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influence of family characteristics**

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1 **Infant feeding patterns over the first year of life: influence of family characteristics**

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20

21 **Abstract**

22 **Background/Objectives:** Early eating patterns and behaviors can determine later eating  
23 habits and food preferences and they have been related to the development of childhood  
24 overweight and obesity. We aimed to identify patterns of feeding in the first year of life and to  
25 examine their associations with family characteristics.

26 **Subjects/Methods:** Our analysis included 1004 infants from the EDEN mother-child cohort.  
27 Feeding practices were assessed through maternal self-report at birth, 4, 8 and 12 months.  
28 Principal component analysis was applied to derive patterns from breastfeeding duration, age  
29 at complementary food (CF) introduction and type of food used at 1y. Associations between  
30 patterns and family characteristics were analyzed by linear regressions.

31 **Results:** The main source of variability in infant feeding was characterized by a pattern  
32 labeled ‘Late CF introduction and use of ready-prepared baby foods’. Older, more educated,  
33 primiparous women with high monthly income ranked high on this pattern. The second  
34 pattern, labeled ‘Longer breastfeeding, late CF introduction and use of home-made foods’ was  
35 the closest to infant feeding guidelines. Mothers ranking high on this pattern were older and  
36 more educated. The third pattern, labeled ‘Use of adults’ foods’ suggests a less age-specific  
37 diet for the infants. Mothers ranking high on this pattern were often younger and multiparous.  
38 Recruitment center was related to all patterns.

39 **Conclusion:** Not only maternal education level and age but also parity and region are  
40 important contributors to the variability in patterns. Further studies are needed to describe  
41 associations between these patterns and infant growth and later food preferences.

42

43 **Keywords:** Feeding patterns – Breastfeeding – Complementary feeding – Home-made  
44 foods – Ready-prepared foods – Infants – Parents – Sociodemographic factors.

45

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49

## 50 **Introduction**

51 Obesity is a worldwide epidemic and numerous studies have focused on the identification of  
52 its early determinants. The early postnatal period appears to be a critical window of  
53 development. Observational studies showed that rapid infant weight gain increases the risk of  
54 overweight and obesity later in childhood<sup>1-3</sup>. Moreover, childhood obesity seems to track into  
55 adulthood<sup>4</sup> increasing the risk of chronic diseases<sup>5</sup>. Early eating patterns and behaviors can  
56 determine later eating habits and food preferences<sup>6-7</sup> and they have been related to the  
57 development of childhood overweight and obesity<sup>8</sup>. It's therefore important to identify  
58 feeding patterns that emerge in the early infancy and related factors.

59 Most of the pediatric societies recommend exclusive breastfeeding until 6 months of age<sup>9-12</sup>.  
60 Further, there is a general consensus on the fact that complementary feeding should not be  
61 introduced to infant diet before 4 months or delayed after 6 months. Results from various  
62 studies of infant feeding practices have shown high level of non-compliance with these  
63 recommendations. Across studies, lower maternal age and education level appeared  
64 consistently related to shorter breastfeeding duration and early complementary food (CF)  
65 introduction<sup>13-15</sup>.

66 There has been a general cultural shift in eating practices over the last decades. Because more  
67 women are working longer hours outside home, there is a decrease in time spent in meal  
68 preparations and an increased use of ready-prepared foods<sup>16-17</sup>. Much remains to be learned  
69 about how these emerging eating habits affect maternal feeding practices.

70 A few studies showed that dietary patterns emerge in early infancy<sup>18-19</sup> and track into  
71 childhood<sup>20-21</sup>. None of those studies have undertaken a global approach of food intake over  
72 the first year of life by taking into account type and duration of milk feeding, age at CF  
73 introduction and type of food used by the mother. Yet, breastfeeding and complementary  
74 feeding practices are interrelated<sup>22-23</sup> and there are arguments to suggest that both influence  
75 later health<sup>24-25</sup>. Our aims were to identify feeding patterns over the first year of life, and to  
76 examine their associations with parental and infants characteristics.

