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## Title page

### Eater profile and associated factors in pediatric patients of the PEDIANUT cohort.

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#### Abbreviations' list:

ARFID Avoidant restrictive food intake disorder  
BEP Big Eater Profile  
BMI Body Mass Index  
DSM Diagnostic and Statistical Manual of mental disorders  
FED Feeding and Eating Disorders  
SEP Small Eater Profile  
UFED Unspecified Feeding and Eating Disorder

## **Abstract**

Appetite traits have multifactorial origins. In association with environmental and genetic factors, they could become problematic and lead to Feeding or Eating Disorders (FED). As the DSM-5 classification is not suitable for pediatric FED, another way to describe eating behavior is to distinguish the clinical profiles of "small eater" and "big eater". The aim of this study was to identify socio-demographic and medical factors associated with these profiles, and to compare problematic and non-problematic profiles. From the Pedianut study, we analysed socio-demographic, medical and family history data among 401 children according to 4 age groups (<1 year n=101, 1-6 years n=99, 6-12 years n=100, 12-18 years n=101). The information collected on eating behavior made it possible to define small eater profile (SEP) and big eater profile (BEP) using predefined grids. BEP was more frequent in adolescents (35.6%), and SEP was more frequent in children aged 1 to 6 years (34.3%). BEP was associated with having separated parents, being male and the oldest sibling ( $p<0.05$ ). Problematic BEP was associated with eating while watching television, being a girl, and having sensory disorders ( $p<0.05$ ). SEP was associated, whatever age, with non-breastfeeding, chronic illness, psychological history, sensory disorders, language delays (in the 1-6 year age group), and family history of FED (in the adolescent group) ( $p<0.05$ ). This analysis of factors associated with eater profile opens new perspectives for research on risk factors associated with eating traits, which warrants further study in larger populations to delineate transition from healthy to problematic eating.

**Key words :** eater profile, appetite traits, associated factors, environmental factors.

1 **Text:**

2 **1. Introduction**

3 The factors conditioning eating behaviors are not yet well understood. Appetite traits (food  
4 avoidance or food approach) could be explained by genetic processes and biological  
5 foundations (Dubois et al., 2013, Llewellyn et al., 2012, Wardle et al., 2009) but also by  
6 psychosocial factors, as parental feeding practices (Fox et al., 2020, Jansen et al., 2017,  
7 Scaglioni et al., 2018, Russel et al., 2019, Zhou et al., 2020) and “they can be perceived as  
8 stable traits” (Guzek et al., 2020). However, in association with environmental and other  
9 genetic factors, these appetite traits could become problematic and lead to Feeding or Eating  
10 Disorders (FED), with restrictive or compulsive eating behaviors (Herle et al., 2020).

11 The normal development of eating profiles in children includes several steps: first, infants  
12 have reflexive sucking up to 4 months, then sucking becomes more voluntary; second  
13 complementary solid food is generally introduced between 4 and 6 months of age. Then there  
14 seems to be a sensitive period during which infants are receptive to a variety of tastes and  
15 food textures, depending on parental feeding practices, which influences eating behavior later  
16 in childhood (Borowitz et al., 2018). A rate of 25 to 45% of parents reported having  
17 experienced feeding difficulties with their child, but most of them resolved over time, and  
18 only 5 to 10% of children required intensive care (Borowitz et al., 2018, Bryan-Waught et al.,  
19 2010, Kerzner et al., 2015). As pediatric FED can differ significantly in terms of severity,  
20 DSM-5 FED definitions are not always appropriate for children (Dovey et al., 2019, Strand et  
21 al., 2019): in our Pedianut study (Prevalence of FED in 401 children aged between 0 and 18  
22 years old), using the DSM-5 classification, we observed a high prevalence of “Unspecified  
23 FED” (UFED) of 9.7% 95%CI (7.2-13.0) (Bertrand et al., 2021). As pediatric UFED are  
24 frequent, and include both restrictive and compulsive unspecified eating disorders, we used in  
25 this study a pragmatic description of pediatric eating behaviors based on appetite traits,  
26 distinguishing non-problematic and problematic "small eater profile" (SEP) and "big eater  
27 profile"(BEP).

28 The aim of this study was thus to investigate whether socio-demographic and/or medical  
29 factors were associated with SEP or BEP, and to compare these factors according to eating  
30 profile severity (problematic SEP or BEP i.e. FED, versus non-problematic SEP or BEP i.e.  
31 appetite traits).

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33 **2. Material and Methods**

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**2.1 Study design**

The Pedianut study was a non-interventional cross-sectional study conducted in one French department (Seine-Maritime, Normandy), from 3rd May 2019 to 5th March 2020. The protocol was approved by a Committee for the Protection of Persons on 18/03/2019 (N° RCB 2019-A00067-50). We analysed socio-demographic, medical and family history data among 401 children according to 4 age groups (<1 year n=101, 1-6 years n=99, 6-12 years n=100, 12-18 years n=101). Physicians used an anonymized questionnaire to conduct the interview, and parents and adolescents also completed a part of the questionnaire with age-appropriate screening tools (Bertrand et al.,2021).

**2.2 Variables collected in the questionnaires.**

Each questionnaire included, for all patients, demographic (age, gender) and medical data (physician measured weight, height, body mass index BMI). Overweight and underweight were assessed according to the latest validated French growth curves. After 2 years of age, children were considered underweight if BMI ≤ International Obesity Task Force (IOTF) 17 (grade II) and overweight if BMI ≥ IOTF 25 (Bertrand et al.,2021).

Questionnaires also included personal history data (prematurity, breastfeeding, digestive disorders (functional constipation, functional abdominal pain disorder, gastroesophageal reflux disease), chronic diseases, sensory disorders (tactile and taste sensitivity), surgical history, food allergies, psychiatric disorders, academic delay, language delay), lifestyle data (parents living together or not, order of birth among siblings, meals with family or not, frequency of meals watching television), family history data (eating disorders, psychiatric diseases, overweight).

Concerning dietary behavior, questionnaires included age-appropriate questions designed by the authors, and additional age-appropriate questions from screening tools extracted from the literature according to feasibility criteria (Baby Eating Behavior Questionnaire, Behavioral Pediatrics Feeding Assessment Scale, Sick Control One Fat Food, French, Eating Attitudes Test EAT-26, Three-Factor Eating Questionnaire TFEQ-R18). These tools and score results were presented in our primary study (Bertrand et al.,2021). Physicians helped families if some questions were misunderstood.

