

# Observation of Family Functioning at Mealtime: A Comparison Between Families of Children With and Without Overweight

Ellen Moens, MA, Caroline Braet, PhD, and Barbara Soetens, MA  
*Ghent University*

**Objective** To examine differences between families of children with and without overweight on parental control and support. **Methods** Twenty-eight families with an overweight child and a control group of 28 families with a normal weight child (age range 7–13 years) participated in the study. Observations and self-reports of mealtime family functioning were administered and analyzed. **Results** Parents of children with overweight reported to exert more control on their children's feeding behavior and an equal amount of parental support in comparison with parents of children without overweight. However, observations at mealtime indicated that in families with an overweight child, maladaptive control strategies were twice as prevalent, and less parental support was displayed. **Conclusions** Self-reports and observations provide complementary information on how parents interact with their overweight children. Family-based treatment programs should include discussions on the adequate amount of parental control and support.

**Key words** family functioning; observation; overweight in children.

Overweight in children is currently seen as caused by genetic factors in interaction with environmental variables (Faith, Tepper, Hoffman, & Pietrobelli, 2002). Twin, adoption, and family studies evidence that genetic variation explains 25–40% of individual differences in adiposity (Bouchard, 1996). As the study of genetic susceptibility to overweight has not led to therapeutic options for children with overweight, research should be targeted to identifying specific environmental influences on childhood overweight. Among others, energy intake and energy expenditure are two important factors frequently studied in this context (Bouchard, 1995). A prolonged positive balance arrived at when energy intake exceeds the physical requirements can lead to the development of overweight. In children with overweight, the imbalance seems to be embedded in a system of interacting elements, directly and indirectly contributing to the child's health. A high-fat intake (Maffeis, Pinelli, & Schutz, 1996), a sedentary lifestyle (Molnar, 2000), children's eating style and pathology (Decaluwé & Braet, 2003), family demographics (Maffeis, Micciolo, Must, Zaffanello, & Pinelli, 1994),

and parenting practices (Birch & Davison, 2001) contribute to a specific (high-risk) environment, increasing the chances for development of early overweight.

In children, the energy intake is mainly influenced by the family context. Within this context, two major dimensions can be distinguished: (a) demandingness or parental control and (b) responsiveness or parental support (Maccoby & Martin, 1983; Van Leeuwen & Vermulst, 2004). In the feeding domain, parental control is defined as attempts to monitor the child's eating by restricting the child from eating certain foods or pressuring the child to eat other foods (Patrick, Niklas, Hughes, & Morales, 2005). Parental support is generally referred to as affective warmth and acceptance as well as a well-modulated parental involvement in different domains of a child's development (e.g., Patterson, Reid, & Dishion, 1992), such as the feeding domain. Both dimensions can be applied in an adaptive or maladaptive way, and hence, maladaptive parenting is hypothesized as a risk factor for developing eating problems in children. However, the literature reveals many inconsistencies.

*All correspondence concerning this article should be addressed to Ellen Moens, Department of Developmental, Personality & Social Psychology, Ghent University, H. Dunantlaan 2, 9000 Ghent, Belgium. E-mail: ellen.moens@ugent.be.*

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Especially, parental control on the dietary intake of children is a widely debated issue. A recent review by Faith, Scanlon, Birch, Francis, and Sherry (2004) shows two contradictory opinions regarding the effects of parental control on the eating behavior of children. One group of researchers adheres to the model of Costanzo and Woody (1985) stating that parents are most likely to control children's behavior in areas that are potentially problematic for parent or child. Applied to families with overweight children, this model suggests that parents will try to exert rigid control over the dietary intake of their children. Fisher and Birch (1999) tested and confirmed this overcontrol hypothesis in several studies. However, Birch and colleagues also found a counterproductive effect of highly controlling feeding practices, indicating that children of highly controlling parents are less able to self-regulate their food intake, which in turn was related to increased body mass (Johnson & Birch, 1994). The studies suggest that too much control is maladaptive, especially in families with overweight children. However, the findings were restricted to well-educated, two-parent families and hence need replication.

On the contrary, studies in samples representing different socioeconomic groups failed to detect a positive relationship between parental control and children's weight status (Baughcum et al., 2001; Gable & Lutz, 2000). Robinson, Kiernan, Matheson, and Haydel (2001), in a sample of 792 third-grade children with diverse ethnic and socioeconomic backgrounds, found for girls an inverse relationship between parental control and the degree of overweight in the children but no relationship for boys. They allude to a more complex relationship between parental control behavior and children's weight status and suggest that lack of parental control is more correlated with overweight in girls. This finding is inconsistent with the overcontrol hypothesis and needs further clarification. In conclusion, the review of Faith et al. (2004) selected 16 studies reporting on the relation between "restriction" and weight status and concluded that the findings are inconsistent across studies with nine studies reporting a positive association and seven studies reporting no or a negative association. Furthermore, study outcomes were unrelated to child ethnicity but Faith et al. (2004) acknowledge that socio-demographic information was reported inconsistently across studies. Contrarily, associations differed by gender. Although most studies were cross-sectional, they suggest a causal mechanism between parental feeding style and overweight in young children. It remains however unexplored, whether these specific parent interactions also maintain overweight problems once the child