77

78 **Material and Methods**

79 *Study population*

80 Subjects were participants of the EDEN mother-child prospective cohort (study of pre- and  
81 early postnatal determinants of child health and development). Between 2003 and 2006, the  
82 study recruited 2,002 pregnant women aged 18-45 years attending their prenatal visit before  
83 24 weeks gestation at Nancy and Poitiers University Hospitals. Exclusion criteria were  
84 multiple pregnancies, diabetes history, illiteracy, moving outside the region planned in the  
85 next three years. The study received approval from relevant ethics committee. Files have been  
86 declared to the 'National Committee for Processed Data and Freedom' (CNIL). Written  
87 consents were obtained from each participant.

88 *Infant feeding assessment*

89 Our infant feeding assessment concentrated on qualitative aspects controlled by the parents  
90 and did not include amounts of food ingested, which depend for a great part on the infant.  
91 Infant feeding mode at discharge was extracted from medical records. In the 4, 8 and 12-  
92 month self questionnaires, mothers reported (1)type of milk feeding and when necessary date  
93 of breastfeeding cessation, (2)age at CF introduction. Among infants whose questionnaires  
94 were returned, reported data at the different ages were combined to estimate any and full  
95 breastfeeding duration and age at CF introduction. In EDEN study, ages of CF introduction  
96 were not collected beyond 8 months for cereals, fruit, vegetables, potatoes, fruit juice, dairy  
97 products, dairy desserts, cheeses, biscuits, or 12 months for the other foods. For infants who  
98 were not introduced to a specific food by 8 or 12 months, respectively the values 9 or 13 were  
99 attributed in order to analyze the variable quantitatively. For infants with available  
100 information on diet in at least one questionnaire, missing data for some of the key variables  
101 were imputed as follows: when mothers reported that the considered food was not introduced  
102 in the first 4 months and information was missing in the following questionnaires, the median  
103 age of introduction among all infants who have been introduced to that food between 4 and 12  
104 months was attributed (n=27, 0.03%). The same rule was applied for those who were not  
105 introduced to foods at 8 months with missing information on at least one CF group at 12  
106 months (n=233, 23.2%).

107 An additional questionnaire on type of food used for the baby at 12 months was added to the  
108 12-month questionnaire during data collection. It collected information on type (ready-  
109 prepared baby foods, home-made foods, ready-prepared adults' foods) and frequency of use  
110 (never, occasionally, regularly, always) of various food and juice groups (dairy products,  
111 soups, vegetables and fruit purees, fruit juices, biscuits, cereals, meat and fish). Subjects  
112 with >2 missing values on the listed items were excluded (n=183, 15.4%); otherwise modal  
113 value of the considered variable was imputed (n=57; 4.8%).

#### 114 *Other data*

115 Between 24-28 weeks gestation, household income, maternal education and pre-pregnancy  
116 weight were obtained by interviewing the mother; maternal height was measured in a clinical  
117 examination. Paternal anthropometric measurements were collected at some point between  
118 mother's inclusion and delivery. Details on measurement protocol have been published  
119 elsewhere<sup>26</sup>. When measurements were unavailable from the father, reported weight by the  
120 father (11.3%) was used, and reported height by the father (11.6%) or by the mother (6.3%)  
121 was used. Parental BMI(kg/m<sup>2</sup>) were categorized as : underweight (BMI<18.5), normal  
122 weight (18.5-<25), overweight (25-<30) and obese (BMI ≥30). Because of small number of  
123 underweight fathers in EDEN cohort (n=19; 1.0%), underweight fathers were grouped in the  
124 normal BMI categories.

125 From obstetrical and pediatric records, parity, infant gender, birthweight and gestational age  
126 were collected. In the 4, 8 and 12-month questionnaires, mothers were asked information  
127 about employment status and main type of childcare. Types of childcare were (1)childcare  
128 center, (2)licensed family childcare home, (3)family member, neighbor and (4)child's own  
129 home by a nanny or a regular infant sitter or parents themselves. Infants were categorized  
130 according to age of first attendance to types (1) and (2).

131 Missing data were handled as follows: when percentage of missing values was <5%, we  
132 imputed the modal class value (maternal education and BMI, household income, parity),  
133 otherwise subjects were grouped into a separate category (paternal BMI, childcare  
134 attendance).

