

1 **Full Title**

2 Observation of parental functioning at mealtime using a sibling design.

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4 **Running Head**

5 Observation of parental functioning at mealtime

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7 **Type of manuscript**

8 Original Article

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Abstract

This study investigates whether parental feeding practices are part of the shared environment or responsive to characteristics of different children from the same family. Thirty six mothers with two children (4-12 y) of which 10 sibling-pairs were discordant for weight status (healthy weight – overweight), were invited to the lab for a standard meal. Maternal responsive and controlling behaviour was observed and coded. Children’s weight status and eating behaviour was assessed. Results indicated that in general, mothers show similar levels of responsiveness and controlling behaviour within families. However, the use of mothers’ authoritarian and permissive behaviour and her expressions of involvement at mealtime were consequently related to children’ s amount of food eaten and their restraining eating style. Thus, the amount of food children eat, both observed and assessed by questionnaire, seems related to more maladaptive parenting practices in mothers. This pleads for more tailor-made guidelines when advising parents of children with eating- and weightproblems.

Key Words parental feeding practices, observation, sibling pairs

[Geef tekst op]

50 **Introduction**

51 Families serve as a model and a principal learning environment for children who need
52 to learn how to regulate their energy intake and how to acquire a varied eating pattern. It is
53 often assumed that parenting practices are part of the shared family environment that
54 influence children's development of eating behaviour. However, following an interactional
55 point of view, children are considered active agents (Bronfenbrenner, 1977) and may evoke
56 parental behaviours (Caspi & Moffitt, 1995). Bi-directionality is indeed more likely and
57 involves that parenting practices result from an interaction between parent and child
58 characteristics. Also, in the context of feeding, it is interesting to study within family
59 variability potentially leading to differential outcomes in siblings. The main goal of the
60 article is to examine shared versus non-shared parental influences on children's eating
61 behaviour.

62 In the general parenting domain, two major dimensions can be distinguished: (1)
63 demandingness or parental control and (2) responsiveness or parental support (Maccoby &
64 Martin, 1983). In the feeding domain, parental control is defined as attempts to monitor the
65 child's eating by restricting the child from eating certain foods or pressuring the child to eat
66 other foods (Birch, 1999). Parental support is generally referred to as affective warmth and
67 acceptance as well as well-modulated parental involvement in different domains of a child's
68 development (e.g. Patterson, Reid, & Dishion, 1992), such as the feeding domain.

69 Research in this domain has mainly focused on specific parental feeding practices
70 reflecting aspects of parental control. Much of the literature in this domain rely on two
71 subscales of the Child Feeding Questionnaire (Johnson & Birch, 1994), namely Restriction
72 and Pressure to Eat, to capture these practices and examine their relationships with
73 children's eating behaviour and weight status. Although it is assumable that a certain

74 amount of parental control is necessary to learn children to cope with the current food
75 environment, controlling practices have been shown to have a detrimental impact on
76 children's eating behaviour. It was evidenced that high parental feeding restriction can lead
77 to selective food preferences in children (Fisher & Birch, 1999) and diminished abilities to
78 self-regulate their energy intake (Johnson & Birch, 1994), which in turn indirectly
79 contributed to the development of overweight as was shown by means of longitudinal
80 research designs (Faith, Scanlon, Birch, Francis, & Sherry, 2004; Francis & Birch, 2005).
81 However, there are also a number of cross-sectional studies reporting no association
82 between parental restriction and children's eating (Moens & Braet, 2007) or child weight
83 (Robinson, Kiernan, Matheson, & Haydel, 2001). This was also confirmed by a longitudinal
84 study showing that lower parental control was associated with higher child BMI-z score after
85 three years (Campbell et al., 2010) As such, it seems that parental strategies that reflect
86 permissive feeding practices neither promote a healthy eating nor healthy weight
87 development.

88 With respect to parental involvement in the feeding domain, there also are
89 conflicting results. The well-known study of Lissau and Sorensen (1994) retrospectively
90 showed that children from neglectful families are almost 10 times more likely to become
91 overweight in adulthood. And this picture was confirmed by two more studies on this topic
92 that found less positive involvement in mothers of children with overweight (Birch, Marlin,
93 Kramer & Peyer, 1981; Kinston, Loader, Miller & Rein, 1988). On the other hand, other
94 studies found no significant differences in parental involvement between families with and
95 without overweight children (Johnson, Brownell, St Jeor, Brunner, & Worby, 1997;
96 Stradmeijer, Bosch, Koops, & Seidell, 1999).