suffers from severe overweight. A closer look revealed that only a few studies reported on children of 8 years or older. Although to our knowledge, five new studies were published after the review of Faith et al. (2004), only one reported on the impact of maternal restriction on children in this age group (Brown & Ogden, 2004). Here, it was concluded that parental control can have a paradoxical effect, which is consistent with the findings of Faith et al. (2004) for studies in schoolchildren.

There might also be a conceptual problem in defining the term "parental control" as a feeding strategy. In line with Birch and Fisher (1995), we want to consider three child-feeding patterns that map on the taxonomy of parenting styles of Baumrind (1971): authoritarian, permissive, and authoritative feeding. Authoritarian feeding is described in Patrick et al. (2005, pp. 243–244) as "attempts to control the child's eating with little regard for the child's choices and preferences." Permissive feeding is characterized by "allowing the child to make his or her own decisions regarding what and the amount of food eaten." Authoritative feeding, finally, is operationalized as "a balance between an authoritarian and a permissive parental style, such that the child is encouraged to eat healthy foods, but is given some own choices." Patrick et al. (2005) remark that former studies have always focused on authoritarian control (for review see Faith et al., 2004) and its detrimental effect on children's feeding behavior. Conversely, little research has evaluated the adequate or optimal amount of parental control on children's feeding behavior. The latter authors found evidence for the benefits of authoritative feeding. This feeding style was positively associated with the availability of fruits and vegetables, with attempts to get the child to eat dairy, fruits, and vegetables and with reported child consumption of dairy and vegetables. Authoritarian feeding, in contrast, was found to be negatively associated with the availability of fruits and vegetables. Nevertheless, the research of Patrick et al. (2005) did not address correlations with the child's body mass index (BMI). Gable and Lutz (2000) did compare feeding styles of parents of children with and without overweight and found that parents of children with overweight reported more inappropriate expectations of child nutrition. The scale items referring to this latter style resemble the permissive feeding style ("It doesn't matter which food my child eats. As long as he/she eats enough, he/she will grow properly" and "The child is old enough to take care of feeding him/herself"). The other feeding styles (authoritarian and authoritative) showed no differences between the two groups. These findings do not clearly delineate whether adaptive

or maladaptive feeding strategies are more present in families with overweight children. The present study aims to compare feeding styles in which an optimal amount of parental control is exposed (adaptive strategy authoritative control) with feeding styles in which too much or too little parental control is exhibited (maladaptive strategies authoritarian and permissive feeding). On the basis of the previous findings, we predict to find more maladaptive strategies – authoritarian control (e.g., Francis & Birch, 2005) and more permissive parental attitude (e.g., Gable & Lutz, 2000) and consequently lesser authoritative feeding strategies in families with overweight children.

Besides the controlling feeding strategy, this study compares the amount of parental support toward the children in families of children with and without overweight. Several studies emphasize the importance of a warm and supportive environment for the well-being of children and adolescents (e.g., Patterson et al., 1992). Especially for youngsters with overweight, Valtolina and Marta (1998) found that the adolescents attached greater importance to the support they received from their mothers than to within-family communication. Lissau and Sorensen (1994) retrospectively showed that children from neglectful families are almost 10 times more likely to become overweighted in adulthood. Birch, Marlin, Kramer, and Peyer (1981) found that mothers of children with overweight talked less to their children and showed less attention to the child's mealtime behavior than mothers of children with normal weight. Kinston, Loader, Miller, and Rein (1988) investigated family interactions via interviews and observed more hostile interactions and open rejection of children with overweight in their families. However, a second group of studies found no significant differences regarding parental involvement between families with and without overweight children (Johnson, Brownell, St. Jeor, Brunner, & Worby, 1997; Stradmeijer, Bosch, Kooops, & Seidell, 2000). Because these latter studies are solely based on self-reports, comparison of both studies is more difficult. In conclusion, these studies do not present a consistent picture of how families of children with and without weight problems differ with regard to parental support. On the basis of the previous findings that children with overweight experience more emotional and behavioral problems (Braet, Mervielde, & Vandereycken, 1997) and that mothers of children with overweight report more stress in accepting their child (Van Leeuwen, Braet, Fournier, & Moens, 2001), we predict that parents of overweight children will show less parental support than parents of children with normal weight.

