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## Short communication

## Perceived parental food controlling practices are related to obesogenic or leptogenic child life style behaviors

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## ABSTRACT

To better understand whether the parental food controlling practices pressure and restriction to eat are obesity preventing or obesity promoting, this study examined whether these parenting practices are related to other (food or non-food) areas that are generally regarded as obesogenic or leptogenic. Are these foods controlling practices more indicative of obesogenic or leptogenic child life style behaviors? In a sample of 7–12-year-old boys and girls ( $n = 943$ ) the perceived parental food controlling practices were related to various measures for unhealthy life style. Using factor analysis we assessed whether there is a constellation of lifestyle behaviors that is potentially obesogenic or leptogenic. Remarkably, perceived parental restriction and pressure loaded on two different factors. Perceived parental restriction to eat had a negative loading on a factor that further comprised potential obesogenic child life style behaviors, such as snacking (positive loading), time spend with screen media (television or computer) (positive loadings) and frequency of fruit consumption (negative loading). Perceived parental pressure to eat had a positive loading on a factor that further comprised potential leptogenic life style behaviors such as frequency of eating a breakfast meal and sporting (positive loadings). It is concluded that low perceived parental restriction in regard to food may perhaps be a sign of more uninvolved 'neglecting' or indulgent parenting/obesogenic home environment, whereas high perceived parental pressure to eat may be sign of a more 'concerned' leptogenic parenting/home environment, though more research into style of parenting is needed.

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Obesity has a substantial genetic component, but its increasing prevalence, also in young children, in a relatively short time must be attributed to environmental and psychological factors, possibly in interaction with metabolic and genetic susceptibilities. The present environment has been designated as obesogenic (Swinburn, Egger, & Raza, 1999), defined as "the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations". The opposite of an obesogenic environment is the "leptogenic" environment (leptos is Greek for thin). In such an environment, healthy food choices are promoted and physical activity is encouraged (Swinburn et al., 1999).

Also the home food environment can be obesogenic or leptogenic. Home food environment may even be one of the most influential environments for the development of eating patterns

and obesity in children (Rosenkranz & Dzewaltowski, 2008). At its micro-level, parents have an important controlling role, for example by providing the emotional context of the parent–child relationship, or whether they are permissive or firm. This may result in permissive (not firm), authoritarian (firm but not warm), or authoritative (firm and warm) parenting styles (Baumrind, 1971). Parents may also exercise control within more specific domains, for example food intake, by exercising pressure or restriction to eat. Both food controlling practices have been characterized as authoritarian, because the attempts to control the child's eating are associated with little regard for the child's own choices and preferences (Patrick, Nicklas, Hughes, & Morales, 2005). An (unintended) side effect of these parental food controlling practices may be that a child's good ability to use its own hunger and satiety cues to initiate and terminate eating is diminished (Carper, Fisher, & Birch, 2000). These practices are therefore considered risk factors for overeating and overweight (Ventura & Birch, 2008), though this has not always been supported in research (Carper et al., 2000, see Fig. 3; Farrow & Blisset, 2008; Kröller & Warschburger, 2008; Van Strien & Bazelier, 2007).

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Aim of the present study is to further research the two parental food controlling practices pressure and restriction as possible risk factors for overweight, this time by determining their relationships with various possible risk factors for overweight, specifically: Snacking, skipping a breakfast meal, low fruit consumption, physical inactivity and much time spend on screen media (television or computer) (Berkey, Rockett, Gillman, Field, & Coditz, 2003; Blass, Anderson, Kirkorian, Pempek, & Koleini, 2006; Hancox, Milne, & Poulton, 2004; Lin & Morrison, 2002; Snoek, Van Strien, Janssens, & Engels, 2007; Wittmeier, Mollard, & Kriellaars, 2008).

Low physical ability and unhealthy eating habits like high snacking, skipping breakfast, and low fruit consumption are considered potentially obesogenic (Snoek et al., 2007), for reason of their possible association with weight gain and overweight. For example, lack of daily breakfast consumption nearly doubled the odds of being overweight among preschoolers (Dubois, Girard, & Potvin Kent, 2006). Spending much time with screen media is considered a risk factor for overweight because of its possible association with reduced physical activity and increased intake of energy (Hancox et al., 2004).