97 As such, the literature does not present a consistent picture with respect to the
98 relation between the two main parenting dimensions and children's eating behavior and
99 weight status. Several explanations can be put forward for this. First, there might be a
100 conceptual problem when defining and applying these two dimensions in the feeding
101 domain. It seems especially difficult to get the concept of parental feeding control clear-cut
102 defined. Until now, studies were directed to the amount of control while also the domain in
103 which parents control their children's food intake matters. Satter (1987) appropriately
104 assigns responsibilities regarding food intake to parents and children. Parents should take
105 responsibility for the timing and for the type of food offered, while children are responsible
106 for the amount of food eaten. Consistent with this view, we want to consider if authoritarian
107 attempts to control the child's eating (with no respect for the child choices on what and how
108 much he or she eats) can be differentiated from permissive (the child can decide on what
109 and how much he or she eats) and from authoritative feeding (the child is offered and
110 encouraged to eat healthy foods, but is given responsibility on the amount of food eaten).

111 Second, there could also be methodological explanations for the found
112 inconsistencies. One should remark that the majority of the studies is limited by its reliance
113 on parental reporting of feeding practice. Although the Child Feeding Questionnaire is widely
114 used and has shown to be internally consistent and reliable over time, this does not tell us
115 whether parents are accurate reporters of their feeding strategies. Especially, when eating is
116 a conflict domain in the family. Moreover, there is no questionnaire that measures parental
117 involvement in feedings situations. An observational study of family functioning in 2007
118 compared observations during actual mealtime situations with self-report measures of
119 parents with overweight children vs. parents of normal-weight children (Moens, Braet, &
120 Soetens, 2007). While parents reported more restrictive feeding practices, the observations

121 showed that maladaptive feeding strategies (both authoritarian as permissive feeding) were
122 twice as prevalent in families with overweight children compared to families with children
123 with a healthy weight. In addition, while parents reported an equal amount of parental
124 involvement, observations revealed that parents of overweight children showed less positive
125 involvement during mealtime. This stresses the importance of a multi-method multi
126 informant design in this domain.

127 Finally, the majority of former studies have used data from one child per family.
128 Research suggests that parents may report using different controlling feeding practices in
129 response to characteristics of each sibling. There are a few studies that addressed parental
130 behaviour in relation to children's weight status and eating behaviour using a sibling design.
131 This seems an interesting methodology to include in research on the influence of parental
132 feeding behaviour as it can better control for environmental factors that may impact child
133 eating behaviour or weight status (eg. family SES, parental education, snack foods at home;
134 Faith, 2005). Already in 2000, Saelens, Ernst and Epstein included sibling pairs discordant for
135 obesity, and found more between-family variability in maternal control towards children
136 than within-family variability. Other studies found that differences in mother's feeding
137 practices corresponded to differences in children's BMI Z-scores (Keller, Pietrobelli, Johnson,
138 & Faith, 2006) and to sibling differences in eating behaviours (Farrow, Galloway, & Fraser,
139 2009). Horn and colleagues investigated the role of a child's temperament in the feeding
140 interaction with parents. They found that parents reported more food restriction for the
141 more distractible child and reported more responsibility towards the child with a more
142 negative mood (Horn, Galloway, Webb & Gagnon, 2011). These three latter sibling studies
143 suggest that parental control would be part of the non-shared environment. To the best of

144 our knowledge there are no studies that use observation methodologies to study within
145 family variability in parental feeding control and parental involvement.

146 In sum, inconsistencies with regard to parental control and involvement in the
147 feeding domain could be due to conceptual differences and measurement issues when
148 reporting about feeding strategies. The current study aims to observe mothers' behaviour
149 during mealtime. In doing that, according to recent insights, both involvement and parental
150 feeding control will be refined. By including sibling pairs, it will be possible to examine
151 whether mothers show different feeding behaviour within their family. Moreover, we will
152 investigate whether within family differences in parental behaviour are related to
153 differences in child body weight and eating behaviour of siblings. It is hypothesized that
154 while parental involvement would be part of the shared environment, parental control is
155 part of the non-shared environment and as such responsive to specific characteristics of the
156 child.