135

136 *Sample*

137 Of the 2,002 recruited women, 96 were excluded because they left the study before or at  
138 delivery for personal reasons, 4 because intra-uterine death, 3 because they delivered outside  
139 the study hospitals. Birthweight was available for 1,899 newborns. The 4, 8 and 12 month-  
140 questionnaires of 1,445 infants were returned. Because the additional questionnaire on type of  
141 food used at 12 months was added to the 12-month questionnaire during data collection, 496  
142 of the recruited families did not receive it. Among the 1,445 families who returned the 4, 8  
143 and 12-month questionnaires 1,187 also returned the additional questionnaire and 183 had  
144 more than 2 missing data on type of food used. The final sample consisted of 1,004 infants.  
145 Compared with the 1,004 included, the 895 excluded mothers were younger (29.0 vs. 29.9  
146 years old,  $p < 0.001$ ), less educated (44.6% vs. 59.2% university degree,  $p < 0.001$ ) and often  
147 multiparous (58.3% vs. 52.9%,  $p = 0.03$ ). Infants that were not included had lower birthweight  
148 and gestational age than that of included infants (3,252g vs. 3,302g,  $p = 0.04$ ; 39.1 vs. 39.4,  
149  $p < 0.001$ ). There was no statistical difference on gender ( $p = 0.18$ ).

150 *Patterns derivation*

151 All the variables described in the infant feeding assessment section were considered for  
152 principal component analysis (PCA). PCA is a statistical technique that aggregates variables  
153 on the basis of the degree to which they are correlated to one another, producing components  
154 that are uncorrelated linear combinations of the initial variables and that maximize the  
155 explained variance<sup>27-28</sup>. To determine the number of components to retain, we used the Kaiser  
156 criterion (eigenvalues  $> 1$ ) in conjunction to scree test (plot of total variance associated with  
157 each component) and interpretability of components. The first 3 components were kept from  
158 this analysis. We considered that variables with coefficients  $> |0.3|$  contribute significantly to  
159 the components. Finally, for each participant, a score was calculated as a sum of the products  
160 of the values of each of the standardized variables included in the PCA with the  
161 corresponding coefficients of the correlation matrix.

162 *Statistical analysis*

163 Infants' scores on the feeding patterns were used as continuous dependent variables.  
164 Unadjusted relations between patterns scores and recruitment centre, parental (maternal

165 education, age at delivery, BMI and employment status, parity, paternal BMI, income) and  
166 infant characteristics (gender, birthweight, gestational age, childcare attendance) were  
167 performed by Student t-test or ANOVA for categorical variables, and Spearman correlations  
168 for quantitative variables (data not shown). Quartiles of the scores were calculated for  
169 presentation purpose. Associations between the pattern scores and family characteristics were  
170 examined using multiple regression models. Analyses were executed with SAS software  
171 (version 9.2; SAS Institute). A p-value<0.05 was considered statistically significant.

## 172 **Results**

173 Family characteristics are presented in Table1. The mean birthweight was 3,302 g and 4.1%  
174 of the infants were born preterm. The mean duration of full breastfeeding since hospital  
175 discharge and age at CF introduction were 2 and 4.5 months respectively. Nearly 26% infants  
176 were introduced to solid foods before 4 months.

177 The first pattern (pattern-1) was characterized by high positive coefficients for introduction of  
178 all foods and use of ready-prepared vegetables, fruit purees and baby main meals but by high  
179 negative coefficients for use of home-made and ready-prepared adults' foods (Table 2). It was  
180 labeled '*Late CF introduction and use of baby foods*'. The second pattern (pattern-2) was  
181 termed '*Longer breastfeeding, late CF introduction and use of home-made foods*' since it  
182 showed high positive coefficients for breastfeeding duration, age of introduction of meat, fish,  
183 vegetables, fruit, potatoes, cereals, dairy products, biscuits and fruit juices and for use of  
184 home-made soups, vegetables, fruit purees and fresh meat and fish but high negative  
185 coefficients for use of baby foods. The third pattern (pattern-3) was named '*Use of adults*  
186 *foods*' as it was characterized by high coefficients on use of ready-prepared dairy products,  
187 soups, fruit purees, fruit juices and biscuits contrasting with lower coefficients on baby dairy  
188 products and on home-made fruit and vegetable purees, fish and meat. The patterns explained  
189 14.7, 12.7, and 6.0% of the variation in the original data respectively. PCA properties allow  
190 maximization of variance along each pattern, contrasting individuals whose characteristics  
191 differ most<sup>29</sup>. Thus, for each pattern, scores define the position of each individual along a  
192 gradient. To facilitate interpretation of the pattern coefficients, distribution of the original  
193 variables within the first and fourth quartiles of the patterns scores have been presented in  
194 table 2. The higher the coefficient of a variable on a pattern, the greater is the variability in its  
195 distribution across quartiles of the patterns scores.