**2.3 Classification by clinical profile of small eater and big eater**

1 After each interview, and according to the analysis of the questionnaire responses, physicians  
2 associated one or more eating behavior characteristic with each patient, according to a  
3 predefined grid, including restrictive or compulsive eating behaviors. These eating behaviors  
4 are listed in **Figure 1**; a patient could have one or more eating behavior item. To define eater  
5 profile, the items “tachyphagia” and “nibbling between meals” were removed (because they  
6 were subjective and not specific, and “nibbling” was present in both SEP and BEP). When  
7 children had the item “selective eating behavior”, the association with other restrictive or  
8 compulsive eating behaviors led us to classify them in SEP or BEP. Thus, it was possible to  
9 compare three patient profiles (SEP, BEP, normal eater), in terms of age, BMI and associated  
10 factors.

11 In a second time, we made a comparative analysis of these factors according to the severity of  
12 eater profile (problematic SEP or BEP versus non-problematic SEP or BEP). Problematic  
13 eaters were defined by physicians as eaters with significant FED (selective disorder,  
14 restrictive disorder with nutritional or psycho-social consequences, phobia of swallowing  
15 and/or vomiting, emotional food avoidance, hyperphagia, compulsive disorders). These  
16 significant FED were already presented in our previous study, corresponding to 11 children  
17 with Avoidant Restrictive Food Intake Disorder (ARFID) and 35 children with UFED  
18 ([Bertrand et al, 2021](#)). Children considered by their parents as small or big eaters without  
19 other significant restrictive or compulsive eating behaviors were considered as having non-  
20 problematic eater profiles.

21

## 22 **2.4 Analysis**

23 A descriptive analysis was done for the entire cohort and for each age group. Qualitative  
24 variables were described in percentages, and continuous variables were described in median  
25 rate (minimal-maximal) for age. Chi-square was used for comparisons of categorical data.  
26 Continuous variables were compared using the Student’s t-test. Statistical analysis was done  
27 with the software XlstatBiomed 2020.3.1.

28

## 29 **3. Results**

30 The demographic (sex ratio, median age) and BMI data of the cohort, by age group, are  
31 presented in table 1. Physicians listed 427 eating behaviors among children including  
32 breastfeeding or bottle difficulties, refusal of the spoon or pieces, big or small eater,  
33 neophobic/selective eater, restrictive eater with nutritional or psycho-social consequences,

1 phobia of swallowing and/or vomiting, emotional food avoidance, hyperphagia, tachyphagia,  
2 nibbling between meals, compulsive eating, nocturnal nibbling or hyperphagia. However, the  
3 interviews did not identify rumination, pica, anorexia, bulimia, binge eating disorder,  
4 orthorexia (Bertrand et al., 2021).

5

### 6 **3.1 Eater profile**

7 Prevalence by age group is presented in **Figure 2**. BEP was more frequent in adolescents  
8 (35.6%), and SEP was more frequent in children aged 1 to 6 years (34.3%).

9

### 10 **3.2 Eater profile and BMI**

11 Children with SEP were significantly more often underweight than children with BEP or  
12 normal eater profile; this finding was observed in all age groups except the 1-6 year group.  
13 Children with BEP were significantly more often overweight than children with SEP or  
14 normal eater profile, regardless of age group ( $p < 0.0001$ ). When analyzing problematic eater  
15 profiles, children with problematic SEP were significantly more often underweight than  
16 children with non-problematic SEP or normal eater profile, and children with problematic  
17 BEP were significantly more often overweight than children with non-problematic BEP or  
18 normal eater profile, whatever age ( $p < 0.05$ ) (**Table 2**).

19

### 20 **3.3 Eater profile and associated factors**

21 SEP was associated with a history of non-breastfeeding ( $p = 0.029$ ), chronic illness ( $p = 0.001$ ),  
22 psychiatric disorders ( $p = 0.003$ ), presence of sensory disorders ( $p = 0.001$ ), food allergies  
23 related to cow's milk in the 0–1-year age group ( $p = 0.035$ ), language delays in the 1-6 year  
24 age group ( $p = 0.037$ ), and a family history of FED in the 12-18 year age group ( $p = 0.026$ ). BEP  
25 was associated with having separated parents ( $p = 0.018$ ), being the oldest sibling ( $p = 0.007$ ),  
26 and being male ( $p = 0.04$ ). Normal eater profile was weakly associated with a history of  
27 surgery ( $p = 0.0028$ ). (**Table 3**).

28

### 29 **3.4 Factors associated with eater profile according to severity.**

30 We identified 34 problematic SEP and 12 problematic BEP. Comparing problematic SEP and  
31 BEP with non-problematic SEP and BEP indicated some differences: problematic SEP was  
32 more frequently associated with breastfeeding, and problematic BEP with eating while  
33 watching television, being a girl, and having sensory disorders ( $p < 0.05$ ). (**Table 4**)

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**4. Discussion**

This study provides additional data on factors associated with eating behavior in pediatric patients, notably, language delay in small eater profile, and sensory disorders in problematic big eater profile.

**4.1 Factors associated with small eater profile.** We found an association between language delay and SEP in the 1-6 year age group. This association has been rarely studied in the literature, while the development of language and orality are probably interconnected. Only one study reported an association between language delay, chewing and selective eating disorders (Palladino et al., 2007). In a more recent study, authors suggested an association between children born prematurely who had initial feeding disorders and language delay (Adams-Chapman et al., 2013). In our study, no children with language delay in the 1-6 year age group had a history of grommets for otitis media, nor a history of tongue tie whose contribution to eating and language disorders remains controversial (O'Shea JE et al.,2017, Wang J et al., 2021). Concerning academic delay, this tended to be more frequent in all ages of our problematic SEP group (p=0.05), which includes restrictive UFED and ARFID, but there are still no data on academic level in literature for these two categories. This contrasts in literature with high academic level in children with anorexia nervosa (Sundquist et al., 2016).

