Youngsters' stress responsiveness and emotional eating during a lab stressor: differences depending on chronic stress and overweight

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GHENT UNIVERSITY

INTRODUCTION

Childhood obesity epidemic (5-19 yrs)

- 18% Overweight & 6% Obesity ♀
- 19% Overweight & 8% Obesity ♂

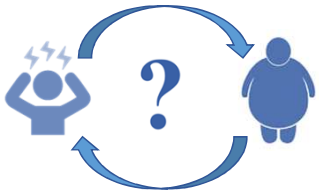
↳ >50% remains through adulthood

Psychosomatic Stress (<18 yrs)

- 35% Stress-related health problems (US)
- 38% Low emotional well-being (Europe)
- 10-20% Mental health problems (Worldwide)
- Suicide is second leading cause of death

↳ >50% experiences stress-related mental illness through adulthood

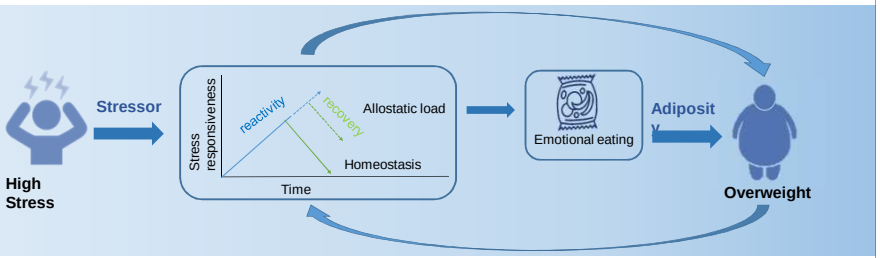
Stress – Obesity Axis



In some youngsters but not all:
- Stress leads to weight increase
- Overweight/obesity leads to stress

→ **Which mechanisms are involved?**

HYPOTHESIS

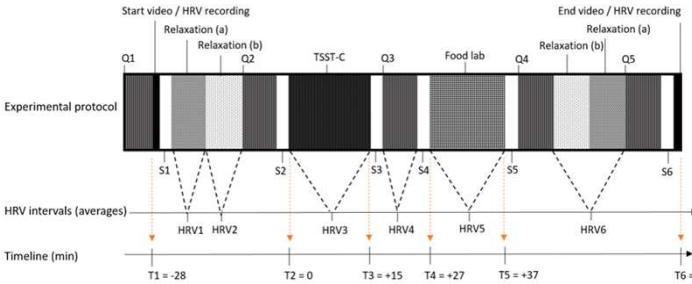


The stress-obesity axis: acute stress activates the hypothalamic-pituitary-adrenal axis with the secretion of cortisol and autonomic nervous system arousal, following increased secretion of catecholamines and altered heart rate variability. If not returned to homeostatis, chronic activation of the stress response might lead to consistently altered arousal levels called allostatic load. The activation of the stress response can directly (via cortisol) as well as indirectly (by emotional eating) lead to increased adiposity.

Hypothesis:

I. Youngsters with elevated chronic stress & overweight express a stronger stress reactivity and emotional eating in response to an acute lab stressor.
II. High stress responsiveness (e.g. high stress reactivity and/or worse stress recovery) explains increased state emotional eating

Stress and Food lab intervention



Stress intervention
Trier Social Stress Test – Children (TSST-C)

Food lab
Snacks (4 groups):
High or Low Fat combined with **Sweet or Savoury**

Intervention including questionnaires (Q1-5), saliva collection (S1-S6) and heart rate variability (HRV)

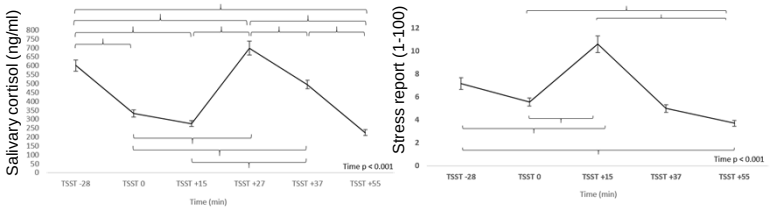
RESULTS

Sample (6-16 yrs)

- Adolescents [n=141, 50.4% boys, 6-18y] OPERA study and Jan Palfijn Hospital (Belgium)
- 4 Groups:
  Chronic stress: Perceived Stress Scale, Children's Depression Inventory 2, hair cortisol
  Weight: adjusted BMI → IOTF cut-offs

Stress manipulation

- Stress-induction was successful (time effect p≤0.05)



! Salivary cortisol has a time lapse of 10-15 minutes; curly brackets show significant changes over time (p≤0.05).

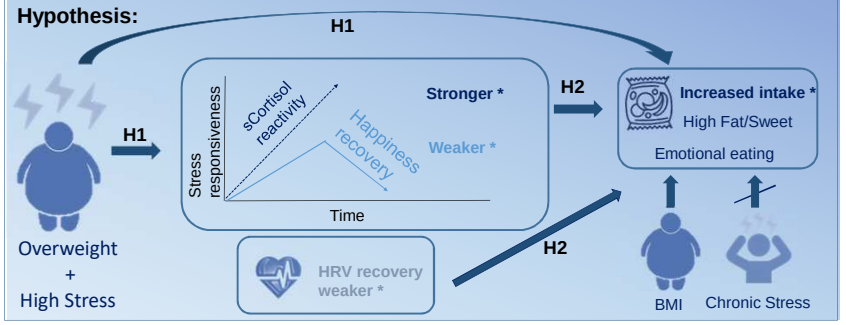
- Stress-induction successfully increased food wanting (from 386 to 494 on a scale of 12-1200) (time effect p≤0.05).
- Increase in wanting was associated with more snack buffet intake (both kcal and g) (p≤0.05).
- Participants liked the presented snacks, 744 on a scale of 12-1200. Liking was not associated with snack buffet intake (p>0.05).

Differences in stress response and emotional eating

	Normal weight & low stress n=52 (Mean±SE)	Overweight & low stress n=16 (Mean±SE)	Normal weight & high stress n=46 (Mean±SE)	Overweight & high stress n=23 (Mean±SE)
% Salivary cortisol reactivity	410.9±1561.5[a]	250.4±3249.3	137.7±1636.8 [b]	7856.9±2710.9[a,b]
% Happy recovery	409.8±148.4[a]	75.0±95.9	-8.8±176.2	-26.6±89.7[a]
HFSW intake (g)	24.1±2.8[a]	35.1±5.6	28.0±3.0[b]	39.4±4.6[a,b]
HFSW intake (kcal)	116.3±13.6[a]	170.6±27.3	134.7±22.4[b]	189.6±22.4[a,b]

Linear regression estimated marginal means and standard errors (mean±SE) adjusted for age, sex and parental education. Wanting and snack buffet intake analyses were additionally adjusted for hunger at study start and liking of presented snacks. Groups with identical superscript letter are significantly different from each other (p≤0.05). p-values for % Salivary cortisol reactivity [a]=0.019 and [b]=0.016, p-values for % Happy recovery [a]=0.014, p-values for HFSW intake (g) [a]=0.007 and [b]=0.040, p-values for HFSW intake (kcal) [a]=0.007 and [b]=0.041.

CONCLUSION



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