157 **Method**

158 *Subject Recruitment*

159 A total of 36 mothers of at least two sibling children ($N = 72$) between 4 and 12 years
160 old participated in this study and visited the lab to consume a standard meal together.
161 Families were drawn from a questionnaire study on parental feeding practices and children's
162 eating behaviour which includes 60 families with at least two siblings from the region of
163 Flanders. Thirty-six families agreed to participate in the current observational mealtime
164 study (response rate 60%). Next to the age criterion (at least two children between 4 and 12
165 years old), no further in-or exclusion criteria were described. The protocol was approved by
166 the Ethical Committee of the University.

167 *Procedure*

168 Observations were conducted at the laboratory by trainees in psychology guided by
169 standardized instructions and under direct supervision of two researchers. In the lab, the
170 video camera was installed, the table was set and three chairs were present. While
171 information was given, the informed consent was obtained and weight and length of mother
172 and the two children were measured. We took several precautions to avoid that
173 behavioural patterns would emerge as part of the family's reaction to the presence of the
174 camera. First, mothers were told that the aim of the study was to study children's eating
175 behaviour and differences between children within families. In that way, mothers were not
176 aware of the fact that their behavior would be observed. After the meal, we debriefed the
177 mothers. Second, all family members had the opportunity to habituate to the camera before
178 the start of the recordings. Finally, the mother received the instruction that the mealtime
179 should occur in the most typical conditions (as it occurs at home). After the meal, we asked
180 her to rate the typicality of the dinner on a scale from '1' (very untypical meal) to '10' (very
181 typical meal). The mean score was 7.86 (SD = 1.14).

182 The dinner consisted of a weighed portion of spaghetti bolognese; a jug of water and
183 grated cheese were available on the table. Before the start of the videotaped meal, the
184 observer left the room. The video camera started when the family began to eat and was
185 stopped when everybody had finished. After 20 minutes, the observer entered the lab,
186 cleaned the plates and the portions were weighed again. Mothers ate on average 428.28 gr
187 (SD = 65.27) and the children 341.81 gr (SD= 130.11). Finally, mothers were asked to fill out
188 complementary questionnaires.

189 *Measures*

190 *Adapted Mealtime Family Interaction Coding System (Adapted MICS) and Mealtime*
191 *Observation Items.* The present study adopted a coding system based on the Mealtime

192 Family Interaction Coding System (MICS; Dickstein, Hayden, Schiller, Seifer, & San Antonio,
193 1994) to rate the videotaped parental practices at mealtimes. The original MICS is a
194 dimensional observational coding system adapted from the McMaster Model of Family
195 Functioning (Epstein, Bishop, & Levin, 1978). It contains seven general ratings to be scored
196 on a 7-points scale ranging from 1 (“very unhealthy”) to 7 (“very healthy”). For the purpose
197 of this study, we focused on two general ratings: (1) ‘Behaviour Control’ (‘BC’) and (2)
198 ‘Interpersonal Involvement’ (‘IV’). Respectively, the two general ratings refer to (1) “the way
199 in which the family expresses and maintains standards for the behaviour of its members”
200 and (2) “the extent to which family members show interest in, and place value on, each
201 other’s activities and concerns” – which is comparable with our definitions of parental
202 control and parental support. The general rating of ‘IV’ remained operationalized as in the
203 MICS. In line with Patrick, Niklas, Hughes, & Morales (2005), we recoded the general rating
204 of ‘BC’. Codes 1 and 2 were operationalized as ‘permissive feeding style’ and codes 6 and 7
205 as ‘authoritarian feeding style’ (maladaptive styles); codes 3 to 5 were defined as
206 ‘authoritative feeding style’ (adaptive style).