In our study, SEP was also associated with non-breastfeeding, sensory disorders, chronic illness, psychological disorders, which have already been cited in the literature with restrictive FED. There are indeed many factors that can lead a child to associate discomfort rather than enjoyment with eating. Restrictive feeding disorders have also been associated with gastroesophageal reflux, chronic abdominal pain, constipation, prolonged hospitalization, surgery, prematurity, food allergy, lack of weaning, abnormal sensory environment, tube feeding or gastrostomy, bad positioning at mealtimes, inappropriate mealtime frequency/duration, and parents' psychological fragility/anxiety (Benjasuwantep et al., 2013, Borowitz et al., 2018, Chao et al., 2018, Green et al., 2015, Johnson et al., 2016, Kerzner et al., 2015, Lapillone et al., 2019, Silvia-Garcia et al., 2016). Breastfeeding and a higher level of parental education seem to facilitate a normal eater profile (Harris et al., 2016, Iron-Segev et al., 2013), while highly controlling or negligent parental feeding practices are associated with poorer child appetite regulation, and with restrictive (or compulsive) behavior (Silvia



1 Garcia et al., 2016, Zhou et al., 2020). Sensory disorders are described in restrictive and  
2 selective behaviors (Dovey et al., 2019, Zickgraf et al., 2020). Chronic diseases requiring  
3 specific diets (food allergies, cystic fibrosis, type 1 diabetes, inflammatory bowel disease,  
4 irritable bowel syndrome) or having anatomical abnormalities like esophageal atresia, could  
5 induce or co-exist with restrictive or selective behaviors (Avila et al., 2019, Borowitz et al.,  
6 2018, Conviser et al., 2018, Menzies et al., 2017, Quick et al., 2013, Reed-Knight et al., 2016,  
7 Wróblewska et al., 2018). For some authors, being the oldest child, eating in front of screens  
8 or not eating with the family are deleterious, but this was not associated with problematic or  
9 non-problematic SEP in our study (Benjasuwantep et al., 2013, Goday et al., 2019, Green et  
10 al., 2015, Kerzner et al., 2015).

11  
12 Psychological disorders were associated with SEP in this study: there are no data in literature  
13 about this factor and no problematic restrictive appetite trait, but children with FED  
14 frequently have depression or anxiety disorders (Herpertz-Dahlmann et al., 2019,  
15 Mohammadi et al., 2020), and selective/restrictive eating behaviors or ARFID are also  
16 associated with attention deficit hyperactivity disorder and autism spectrum disorders  
17 (Cooney et al., 2018, Eddy et al., 2015, Fisher et al., 2014, Kambanis et al., 2020, Lucarelli et  
18 al., 2017, Nicely et al., 2014, Norris et al., 2014, Sharp et al., 2013). In the adolescent age  
19 group, we found an association between SEP and a family history of eating disorders. ARFID,  
20 as anorexia nervosa, have been described with a family history of anxiety and depression  
21 and/or eating disorders (Bion et al., 2018, Bryant-Waugh et al., 2010, Green et al., 2015,  
22 Lucarelli et al., 2018, Martini et al., 2019, Nicholls et al., 2011, Norris et al., 2014), and food  
23 selectivity could be related to genetic background (Elkins et al., 2018, Knaapila et al., 2007).

24  
25 **4.2 Factors associated with big eater profile.** BEP was associated in the present study with  
26 being male, the oldest sibling, and having separated parents. A biopsychosocial model  
27 explaining sex differences in eating behaviors has been proposed (Keller et al., 2019), arguing  
28 that “a feminine identity is characterized by eating smaller portions, consuming less meat, and  
29 preferring healthier options to maintain appearance, while a masculine eating identity is  
30 characterized by feeling full, with a focus on physical performance” and that “social  
31 influences include differences in parental feeding practices directed at males and females”, as  
32 boys are generally encouraged to eat more than girls (Loth et al., 2013), while society  
33 encourage girls to be thin. Adolescent girls may be more sensitive to internal satiety cues and

1 boys have higher scores for food responsiveness (de la Fuente-Reynoso et al., 2020, Hunot-  
2 Alexander et al., 2019). However, recent French studies found no significant gender  
3 difference in children in terms of BMI (Verdot et al., 2017). Some studies have analysed birth  
4 order among siblings, one study found an association between higher caloric intake diet with  
5 having two or more older siblings, possibly because parents with larger families have less  
6 time to cook healthy food, but there are few data about the oldest sibling (Coxon et al., 2019,  
7 Lioret et al., 2015). Having separated parents particularly before 6 years of age was associated  
8 with a higher long-term BMI in one study, but this may be related to psycho-economic-social  
9 biases (Goisis et al., 2019). Whether parental divorce is a risk factor for eating disorders  
10 remains debated (Bachar et al., 2008, O'Connor et al., 2016).

11  
12 Although we did not highlight this factor, breastfeeding may protect children and adolescents  
13 against overweight through a better acceptance of vegetables (Specht et al., 2018, Wang et al.,  
14 2020), but not from eating disorders like bulimia (Iron-Segev et al., 2013). An authoritative  
15 parenting style could limit children's intake of snack food and lower the risk of obesity, while  
16 parental emotional feeding and parental restrictive feeding favor children's overeating and  
17 high BMI (Jansen et al., 2015, Rodgers et al., 2013, Scaglioni et al., 2018, Zhou et al., 2020).  
18 We did not study this factor, but a low socioeconomic status has also been associated with  
19 being overweight (Scaglioni et al., 2018, Shrewsbury et al., 2008), and it is considered that  
20 parents with high socioeconomic status have better resources to buy food, better knowledge  
21 about healthy food and good feeding practices (Harris et al., 2016, Saxton et al., 2009).  
22 Although a family history of being overweight and psychological disorders were not  
23 significant factors in our cohort, it is known that genetics is an important risk factor for  
24 obesity, including compulsive eating disorders (Lamerz et al., 2005, Lee et al., 2018), and that  
25 obese adolescents with compulsive disorders have more anxiety and depression disorders  
26 (Rancourt et al., 2015).

