

Pathways to Eating in Children and Adolescents with Obesity

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Conflict of Interest

I have no conflicts of interest to disclose.

Introduction & Eating Behaviours

Current Treatment



One Size Does Not Fit All



Children with Obesity vs Non-Obese Peers

Table 2. Means (and SDs) on the three scales of the DEBQ-parent version for obese and non-obese boys and girls

DEBQ-scales (parent version)	Boys		Girls	
	Obese <i>N</i> = 52	Non-obese <i>N</i> = 58	Obese <i>N</i> = 93	Non-obese <i>N</i> = 89
Emotional eating	2.43 (0.85)	1.76 (0.60)	2.37 (0.79)	1.68 (0.57)
External eating	3.41 (0.64)	2.88 (0.46)	3.46 (0.71)	2.93 (0.53)
Restrained eating	2.45 (0.69)	1.41 (0.44)	2.46 (0.78)	1.55 (0.59)

(Braet & van Strien, 1997)

Children with Obesity vs Non-Obese Peers

TABLE 1 Means (SD) and *t* statistics (chi-square for gender) of sample characteristics

	Obesity patients	Controls	<i>t</i> statistics		
	<i>M</i> (SD)		<i>t</i> (df)	<i>P</i>	Cohen's <i>d</i>
Gender	16 ♀ /18 ♂	8 ♀/16 ♂	2.14 ^a	1.44 ^a	
Age	13.1 (2.16)	14.2 (2.34)	1.84 (52)	0.072	0.51
Years of education	7.65 (2.31)	8.80 (2.46)	1.58 (41)	0.123	0.51
Hunger scale	3.16 (1.88)	5.05 (1.84)	3.40 (43)	0.001	0.87
BMI-SDS	2.47 (0.32)	-0.02 (0.87)	14.6 (52)	<0.001	4.04
Trait food craving	85.6 (42.9)	79.6 (31.2)	0.55 (49)	0.586	0.15
Impulsivity	34.4 (8.36)	33.0 (8.75)	0.59 (51)	0.556	0.16
Restrained eating	29.9 (9.00)	19.4 (5.37)	4.82 (49)	<0.001	1.36

Note: BMI-SDS, body mass index standard deviation score; trait food craving, Food Cravings Questionnaire trait; impulsivity, Barratt Impulsiveness Scale (short form); restrained eating, restrained eating scale of the Dutch Eating Behavior Questionnaire; ^a $\chi^2(1, 54)$. Scores for trait food craving, impulsivity, and restrained eating were calculated by sum scoring.

(Hoffmann et al, 2015)

Eating Mechanisms Co-occur in Children with Obesity

TABLE 2. Relationship between group assignment by BMI z-score and LOC-ES and ADHD measures

Group	ADHD Diagnosis ^a	Conners' Inattentive ^b	Conners' Hyperactive-Impulsive ^b	BRIEF Inhibit ^c	BRIEF Emotional Control ^c
	Adjusted Odds Ratio (95% CI)	Regression Coefficient (95% CI) ^d	Regression Coefficient (95% CI) ^d	Regression Coefficient (95% CI) ^d	Regression Coefficient (95% CI) ^d
OW/OB + LOC-ES vs. non-OW/OB	10.44 ^e (2.96, 36.75)	20.70 ^e (12.63, 28.63)	19.49 ^e (10.52, 28.06)	13.99 ^e (5.94, 21.10)	14.59 ^e (8.01, 21.15)
OW/OB + NO LOC-ES vs. non-OW/OB	1.43 (0.39, 5.33)	6.96 (-3.29, 67.07)	6.57 (-3.17, 16.29)	7.43 (-1.95, 18.30)	8.74 ^f (0.01, 17.24)
OW/OB + LOC-ES vs. OW/OB + NO LOC-ES	7.29 ^f (1.88, 28.17)	13.73 ^f (2.88, 22.33)	12.91 ^f (3.73, 21.71)	6.56 (-2.64, 14.77)	5.86 (-2.68, 13.50)

Notes: OW: overweight; OB: obese; LOC-ES: loss of control eating syndrome; ADHD: attention deficit-hyperactivity disorder; CI: confidence interval; vs: versus.