207 Based on previous research with the MICS (Moens et al., 2007), we added 6 IV and 7
208 BC observations items in order to collect more detailed observations. These observation
209 items are scored with ‘1’ (= behaviour did not occur), ‘2’ (= behaviour occurred doubtfully),
210 ‘3’ (= behaviour was present), ‘4’ (= behaviour was clearly present) and ‘5’ (= behaviour was
211 frequently displayed). The IV subscale (based on 6 IV observation items) has a Cronbach
212 alpha of .84 in the present study. According to recent insights on parental feeding ‘BC’
213 observation items measured authoritarian (4 observation items), authoritative (2
214 observation items) or permissive (1 observation item) feeding strategies. For the

215 authoritarian subscale and for the authoritative subscale Cronbach alpha was respectively
216 .57 and .58.

217 The video recordings were coded by psychology students who were blind to the
218 direction of the hypotheses. The coders were familiarized with the operational definitions of
219 the general ratings and the mealtime observation items and received a practical training.
220 During the 20 minute session, there were two codings at fixed intervals for both the general
221 ratings (at 3' and 12' for IV; at 6' and 15' for BC) as for the observation items (at 9' and at
222 20'). A mean score was calculated and used in the analyses. Sixteen at random selected
223 recordings were recoded by an additional observer. A significant correlation showed a good
224 agreement between observers for the general rating of BC, $r = .76$. and of IV, $r = .73$, both
225 significant at $p = .001$.

226 *Anthropometric and demographic information.* Children's and mothers' length and weight
227 were measured in the lab, following standardized instructions. Participants were dressed in
228 light clothing and measured without shoes. The BMI for the adults ($\text{weight}/\text{height}^2$) and the
229 adjusted BMI for the children ($\text{Actual BMI}/\text{Percentile 50 of BMI for age and gender} \times 100$)
230 was used in the analyses. Children's weight status was identified in relation to the European
231 body mass index values for 0-to 21-year-olds (Fredriks, van Buuren, Wit, & Verloove-
232 Vanhorick,2002). We used the widely accepted cut-off for assigning children to the
233 overweight group (i.e. a percentage of 120% or more indicates overweight; Troiano & Flegal,
234 1998). The familial socio-economic situation was calculated using the Hollingshead Index of
235 Social Position (ISP), based on parents' education and occupation. This index results in an ISP
236 total score that can be converted to five social position indexes (Hollingshead, 1975). In the
237 present study we solely included the mother's education and occupation. Children from
238 different socio-economic groups and from city as well as rural environments were included.

239 *Children's eating behavior* was assessed by means of (1) the amount of food (in gr.) eaten
240 during mealtime and (2) by the Dutch Eating Behaviour Questionnaire – parent version
241 (original DEBQ; van Strien, Frijters, Bergers & Defares, 1986). As such, both adaptive as well
242 as maladaptive eating was measured. The DEBQ assesses external eating (10 items),
243 emotional eating (13 items) and restrained eating (10 items). Items are scored on a 5-point
244 Likert scale and subscale scores are calculated by adding the individual item scores. The
245 parent version assesses the parental perspective on the child's eating behaviour. Research
246 revealed satisfying internal consistency and external validity and a stable factor structure for
247 the DEBQ Parent version (Braet et al., 2008). The present study found Cronbach alphas
248 varying from .75 to .86 for the parent version.

249 *Statistical analyses*

250 Children within each family were assigned to be child 1 or child 2 according to their age. To
251 eliminate any effects of age, with one sibling consistently being older, in 50% of cases the
252 older child was assigned to be child 1 and the younger child was assigned to be child 2. For
253 the remaining cases the reverse method was used. This procedure is in accordance with
254 Farrow et al. (2009). With regard to possible gender effects, we conducted a series of
255 independent t-tests to examine gender differences across the sample on the different parent
256 behaviour observations and children's measures. Using an alpha of $p < .001$ to reduce the
257 risk of Type 1 errors, no gender differences were found. Consequently, gender was not
258 controlled for in further analyses.

259 To ascertain familial correlation of parental behaviour as observed at mealtime for their two
260 children, a series of two-way random intraclass correlation coefficients (absolute agreement)
261 were used, as described by the procedure of Keller et al. (2006). Next, for each sibling pair
262 within-family difference scores were calculated for parental mealtime behaviour and

263 children's characteristics (by subtracting scores for child 2 from scores for child 1). These
264 difference scores were correlated to assess whether parents showed different levels of
265 mealtime practices with siblings with different characteristics. These analyses will be
266 conducted for all 36 sibling pairs and for concordant ($n=26$) and discordant ($n=10$) pairs
267 separately.