27  
28 **4.3 We identified some differences between problematic SEP or BEP and non-**  
29 **problematic SEP or BEP**, but these findings should be interpreted with caution because of  
30 our limited population. Our finding that children with problematic SEP were more frequently  
31 breastfed is at variance with previous findings supporting a protective role of breastfeeding  
32 against restrictive eating disorders (Harris et al., 2016, Iron-Segev et al., 2013). Our  
33 observation that problematic BEP was associated with eating in front of screens is in  
34 agreement with previous reports binding overweight in adolescents with screen viewing, low

1 family economic status, high food intakes of a low-quality diet with sugar-sweetened  
2 beverages and high sugar and high fat foods (Avery et al., 2017, Robinson et al., 2017,  
3 Scaglioni et al., 2018). In contrast, eating with the family during adolescence could favor  
4 healthy diet habits in young adulthood (Harrison et al., 2015); however, we were not able to  
5 distinguish eater profiles according to this factor in the present study, which may be due to the  
6 insufficient number of patients in the adolescent group. Problematic BEP was also associated  
7 with being a girl, which could be explained by the fact that adolescent girls show higher  
8 levels of emotional over-eating than boys (Hunot-Alexander et al., 2019, Keller et al., 2019).  
9 Interestingly, problematic BEP was associated with having sensory disorders (tactile and  
10 taste), which is a factor rarely screened in studies. Navarette-Muñoz et al reported recently a  
11 significant association between an increase in BMI and a higher prevalence of atypical tactile  
12 sensivity in a general population of children aged 3-7 years, possibly due to a poorer quality  
13 of diet induced by selective eating behaviors (Navarette-Muñoz et al., 2020). Sensory  
14 avoiding behaviors associated with higher BMI have also been described in children with  
15 autism spectrum disorder, with a high prevalence of obesity, and authors hypothesized that  
16 these sensory avoiding behaviors induce both less physical activity and higher selective eating  
17 behaviors (Lawson et al., 2016).

18

19 **4.4 Concerning eater profile and BMI**, SEP and BEP were associated respectively with  
20 being underweight and overweight. This fact was already observed in previous pediatric or  
21 adult studies, with a good correlation between appetitive traits and BMI (Aschroft et al., 2008,  
22 Hunot-Alexander et al., 2016, Mallan et al., 2017, Van Jaarsveld et al., 2011, Webber et al.,  
23 2009).

24

25 **4.5 Strength and limitations of the study**. Our study is one of the rare pediatric studies  
26 based on clinical interviews conducted in a general population. But we cannot exclude the  
27 fact that parents may have misperceived their child's eating behavior, and adolescents may  
28 have minimized their eating behaviors, which can induce an initial classification bias. In  
29 addition, some factors as chronic diseases, history of surgery, food allergies may be different  
30 in terms of severity. Lastly, as this was an exploratory study, with no a priori hypothesis on  
31 statistical power, correction for multiple testing was not performed. Therefore, caution is  
32 needed in the interpretation of significant results which will need to be confirmed in further  
33 studies.

34

1 **5. Conclusion**

2 This analysis of factors associated with eater profile opens new perspectives for research on  
3 risk factors associated with eating traits in children. We found two new factors rarely screened  
4 in literature: language delay in small eater profile, and sensory disorders in problematic big  
5 eater profile. These preliminary results need to be confirmed with prospective studies  
6 conducted in larger cohorts. A better knowledge of the psycho-social and environmental  
7 factors that could make appetite traits become problematic eating behaviors could help  
8 improve the prevention of these restrictive or compulsive disorders.

9

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13

14 **Author Contributions**

15 Dr Bertrand conceptualized and designed the study, collected and analyzed data, drafted the  
16 initial manuscript, and reviewed and revised the manuscript.

17 Dr Tiburce collected data, carried out the initial analyses, drafted the initial manuscript, and  
18 reviewed and revised the manuscript.

19 Dr Sabatier designed the data collection instruments and reviewed and revised the manuscript.

20 Dr Dufour collected data and reviewed and revised the manuscript.

21 Prof Déchelotte conceptualized and designed the study, and critically reviewed the manuscript  
22 for important intellectual content.

23 Dr Tavolacci designed the data collection instruments, analyzed data, and reviewed and  
24 revised the manuscript.

25 All authors approved the final manuscript as submitted and agree to be accountable for all  
26 aspects of the work.

27

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30 commercial, or not-for-profit sectors.

31

32 **Availability of data and materials**

33 The anonymized dataset analyzed during the current study is available upon request.

34

35 **Institutional Review Board Statement**

36 The study was conducted according to the guidelines of the Declaration of Helsinki and  
37 approved by the committee for the Protection of Persons of Tours (N° RCB 2019-A00067-50,  
38 18/03/2019). Informed consent was obtained from all subjects involved in the study.

39

40 **Conflict of Interest Disclosures**

41 The authors have no conflicts of interest relevant to this article to disclose.

42

43

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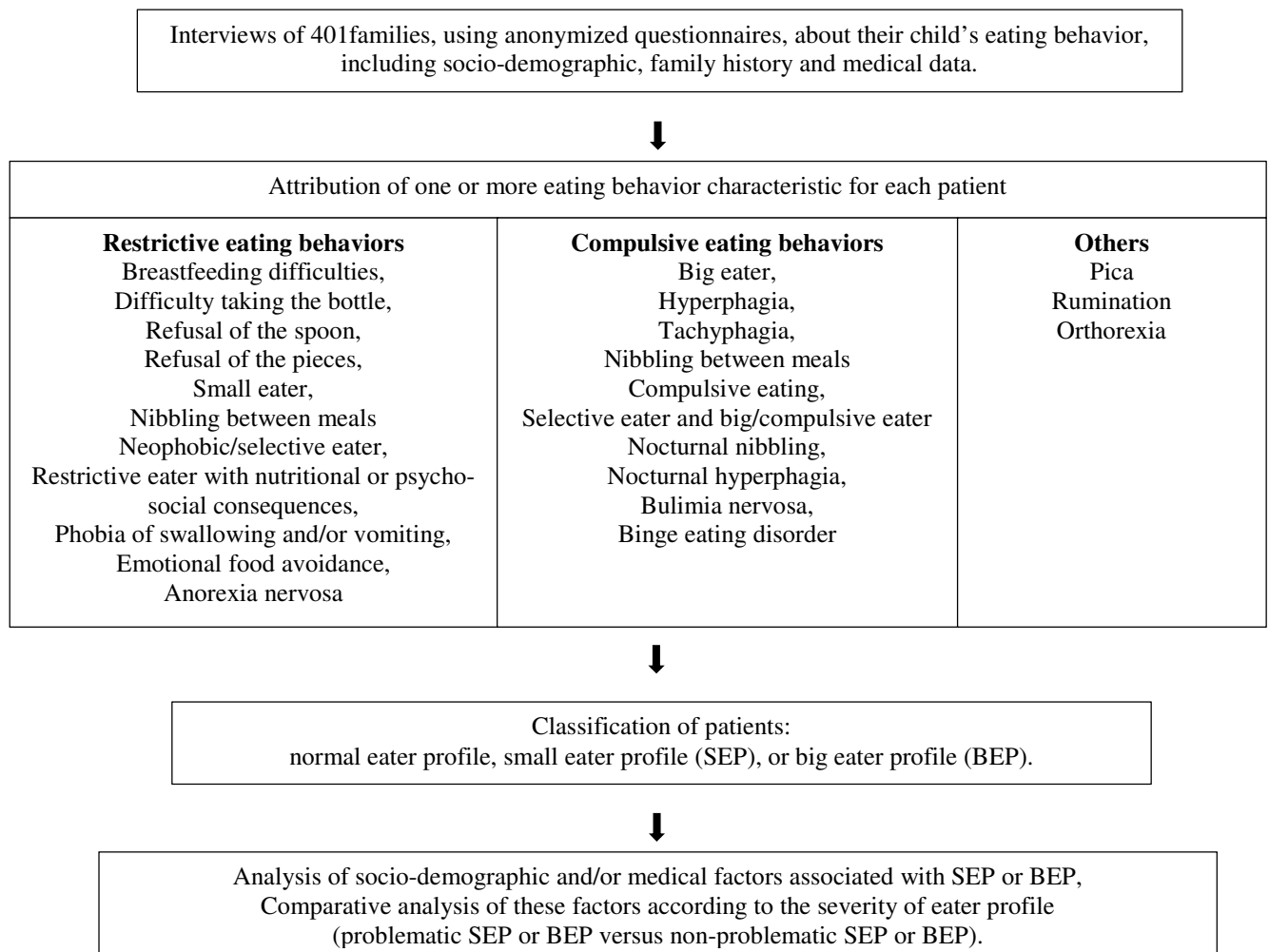