^aKSADS: (Kiddie-SADS-Present and Lifetime Version) diagnosis plus either >65 on either Conners DSM-IV-TR Scale (Inattentive or hyperactive-impulsive).

^bConners': Conners-3 parent form DSM-IV-TR ADHD (inattentive or hyperactive-impulsive subscale T-scores).

^cBRIEF: behavior rating inventory of executive function (inhibit or emotional control scale T-scores).

^dBias-corrected confidence intervals based on 500 bootstrapped samples, adjusted for age and sex.

^e $p < 0.001$.

^f $p < 0.05$.

(Reinblatt et al, 2015)

Appetite Regulation is Complex

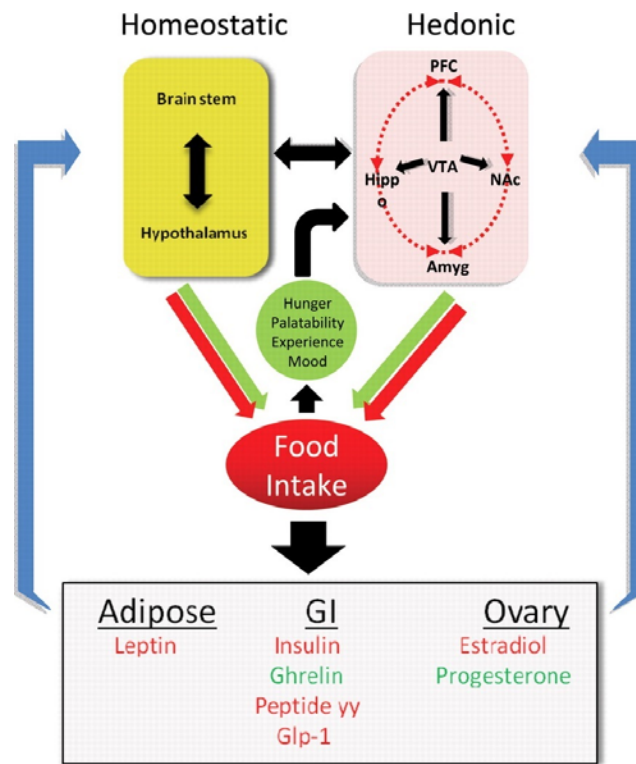
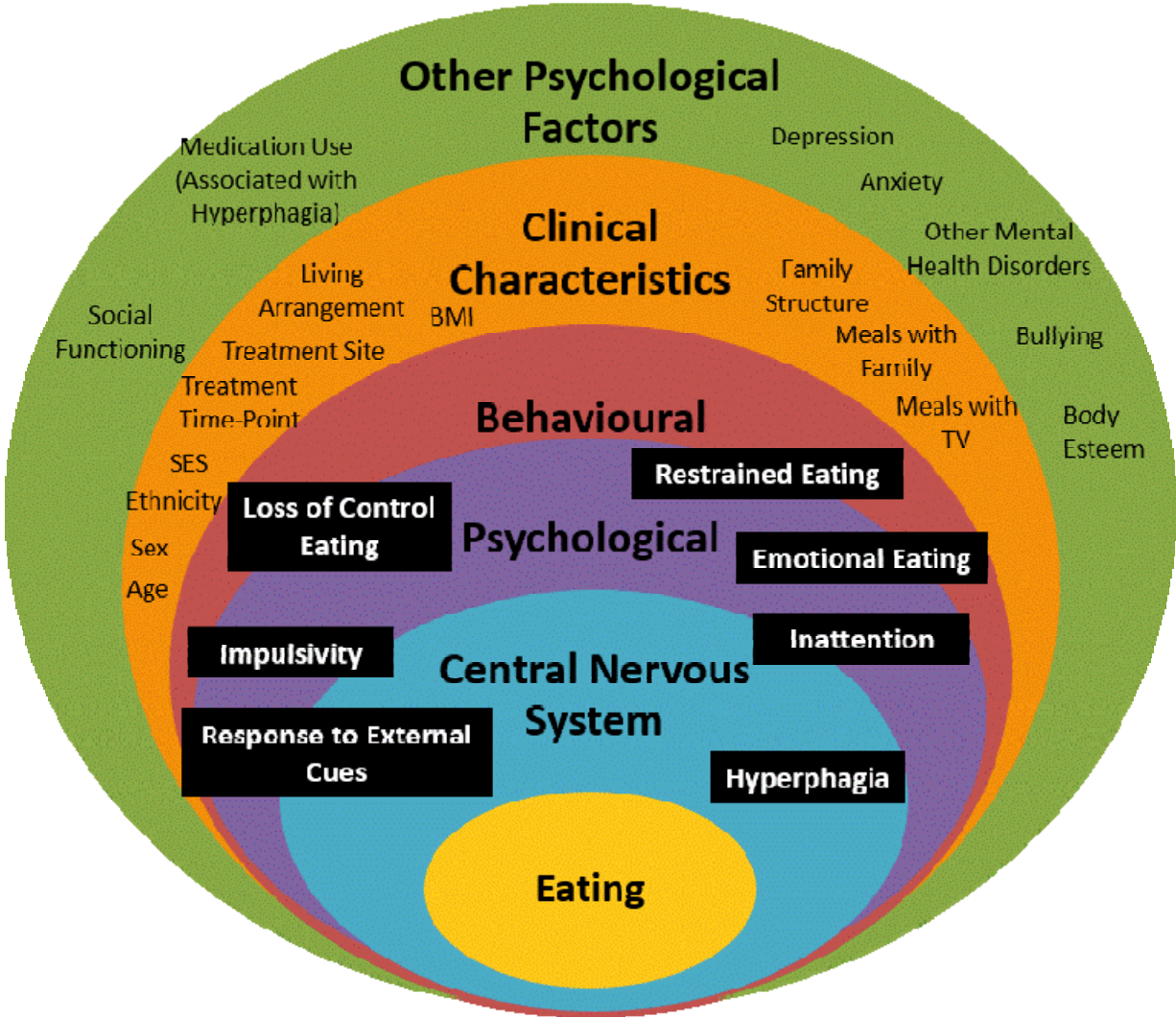


