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Introduction

- ❖ Childhood obesity rates have increased exponentially in the past three decades.
- ❖ Parental characteristics => potential determinants of offspring obesity: weight status; physical activity (PA); education; smoking habits

Objectives

- ❖ Identify clusters of parental characteristics
- ❖ Estimate their influence on offspring adiposity in late adolescence.

Methods

- ❖ Data stem from the QUALITY Cohort, a longitudinal study of children with at least one obese parent.
- ❖ Children were evaluated at 8-10y (n=630), 10-12y (n=564), and 15-17y (n=377)
- ❖ Parental smoking habits, PA and education were self-reported
- ❖ Weight and height were obtained and body mass index (BMI) was calculated
- ❖ 209 case-complete families: mothers and fathers were clustered separately
- ❖ Clustering on partitioning around medoids (PAM) based on parental: BMI; PA; Education; Smoking habits
- ❖ Linear regressions, adjusted for child age, sex and Tanner stage, were used to assess associations between clusters (mothers and fathers) and measures of childhood adiposity (BMI z-score) at 15-17y

Results

Figure 1: Mothers clusters identification via t-SNE algorithm

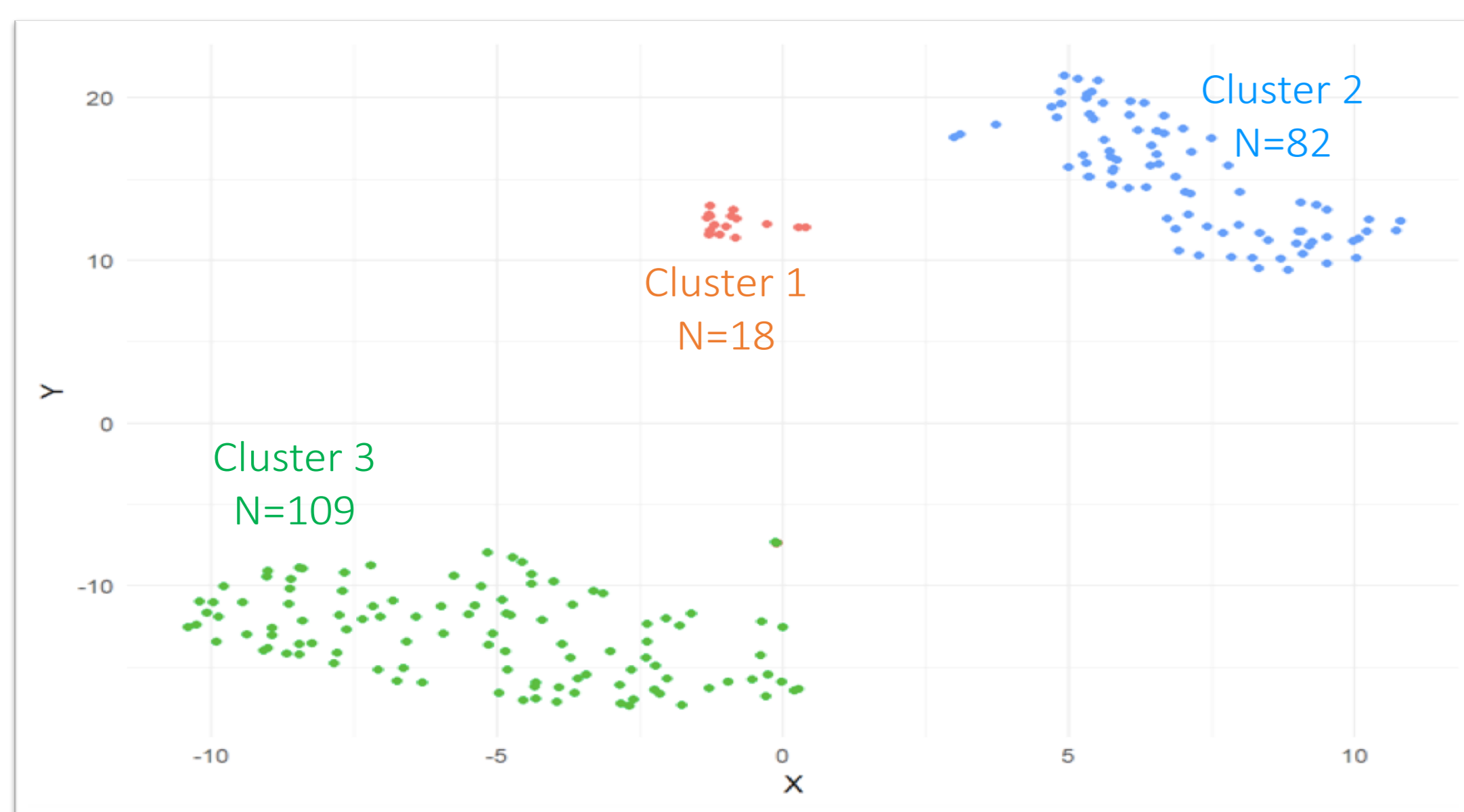
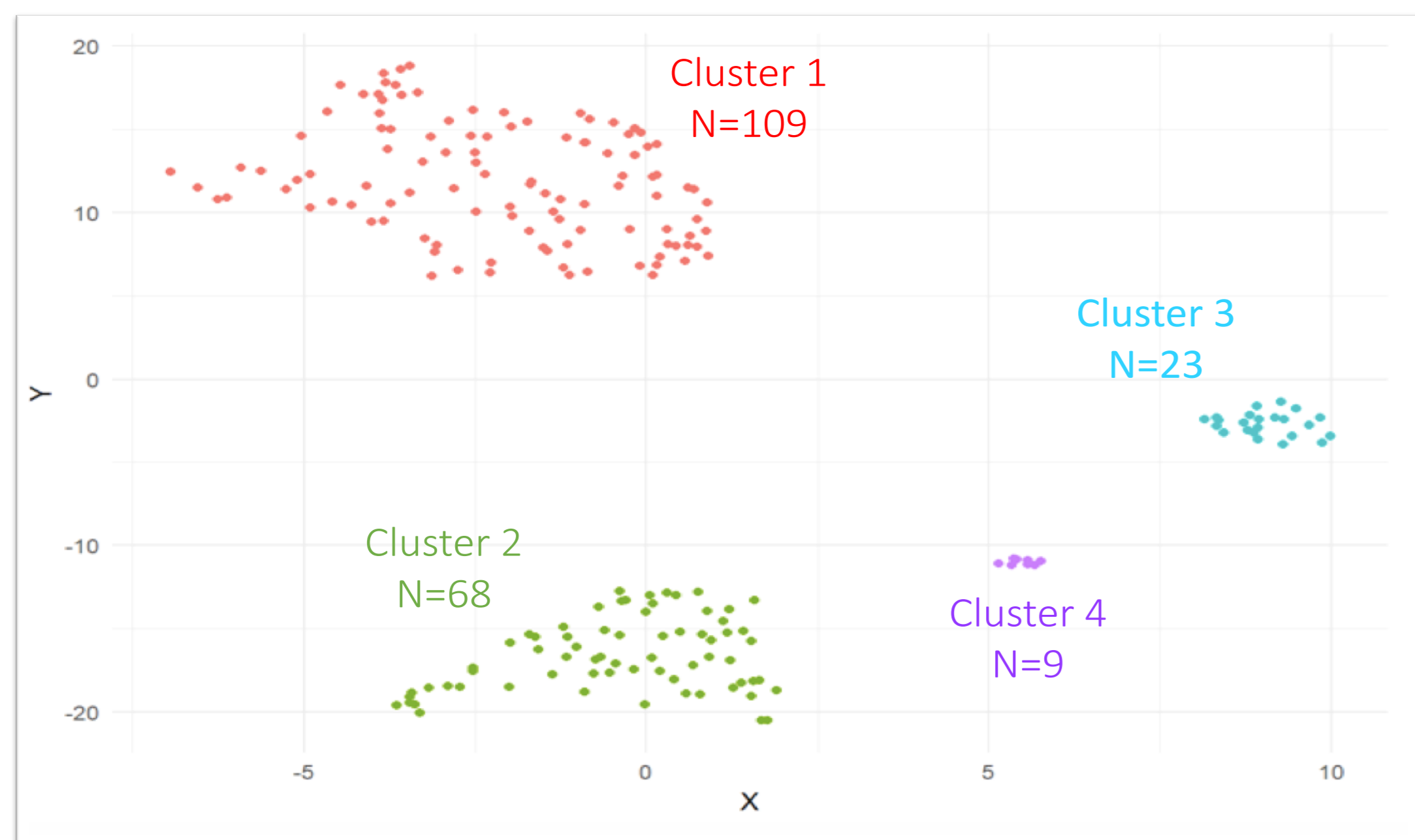