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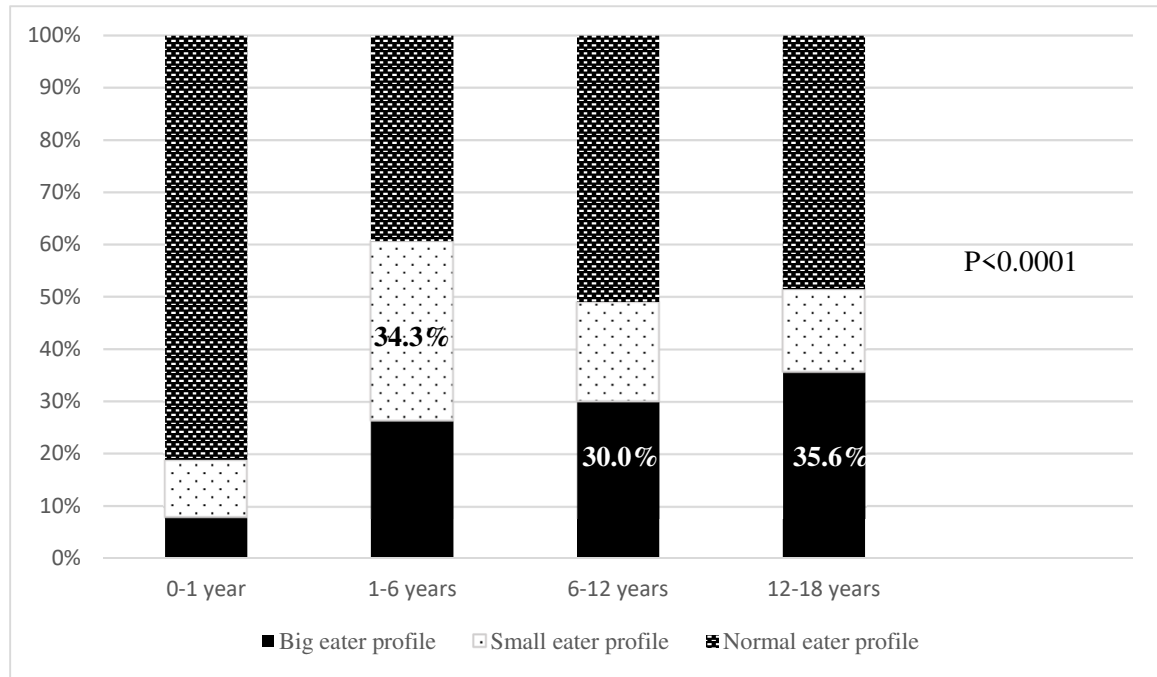
**Figure 1:** Flowchart showing the strategy for classifying the clinical profile of small eater or big eater.



**Table 1:** Demographic data and BMI data of the pediatric population, by age group.

<b>Age groups (total = 401 patients)</b>					
	<b>0-1 years old n= 101</b>	<b>1-6 years old n=99</b>	<b>6-12 years old n= 100</b>	<b>12-18 years old n=101</b>	<b>P</b>
<b>Sex ratio 1.09</b> (Males/Females)	1.2	0.86	1.2	1.1	P=0.58
<b>Median age</b> <b>(min-max)</b>	3.5 months (0.1-11.9)	3 years old (1-5.5)	8 years old (6-11.5)	14 years old (12-18)	
<b>BMI overweight</b> (including obesity)	8.9%	15.1%	<b>28%</b>	<b>28.7%</b>	P<0.001
<b>BMI grade II</b> <b>underweight</b>	1.9%	<b>12.1%</b>	4%	0%	P<0.001