196 High scores on pattern-1 were significantly related to high family income, maternal age and  
197 education, low parity, tended to be more common in females (Table 3). Mothers of infants  
198 with high scores on pattern-2 were more likely to be older, to have high education level, and  
199 less likely to be obese. High scores on pattern-3 were significantly associated with low  
200 maternal age, being multiparous. None of the patterns was significantly related to paternal  
201 BMI and infant's gestational age.

202 We ran the same multivariate models, excluding premature infants (n=27, 0.03%), then  
203 excluding subjects having missing values on parental characteristics (n=88, 5.5%). Results  
204 remained similar to those presented above (data not shown). Further analyses were performed  
205 excluding infants with missing value on CF introduction between 4-12 months (n=27, 0.03%),  
206 between 8-12 months (n=233, 23.2%) and type of food use at 12 months (n=57; 4.8%).  
207 Results were similar to those presented except for centre that was no longer significantly  
208 related to pattern-2 (0.10[-0.07, 0.26]) and pattern-3 (-0.16[-0.32, 0.01]).

## 209 **Discussion**

210 In our study, the main source of variability in infant feeding was characterized by pattern-1  
211 labeled '*Late CF introduction and use of ready-prepared baby foods*'. Older, more educated,  
212 primiparous women with high monthly income ranked high on this pattern. Pattern-2, labeled  
213 '*Longer breastfeeding, late CF introduction and use of home-made* was the closest to infant  
214 feeding guidelines. Mothers with high scores on this pattern were older and more educated.  
215 Pattern-3, labeled *Use of adults' foods* suggests a less age-specific diet for the infants.  
216 Mothers ranking high on this pattern were often younger and multiparous.

217 Recent studies in infants have applied PCA on various food items (from food frequency  
218 questionnaires (FFQ)) to derive dietary patterns with a transversal approach<sup>18-19</sup>. Our study is  
219 original in its longitudinal aspect: we used breastfeeding duration, age at CF introduction and  
220 type of food used at 12 months. This approach enabled us to appreciate the prospective aspect  
221 of infant feeding in the first year of life. Although some differences in variables included, our  
222 second pattern was similar to the '*infant guidelines*' pattern of the Southampton Women  
223 Study<sup>18</sup> and to the '*Breastfeeding*' pattern of ALSPAC study<sup>19</sup>, both extracted at 6 months and  
224 characterized by longer breastfeeding, high frequency of consumption of home-made foods  
225 but low frequency of use of baby foods.

226 In our study, mothers of infants ranking high on pattern-1 and pattern-3, more often recruited  
227 in Nancy, were more likely to use ready-prepared foods but in pattern-1, types of food were  
228 adapted to infants whereas in pattern-3, types of food were less specific to infants. In patterns  
229 1 and 2, age of introduction of eggs contributed little to the characterization of early or late  
230 introducers of CF, showing that the recommendation of late introduction of eggs (see table 2  
231 footnote) is well met by the mothers in our cohort. Higher scores on pattern-1 seem to be  
232 explained by awareness of specific nutritional needs for infant, lack time or culinary skills to  
233 implement it and income allowing the use of ready-prepared infant foods. Higher scores on  
234 pattern-3 were mainly related to low maternal age and increased parity. Young mothers of our  
235 study seem to cook less and the presence of older children in the household decreases the  
236 likelihood for a specific diet for the infant. Unlike others, mothers ranking high on pattern-2,  
237 more often recruited in Poitiers, breastfed longer, introduced CF later and were more likely to  
238 cook meals. These mothers may be more aware of infant feeding guidelines and may have  
239 more time to spend for meals preparation. These findings are consistent with previous results  
240 that showed a negative relation between age, education and household size and ready-  
241 prepared foods use in general population<sup>30-32</sup>, which may be explained by lack of time or  
242 ability and/or willingness to ‘cook from scratch’<sup>16</sup>. Local culture as well as food availability  
243 and prices play a major role in determining where, how and what foods are eaten<sup>33</sup>. Type of  
244 jobs and time spent in transportation, which are likely to differ between the regions of Poitiers  
245 and Nancy may also explain the differences in feeding patterns. Nancy region is more  
246 urbanized than Poitiers region (population density of their regions in 2009: 100 people/km  
247 sq.<sup>34</sup> vs. 68 people/km sq.<sup>35</sup>). We have to acknowledge that nowadays, ready-prepared foods  
248 are widely used and ‘home-made’ meals sometimes include the help of various ready-  
249 prepared products<sup>36</sup>. We were not able to evaluate this aspect in our study.

