

Childhood overweight dependence on mother-child relationship

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Abstract

The causes of childhood overweight are numerous and inter-related. The mother-child relationship is of great significance for the child's health. Previous studies have found patterns of dysfunctional interaction in families with obese children. Therefore, development of childhood overweight could be due to the mother-child relationship. The aim of this study was to investigate how, and to what degree, the mother-child relationship, assessed by the mothers, was related to overweight among children aged seven to nine years. The study was a cross sectional case-controlled one. It included 111 overweight and 149 non-overweight seven to nine year old children and their mothers. Weight status was determined according to the International Obesity Task Force reference for children Body Mass Index, age and gender adjusted. An interviewer-administered questionnaire was used to categorize the mother-child relationship as: complementary, asymmetrical, symmetrical or symbiotic prototypes. There was no difference in mother-child relationships – characterized by the prototypes – between the overweight and non-overweight mother-child pairs. Therefore, we conclude that the mother-child relationship has no bearing on the child's weight status according to the prototypes. It is suggested that it is more the culture, or the universal phenomenon of expressing love through food, than the mother-child relationship, which influences the development of childhood overweight, or that the mothers are not capable of assess the true attachment style between themselves and their children.

Introduction

The trend of overweight and obesity is particularly alarming in children and adolescents

and is a worldwide public health concern.¹ Being overweight in childhood have numerous and inter-related causes,² e.g. have studies found poor quality of the early maternal-child relationship to be associated with higher prevalence of adolescent obesity.^{2,3} Thus, the social-emotional climate in the homes of children and young people matters as attachment and bonding in families have been shown to decrease children's episodes of overeating.⁴ Attachment security reflects the development of children's emotion regulation and stress response, where children are less likely to avoid conversing about negative feelings when they are in secure attachment and when mothers acknowledge the perspective of the child.⁵ However, characteristic dysfunctional pattern of interaction are found in families with obese children.^{4,6} For instance, children with difficult temperament and insensitive mothers were found to have significantly higher risk of being overweight or obese during school age,⁷ as well as children in families with mealtime challenges, maternal distress and family conflicts.⁸ Among infants and toddlers, parents may over-fee difficult children in a misunderstanding of being good parents and in an effort to calm or reduce the children emotional intensity.⁹ Therefore, the mother-child relationship is of great significance for the child's health, since one ... *does not have relations but is in one's relations, in the sense that the relations decide what situations we must and can find ourselves in.*¹⁰ For the child, the mother is a significant other, and the basic conditions for the mother-child relationship are mutual trust and love, where the child's understanding of individual processes, such as reflection, feelings and values are fundamental.

This relationship has the greatest influence on the child's self-confidence and it is essential to the way in which the mother acts, supports the child's needs, organizes the surroundings for the child's development, and how she herself interacts,¹⁰ and is ultimately essential to the child's competence to engage in relationships with other people.^{11,12} The intellectual and emotional bonds are crucial to the quality and character of the relationship between mother and child. In the same way that different people find a particular significance in the relationships they engage in, this one gets its special meaning from the context within which it unfolds. The context determines the opportunities and limitations of the relationship, based on its character and the quality of the conditions that the context sets for its development.¹⁰ Therefore, development of childhood overweight may be due to the mother-child relationship.

Theoretical framework for mother-child relationship

Based on Bowlby and Ainsworth's theory and

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Key words: childhood overweight, attachment, bonding, mother-child relationship, children.

Acknowledgements: the authors would thank: the children and mothers who participated in the study; project nurse Karina Larsen for data collection and keying data; psychologist Flemming Andersen for use of model and illustration (Figure 1) and for inspiring, critical and fruitful collaboration in developing questions, categorization and analysing data. We also thank for help with face and content validity: psychologist Helle Grønbaek, communications expert Inger Dahl; paediatrician, MD, Birgit Peitersen and research leader, Professor MD Thorkild IA Sørensen. We also thank psychologist Arendse Marie Biering for critical revisions to the manuscript.

Contributions: AB was responsible for the design, data collection, data analysis and the drafting of the manuscript; LW and IP supervised the design and data analysis and made critical revisions to the manuscript.

Conflict of interests: the authors declare no potential conflict of interests.