268 **Results**

269 *Descriptive statistics*

270 Participating mothers were on average 37 years ($SD = 3.69$; range 30-46 years) and
271 had a mean BMI of 24.64 ($SD = 5.28$; range 18-47). Of the mothers, 67% was normal-weight
272 ($BMI \leq 25$); 27% were overweight ($25 < BMI \leq 30$) and 6% was obese ($BMI > 30$). The familial
273 socio-economic situation was calculated using the Hollingshead Index of Social Position (ISP),
274 resulting in a score that can be converted to five social position indexes (Hollingshead,
275 1975). To avoid cells with expected frequencies less than five, we recoded the five social
276 position indexes into three social classes (upper, upper middle into 'high' and middle into
277 'middle' and lower middle and lower into 'low'). The middle class was most present, 50.70%
278 of the current sample. 46.30 % of the families belonged to highest class and 3% to the
279 lowest classes.

280 Of the 72 children that took part, 42% is male. Their mean age is 7.04 ($SD = 1.98$) and
281 the children have a mean adjusted BMI of 105.78% ($SD = 15.06$; range 86-157). Across the
282 sample and according to the European body mass index values for 0-to 21-year olds (Fredriks
283 et al., 2002), 17% of the children had overweight, whilst the others had a healthy weight.
284 There were 10 pairs of siblings that were discordant for their overweight status.

285 Table 1 shows descriptive statistics for parental mealtime behaviour and children's eating
286 behaviour and amount of food eaten for all children ($n=72$) and for the children of the

287 concordant ($n=52$) and the discordant sibling pairs ($n=20$) separately. Within the subgroup of
288 discordant siblings, paired sample t-tests indicated that there were significant differences
289 between the overweight and the non-overweight sibling on dietary restraint ($t(9) = 3.00, p <$
290 $.05$) and external eating ($t(9) = 4.07, p < .01$), with higher scores for the overweight sibling.
291 The IV subscale score significantly differed for discordant siblings ($t(9) = -2.61, p < .05$),
292 indicating a higher parental involvement towards the non-overweight sibling.

293 *Within-family differences in parental feeding behaviour*

294 Table 2 shows the intraclass correlation coefficients for mealtime behaviour observed in
295 parents for two sibling children. All coefficients are significant and positive, indicating that
296 parents show significantly similar feeding practices within families. When repeating the
297 analysis for the subgroup of 26 concordant and 10 discordant sibling pairs, the same
298 significancies are found.

299 Next, differences in sibling amount of food eaten at mealtime in lab, maladaptive eating (as
300 reported by the DEBQ), age and weight status were correlated with differences in parental
301 behaviour during mealtime using Pearson's correlations. Due to the large number of
302 correlations being performed the alpha level was reduced to $.001$ to reduce the risk of Type
303 1 errors. Table 3 shows that for both general ratings of the MICS no correlations with
304 difference scores for child characteristics were found.

305 Further, correlations indicate that parents showed more authoritarian feeding behaviour
306 with the sibling who is younger and eats more at mealtime. Parents are also more
307 authoritarian with the sibling that shows a less restraint eating style, and this seems
308 particularly the case in discordant siblings. Parents showed more permissive feeding
309 behaviour at mealtime with the older sibling, who has a higher adjusted BMI, ate less at
310 mealtime and has a more restraint eating style. Differences in parents' authoritative feeding

311 behaviour were not correlated with differences in siblings' characteristics. Finally, parents
312 showed more expressions of positive involvement towards the sibling that is younger and
313 eats more during the mealtime. When correlational analyses were repeated for the
314 subgroups of concordant and discordant sibling pairs, no new correlations were found.

315 **Discussion**

316 The current study examined parental functioning by means of observations of their
317 mealtime behaviour. By doing so, we tried to avoid response bias, which is often inherent to
318 parental reporting of feeding behaviours. A sibling design enables to study whether parental
319 feeding strategies are shared by siblings in the same household. It was our hypothesis that
320 while parental involvement would be part of the shared environment, parental control at
321 mealtime would be more responsive to specific characteristics of the child.