Until now, most of these studies relied on self-report measures. We want to extend the methodology of the above-described studies by including observations of family functioning at mealtimes, to enhance the ecological validity. To our knowledge, few studies have examined the effects of parental mealtime behaviors on children's weight problems based on observation of actual family-meal situations. Klesges et al. (1983) developed a coding system [(Bob and Tom's Method of Assessing Nutrition (BATMAN))] to record child behaviors at mealtime and related physical and social parental variables. They observed 14 families at mealtime (10 families with normal weight children and four families with an overweight child) and found positive relationships between parental influences, especially parental encouragements to eat and relative infant weight. Koivisto, Fellenius, and Sjöden (1994) observed 50 families with children aged 3–7 years and found, by contrast, no relationship between parental mealtime practices and child overweight.

In conclusion, to resolve inconsistencies in literature regarding parental practices in families of children with and without overweight, new observational studies are required. We will refine the measurement of "parental control" by administering observations in addition to self-reports. On the basis of the observations and results from former studies, we hypothesize that parents of children with overweight, in comparison with parents of children with normal weight, (a) exert more maladaptive (authoritarian and permissive) feeding strategies and (b) will show less parental support toward their children. Moreover, measurement of the relationship between parental behavior and child's weight status will be controlled for three important variables: maternal BMI (Koivisto et al., 1994), familial socioeconomic position, and child gender (Robinson et al., 2001).

## Method

### Subjects

A total of 56 European (Caucasian) families with children between 7 and 13 years old ( $M = 10.07$ ;  $SD = 1.61$ ) participated in this study. The overweight group consists of 28 families with a child at risk for overweight or with a child with overweight that was on a waiting list for treatment for overweight. Patients suffering from secondary overweight, caused by endocrinal, chromosomal, hypothalamic diseases, or by mental retardation, were excluded from the study. The control group consists of 28 families with a normal weight child. Children from different socioeconomic groups and from city as well as rural environments were included (see also Table I).

**Table 1.** Demographic and Anthropometric Characteristics of the Families

	Group with overweight	Control group	Difference
Gender			
Girls (%)	68	46	<i>ns</i>
Boys (%)	32	54	<i>ns</i>
Age in years [M (SD)]	10.40 (1.75)	9.75 (1.40)	<i>ns</i>
Child's adjusted BMI [M (SD)]	156.76 (23.25)	95.84 (9.41)	0.001
Child's BMI [M (SD)]	26.63 (4.75)	15.85 (1.83)	0.001
BMI z-score [M (SD)]	1.93 (.43)	-.78 (.96)	0.001
Maternal BMI [M (SD)]	26.28 (7.19)	22.34 (2.73)	0.01
ISP (%)			
Low	46.40	7.10	<i>ns</i>
Middle	42.90	67.90	<i>ns</i>
High	10.70	25.00	<i>ns</i>
ISP total score [M (SD)]	45.75 (12.60)	41.18 (10.97)	<i>ns</i>
Mothers not working (%)	14.29	14.29	<i>ns</i>
Divorced families (%)	14.30	10.70	<i>ns</i>

BMI, body mass index; ISP, index of social position; *ns*, not significant.

## Procedure

### Subject Recruitment

The overweight group consists of families with children on a waiting list for (a) inpatient treatment, (b) outpatient treatment, or (c) a school intervention program. Letters requesting participation were sent to all families with a child with overweight between 7 and 13 years old (on one of the waiting lists). Because mealtimes had to be videotaped, families were not eager to participate in the study. Although 73 letters were sent out, only 28 (38%) were returned with a confirmation to participate. Families for the control group were randomly selected from the same region of the child with overweight. The protocol was approved by the Ethical Committee of the Ghent University.

### Home Visits

Observations were conducted at home. All home visits were conducted by trainees in psychology guided by standardized instructions. The observer arrived at home before dinner, obtained informed consent, and installed the camera. All family members and especially the participating child had the opportunity to habituate to the camera. The cook of the family, usually the mother,

received in advance the instruction to prepare an ordinary meal, not the favorite dish of the child, but also not something he or she disliked. The mealtime should occur in the most typical conditions. If, for example, the family was used to dine without the father or with a grandparent present, then the observed meal was videotaped under the same conditions. After the meal, one of the parents was asked to rate the typicality of the dinner on a scale from "1" (very untypical meal) to "5" (very typical meal). An appointment for a second observation was planned when parents gave a score below 3, but fortunately this was not necessary for the present sample. Before starting the observation, all family members were asked (a) not to watch television while eating and (b) not to answer the telephone. Before the start of the videotaped meal, the observer left the room. The video camera started when the family began to eat and was stopped when everybody had finished and the table was cleaned. After that, parents were asked to fill out complementary questionnaires.