Funding: Lundbeck Foundation/UCSF, Åse & Ejnar Danielsens Foundation, Nurses Research Foundation, Hvidovre Hospital Research Foundation, Rosalie Petersens Foundation, Beckett-Foundation, King Christian X Foundation, Else Poulsens Memorial Award.

Received for publication: 18 April 2013.

Accepted for publication: 19 April 2013.

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Health Psychology Research 2014; 2:1583

empiricism on relationships, bonding and attachment the Danish psychologist Flemming Andersen describes relationships and communication in four distinct ways as prototypes.¹³⁻¹⁶ They influence the child's way of being seen, treated and developed, in relation to self-confidence, self-determination, behavior and lifestyle. The four prototype relations are: the asymmetric, the symmetric, the symbiotic and the complementary (Figure 1).¹⁰ *The asymmetrical*, or the power-twisted, relationship is characterized by a strong dependency and is without equality; in practice the mother decides what

the child should think and do. There will be a battle for power with a perpetual series of arguments (attempts at emancipation) and reconciliation (the reconfirmation of dependency). *The symmetrical*, or the parallel, relationship is characterized by an insufficient, mutual but dependent relation between mother and child, marked by ambivalence. *The symbiotic*, or the confluent, relationship is characterized by the two parties having difficulty understanding that they each have a particular position in the relationship (diffusion); this results in a confusion of needs, roles and responsibilities. *The complementary*, or mutually acknowledging, relationship is characterized by the presence of both dialectical communication and mutual recognition of each individual's identity, integrity and freedom. This relationship is the optimal one, and is deemed the most appropriate for the child's development and behavior.^{10,17}

The attachment style is based on regulation. Thus, determines the attachment style the maternal sensitivity in reading the infant's signals and deliver a prompt, adequate and consistent response,^{12,14} i.e. an appropriate management strategy to regulate what she has read. A secure attachment style has its roots in a sensitive mother who has tools to contain and reduce an emotional insensitivity from the child.¹⁴ In contrast if the mother is missing such tools and does not know how to contain the emotional intensity of the child, she could choose to give the child food, since food normally is a successful tool of calming. In this way regulation with food begins in infancy and could continue throughout the childhood. Due to attachment patterns they are stable after the first years foundation and persist throughout life.^{14,18} Mothers' who are capable of secure attachment to their children is characterized by a very nuanced and clarified approach to their own attachment relationships e.g. to their own mothers.¹⁴ According to the theory of relationship and attachment theory, attachment styles are intercultural, meaning that the mothers reactions to the children are predictable regardless of cultural setting.^{12,16} However, the way of interpreting the attachment styles can be different in different cultures. When the mothers pay attention and are able to interpret and handle the children's signals and relevant needs they give the children the best conditions for development of self-confidence, autonomy and the capacity to freely explore and meet the world, in contrast to a dependent child who is not necessarily well bonded.¹⁵ However, this is a Western way of thinking which reflects broadly common Western patterns of relatedness. On the other hand people in almost all parts of the world have transitioned from a traditional way of life to incorporate western culture to some degree.¹⁹ However, Rothbaum *et al.*²⁰ showed that many of the behaviors associated with the different attachment styles have different meanings in

different countries and cultures. For example in a Japanese context an extremely close relationship between mother and child, characterized by absence of boundary (equivalent to Andersen's symbiotic relation, Figure 1), is acknowledged as a sign of maturity, whereas in a Western context it would be considered as pathological and a sign of regression.²⁰ Therefore, different goals and behaviors based on different values and experiences can serve different functions in different cultures, and differently define what an appropriate attachment style is.¹² Furthermore, different parenting values and norms correspond to different behavioral parenting strategies across families and countries.^{12,21} Therefore the different prototype relationships are employed in this study to explore whether there is a link between the form of the mother-child relationship (assessed by the mothers), and whether or not the seven to nine year old child is overweight.