We have two research questions. Firstly: are the parental food controlling practices pressure and restriction to eat associated with other (food or non-food) areas, such as eating a breakfast meal or use of screen media? Secondly, are the two different ways of parenting more indicative of obesogenic or leptogenic child life style behaviors?

We studied these questions in 7–12-year-old primary school children, because in the Netherlands parents are (held) responsible for their child's behavior for the whole period that the child attends primary school. Furthermore, the parental food controlling practices were studied as perceived by the child, because in the study of Carper et al. (2000) parental reports of control only showed weak to no relationships with the child's reports of parental control, and only the child's reports predicted dietary restraint or overeating tendencies.

## Method

### Participants

The participants were 943 children (469 boys and 474 girls) from six primary schools in the eastern part of the Netherlands. Their ages ranged between 7 ( $n = 82$ ) and 12 years ( $n = 100$ ), and their mean age was 9.5 ( $SD = 1.5$ ). BMI (body mass index (height/weight  $\times$  weight)) was calculated based on measured height and weight. Weight was measured in light clothing and without shoes to the nearest of 0.1 kg. Height was also measured according to standard procedures (without shoes and hair decorations), to the nearest of 0.5 cm. To determine whether a child was overweight or obese we used international cut-off scores (Cole, Bellizzi, Flegal, & Dietz, 2000). These cut-off points are age and sex specific and based on curves that reach BMI scores of 25 and 30 at the age of 18. Scores higher than the first curve (BMI at age 18 = 25) were considered overweight; this also includes obesity. Scores higher than the second curve (BMI at age 18 = 30) were considered obese. A total of 79.8% of the children had a normal weight status and 14.6% children were overweight or obese. We also determined underweight by using cut-off scores of the Dutch Centre for Nutrition (Voedingscentrum, 2008), and 5.6% of the children had underweight. So there were four BMI-levels, ranging from underweight to obese.

### Procedure

Parental consent was acquired from the parents for all the children. The questionnaires were handed out under supervision of

a teacher from the school and a researcher. The children had the possibility to ask questions to the researcher, to ensure that all the items were understood correctly. In the classes with children with age of 7, the investigator read the questions to the children and gave examples when necessary.

### Materials

Maternal control of food intake from the child's perspective was measured with the children's version of the child feeding questionnaire (KCFQ, as modified by Van Strien & Bazelier, 2007, p. 620). The items had a three choice response format of no (1), sometimes (2) and yes (3). An example of an item on pressure to eat is: 'Does your mummy make you eat all the food on your plate?' An example of an item on restriction to eat is: 'Does your mommy ever let you have snacks?' (reverse scored). The internal consistency for the subscales 'pressure to eat' (eight items) and 'restriction to eat' (five items) in the present study was .66 and .61, respectively. So the scales have adequate reliability for assessment of associations with other variables.

In addition, questions were asked about health related life style. Specifically, in single items we asked the frequency of consumption of (a) fruit (response categories: never (1), sometimes (2), every day (3)), (b) eating a breakfast meal and (c) consumption of sweet and/or savoury snacks per week (response categories: never (1), 1 day a week (2), 2 days a week up to every day (8)), (d) the consumption of sweet and/or savoury snacks per day (response categories: never (1), one piece a day (2), two pieces a day (3) up to five pieces or more a day (6)), (e) sporting (times a week), (f) time spend on watching television (including video or DVD) and (g) time spend on the computer (response categories: <30 min (1); 30 min–1 h (2); 1–2 h (3); 2–3 h (4); >3 h (5)).

Self-reported television viewing (TVV) has been used in most non-experimental studies on TVV (Hancox et al., 2004), and also most of the other single items to measure child behaviors have been used before (see for example Snoek, Van Strien, Janssens, & Engels, 2006; Van Strien & Oosterveld, 2008). In the study by Van Strien & Oosterveld, snacking, eating breakfast, sporting and use of screen media (TV; computer) showed, for example, adequate convergent and discriminative validity for dietary restraint and overeating tendencies.

