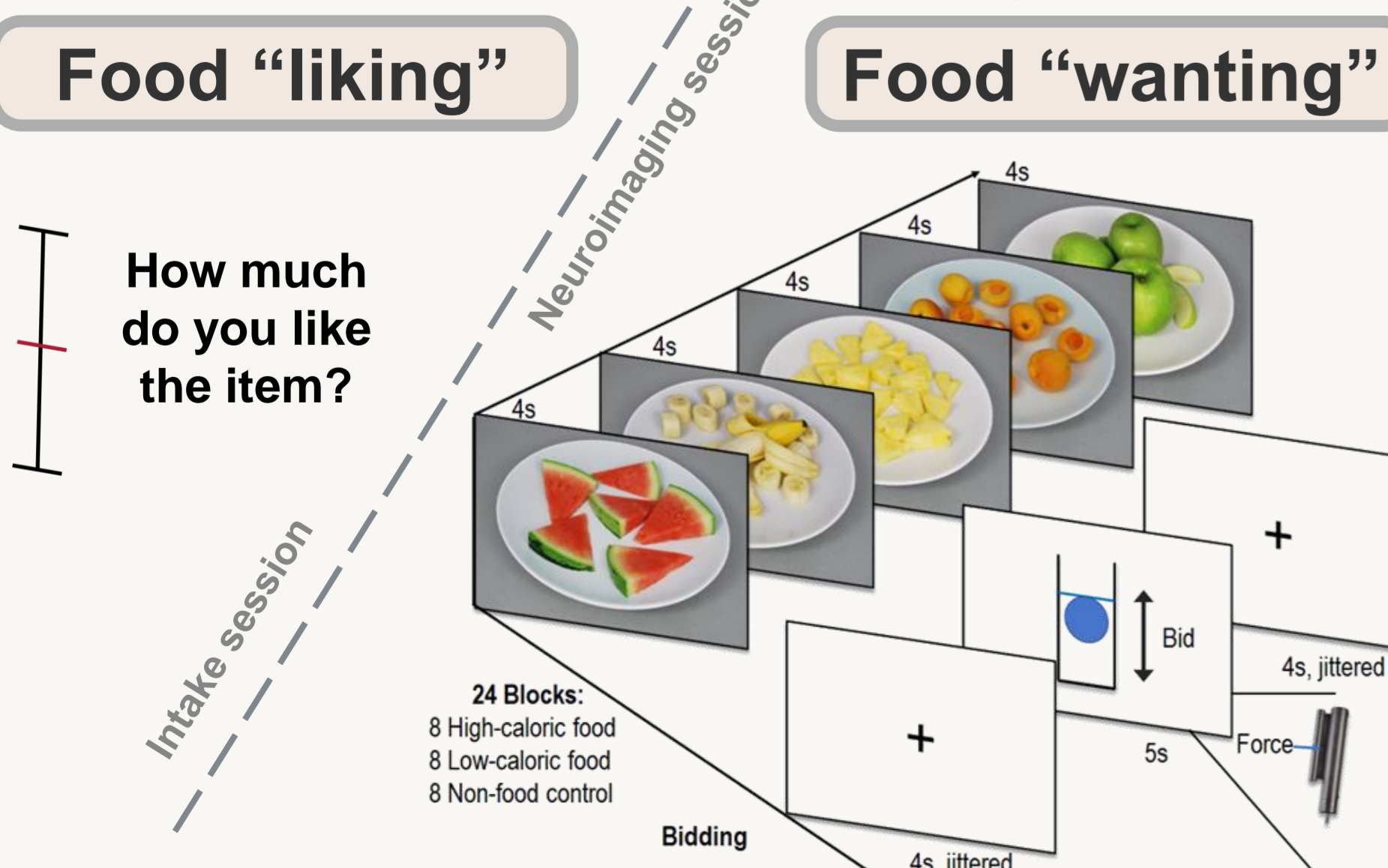