250 Longer breastfeeding duration has been positively associated with later CF introduction<sup>22-23</sup>,  
251 higher maternal age and education level<sup>13,37-38</sup>, parity<sup>37,39</sup>. Early CF introduction has been  
252 related to lower maternal age and education<sup>13,38,40</sup>, higher birthweight<sup>22,41</sup> and infant  
253 gender<sup>38,40,42</sup>. Our findings are consistent with those results. When considering the whole  
254 feeding in the first year of life, infants’ characteristics were not related to the patterns except  
255 for a tendency for earlier CF introduction in boys as already published<sup>38,40,42</sup>. Early return to  
256 employment in the postpartum period has been negatively associated with breastfeeding  
257 duration<sup>43-44</sup>; relations with CF introduction have less been examined. Evidences showed that

258 infants cared in non-parental care compared with parental care were shorter breastfed<sup>45-46</sup> and  
259 early introduced to CF<sup>45</sup>. In our study, maternal employment and childcare attendance were  
260 not strongly associated with parental feeding practices suggesting that they are not major  
261 factors explaining the variability in infant feeding.

262 In accordance with other studies<sup>18-19</sup>, we found a significant association between the feeding  
263 patterns and maternal BMI. Previous analyses suggested that women who are  
264 overweight/obese before pregnancy are more likely to discontinue breastfeeding earlier than  
265 do normal-weight women<sup>47-50</sup>. In our results, mothers with high scores on pattern-2 were less  
266 likely to be obese in contrast to mothers with high scores on pattern-3 who were more likely  
267 to be obese. Paternal BMI, marker of a familial obesogenic environment besides maternal  
268 BMI, was not related to the patterns.

269 Our study had some limitations. The EDEN population is not representative of the general  
270 population. Compared to the national perinatal survey carried out on 14,482 women who  
271 delivered in France in 2003<sup>51</sup>, women included in EDEN study were slightly older, more  
272 educated and more often employed. We were however able to show differences in infant  
273 feeding practices according to maternal age, education, household income, and region even if  
274 our sample was more homogenous than the general French population according to these  
275 criteria. We did not find association regarding employment status although our sample did  
276 not lack variability on this criterion (29% of the mothers never worked between 0-12 months).  
277 Therefore, we believe that the relationships observed are of interest for the general population  
278 of infants born in France from middle class parents.

279 Our questionnaire on infant feeding has not been validated as most questionnaires used to  
280 assess food habits in infancy (ref JAND). Nevertheless, some questions were repeated in in  
281 the 4, 8 and 12-mo questionnaires, which allow to correct for inconsistency in maternal report.  
282 As we did not use a FFQ in our study, we were not able to go into details on qualitative  
283 aspects of diet at different ages to reproduce published results. However, interesting patterns  
284 emerged from our analyses and we believe that our approach provides complementary  
285 information to existing publications on feeding practices in the first year of life. Data on  
286 breastfeeding duration and age at CF introduction were missing at some ages between 0-12  
287 months. However we were able to retrieve information by combining data from three  
288 questionnaires. Imputations that were performed in infants with incomplete data probably lead

289 to a loss of information in terms of variability of maternal practices but represent a fairly good  
290 approximation of early or late CF introduction/breastfeeding discontinuation according to the  
291 current guidelines.