Responses on the two questions on snacking were combined (snack days per week  $\times$  amount of snacks per day) into the new variable 'snacking'. Snacking measures the total amount of snacks the child usually ate per week.

## Results

The amount of snacks the children ate per week ranged between 0 (2.4%) and 35 (3.4%) with a mean of 9.2 ( $SD = 8.4$ ). A total of 85% of the children ate breakfast on a daily basis, but 9.5% ate breakfast only three times a week or less. As much as 67% of the children reported to eat fruit on a daily basis, and only 1% of the children reported to never eat a piece of fruit. The mean times a week of sporting was 2.5 ( $SD = 1.8$ ), but 11% of the children reported to spend no time at sporting at all. As much as 17% of the children reported to watch television more than 2 h a day and a similar percentage of the children (15%) reported to spend more than 2 h a day on the computer.

Table 1 shows the Pearson correlation coefficients of the variables in our study. Most notable were the significant negative relationships of perceived maternal restriction to eat with snacking, time spend on the computer and with watching television. Further, the significant positive relationship of snacking with time spend on the computer and with watching television should be notified, and also the significant relationship between

**Table 1**  
Pearson correlation coefficients of the variables.

Variable	1	2	3	4	5	6	7	8
1. Restriction								
2. Pressure	.13*							
3. Snacking	-.28*	-.02						
4. Breakfast	.07*	.05	.03					
5. Fruit consumption	.09*	.00	-.19*	.10*				
6. Sporting	.04	.00	-.06*	.09*	.08*			
7. Computer	-.26*	-.08*	.29*	-.09*	-.09*	.02		
8. Television	-.21*	.01	.20*	-.08*	-.05	-.04	.34*	
9. BMI-level	.08*	-.10*	-.09*	-.05	.06*	-.03	-.01	-.02

\* <0.05.

time spend on the computer and time spend on watching television.

Treating each of the child behaviors as scale, we assessed by means of secondary factor analysis (this is factor analysis on the level of scales) whether there is a constellation of life style behaviors that is potentially obesogenic or leptogenic. KMO (Keiser–Meyer–Olkin–Measure of Sampling Adequacy) was 0.65, suggesting that the data were amenable of factor analysis. The factor analysis was performed by means of a principal component method of extraction. The scree-test suggested a two-factor solution to best fit the data and as the two factors correlated only  $-.15$ , it was decided to use varimax rotation.

The two-factor solution accounted for 34.07% of the variance. Factor 1 had an eigenvalue of 1.90 and accounted for 20.93% of the variance; factor 2 had an eigenvalue of 1.17 and accounted for 13.13% of the variance. Loadings of the variables on the factors are shown in Table 2.

Remarkably, perceived parental restriction and pressure loaded on two different factors. Perceived parental restriction to eat had a negative loading on the first factor that further comprised the following items (ordered by the size of their factor loading): daily time spend on the computer, amount of snacking per day per week, daily time spend on television viewing and weekly consumption of fruit (negative loading). We deduced this factor to point at potentially obesogenic child life style behaviors. Perceived parental pressure to eat had a positive loading on the second factor that further comprised the following items (ordered by size of their loading): BMI-level (negative loading), weekly consumption of a breakfast meal, and weekly time spend on doing sports (positive loading). We deduced this factor to point at potentially leptogenic child life style behaviors.

## Discussion

At present it is unclear whether the two parental food controlling practices pressure and restriction to eat are more

**Table 2**  
Factor loadings<sup>a</sup>.

Factor loadings	Factors	
	Obesogenic life style behaviors	Leptogenic life style behaviors
Computer	.685	
Snacking	.677	
Restriction	-.629	
Television	.603	
Fruit consumption	-.343	
BMI-level		-.626
Pressure		.563
Breakfast		.551
Sporting		.350

<sup>a</sup> Only loadings >.30 are reported.

obesogenic or leptogenic. This study, by assessing their possible associations with various (food and non-food) life style factors, attempted to resolve this issue. We reasoned that associations of parental food controlling practices with life style factors regarded as risk factor for overweight would suggest the parental practice to be potentially obesogenic, whereas associations with life style factors regarded as protective factors for overweight would suggest the parental practice to be potentially leptogenic. The results of this study suggest that parental food controlling practices may indeed be related to potentially obesogenic or leptogenic child lifestyle behaviors, though particularly low perceived parental restriction to eat may be associated with a potentially obesogenic life style.