Image from: Van Vugt (2010) Brain imaging studies of appetite in the context of obesity and the menstrual cycle. Human Reproduction Update 16(3): 276-292

Eating Mechanisms



Objectives

Objectives

- 1) To determine the **clustering** properties of **eating mechanisms** in children and adolescents with obesity
- 2) To relate identified **phenotypes** to demographic, anthropometric, and eating environment measures

Methodology

Study Population

- **Ages 10-18 years**
- **English-speaking**
- **Enrolled in CIHR-funded CANPWR (Baseline or 12 month visit)**

Data Collection

Responses to 2 child/adolescent self-report and 2 parent-for-child-report questionnaires

Questionnaires (total items: parent = 31, child = 25):

- **EDE-Q: Loss of control eating**
- **DEBQ: Emotional, Restrained, and External Eating subscales**
- **HQ: Total hyperphagia score**
- **SWAN: Hyperactivity/Impulsivity and Inattention subscales**

Analytic Plan

Cross-Sectional Analysis

Objective #1: Latent Profile Analysis (LPA)

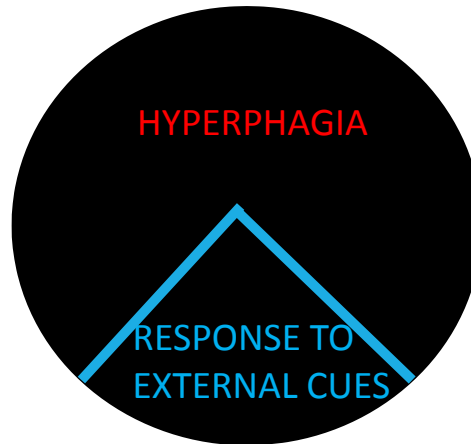
- Phenotypes identified using indicator variables (mechanisms)
- Membership assigned to “latent” cluster from similarities between variables
- Sample size of 250-300 is comparable to similar analyses