## Measures

### Adapted Mealtime Family Interaction Coding System and Mealtime Observation Items

The present study adopted a coding system based on the Mealtime Family Interaction Coding System (MICS) (Dickstein, Hayden, Schiller, Seifer, & San Antonio, 1994) to rate the videotaped parental practices at mealtimes. The original MICS is a dimensional observational coding system adapted from the McMaster Model of Family Functioning (Epstein, Bishop, & Levin, 1978). It contains seven general ratings to be scored on a 7-point scale ranging from 1 ("very unhealthy") to 7 ("very healthy"). For the purpose of this study, we focused on two general ratings: (a) "behavior control" ("BC") and (b) "interpersonal involvement" ("IV"). Respectively, the two general ratings refer to (a) "the way in which the family expresses and maintains standards for the behavior of its members" and (b) "the extent to which family members show interest in, and place value on, each other's activities and concerns" which is comparable with our definitions of parental control and parental support. The general rating of "IV" remained operationalized as in the MICS. In line with Patrick et al. (2005), we recoded the general rating of "BC". Codes 1 and 2 were operationalized as "permissive feeding style," codes 6 and 7 as "authoritarian feeding style" (maladaptive styles), and codes 3–5 were defined as "authoritative feeding style" (adaptive style).

To collect more detailed observations of parental practices at mealtimes, we extended the original MICS

by adding 19 mealtime observation items to the general ratings, to be scored with “1” (behavior did not occur), “2” (behavior occurred doubtfully), “3” (behavior was present), “4” (behavior was clearly present), and “5” (behavior was frequently displayed). Eleven “BC” observation items and eight “IV” observation items were selected based on clinical experience and literature (Johnson & Birch, 1994; Klesges et al., 1983; Van Leeuwen, 2000), through several rounds of discussion and revision.

**Coder Training and Reliability of Observations.** The video recordings were coded by psychology students who were blind to the direction of the hypotheses. The coders were familiarized with the operational definitions of the general ratings and the mealtime observation items. One student observed the “IV” interactions, another the “BC” items. A third observer recoded 10 (five from the overweight group and five from the control group) at random-selected videotapes. Significant correlations showed a good agreement between observers, respectively,  $r = .92$  and  $r = .74$  for the general rating of “IV” and “BC”. Analysis of items showed moderate-to-high correlations between the coders for 16 of the 19 observation items. The three observation items that correlated low between coders were reconsidered.

To collect data on test-retest reliability, 10 at random-selected families (five from the overweight group and five from the control group) were revisited, within a mean interval of 18.57 days ( $SD = 12.68$ ) between the first and the second observed meal. The general ratings for the first and the second meal correlated,  $r = .64$  for “IV” and  $r = .99$  for “BC”. Paired  $t$  tests revealed no significant mean differences between the first and second observation for the “IV” items and only one significant difference for a “BC” item. During the first meal, parents significantly dished up more frequently the plates of their children,  $t(9) = 3.00$ ,  $p < .01$ , than during the second observation.

**Factor Structure.** We conducted an exploratory factor analysis on the 19 mealtime observation items to determine the underlying structure. Two “BC” observation items and one “IV” item were deleted because of weak-item general rating and inter-item correlations. Factors with eigenvalues greater than 1.0 (Kaiser criterion) were retained. Principal axis factoring (varimax rotation) resulted in a six-factor solution for the 16 retained items. This solution accounted for 53.82% of the variance in item responses. The first two factors already accounted for 25.02% of the variance. Therefore, we conducted a principal axis factoring extracting only two factors. This factor solution accounted for 29.83% of the total variance in item responses. After rotation, the first

factor explained 19.98% of the variance, and the second factor explained 9.84%. An individual item was retained if it loaded at or above the 0.32 criterion recommended by Tabachnick and Fidell (1996) on a single factor, and the difference was greater than .20 between that factor loading and the loading on any other factor. According to these loading criteria, five items were left out. Therefore, a final principal axis factoring (varimax rotation) was conducted on the retained 11 items, four “BC” items and seven “IV” items. We conclude that the two-factor solution accounting for 37.08% of the variance in item responses (including four “BC” items and seven “IV” items) provided the best representation of the originally proposed constructs. Scores on the items of the first factor were added to form a 7-item subscale score for the factor presenting “IV,” resulting in a Cronbach  $\alpha$  of .78. If necessary, the scores on items of the second factor were reverse-coded and added to form a 4-item subscale score of the “BC” factor, yielding an internal consistency of .49, which is rather low but understandable in the light of the lack of variance of some of the items and the small number of items (Cronbach, 1984). The general ratings of both “IV” and “BC” showed high and significant correlations with, respectively, the 7-item subscale score of the factor presenting “IV” ( $r = .88$ ,  $p < .001$ ) and the 4-item subscale score of the factor presenting “BC” ( $r = .56$ ,  $p < .001$ ). Table II explains how the definitions of the general ratings and the 11 retained mealtime observations items were operationalized.