292 In summary, our study allowed the identification of well individualized feeding patterns in the  
293 first year of life, which explain a large part of the variability in our samples. It highlighted that  
294 not only maternal education level and age but also parity and region are important  
295 contributors to the variability in patterns. Our results reflect constraints regarding cooking  
296 skills, spendable time on meals preparation, cost and availability of fresh foods in different  
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316 conception to manuscript writing. AB, AF and MB participated in data management for the  
317 present analyses. AB analyzed and interpreted the data and wrote the initial draft of the  
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**Table 1: Characteristics of parents and offspring (n=1,004).**

<b>Variable</b>	<b>Total</b>	<b>Mean ± SD or % yes</b>
<b>Parental characteristics</b>		
Education (% university degree)	984	60.4 %
Monthly family income < 3,000 €	999	69.0 %
Primiparous	1,002	47.0 %
The mother never worked in 0-12 months	1,004	29.1 %
Maternal age at child's birth (yrs)	1,004	29.9 ± 4.7
Maternal pre-pregnancy BMI < 25 kg/m <sup>2</sup>	987	75.1 %
Paternal BMI < 25 kg/m <sup>2</sup>	931	47.9 %
<b>Child characteristics</b>		
Female sex	1,004	48.9 %
Gestational age (weeks of amenorrhea)	1,004	39.2 ± 1.7
Birthweight (kg)	1,004	3.3 ± 0.5
Never attended to childcare in the first year of life	753	11.2
<b>Other variables</b>		
Recruitment center (% Poitiers)	1,004	43.6 %

**Table 2: Description of infant feeding variables within quartiles (Q) of pattern scores and PCA coefficients, n=1004.**

	Pattern 1			Pattern 2			Pattern 3		
	Q1	Q4	Coefficients	Q1	Q4	Coefficients	Q1	Q4	Coefficients
<i>Breastfeeding duration in the first year (months)*</i>									
Any breastfeeding duration	2.58	4.55	0.20	1.58	6.13	<b>0.48</b>	2.99	3.76	0.08
Full breastfeeding duration	1.50	2.67	0.17	0.75	4.02	<b>0.47</b>	1.55	2.40	0.11
<i>Ages of food introduction in the first year (months)*</i>									
Meat	6.20	7.47	<b>0.33</b>	6.09	7.90	0.51	6.47	7.31	0.20
Fish	6.95	9.01	<b>0.39</b>	6.82	9.37	<b>0.47</b>	7.66	8.41	0.11
Vegetables	4.34	5.92	<b>0.40</b>	4.20	6.04	<b>0.50</b>	4.81	5.66	0.21
Fruit	4.46	6.08	<b>0.36</b>	4.37	6.17	<b>0.43</b>	4.86	5.92	0.23
Potatoes	5.25	7.00	<b>0.41</b>	5.45	6.86	<b>0.34</b>	5.62	6.75	0.26
Cereals	5.70	8.06	<b>0.35</b>	5.79	8.12	<b>0.38</b>	6.73	6.94	0.02
Dairy products	5.42	7.33	<b>0.47</b>	5.60	7.40	<b>0.47</b>	6.01	6.79	0.16
Cheeses	7.99	8.90	<b>0.41</b>	8.48	8.79	0.12	8.45	8.69	0.07
Dairy desserts	6.94	8.68	<b>0.49</b>	7.41	8.30	0.26	8.06	7.74	-0.12
Biscuits	7.00	8.39	<b>0.35</b>	6.89	8.63	<b>0.42</b>	7.49	8.10	0.12
Eggs	11.5	12.4	0.29	11.8	12.1	0.09	11.8	12.0	0.01
Egg yolks	9.83	11.6	<b>0.39</b>	10.9	10.8	-0.02	10.2	11.1	0.18
Fruit juices	6.38	8.44	<b>0.40</b>	6.65	8.42	<b>0.35</b>	7.12	7.89	0.14
Cow's milk	10.0	12.7	<b>0.49</b>	11.6	12.0	0.07	12.1	11.2	-0.18
<i>Use of Ready-prepared baby foods at 12 mo**</i>									
Dairy products	39.4	73.9	0.25	79.5	39.0	<b>-0.34</b>	84.9	31.5	<b>-0.42</b>
Soups	21.3	44.3	0.23	62.3	6.8	<b>-0.52</b>	28.3	27.0	0.01
Vegetables puree	24.9	81.8	<b>0.53</b>	83.1	17.9	<b>-0.56</b>	34.3	60.9	0.20
Fruit puree	42.6	93.3	<b>0.47</b>	84.7	45.8	<b>-0.38</b>	75.7	54.8	-0.23
Fruit juices	10.4	7.9	-0.09	22.5	2.4	<b>-0.34</b>	18.7	6.1	-0.18