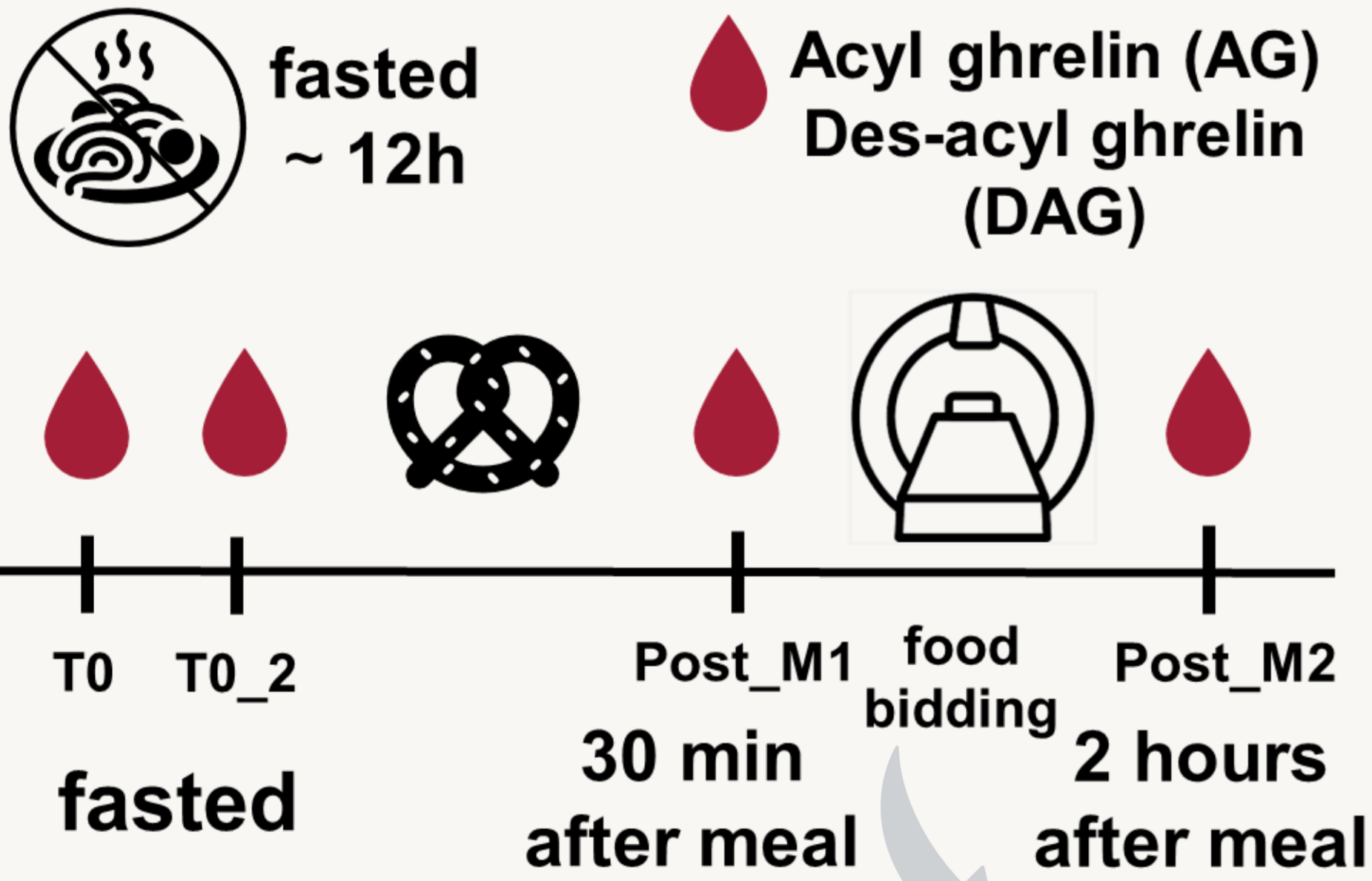
## Methods