322 Results revealed that all intraclasscoefficients were positive and significant, indicating
323 that mothers showed a high degree of similarity in their mealtime behavior towards their
324 different children. Also, for the subgroup of discordant sibling pairs, this high degree of
325 similarity was found despite significant weight differences between siblings. This is in
326 accordance with other sibling design studies. Saelens et al. (2000) solely included sibling
327 pairs discordant for obesity and found no within-family variability in maternal feeding
328 control. Also Farrow et al. (2009) found significant positive intraclass correlations for all
329 subscales of the Child Feeding Questionnaire, with the exception of one subscale namely
330 Perceived Child Weight.

331 However, we found differences in parental practices at mealtime also to be related to
332 certain differences in children 's characteristics. This was especially true for the maladaptive
333 feeding control behaviour - both authoritarian and permissive feeding. Mothers showed
334 more authoritarian feeding behaviour towards the child that is younger, eats a greater

335 amount of food at mealtime and has a less restraining eating style of its own. This last
336 correlation was even stronger for the subgroup of sibling pairs discordant for overweight.

337 For the permissive feeding subscale, the same significancies are found but in the
338 opposite direction. Mothers show more permissive feeding behaviour towards the child that
339 is older, eats less at mealtime and has a more restraining eating style of its own. There was
340 also a relationship with within-differences for child's weight, indicating that mothers show
341 more permissive mealtime behaviour with the child that is heavier. When we reran the
342 analyses for a subgroup of discordant sibling pairs, the same correlation was found to be of
343 significance, although only trend significant because of the stringent Bonferroni correction
344 we applied.

345 The findings are important as they add to existing findings in the same direction.
346 Farrow et al. (2009) also found that parents reported more feeding control practices in
347 answer to certain eating behaviour characteristics of their child. More specifically, these
348 authors examined the use of restriction and pressure to eat - both subscales of the CFQ.
349 They found that parents reported using greater restrictive feeding practices and more
350 pressure to eat with children who are fussier than their siblings. Parents also reported using
351 more pressuring practices with siblings who ate slower, emotionally under-ate, enjoyed food
352 less, were less responsive to food, and were more responsive to internal satiety cues. This
353 study however, and other sibling design studies, solely focus on maladaptive feeding
354 practices, in particular on too strict parental controlling practices.

355 In the present study, by adapting the taxonomy of Baumrind (1971), we also focused
356 on too little parental control (permissive feeding practices) but even more important, we
357 also included an adaptive way of feeding control, namely authoritative feeding. Interesting,
358 and in contrast with the maladaptive feeding control practices, mothers' authoritative

359 feeding was not related to within-family differences of children's characteristics.
360 Observation items of our coding system that refer to authoritative feeding are: (1) mother
361 reacts responsively on food request or food finish, the child decides on the amount of food
362 eaten; and (2) mother stimulates autonomy in the child's eating. Therefore, we suggest that
363 authoritative practices are more related to functional eating patterns and what is eaten. In
364 addition maladaptive practices seem more related to the amount of food eaten at mealtime
365 (and validated by the findings on the DEBQ-questionnaire parent report). This could also lead
366 to the cautionary assumption that in general parents engage in adaptive feeding practices
367 but lapse into maladaptive practices in response to certain difficulties the child is showing,
368 which is in accordance with Webber, Hill, Cooke, Carnell, & Wardle (2010). Especially the
369 result that parents tend to act more in an authoritarian way toward their child that eats
370 more, shows that the rule of the division of responsibilities as formulated by Satter is not
371 common practice in parents. Given the consequences of too strict parental control on the
372 amount that children eat on the development of their intern selfregulation mechanism, it is
373 important to inform young parents. Mitchell, Farrow, Haycraft & Meyer (2013) stress in their
374 review on the topic that the depth of feeding-related advices for parents are limited and that
375 the education is being given too late. They plead for a preventive approach. Parents, as part
376 of pre-natal care, can be given practical guidelines on how to support a healthy eating
377 development and how to cope with difficult eating situations (like a child that eats too
378 much). More research is needed on how these guidelines can be implemented on a
379 structural level in the different environments of the child, e.g family, school, child care.