Biscuits	24.9	36.8	0.15	41.8	20.7	-0.18	42.2	18.9	-0.26
Cereals	53.0	37.1	-0.12	58.6	33.1	-0.27	58.6	42.3	-0.13
Main meals (including meat, fish and vegetables)	33.3	84.6	<b>0.46</b>	91.2	17.5	<b>-0.65</b>	37.9	67.3	0.25
<i>Use of ready-prepared adults' foods at 12 mo**</i>									
Dairy products	72.3	26.7	<b>-0.41</b>	36.9	56.2	0.11	25.5	79.8	<b>0.48</b>
Soups	18.5	6.7	<b>-0.37</b>	9.2	6.8	-0.06	1.6	21.0	<b>0.40</b>
Vegetables puree	34.1	17.0	<b>-0.48</b>	10.4	17.5	0.09	7.6	25.8	0.25
Fruit puree	44.2	5.1	<b>-0.49</b>	16.5	20.7	0.00	4.8	45.6	<b>0.50</b>
Fruit juices	17.7	0.0	<b>-0.44</b>	7.6	7.6	-0.09	2.0	12.9	<b>0.31</b>
Biscuits	51.4	4.7	<b>-0.48</b>	27.3	20.3	-0.11	8.0	46.0	<b>0.41</b>
Cereals	12.9	1.2	<b>-0.32</b>	5.2	2.8	-0.04	2.4	10.1	0.19
Processed meat and fish	31.7	3.2	<b>-0.45</b>	10.8	15.9	0.06	9.6	18.6	0.11
<i>Use of home-made foods at 12 mo**</i>									
Dairy products	18.1	1.2	<b>-0.45</b>	4.0	13.9	0.08	11.2	4.0	-0.04
Soups	60.6	11.5	<b>-0.44</b>	10.0	68.5	<b>0.46</b>	61.8	24.2	<b>-0.32</b>
Vegetables puree	68.7	22.1	<b>-0.43</b>	12.5	89.6	<b>0.62</b>	74.9	33.1	<b>-0.39</b>
Fruit puree	25.3	10.3	-0.24	4.8	52.2	<b>0.52</b>	33.5	10.1	-0.28
Fruit juices	8.0	0.8	-0.22	0.4	6.4	0.15	6.8	2.8	-0.15
Biscuits	12.6	17.4	<b>-0.40</b>	1.6	8.0	0.14	6.0	6.5	0.02
Fresh meat and fish	69.5	13.4	<b>-0.48</b>	8.4	76.5	<b>0.52</b>	70.9	27.8	<b>-0.39</b>

\* Values in Q1 and Q4 are means. \*\* Values in Q1 and Q4 are proportion of subjects using the considered type of food regularly or always.

Patterns coefficients  $\geq |0.3|$  are shown in bold. Pattern 1: 'Late complementary food introduction and use of baby foods', Pattern 2: 'Longer breastfeeding, late complementary food introduction and use of home-made foods', Pattern 3: 'Use of adult's foods'. French recommendations on introduction of various CF groups are available in the infant's personal health record and are the following: fruit, vegetables, potatoes, cereals, meat and fish should be introduced to the infant between 5 and 7 month; dairy products and cheeses between 6 and 7 months; eggs from 7 months.

**Table 3: Multivariate associations between infant feeding patterns and family characteristics in EDEN cohort study, n=1004.**