As expected, perceived parental restriction and parental pressure to eat loaded on two different factors. Inspection of the first factor with parental restriction to eat remarkably revealed that low perceived parental restriction to eat was associated with a constellation of life style factors generally regarded as obesogenic: high snacking, low fruit consumption and high use of screen media. We do not know whether this constellation of behaviors reflects uninvolved parenting (parental neglect: few demands and low levels of responsiveness to the child) or indulgent parenting (few demands, but high levels of responsiveness to the child). The present data suggest that low degrees of parental restriction to eat may be a possible sign of other potentially obesogenic child life style behaviors, perhaps as a result of a more general obesogenic parenting style and/or obesogenic home environment.

In contrast, high perceived parental pressure to eat was negatively associated with level of overweight and positively associated with frequency of eating breakfast and sporting. More parental pressure to eat with lighter children is consistent with results of other studies (Brann & Skinner, 2005; Francis, Hofer, & Birch, 2001), and may reflect parental concern that their child has underweight. Higher frequency of eating a breakfast meal and sporting are regarded as life style factors that protect against weight gain and overweight. So, it seems that high degrees of perceived parental pressure to eat may be possible signs of other potentially leptogenic child life style behaviors, perhaps as a result of a more general leptosomic parenting style and/or home environment.

It should be noted that in the present study snacking and time spend on the television and/or on the computer were not associated with BMI or overweight level. Nevertheless one may expect that, when the high snacking and/or high use of screen media continues, overweight may ultimately develop. It should further be noted that the present results do not warrant any conclusions regarding the effects of high parental pressure or restriction to eat in the long run. But parental feeding styles are regarded as problematic because they may impede the development of self-regulation (Costanzo & Woody, 1985). Restricting access to palatable foods was indeed shown to actually promote consumption of restricted foods (Fisher & Birch, 1999a,b; Fisher & Birch, 2000). However, most research on parental feeding to date has focused on authoritarian feeding styles, that is where there is little regard for the child's own choices and preferences. It has been suggested (Patrick et al., 2005) that a good balance between authoritative and permissive feeding may be authoritative feeding. Like authoritarian parenting also authoritative parenting seeks compliance of a child with requests of the caregiver, only the style of parenting and emotional context differs. Instead of forcing or bribing the child, a caregiver tries to reason with the child and to explain why compliance may be important. The KFCQ, the measure for perceived parental restriction or pressure to eat that we used in the present study, primarily measures authoritarian feeding. So, it was not possible to assess the benefits of authoritative feeding, and also not whether the present outcome regarding low restrictions

are to be attributed to indulgence or uninvolved. For the future it would be of interest to replicate the present study using the CFSQ (Caregiver Feeding Style Questionnaire; Hughes, Power, Fisher, Mueller, & Nicklas, 2005), a measure that additionally assesses authoritative, indulgent and uninvolved feeding styles.

There are a number of limitations to this study. Acquiescence and social desirability may have influenced the results, particularly so for the young and/or overweight children. A further limitation is that the data are cross-sectional, while longitudinal data are necessary to generate conclusions about the direction of associations. One of the stronger points of the study is the large sample of young boys and girls, and also that body weight and height were measured, and not self-reported.

In conclusion, low perceived parental restriction may be obesogenic as result of its association with life style factors that may promote overweight, perhaps as result of permissive 'neglecting' or indulgent parenting. High perceived parental pressure to eat may be a sign of a more 'concerned' leptogenic home environment, for reason of its association with life style factors that may protect against overweight. However, more research into style of parenting is needed, whether a caregiver seeks compliance though authoritative versus authoritarian parenting.

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