**Figure 2:** Distribution of eater profile by age group.



**Table 2** : BMI according to eater profile and age.

<b>n=401</b>	<b>Big eater profile n=100 (%)</b>	<b>Small eater profile n=80 (%)</b>	<b>Normal eater profile n=221 (%)</b>	<b>p</b>
<b>Underweight</b>	2/100 (2%)	13/80 (16.25%)	3/221 (1.4%)	P<0.0001
0-1 year n=2	0/8 (0%)	2/11(18.2%)	0/82 (0%)	P=0.0001
1-6 years n=12	2/26 (7.7%)	7/34 (20.6%)	3/39 (7.7%)	P=0.17
6-12 years n=4	0/30 (0%)	4/19 (21%)	0/51 (0%)	P=0.0001
12-18 years n=0	0/36 (0%)	0/16 (0%)	0/49 (0%)	-
<b>Overweight</b>	43/100 (43%)	6/80 (7.5%)	32/221 (14,5%)	P<0.0001
0-1 year n=9	3/8 (37.5%)	1/11 (9%)	5/82 (6.1%)	P=0.01
1-6 years n=15	9/26 (34.6%)	1/34 (2.9%)	5/39 (12.8%)	P=0.003
6-12 years n=27	15/30 (50%)	3/19 (15.8%)	10/51 (19.6%)	P=0.006
12-18 years n=29	16/36(44.4%)	1/16 (6.2%)	12/49 (24.5%)	P= 0.01
<b>n=401</b>	<b>Problematic Big eater profile n=12 (%)</b>	<b>Non-problematic Big eater profile n=88 (%)</b>	<b>Others n=301 (%)</b>	<b>p</b>
<b>Overweight</b>	6/12 (50%)	37/88 (42%)	38/301 (12,6%)	P=0.0001
0-1 year n=9	0/0 (0%)	3/8 (37.5%)	6/93 (6.4%)	P=0.02
1-6 years n=15	0/0 (0%)	9/26 (34.6%)	6/73 (8.2%)	P=0.001
6-12 years n=27	1/4 (25%)	14/26 (53.8%)	13/70 (18.6%)	P=0.003
12-18 years n=29	5/8 (62.5%)	11/28 (39.3%)	13/65 (20%)	P=0.01
<b>n=401</b>	<b>Problematic Small eater profile n=34 (%)</b>	<b>Non-problematic Small eater profile n=46 (%)</b>	<b>Others n=321 (%)</b>	<b>p</b>
<b>Underweight</b>	10/34 (29.4%)	3/46 (6.5%)	5/321 (1.5%)	P<0.0001
0-1 year n=2	1/7 (14.3%)	1/4(25%)	0/90 (0%)	P=0.0001
1-6 years n=12	6/14 (42.8%)	1/20 (5%)	5/65 (7.7%)	P=0.0006
6-12 years n=4	3/9 (33.3%)	1/10 (10%)	0/81 (0%)	P<0.0001
12-18 years n=0	0/4 (0%)	0/12 (0%)	0/85 (0%)	-

**Table 3 :** Associated factors according to eater profile and age (results/number of answers in %).

n=401	Big eater profile n=100 (%)	Small eater profile n=80 (%)	Normal eater profile n=221 (%)	p
<b>Prematurity</b>	4/98 (4.08%)	7/80 (8.75%)	18/213 (8.45%)	P=0.34
0-1 year	1/8 (12.5%)	0/11 (0%)	8/82 (10.3%)	P=0.51
1-6 years	0/26 (0%)	3/34 (8.8%)	4/39 (10.8%)	P=0.25
6-12 years	1/30 (3.4%)	1/19 (5.2%)	4/51 (7.8%)	P=0.72
12-18 years	2/36 (5.5%)	3/16 (18.7%)	2/49 (4.2%)	P=0.13
<b>Breastfeeding &gt; 1 month</b>	43/100 (43%)	30/80 (37.5%)	117/219 (53.42%)	<b>P=0.02</b>
0-1 year	3/8 (37.5%)	9/11 (81.8%)	53/82 (64.6%)	P=0.13
1-6 years	9/26 (34.6%)	12/34 (35.3%)	20/39 (51.3%)	P=0.28
6-12 years	14/30 (46.7%)	6/19 (31.6%)	24/51 (48%)	P=0.45
12-18 years	17/36 (47.2%)	3/16 (18.7%)	20/49 (41.7%)	P=0.14
<b>Functional bowel diseases and GERD</b>	25/100 (25%)	15/80 (18.75%)	63/221 (28.51%)	P=0.227
0-1 year	5/8 (62.5%)	2/11 (18.2%)	33/82 (40.2%)	P=0.14
1-6 years	5/26 (19.2%)	3/34 (8.8%)	5/39 (12.8%)	P=0.49
6-12 years	6/30 (20%)	4/19 (21%)	13/51 (25.5%)	P=0.83
12-18 years	9/36 (25%)	6/16 (37.5%)	12/49 (24.5%)	P=0.57
<b>Sensory disorders (n=240)</b>	7/60 (11.7%)	17/63 (27%)	8/117 (6.8%)	<b>P=0.001</b>
0-1 year (who started food)	0/4 (0%)	0/10 (0%)	0/27 (0%)	P=1
1-6 years	2/26 (7.7%)	11/34 (32.3%)	4/39 (10.2%)	P=0.15
6-12 years	5/30 (16.7%)	6/19 (31.6%)	4/51 (7.8%)	P=0.05
<b>Chronic diseases</b>	21/100 (21%)	28/80 (35%)	34/221 (15.38%)	<b>P=0.001</b>
0-1 year	1/8 (12.5%)	1/11 (9%)	6/82 (7.3%)	P=0.86
1-6 years	6/26 (23%)	13/34 (38.4%)	6/39 (15.4%)	P=0.07
6-12 years	7/30 (23.3%)	6/19 (31.6%)	10/51 (19.6%)	P=0.57
12-18 years	7/36 (19.4%)	8/16 (50%)	12/49 (24.5%)	P=0.06
<b>Surgical history</b>	28/100 (28%)	22/80 (27.5%)	37/221 (16.7%)	<b>P=0.02</b>
0-1 year	0/8 (0%)	1/11 (9%)	0/82 (0%)	<b>P=0.01</b>
1-6 years	4/26 (15.4%)	7/34 (20.6%)	3/39 (7.7%)	P=0.28
6-12 years	10/30 (33.3%)	6/19 (31.6%)	16/51 (31.4%)	P=0.98
12-18 years	14/36 (38.9%)	8/16 (50%)	18/49 (36.7%)	P=0.64
<b>Food allergies</b>	5/100 (5%)	5/80 (6.25%)	8/220 (3.64%)	P=0.6
0-1 year	0/8 (0%)	2/11 (18%)	2/82 (2.4%)	<b>P=0.03</b>
1-6 years	0/26 (0%)	2/34 (5.9%)	1/39 (2.5%)	P=0.41
6-12 years	4/30 (13.3%)	1/19 (5.2%)	2/51 (3.9%)	P=0.26
12-18 years	1/36 (2.8%)	0/16 (0%)	3/49 (6.2%)	P=0.64
<b>Psychiatric diseases</b>	17/100 (17%)	16/80 (20%)	16/219 (7.31%)	<b>P=0.003</b>
0-1 year	0/8 (0%)	1/11 (9%)	1/82 (1.2%)	P=0.2
1-6 years	0/26 (0%)	5/34 (14.7%)	0/39 (0%)	<b>P=0.007</b>
6-12 years	7/30 (23.3%)	4/19 (21%)	4/51 (7.8%)	P=0.12
12-18 years	10/36 (27.8%)	6/16 (37.5%)	11/49 (22.4%)	P=0.49
<b>Language delay (n=293)</b>	8/86 (9.9%)	8/68 (11.8%)	13/139 (9.3%)	P=0.84
1-6 years	0/18 (0%)	4/27 (14.8%)	0/24 (0%)	<b>P=0.03</b>
6-12 years	4/30 (13.3%)	2/19 (12.5%)	10/51 (19.6%)	P=0.58
12-18 years	4/36 (11%)	2/16 (12.5%)	3/49 (6.1%)	P=0.62
<b>Academic delay (n=252)</b>	6/75 (8.0%)	2/58 (3.4%)	9/119 (7.56%)	P=0.71
3-6 years	0/9 (0%)	2/23 (8.6%)	0/19 (0%)	P=0.32
6-12 years	2/30 (6.7%)	0/19 (0%)	3/51 (5.9%)	P=0.53
12-18 years	4/36 (11.1%)	0/16 (0%)	6/49 (12.2%)	P=0.54
<b>Eating disorders in family history</b>	10/100 (10%)	9/80 (7.24%)	16/221 (7.24%)	P=0.48
0-1 year	1/8 (1.5%)	0/11 (0%)	7/82 (8.5%)	P=0.54
1-6 years	0/26 (0%)	2/34 (5.9%)	4/39 (10.2%)	P=0.23
6-12 years	5/30 (16.7%)	2/19 (10.5%)	2/51 (3.9%)	P=0.15
12-18 years	4/36 (11.1%)	5/16 (31.2%)	3/49 (6.1%)	<b>P=0.02</b>
<b>Psychiatric diseases in family history</b>	23/100 (23%)	14/80 (17.5%)	33/221 (14.9%)	P=0.21
0-1 year	2/8 (25%)	2/11 (18.2%)	9/82 (11%)	P=0.45
1-6 years	6/26 (23%)	5/34 (14.7%)	6/39 (15.4%)	P=0.65
6-12 years	7/30 (23.3%)	1/19 (5.2%)	6/51 (11.7%)	P=0.17
12-18 years	8/36 (22.2%)	6/16 (37.5%)	12/49 (24.5%)	P=0.49
<b>Overweight in family history</b>	45/100 (45%)	33/80 (41.25%)	98/221 (44.3%)	P=0.86
0-1 year	3/8 (37.5%)	4/11 (36.3%)	38/82 (46.3%)	P=0.75
1-6 years	9/26 (34.6%)	14/34 (41.2%)	17/39 (43.6%)	P=0.76
6-12 years	14/30 (46.7%)	6/19 (31.6%)	24/51 (47%)	P=0.48