### Parental Practices

The Child Feeding Questionnaire (CFQ) (Johnson & Birch, 1994, Dutch version by Moens, Pottier, & Braet, 2002) assesses parental attitudes, beliefs, and practices regarding children’s feeding behavior. It contains 7 subscales, of which 4 assess parental perceptions and concerns about own and children’s weight, and the others assess three aspects of control in feeding (“Restriction,” “Pressure to eat,” and “Monitoring”). In line with Birch and Fisher (2000), the present study will use the “Restriction” scale and the “Monitoring” scale to measure parental control on children’s eating. Analyses of Birch et al. (2001) showed internal consistencies above .70 for the seven factors. In this study, the Cronbach  $\alpha$ ’s for the two subscales were .62 and .90 for “Restriction” and “Monitoring,” respectively.

To our knowledge, there is no questionnaire that measures parental support at mealtime. Therefore, we administered The Ghent Parental Behaviour Scale (GPBS) (Van Leeuwen, 2000) to assess parental support in general parenting situations. This questionnaire is

**Table II.** Adapted Mealtime Family Interaction Coding System: General Rating and Mealtime Observation Items for Assessing Parental Controlling Behavior and Involvement at Mealtimes

	Examples/operational definitions
General ratings	
Interpersonal involvement <sup>a</sup>	The extent to which family members show interest in, and place value on, each other's activities and concerns
Rating 1	Lack of involvement
Rating 3	Narcissistic involvement or involvement devoid of feelings
Rating 5	Overall adequate affective involvement, so that basic levels of care and concern are demonstrated
Rating 7	Empathic involvement between family members, genuine interest in each other's activities
Behavior control <sup>b</sup>	The way in which the family expresses and maintains standards for the behavior of its members
Rating 1	Totally permissive: the child determines what, how, and how much to eat. There are no table rules: no structure, chaos, the child runs back and forward to the table
Rating 2	Permissive: the child determines what, how, and how much to eat. Mealtime runs smoothly
Rating 3	Authoritative: parents show responsibility on the eating behavior of the child: they confer with the child, encourage alternative behavior, but permit the child to make all decisions
Rating 4	Authoritative: there is a division of responsibility. Parents are responsible for the type of food offered, while children determine the amount of food eaten
Rating 5	Authoritative: Parents are responsible; they confer but make the final decisions
Rating 6	Authoritarian. Parents decide on what and the amount of food eaten. They dish up the plates
Rating 7	Authoritarian. Parents decide on the type of food and the amount eaten. They force their child to clean up the plate or restrict the amount of food. They strictly guard the good manners and discipline at mealtime
Mealtime observation items <sup>c</sup>	
Interpersonal involvement	
IV1: parent shows interest	There is discussion at mealtime of personal or family-related interests
IV2: parent shows active care	The parent takes care in a positive manner
IV3: parent asks opinion, feelings, thoughts	For example: Mothers asks whether the child is enjoying his meal
IV4: parent seeks eye-contact	There is eye contact between parent and child
IV5: there is adequate physical nearness	Family members do not act aloof
IV6: shows non verbal affection	There is an open attitude toward each other, physical contact is displayed
IV8: adequate interpersonal involvement	There is an overall balance between over-involvement and lack of involvement
"IV" subscale score <sup>d</sup>	
Behavior control	
BC1: mother dishes up	Mother dishes up at the start and during mealtime
BC2: mother guards good manners	For example: mother demands her children to eat properly and to sit still.
BC6: mother forbids	For example: mother forbids her child to dish up his plate, to take a second portion, to drink soda...
BC7: mother reacts responsively on food request	For example: mother confirms the child's request for food
"BC" subscale score <sup>d</sup>	

<sup>a</sup>The operational definition of the ratings of the construct "Interpersonal Involvement" is adopted from the original Mealtime Family Interaction Coding System (Dickstein, Hayden, Schiller, Seifer, & San Antonio, 1994).

<sup>b</sup>The ratings of "Behavioral Control" were recoded to encompass three feeding styles based on the Baumrind's taxonomy of parenting styles (1971).

<sup>c</sup>Additional observation items loading on the two constructs of the MICS to be scored with "1," behavior did not occur; "2," behavior occurred doubtfully; "3," behavior was present; "4," behavior was clearly present; and "5," behavior was frequently displayed.

<sup>d</sup>"IV" subscale score and "BC" subscale score, sum of the items of "IV" and "BC," respectively.

based on the model of Patterson et al. (1992) and allows assessment of general parental skills. Within the scope of this study, only the positive parental behavior subscale was selected. This scale is defined as “showing interest and giving positive attention to the child,” which resembles most closely our definition of parental support. In the present study, the internal consistency of this scale is .86.