N = 65 women, N(MR and blood) = 58

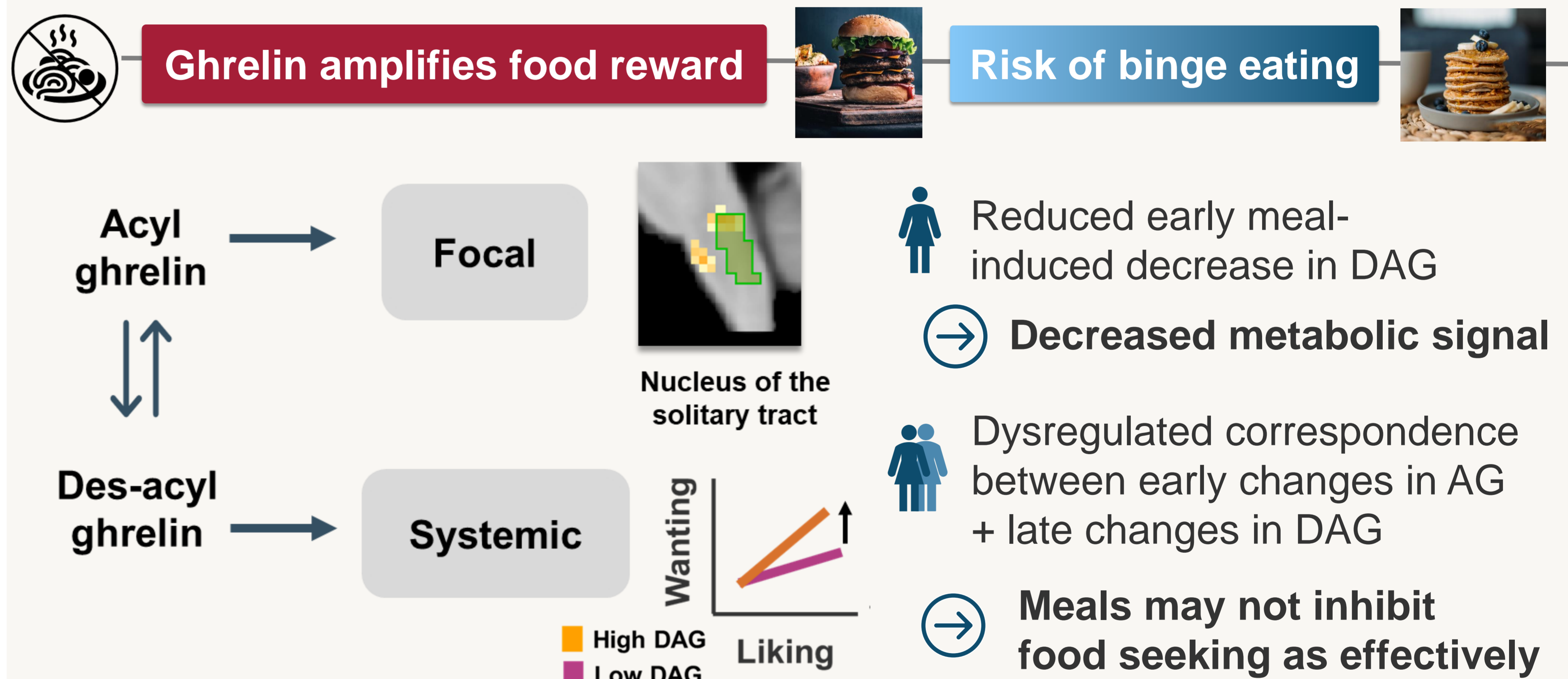
M<sub>Age</sub> = 40.6 years, M<sub>BMI</sub> 31.5 kg/m<sup>2</sup>



\*matched for BMI and sex, all analyses are controlled for BMI and age  
\*\* sub-BED: subsyndromal BED, frequency binges <1/week over 3 months



## Discussion



**Ghrelin amplifies the hedonic drive to pursue preferred food, while dysregulation in meal-induced reductions in ghrelin is associated with an elevated risk for BE.**

## References

- [1] Yanagi S, Sato T, Kangawa K, Nakazato M. The Homeostatic Force of Ghrelin. *Cell Metab.* (2018)
- [2] Skibicka KP, Hansson C, Egecioglu E, Dickson SL. Role of ghrelin in food reward: impact of ghrelin on sucrose self-administration and mesolimbic dopamine and acetylcholine receptor gene expression. *Addict Biol.* (2012)
- [3] Malik S, McGlone F, Bedrossian D, Dagher A. Ghrelin modulates brain activity in areas that control appetitive behavior. *Cell Metab.* (2008)
- [4] Schulz C, Vezzani C, Kroemer NB. How gut hormones shape reward: A systematic review of the role of ghrelin and GLP-1 in human fMRI. *Physiol Behav.* (2023)



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