Figure 2: Fathers clusters identification via t-SNE algorithm



- ❖ Mothers in cluster 1 were obese, less educated, smoked, and tended to be more active; cluster 2 were overweight, educated and non-smokers; cluster 3 were overweight, less educated, non-smokers and tended to be less active.
- ❖ Fathers in cluster 1 were less educated and non-smokers, cluster 2 were educated and non-smokers, cluster 3 were less educated and smokers and cluster 4 were older, educated and smokers
- ❖ Children of obese, less educated and smoking mothers (cluster 1) had higher adiposity measurements compared with children of overweight, educated, non-smoking mothers (cluster 2), with an increase in BMI z-score of +0.94 (95% CI: 0.35-1.53); p=0.002
- ❖ Child adiposity measurements were comparable across father phenotype clusters.

Results

Table 1: Clusters of mother characteristics summaries

Mother's characteristics	Cluster 1	Cluster 2	Cluster 3	p
BMI (kg/m ²); mean (SD)	32.0 (6.3)	27.9 (5.3)	28.7 (5.8)	0.02
Physical Activity (min/day); mean (SD)	26.4 (35.0)	22.8 (20.6)	17.3 (14.9)	0.09
Age (years); mean (SD)	38.7 (5.8)	41.0 (4.3)	40.2 (5.1)	0.15
Education				
Completed University (yes); % (N)	11.1 (2)	100 (109)	0	<0.01
Smoking Status				
Smoker (yes); % (N)	100 (18)	3 (2.8)	0	<0.01
Employment Status				
Full Time; % (N)	72.2 (13)	69.7 (76)	64.6 (53)	
Part Time; % (N)	27.8 (5)	29.4 (32)	35.4 (29)	0.78
Unemployed; % (N)	0	0.9 (1)	0	
Financial Stress				
Yes; % (N)	44.4 (8)	24.8 (27)	30.5 (25)	0.20
Alcohol Consumption				
Never; % (N)	5.6 (1)	3.7 (4)	8.5 (7)	
< 1 / week; % (N)	83.3 (15)	94.5 (103)	90.2 (74)	0.11
> 1 / week; % (N)	11.1 (2)	1.8 (2)	1.2 (1)	
Child Parameters				
BMIz; mean (SD)	1.5 (1.4)	0.5 (1.1)	0.6 (1.2)	0.01
Android-Gynoid Fat Ratio; mean (SD)	0.4 (0.1)	0.3 (0.1)	0.3 (0.1)	0.01
% BF (%); mean (SD)	33.1 (11.3)	25.3 (11.6)	28.2 (10.9)	0.01
FMI (kg/m ²); mean (SD)	9.6 (5.2)	6.2 (3.9)	6.9 (3.7)	0.01

Legend: BMIz: body mass index z-score; %BF: percentage body fat; FMI: fat mass index

Table 2: Clusters of fathers characteristics summaries

Father's characteristics	Cluster 1	Cluster 2	Cluster 3	Cluster 4	p
BMI (kg/m ²); mean (SD)	30.5 (5.2)	30.5 (5.1)	30.2 (6.0)	29.8 (4.1)	0.97
Physical Activity (min/day); mean (SD)	26.4 (35.0)	27.9 (31.4)	28.6 (26.6)	20.4 (17.9)	0.39
Age (years); mean (SD)	41.7 (5.6)	43.1 (4.8)	40.2 (5.0)	47.8 (5.6)	<0.01
Education					
Completed University (yes); % (N)	0	100 (68)	0	100 (9)	<0.01
Smoking Status					
Smoker (yes); % (N)	0	0	100 (23)	100 (9)	<0.01
Employment Status					
Full Time; % (N)	90.8 (99)	92.6 (63)	82.6 (19)	88.9 (8)	
Part Time; % (N)	8.3 (9)	5.9 (4)	17.4 (4)	11.1 (1)	0.53
Unemployed; % (N)	0.9 (1)	1.5 (1)	0	0	
Financial Stress					
Yes; % (N)	31.2 (34)	27.9 (17)	26.1 (6)	33.3 (3)	0.94
Alcohol Consumption					
Never; % (N)	5.5 (6)	4.4 (3)	4.3 (1)	0	
< 1 / week; % (N)	91.7 (100)	89.7 (61)	87 (20)	77.8 (7)	0.25
> 1 / week; % (N)	2.8 (3)	5.9 (4)	8.7 (2)	22.2 (2)	
Child Parameters					
BMIz; mean (SD)	0.6 (1.3)	0.5 (1.1)	0.8 (1.2)	0.5 (1.4)	0.7
Android-Gynoid Fat Ratio; mean (SD)	0.3 (0.1)	0.3 (0.1)	0.3 (0.1)	0.3 (0.1)	0.75
% BF (%); mean (SD)	27.7 (11.6)	25.0 (10.1)	29.1 (12.1)	30.4 (12.7)	0.26
FMI (kg/m ²); mean (SD)	6.9 (4.7)	6.1 (3.4)	7.6 (4.6)	7.8 (6.1)	0.30

Legend: BMIz: body mass index z-score; %BF: percentage body fat; FMI: fat mass index

Table 3: Association between clusters of mother characteristics and child adiposity measures using linear regression

Clusters (reference #2)	BMIz	Android-Gynoid Fat Ratio	%BF	FMI
	beta coefficient (95% confidence interval)			
Cluster 1	0.94** (0.35-1.53)	0.08** (0.03-0.13)	7.63** (2.90-12.35)	3.35*** (1.49-5.21)
Cluster 3	0.10 (-0.24-0.44)	0.02 (-0.01-0.05)	2.24 (-0.46-4.95)	0.58 (-0.48-1.65)

Legend: BMIz: body mass index z-score; %BF: percentage body fat; FMI: fat mass index

p-value<0.01 *p-value<0.001

All models adjusted for age, sex and Tanner stage at baseline

- ❖ No associations were found between clusters of father characteristics and child adiposity measures using linear regression

Conclusions

- ❖ Targeting obese and less educated mothers who smoke to promote the adoption of healthier lifestyle habits may be effective at preventing later adiposity in their offspring