### Anthropometric and Demographic Measures

During the home visits, following standardized instructions, the observer measured the height and the weight of both parents and the target child. Participants were dressed in light clothing and measured without shoes. The BMI for the adults ( $\text{weight}/\text{height}^2$ ) and the adjusted BMI for the children ( $\text{Actual BMI}/\text{Percentile 50 of BMI for age and gender} \times 100$ ) were used in the analyses. Children's overweight status was identified in relation to the European BMI values for 0- to 21-year olds (Frederiks, van Buuren, Wit, & Verloove-Vanhorick, 2002). In addition, to compare the degree of overweight of the present European sample with that of US studies on overweight, BMI percentiles and BMI  $z$ -scores were calculated using a program provided by the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention, 2000b). The calculated scores correspond to the percentiles on the 2000 CDC growth charts (Centers for Disease Control and Prevention, 2000a). The CDC has defined the following cutoff points: children below the 85th percentile are normal weight children, children from the 85th to 95th percentile are children at risk for overweight, and children at or above the 95th percentile are children with overweight. In the overweight group of the present study, 26% of the children were at risk for overweight, while 74% of the children had overweight. The familial socioeconomic situation was calculated using the Hollingshead Index of Social Position (ISP), based on parents' education and occupation. This index results in an ISP total score that can be converted to five social position indexes (Hollingshead, 1975). In the present study, we solely included the father's education and occupation.

## Results

### Sample Description

The child and family characteristics of the sample are summarized in Table I. In the overweight group, 32% was male and the mean age was 10.40 ( $SD = 1.75$ ), while in the control group 54% was male and the mean age was 9.75 ( $SD = 1.40$ ). Analyses showed no

significant gender and age differences between the two groups.

The mean adjusted BMI of the overweight group was 156.76% ( $SD = 23.25$ ) and ranged from 120.37 to 206.61% (CDC BMI  $z$ -scores range from 0.95 to 2.47). The mean adjusted BMI of the normal weight group was 95.84% ( $SD = 9.41$ ) and ranged from 79.49 to 119.27% (CDC BMI  $z$ -scores range from  $-3.32$  to 0.89). With regard to the adjusted BMI of the children, both groups do differ,  $t(34) = -12.65$ ,  $p < .001$ .

Mothers of the overweight group had a mean BMI of 26.28 ( $SD = 7.19$ ) which differs significantly from the control group, 22.34 ( $SD = 2.73$ );  $t(33) = -2.71$ ,  $p < .01$ . The ISP total index did not vary between groups. In the overweight group, a total ISP score of 45.75 ( $SD = 12.60$ ) was found, whereas in the control group it was 41.18 ( $SD = 10.97$ ). To avoid cells with expected frequencies less than five, we recoded the five social position indexes into three social classes (upper, upper middle into “high,” middle into “middle,” and lower middle and lower into “low”). Chi-square analysis showed no significant differences between the two groups,  $\chi^2(1, N = 56) = 3.58$ ,  $p > .05$ ). The middle class was most present, 55.40% of the total group. A total of 8.90% of the 56 families belonged to “high” and 35.70% to “low” classes. In both groups, 14.29% of mothers were housewives. Furthermore, in both groups, a comparable number of families were divorced, 10.70% of the control group and 14.30% of the overweight group.

### Parental Control Within Families of Children with and without Overweight

A MANCOVA was conducted on two subscales of the CFQ with two between-subject factors: group (overweight group vs. control group) and gender, while controlling for maternal BMI and the familial socioeconomic position (ISP total score). The results indicated a multivariate main effect for group,  $F(2, 48) = 4.85$ ,  $p < .01$ . The univariate  $F$  tests revealed significant results for “Restriction”  $F(1, 49) = 5.48$ ,  $p < .05$  and “Monitoring”  $F(1, 49) = 6.62$ ,  $p < .05$ . Parents of children with overweight report more restriction and monitoring of the food habits of their children (see also Table III). Neither a significant multivariate main gender effect nor an interaction effect was revealed. Furthermore, there were no significant effects of the potential covariates, indicating that the effects cannot be accounted for by maternal BMI and familial socioeconomic position.

A chi-square analysis on the general rating of “BC” as measured with the MICS revealed a significant difference between the two groups on adaptive and maladaptive

**Table III.** Mean and Standard Deviations for the Overweight and the Control Group on CFQ, GPBS, and MICS

	Overweight group <i>M (SD)</i>	Control group <i>M (SD)</i>	<i>(df1, df2)</i>	<i>F</i>
CFQ				
Restrictions	27.19 (3.31)	24.11 (4.79)	(1, 49)	5.48*
Monitoring	12.22 (2.42)	10.71 (2.80)	(1, 49)	6.62*
GPBS				
Positive involvement	38.22 (4.90)	36.54 (5.14)	(1, 49)	.35
MICS				
General rating "BC"				
Permissive (1–2) (%)	46.40	25.00		
Authoritative (3–5) (%)	46.40	71.40		
Authoritarian (6–7) (%)	7.10	3.60		
General rating "IV"				
Low (1–2) (%)	11.10	44.40		
Medium (3–4) (%)	63.00	48.10		
High (5–7) (%)	25.90	7.40		
Mealtime observation items				
"BC" subscale score	9.70 (1.66)	10.14 (1.88)	(1, 49)	.74
"IV" subscale score	14.38 (3.75)	17.30 (3.78)	(1, 47)	8.15**