380 Differences in the two general ratings of behaviour control and involvement were
381 unrelated to within differences of children's characteristics. We can assume that these
382 general styles are more family-specific than child-specific. However, there is no full

383 confirmation for the hypothesis that parental involvement would be part of the shared
384 environment. Within-family differences for the IV-subscale were related to sibling
385 differences in age and amount of food eaten. Mothers showed more positive involvement
386 towards the sibling that is younger. This could refer to a developmental trend in parental
387 involvement in eating situations, which probably fits with the development of the child. The
388 mother also showed more involvement towards the child that ate more. As was seen in
389 former research, parental attention and encouragement during mealtime was indeed
390 related to the consumption of larger amounts of food (e.g. Koivisto, Fellenius & Sjoeden,
391 1994). On the other hand, more recent research gives evidence for associations between
392 overeating in children and lack of parental support (Shuetzmann, Richter-Appelt, Schulte-
393 Markwort, & Schimmelmann, 2008), which would also be related to early attachment
394 processes (Wilkinson, Rowe, Bishop, & Brunstorm, 2010). As the current study cannot
395 address direction of causality for the observed associations, further longitudinal research is
396 needed to elucidate these relationships. Nevertheless, it seems that parental involvement is
397 a more important parental dimension to study in relationship to children's eating
398 development than formerly assumed. It is possible that parental involvement in feeding
399 situations, like parental control, can be situated along a continuum with maladaptive forms
400 of involvement on the extreme sides (too much or too little involvement). It is however not
401 yet clear how the adaptive form of parental involvement in feeding situations should be
402 clear-cut conceptualized. On the other hand, it seems that a pleasant atmosphere at the
403 table, where family members show their interest in each other, and eating development is
404 considered as a learning process, whereby parents do not display coercive practices are
405 protective for the development of a healthy, varied and balanced diet (Mitchell et al., 2013).

406 Strengths of the current study are the sibling design and the use of observations to
407 measure parental control and involvement. An important limitation concerns the lower
408 internal consistency of the authoritative and the authoritarian subscale of the BC-factor. It is
409 possible that this factor was represented by too few items. It might be relevant to conduct a
410 new observation study using an extended coding system with new items measuring different
411 types of parental control. Another limitation is the small sample size. However, a power
412 analysis showed that a sample of 64 would yield statistical power of .80 (based on $\alpha = .05$) to
413 detect medium correlational effects, indicating that the current sample was sufficiently
414 powered.

415 *Conclusions*

416 Next to the developmental stage also the amount of food the children eat, both observed
417 and assessed by questionnaire, seems to be related to more extreme parenting practices in
418 mothers. Mothers tend to engage in an authoritarian feeding style towards the child that
419 eats more. Although this relationships needs to be further clarified, it seems that, in
420 nowadays society, it is challenging for young parents to get their child to eat an adequate
421 amount of food. The finding that this eating pattern of children also relates to differences in
422 their mothers' expression of involvement at mealtime indicates the importance of studying
423 relational aspects in the link between parental feeding behaviour and children's eating
424 behaviour.

425

426 **Acknowledgements**

427 This research was supported by a post-doctoral research grant awarded to the first author
428 by the National Fund for Scientific Research-Flanders (Belgium).

429

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517 Table 1

518 *Descriptive statistics for parental mealtime behaviour and children's eating behaviour and amount of food*

519 *eaten for all children (n=72) and for the subgroup of concordant the children of the discordant sibling pairs*