	n	Feeding patterns					
		<i>Late CF* introduction and use of baby foods</i>		<i>Longer breastfeeding, late CF* introduction and use of home-made foods</i>		<i>Use of adults' foods</i>	
		$\beta$	95% CI**	$\beta$	95% CI	$\beta$	95% CI
<b>Recruitment center</b>							
Nancy	566	Referent		Referent		Referent	
Poitiers	438	<b>-0.25</b>	<b>-0.38, -0.13</b>	<b>0.16</b>	<b>0.03, 0.29</b>	<b>-0.20</b>	<b>-0.33, -0.07</b>
<b>Parental characteristics</b>							
Mother's age at child's birth(y)	1004	<b>0.02</b>	<b>0.00, 0.03</b>	<b>0.03</b>	<b>0.01, 0.04</b>	<b>-0.03</b>	<b>-0.04, -0.01</b>
Maternal Education							
No diploma	240	<b>-0.32</b>	<b>-0.51, -0.14</b>	<b>-0.61</b>	<b>-0.80, -0.41</b>	0.11	-0.08, 0.30
High school diploma	170	<b>-0.22</b>	<b>-0.41, -0.03</b>	<b>-0.36</b>	<b>-0.56, -0.17</b>	-0.03	-0.23, 0.17
2-year university degree	225	-0.11	-0.26, 0.05	<b>-0.28</b>	<b>-0.45, -0.12</b>	-0.07	-0.24, 0.09
≥ 3-year university degree	369	Referent		Referent		Referent	
Monthly family income (euros)							
<1501	113	<b>-0.50</b>	<b>-0.76, -0.25</b>	-0.03	-0.29, 0.23	0.19	-0.08, 0.45
1501-2300	300	<b>-0.22</b>	<b>-0.40, -0.04</b>	-0.09	-0.27, 0.09	0.06	-0.12, 0.25
2301-3000	281	-0.11	-0.27, 0.05	-0.04	-0.20, 0.13	0.15	-0.02, 0.32
>3000	310	Referent		Referent		Referent	
Maternal employment status in the first year							
Worked from 0-4m	397	Referent		Referent		Referent	
Worked from 4-8m	243	0.06	-0.13, 0.26	0.07	-0.13, 0.26	0.03	-0.17, 0.22
Worked from 8-12m	72	-0.07	-0.37, 0.23	0.04	-0.27, 0.34	0.24	-0.07, 0.55
Never in the 1st year	292	-0.15	-0.44, 0.13	-0.00	-0.29, 0.29	0.28	-0.02, 0.58
Parity							
1	473	Referent		Referent		Referent	
2	359	<b>-0.15</b>	<b>-0.29, -0.02</b>	-0.01	-0.15, 0.13	<b>0.30</b>	<b>0.15, 0.44</b>
≥ 3	172	<b>-0.22</b>	<b>-0.43, -0.02</b>	-0.14	-0.34, 0.07	<b>0.47</b>	<b>0.26, 0.68</b>

Maternal BMI							
Thin	84	0.12	-0.10, 0.34	0.03	-0.19, 0.26	-0.03	-0.28, 0.22
Normal	674	Referent		Referent		Referent	
Overweight	169	<b>-0.19</b>	<b>-0.35, -0.03</b>	-0.13	-0.29, 0.04	0.06	-0.07, 0.20
Obese	77	0.00	-0.23, 0.23	<b>-0.24</b>	<b>-0.47, -0.00</b>	0.17	-0.07, 0.41
Paternal BMI							
Missing	73	-0.06	-0.30, 0.18	-0.15	-0.40, 0.09	-0.03	-0.28, 0.22
Normal	481	Referent		Referent		Referent	
Overweight	370	-0.08	-0.21, 0.05	0.04	-0.09, 0.17	0.06	-0.07, 0.20
Obese	80	0.03	-0.20, 0.26	0.08	-0.16, 0.32	0.17	-0.07, 0.41
<b>Infant characteristics</b>							
Birthweight (kg)	1004	0.00	-0.15, 0.15	0.11	-0.04, 0.26	0.04	-0.12, 0.19
Gestational age (weeks of amenorrhea)	1004	-0.01	-0.05, 0.04	0.02	-0.03, 0.07	0.01	-0.03, 0.06
Gender							
Male	513	<b>-0.12</b>	<b>-0.24, -0.00</b>	-0.02	-0.14, 0.10	-0.04	-0.16, 0.09
Female	491	Referent		Referent		Referent	
Infant's age at first attendance to childcare							
Missing	251	0.08	-0.21, 0.38	0.29	-0.01, 0.59	-0.21	-0.52, 0.09
0-4m	364	Referent		Referent		Referent	
4-8m	208	0.11	-0.09, 0.31	0.12	-0.09, 0.32	-0.09	-0.30, 0.12
8-12m	69	0.06	-0.25, 0.37	0.25	-0.06, 0.57	-0.22	-0.54, 0.10
Never in the 1st year	112	-0.00	-0.23, 0.22	0.11	-0.12, 0.34	-0.01	-0.25, 0.22

463 \* CF : complementary food, \*\* CI : Confidence interval

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