CFQ, Child Feeding Questionnaire; GPBS, Ghent Parental Behavior Scale; MICS, Mealtime Interaction Coding System; BC, behavior control; IV, interpersonal involvement;

\* $p < .05$ . \*\* $p < .01$ .

parenting styles,  $\chi^2(1, N = 56) = .06, p = .05$ . A cross-tab indicated that maladaptive control behavior was more frequent in the overweight group than in the control group (54 vs. 29%, respectively). Further analysis showed that in the overweight group the permissive and the authoritative styles were equally present (46%), while the authoritarian style was least observed (7%). In the control families, the authoritative style was most prevalent (71%), the permissive style was observed in 25% of the families, and the authoritarian style in 4% (see Table III).

An ANCOVA with two between-subject factors, group and gender, was conducted on the 4-item subscale score of the factor representing "BC" scale, while controlling for maternal BMI and the familial socioeconomic position. No significant main effect for group was found. A significant gender difference did appear,  $F(1, 49) = 11.50, p < .001$ . Parents of girls exerted less "BC" at mealtimes ( $M = 9.25; SD = 1.53$ ) compared with parents of boys ( $M = 10.79, SD = 1.72$ ).

### **Parental Support within Families of Children with and without Overweight**

An ANCOVA was conducted on the "Positive Involvement" subscale of the GPBS with group and gender as between-subject factors, while controlling for maternal BMI and familial socioeconomic position (ISP-total score). Results indicated no significant main effects of

the two between-subject factors on positive parental involvement. Furthermore, no significant interaction was found, and no significant effects of the covariates were revealed. Parents of children with and without overweight both report comparable scores on positive involvement toward their children.

An ordinal regression procedure or Polytomous Universal Model (PLUM), also called proportional odds model, was conducted with the general rating of "IV" as dependent variable and group, child's gender, maternal BMI, and familial socioeconomic position as predictor variables. Maternal BMI, gender, and familial socioeconomic position showed no relationships with the ranking of "IV." However, the coefficient for the normal weight group is positive and significant, which means it is associated with higher rankings of IV. The ratio of the odds for low-to-high scores is  $\exp(1.604) = 4.97, p < .01$ .

When entering the 7-item subscale score of the factor representing "IV" in an ANCOVA with two between-subjects factors (group and gender) while controlling for maternal BMI and familial socioeconomic position, a significant group difference appears,  $F(1, 47) = 8.15, p < .01$ . Table III summarizes the means and standard deviations on the GPBS subscales and Mealtime Observation subscale scores for the overweight and the control group. The analyses on the general rating of "IV" as well as on the 7-item subscale score both evidence that



parents of children with overweight provide less parental support for their children as observed at mealtimes.

## Discussion

To our knowledge, this study is the first to include both self-reported measures of parental feeding strategies and observations during actual meal situations. The study aimed at resolving existing inconsistencies in research on feeding strategies of parents of children with and without overweight. We focused on two major parental strategies, namely, parental control and parental support and hypothesized that families with overweight children would be characterized by more maladaptive control strategies and a less-supportive social-affective eating environment.

Based on the CFQ, mothers of children with weight problems reported more restrictive strategies. These findings are consistent with the studies of Birch and colleagues, reporting significant associations between maternal restrictive strategies and increased child BMI. However, based on observations at mealtime another pattern emerges, pointing toward a higher prevalence of maladaptive control strategies within the overweight families (54% in the overweight families vs. 29% in the control families). Among the maladaptive control strategies, the permissive feeding style was most prevalent in families with overweight children. This result corroborates the work of the opponents of the overcontrol hypothesis and stresses the lack of parental control over children's nutrition in almost half of the sample overweight families. However, analyses on the observed 4-item subscale score representing "BC" could not confirm this finding. Nevertheless, we obtained a main effect of gender on the subscale score, indicating that parents of boys exert more "BC" at mealtimes than parents of girls. This finding is in contrast with several large-scale studies reporting associations between feeding restrictions and child's eating especially in mother-daughter relations (e.g., Fisher & Birch, 2002). However, next to feeding restriction, the 4 items of the factor representing "BC" also tap general table manners (item BC2: mother guards good manners). This could offer a possible explanation for the higher "BC" subscale score for parents of boys in the present study.