12-18 years	19/36 (52.8%)	9/16 (56.2%)	19/49 (38.8%)	P=0.3
<b>Separated parents</b>	21/100 (21%)	6/80 (7.5%)	21/219 (9.6%)	<b>P=0.01</b>
<b>Parents living together</b>	63/100 (63%)	62/80 (77.5%)	170/219 (77.6%)	
<b>Singleton parent</b>	16/100 (16%)	12/80 (15%)	28/219 (12.8%)	
0-1 year/101 responses	couple /others 6 (75.0%) /2 (25.0%)	couple /others 11 (100.0%)/0 (0.0%)	couple /others 74 (90.2%)/8 (9.8%)	P=0.32
1-6 years/99 responses	23 (88.5%) /3 (11.5%)	25 (73.5%)/9 (26.5%)	34 ((87.2%)/5 12.8%)	P=0.39
6-12 years/100 responses	16 (53.3%)/14 (46.7%)	14 (73.7%)/5 (26.3%)	36 (70.6%)/15 (29.4%)	P=0.34
12-18 years/101 responses	18 (50.0%)/18 (50.0%)	12 (75.0%)/4 (25.0%)	26 (53.1%)/23 (46.9%)	P=0.63
<b>First of siblings</b>	34/99 (34.3%)	19/80 (23.7%)	38/221 (17.2%)	<b>P=0.007</b>
<b>&gt;=second of siblings</b>	51/99 (51.5%)	48/80 (60%)	129/221 (58.4%)	
<b>Singleton child</b>	14/99 (14%)	13/80 (16.2%)	54/221 (24.4%)	
0-1 year/101 responses	First or single/others 3 (37.5%) / 5 (62.5%)	First or single/others 4 (36.3%)/11 (3.7%)	First or single/others 34 (41.4%)/48 (58.5%)	P=0.93
1-6 years/98 responses	11 (44.0%)/14 (56.0%)	12 (35.3%)/22 (64.7%)	19 (48.7%)/20 (51.3%)	P=0.42
6-12 years/100 responses	15 (50.0%)/15 (50.0%)	9 (47.4%)/10 (52.6%)	25 (49.0%)/26 (51.0%)	P=0.8
12-18 years/101 responses	19 (52.8%)/17 (47.2%)	7 (43.7%)/9 (56.3%)	14 (28.6%) / 35 (71.4%)	P=0.18
<b>Eating while watching TV (in 393 responses)</b>				<b>P=0.23</b>
<b>Always n=107</b>	35/98 (35.7%)	19/80 (23.7%)	53/215 (24.6%)	
<b>Rarely n=34</b>	8/98 (8.1%)	7/80 (8.7%)	19/215 (8.8%)	
<b>Sometimes n=93</b>	25/98 (25.5%)	22/80 (27.5%)	46/215 (21.4%)	
<b>Never n=159</b>	30/98 (30.6%)	32/80 (40%)	97/215 (45.1%)	
0-1 year /97 responses	Always/others 0 (0.0%) / 8 (100.0%)	Always/others 2 (18.2%)/9 (81.8%)	Always/others 16 (20.5%)/62 (79.5%)	P=0.11
1-6 years/96 responses	7 (28.0%)/18 (72.0%)	6 (17.6%)/28 (82.4%)	5 (13.5%)/32 (86.5%)	P=0.12
6-12 years/99 responses	11 (37.9%)/18 (62.1%)	6 (31.6%) / 13 (68.4%)	14 (27.4%)/37 (72.6%)	P=0.82
12-18 years/101 responses	17 (47.2%)/19 (52.8%)	5 (31.2%)/11 (68.8%)	18 (36.7%) / 31 (63.3%)	P=0.27
<b>Eating with family (in 391 responses)</b>				<b>P=0.52</b>
<b>Always n=313</b>	73/98 (74.5%)	62/80 (77.8%)	178/213 (83%)	
<b>Rarely n=13</b>	3/98 (3%)	4/80 (5%)	6/213 (2.8%)	
<b>Sometimes n=45</b>	16/98 (16%)	9/80 (11.2%)	20/213 (9.4%)	
<b>Never n=20</b>	6/98 (6.1%)	5/80 (6.2%)	9/213 (4.2%)	
0-1 year /96 responses	Always/others 6 (75.0%) /2 (25.0%)	Always/others 9 (81.8%)/2 (18.2%)	Always/others 67 (84.8%) / 12 (15.2%)	P=0.59
1-6 years /96 responses	19 (73.1%) / 7 (26.9%)	26 (76.5%) / 8 (23.5%)	32 (82.1%) /7 (17.9%)	P=0.77
6-12 years/99 responses	21 (75.0%)/7 (8.0%)	15 (78.9%)/4 (21.1%)	44 (86.3%) / 7 (13.7%)	P=0.13
12-18 years /100 responses	28 (77.8%)/8 (22.2%)	12 (75.0%)/4 (25.0%)	39 (81.2%)/9 (18.8%)	P=0.91
<b>Sex (Male)</b>	63/100 (63%)	37/80 (46.25%)	109/220 (49.55%)	<b>P=0.04</b>
0-1 year	7/8 (87.5%)	4/11 (36.3%)	45/82 (54.8%)	P=0.08
1-6 years	15/26 (57.7%)	15/34 (44.1%)	16/39 (41%)	P=0.39
6-12 years	19/30 (63.3%)	8/19 (42.16%)	27/51 (54%)	P=0.34
12-18 years	22/36 (61.1%)	10/16 (62.5%)	21/49 (42.8%)	P=0.17