520 *(n=20).*

Measures	All children (n = 72)	Concordant siblings (n=52)		Discordant siblings (n=20)	
	M(SD)	M(SD)		M(SD)	
		Child 1	Child 2	Child with overweight	Child without overweight
Adjusted BMI	105.78 (15.06)	101.04 (11.14)	101.67 (10.78)	132.85 (9.42)	101.72 (9.35)
MICS					
General Rating BC	3.86 (1.12)	3.90 (1.17)	3.94 (1.24)	3.55 (.98)	3.85 (.88)
General Rating IV	5.64 (1.12)	5.73 (1.19)	5.75 (1.09)	5.35 (1.11)	5.40 (1.13)
BC authoritarian-subscale	7.49 (2.16)	7.21 (2.04)	7.50 (2.27)	7.35 (2.22)	8.35 (2.25)
BC authoritative-subscale	4.60 (1.17)	4.71 (1.18)	4.50 (1.20)	4.70 (1.06)	4.45 (1.30)
BC permissive-subscale	1.62 (.86)	1.60 (.93)	1.46 (.69)	2.00 (1.00)	1.70 (.92)
IV subscale	21.43 (4.30)	21.35 (5.03)	22.42 (2.90)	18.80 (4.95)*	21.70 (4.16)*
DEBQ					
External eating	3.15 (.70)	30.63 (5.81)	29.58 (4.67)	38.00 (8.50)**	30.10 (7.53)**
Emotional eating	1.93 (.73)	25.05 (9.29)	22.63 (7.92)	28.44 (11.28)	25.78 (11.12)
Restraint eating	1.51 (.52)	15.06 (4.53)	14.64 (4.30)	20.00 (7.32)*	13.30 (2.75)*
Amount of food eaten	341.81 (130.11)	367.38 (118.71)	336.73 (136.88)	362.50 (160.12)	267.80 (90.47)

521 *MICS: Mealtime Interaction Coding System; BC: Behaviour Control; IV: Interpersonal Involvement; . Dutch*

522 *Eating Behaviour Questionnaire (DEBQ)*

523 ** significant difference between children with and without overweight of the discordant siblings at a p < .05*

524 *level.*

525 *** significant difference between children with and without overweight of the discordant siblings at a p < .01*

526 *level.*

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536 Table 2

537 *Intraclass correlation coefficients for mealtime behaviour observed in parents for all sibling pairs and for a*538 *subgroup of sibling pairs discordant for weight status.*

MICS	All Sibling pairs (n=36)	Concordant sibling pairs (n=26)	Discordant sibling pairs (n=10)
General Rating BC	.83***	.86***	.74**
General Rating IV	.97***	.96***	.99***
BC authoritarian-subscale	.58***	.62***	.55*
BC authoritative-subscale	.53***	.52**	.60*
BC permissive-subscale	.75***	.87***	.54*
IV subscale	.51***	.50**	.70**

539 * $p < .05$; ** $p < .01$; *** $p < .001$

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552 Table 3

553 *Difference score correlations for child characteristics and parental mealtime behaviour for the group of sibling*554 *pairs (n = 36) and the subgroup of discordant sibling pairs (n=10)*

MICS	Age	AdjBMI	Food_amount	Ext Eat	Emo Eat	Restr Eat
General Rating BC						
All sibling pairs	-.44	-.14	.13	-.07	.03	-.43
Concordant pairs	-.51	.14	.21	.22	.37	-.60
Discordant pairs	-.18	-.39	-.10	-.31	.23	-.37
General Rating IV						
All sibling pairs	-.16	.01	.40	.05	.01	-.12
Concordant pairs	-.28	.12	.45	.23	.04	-.20
Discordant pairs	.20	-.17	.43	-.29	.06	-.09
BC authoritarian-subscale						
All sibling pairs	-.69*	-.19	.51*	-.05	-.27	-.66*
Concordant pairs	-.60*	.15	.54*	.45	.43	-.32
Discordant pairs	-.76	-.50	.43	-.33	-.37	-.78*
BC authoritative-subscale						
All sibling pairs	-.42	.09	-.38	-0.2	.23	.48
Concordant pairs	.26	-.05	-.40	-.28	-.23	.33
Discordant pairs	.67	.28	-.30	.17	.36	.63
BC permissive-subscale						
All sibling pairs	.68*	.47*	-.52*	-.03	.15	.65*
Concordant pairs	.48	.16	-.41	-.42	-.54	.62
Discordant pairs	.84*	.66	-.63	.12	.27	.66
IV subscale						
All sibling pairs	-.62*	-.24	.51*	-.05	.08	-.49
Concordant pairs	-.70*	.41	.55*	.32	.26	-.44
Discordant pairs	-.33	-.72	.33	-.33	.30	-.51

§§§ .001

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