Furthermore, in comparing the parental support in both groups, differences emerge according to the method used. On the basis of the GPBS scores, parents of children with overweight report the same amount of positive parental involvement toward the children as parents of children with normal weight. Compared with

a normal group of 600 families (Van Leeuwen, 2000), both groups obtain average scores. On the contrary, observations revealed significant lower scores for the general rating and the additional 7-item subscale score of the factor "IV" for the overweight families. These latter results are in line with previous quantitative studies (Birch et al., 1981; Kinston et al., 1988; Lissau & Sorensen, 1994).

How can these differences between self-reports and observations be interpreted? Perhaps, previous studies were biased because they relied on retrospective reports on feeding strategies, whereas observations are less susceptible to bias because they rate ongoing moment-to-moment behavior (e.g., Patterson & Forgatch, 1995). The observed differences can also be due to social desirability. Parents of children with weight problems could be more inclined to report on how they think their children ought to behave, while observations of their actual behavior reveal converse reactions (Eddy, Dishion, & Stoolmiller, 1998). Otherwise, parents may be genuinely convinced that they adequately control children's food intake and are sufficiently positive involved, while observations indicate that they fail to control food intake and lack positive involvement. Although the multi-method design is a strength of this study, the inconsistent results might also be attributable to the use of different measures of parental behavior. Especially for parental support, the observation focused on the presence of parental involvement at mealtime, while the questionnaire measures parental involvement in general parenting situations. Also, it cannot be excluded that behavioral patterns emerged as part of the family's reaction to the presence of the observer (Gardner, 2000), although we familiarized the family with the recording procedures and conducted a reliability check. Finally, as the observers were not blind to which group any family belonged to, it could be argued that preconceptions about the overweight families have biased the observers. However, several precautions were taken to minimize the presence of observer bias. The coders had no theoretical background on the specific topic and were consequently totally blind to the direction of the hypotheses. Furthermore, several reliability checks were sufficiently high evidencing that the different observers assessed similar patterns of parental behavior. In all cases, both methods provide complementary information on how parents cope with the weight problems of their children and revealed differences in parental perception of feeding and actual mealtime behavior.

This study has some limitations. Collecting, coding, and interpreting observational data are ambitious,

time-consuming, and expensive endeavors that restrict sample size and hence lower stability of measurement and power of statistical tests (Stoolmiller, Eddy, & Reid, 2000). Although we evaluated reliability and validity issues, additional information on the psychometric qualities of the measures based on a different and larger sample is required. Secondly, we aimed to broaden the concept of parental control by focusing on authoritative feeding. Exploratory factor analysis, however, did not reveal a separate factor representing this feeding style. Items that referred to authoritative feeding often loaded on "BC" as well as on "IV." It is reasonable to assume that parental "IV" and authoritative parenting have common grounds. Moreover, the "BC" factor was represented by too few items, contributing to the low internal consistency of this factor and lowering the likelihood to detect differences between parents of children with and without overweight. New instruments refining this concept are warranted, especially in the light of the surging worldwide concern about childhood overweight and its prevention. Thirdly, weight group comparisons are based on cutoff values that classify subjects into a normal weight and an overweight group. Although we used the widely accepted cutoff for overweight (Troiano & Flegal, 1998), we acknowledge the arbitrary nature of cutoff points. For that reason, we repeated the analyses with adjusted BMI of children as continuous variable. This additional analysis revealed similar results and in particular a similar number of significant effects. Also, generalizability of the results is limited by the use of a sample consisting only of children with overweight seeking treatment. Given that previous research highlights that this group reports more psychological distress (Braet et al., 1997), our results should not be generalized to the general pediatric overweight population. It would be interesting to examine parental feeding strategies during actual meal situations in a more representative sample of youngsters with overweight via a population-based study. Finally, this research design cannot address direction of causality for the observed associations. Consequently, we are unable to conclude whether parental feeding style causes child overweight or vice versa that overweight children elicit a particular feeding style based on the parents' concern about their children's size.

The preliminary nature of this work necessitates a cautionary approach to the formulation of sensible implications. Both points of views (over vs. under control and over vs. under support) certainly offer some guidelines for coping with families with overweight. Nutritional advice to parents of children with weight

problems should be directed to what parents can do, instead of proclaiming what they should not do. Like Patrick et al. (2005), we acknowledge the benefits of an authoritative feeding style, appropriately assigning responsibilities regarding food intake to parents and children. Satter (1987) actualizes this style as follows: Parents take responsibility for the timing and for the type of food offered, while children are responsible for the amount of food eaten. In addition, professionals screening parental skills should take into account that (retrospective) parental reports on feeding behavior do not necessarily match with observed parental behavior. In this respect, family-based treatment programs could benefit from including more discussion on the adequate amount of parental control, the level of required support, and satisfactory guidelines promoting personal choice as well as shared responsibilities.

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