Abbreviations: GERD gastroesophageal reflux disease.

**Table 4:** Comparative associated factors according to eater profile severity (problematic or not).

n=100	Problematic big eater profile n= 12 (%)	Non - problematic big eater profile n= 88 (%)	p	Problematic small eater profile n=34 (%)	Non-problematic small eater profile n=46 (%)	p
<b>Prematurity</b>	1/12 (8.3%)	3/88 (3.4%)	0.41	4/34 (11.7%)	3/46 (6.5%)	0.41
<b>Breastfeeding &gt; 1 month</b>	5/12 (41.6%)	38/88 (43.2%)	0.92	17/34 (50.0%)	13/46 (28.2%)	<b>0.04</b>
<b>Functional bowel diseases</b>	4/12 (33.3%)	19/88 (21.5%)	0.48	9/34 (26.4%)	6/46 (13.0%)	0.12
<b>Sensory disorders (n=240)</b>	2/4 (50%)	5/56 (8.9%)	<b>0.01</b>	10/32 (31.2%)	7/31 (22.5%)	0.28
<b>Chronic diseases</b>	4/12 (33.3%)	17/88 (19.3%)	0.26	10/34 (29.4%)	18/46 (39.1%)	0.37
<b>Surgical history</b>	3/12 (25%)	25/88 (28.4%)	0.11	9/34 (26.4%)	13/46 (28.2%)	0.07
<b>Food allergies</b>	1/12 (8.3%)	4/88 (4.5%)	0.57	2/34 (5.8%)	3/46 (6.5%)	0.91
<b>Psychiatric diseases</b>	4/12 (33.3%)	13/88 (14.7%)	0.11	10/34 (29.4%)	6/46 (13.0%)	0.07
<b>Language delay (n=293)</b>	0/12 (0%)	8/74 10.8%	0.23	5/27 (18.5%)	3/41 (7.3%)	0.13
<b>Academic delay (n=247)</b>	1/12 (8.3%)	5/63 (7.9%)	0.95	2/22 (9.0%)	0/36 (0%)	0.05
<b>Eating disorders in family history</b>	3/12 (25%)	7/88 (7.9%)	0.06	5/34 (14.7%)	4/46 (8.6%)	0.40
<b>Psychiatric diseases in family history</b>	4/12 (33.3%)	19/88 (21.5%)	0.36	6/34 (17.6%)	8/46 (17.3%)	0.98
<b>Overweight in family history</b>	7/12 (58.3%)	38/88 (43.1%)	0.32	13/34 (38.3%)	20/46 (43.4%)	0.99
<b>Separated parents</b>	4/12 (33.3%)	17/88 (19.3%)	0.51	3/34 (8.8%)	3/46 (6.5%)	0.75
<b>Parents living together</b>	6/12 (50%)	47/88 (53.4%)		27/34 (79.4%)	35/46 (76.0%)	
<b>Singleton parent</b>	2/12 (16.6%)	14/88 (15.9%)		4/34 (11.7%)	8/46 (17.3%)	
<b>First of siblings or single</b>	6/12 (50%)	28/88 (31.8%)	0.23	9/34 (26.4%)	10/46 (21.7%)	0.62
<b>≥ second of siblings</b>	6/12 (50%)	45/88 (51.1%)		21/34 (61.7%)	27/46 (58.6%)	
<b>Singleton child</b>	0/12 (0%)	14/88 (15.9%)		4/34 (11.7%)	9/46 (19.5%)	
<b>Eating while watching TV (in 393 responses)</b>			<b>0.02</b>			0.62
<b>Always n=107</b>	8/12 (66.7%)	27/86 (31.3%)		9/34 (26.4%)	10/46 (21.7%)	
<b>Rarely, sometimes, never (n=286)</b>	4/12 (33.3%)	59/86 (68.7%)		25/34 (73.6%)	36/46 (78.3%)	
<b>Eating with family (in 391 responses)</b>			0.49			0.15
<b>Always n=313</b>	8/12 (66.7%)	65/86 (75.5%)		29/34 (85.3%)	33/46 (71.7%)	
<b>Rarely, sometimes, never (n=78)</b>	4/12 (33.3%)	21/86 (24.4%)		5/34 (14.7%)	13/46 (28.3%)	
<b>Sex (Male)</b>	4/12 (33.3%)	59/88 (67.0%)	<b>0.02</b>	18/34 (52.9%)	19/46 (41.3%)	0.30