Sample Model: 4 Clusters/Phenotypes

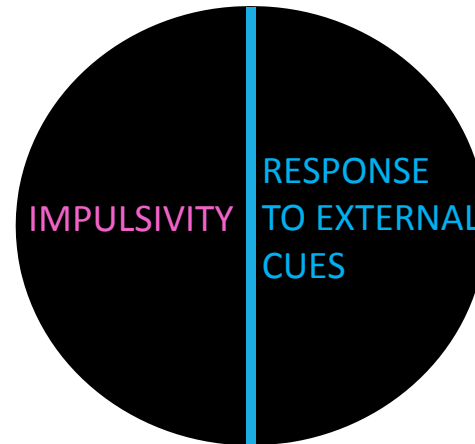
Emotional-
Restrained



Hyperphagic



Impulsive-
External



Distracted-
Uninhibited



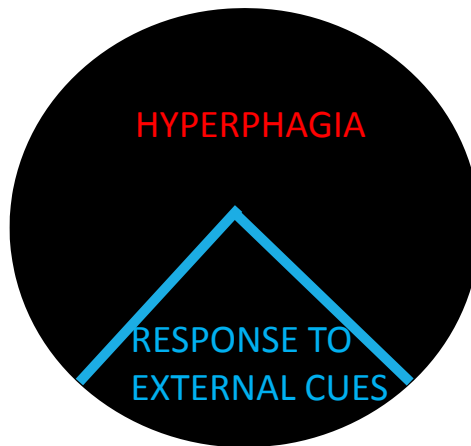
Strategies for Treatment

Emotional-
Restrained



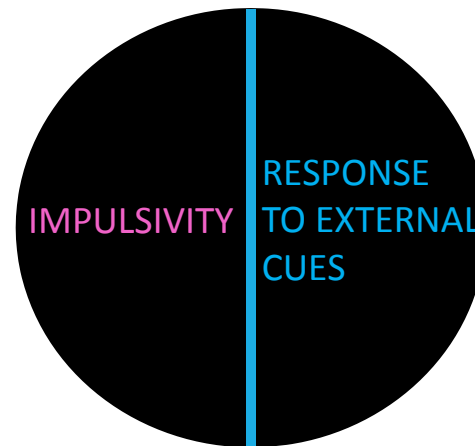
DBT/CBT

Hyperphagic



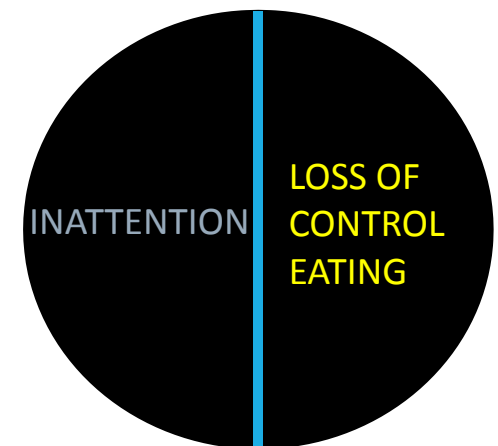
Behavioural Therapy/
Medication

Impulsive-
External



Mindfulness

Distracted-
Uninhibited



ADHD coach/
Medication for ADHD

Cross-Sectional Analysis

Objective #2: Analysis of Variance (ANOVA)

- **Clinical characteristics will be compared across phenotypes**
 - **Demographics (e.g. age, sex, family structure)**
 - **Anthropometrics (BMI)**
 - **Eating Environment (e.g. meals with family, meals in front of TV)**

Current Progress & Significance

Recruitment

➤ 8 CANPWR sites



➤ ~220 participants to date

➤ 300 anticipated by January 2017

Significance

- **Identifying latent phenotypes in children and adolescents with obesity will lead to increased investigation into better targeted weight-management interventions**

Acknowledgements

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Sickkids STOMP Team



CANPWR Investigators



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Questions



Image from: http://www.123rf.com/stock-photo/eating_questions.html

Extra Slides

Recruitment Update

BC Children's (Vancouver)	3
Alberta CH (Calgary)	37
Stollery CH (Edmonton)	19
McMaster (Hamilton)	61
Credit Valley (Toronto)	21
SickKids (Toronto)	53
CHEO (Ottawa)	29
Montreal CH (Montreal)	0
TOTAL	223