Materials and Methods

Design

The study was a cross sectional case-control one conducted as part of an investigation of mothers' wishes and abilities to counteract overweight among their seven to nine year old children.^{22,23} Mother-child pairs were recruited from The Danish National Birth Cohort (DNBC)²⁴ established when the mothers were pregnant. Initially 101 thousand mothers were included, each having been interviewed five times in the period to the children' seventh birthdays. When recruiting for our study, 2846 fulfilled the following criteria. Inclusion criteria: i) the biological mothers participated in all five interviews in the DNBC, ii) the children were singleton term born during 1999 and 2000, living in Denmark within the Capital Region of Copenhagen, the region of Zealand and Funen, iii) the children were categorized, either as cases or controls, according to World Health Organization and the International Obesity Task Force (IOTF) reference for children Body Mass Index (BMI), age and gender adjusted.²⁵ This was calculated from the children's reported height and weight at the seven-year follow-up. Cases were overweight children with BMI age and gender adjusted, corresponding to adult BMI ≥ 25 and controls were non-overweight

children with BMI age and gender adjusted, corresponding to adult BMI < 25 . Exclusion criteria were: i) children with congenital diseases, malformations, syndromes or chronic diseases; ii) pre-pubescent children with physical signs of puberty,²⁶ and iii) mothers with psychiatric diagnoses. In total 471 mother-child pairs fulfilling the above criteria were invited to participate in the study. They were made up of 241 overweight children and 230 non-overweight children and their mothers. In total 211 of those invited withdrew for reasons reported elsewhere.²³ Thus, the study included 111 overweight and 149 non-overweight children, equivalent to 260 (55%) of the eligible mother-child pairs. The children were measured by the authors at mean age 8.1 years. The participants were categorized as overweight children/mothers of overweight children (MOC) and non-overweight children/mothers of non-overweight children (MNC) regardless of the mothers' weight and BMI.

Ethics

The study received approval from The Danish National Data Protection Agency (ref. no. 2007-41-1435) and The Danish National Birth Cohort (ref. no. 2007-05). Approval from the Danish National Committee on Biomedical Research Ethics was not required under Danish Law because of the non-biomedical character of the study. However, the committee was informed (ref. no. H-D-2007-0015). The study was performed in accordance with the Ethical Guidelines for Nursing Research in the Nordic Countries,²⁷ and the Helsinki Declaration.²⁸ Oral and written informed consent was obtained from all mothers and children.

Methods

Since no existing questionnaire was found to cover appropriately the key aim of the study, an interviewer-administered questionnaire was developed to investigate the themes: mother-child relationship, action competence and health behavior in relation to preventing or combating childhood overweight. We only present the mother-child relationship in this article. To characterize the mother-child relationship, four statements were developed in order to highlight each prototype: complementary, asymmetrical, symmetrical and symbiotic (Figure 1), thus we developed a questionnaire made up of 16 questions²⁹ (Appendix). The

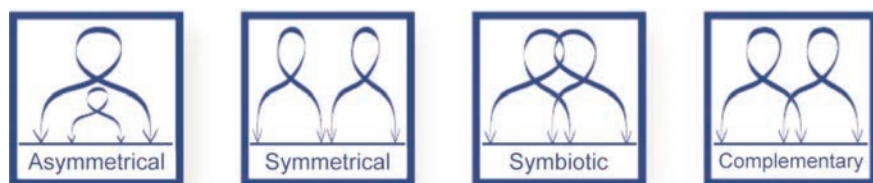


Figure 1. Illustrations of the four prototypes.

chosen statements were developed through close dialogue with psychologist Flemming Andersen the originator of the prototypes. We moved from a conceptual to an operational level, where the variables that would be the subject of analysis were identified and formulated as operational questions.^{30,31} The statements in the questionnaire (Appendix) were randomly arranged and were posed consecutively, with the mothers asked to state whether or not they agreed with each statement.²⁹ In addition, we asked seven questions about mother-child relationships with answer possibilities according to the principle of a Lickert scale *i.e.* with a natural hierarchy. All questions were formulated to be meaningful and relevant to mothers and were posed in everyday language. The questionnaire was evaluated by peers, two psychologists, senior researchers and a communication expert to achieve face and content validity.³¹ The interviewer-administered questionnaire was pre-tested on four mothers, and found valid.

Procedures

The interviewer-administered questionnaire for mothers was performed in most cases while the child played at the other end of the room; it was possible on occasion for the children to hear the questions posed by the researcher and the answers given by the mother. The mothers had a copy of the questionnaire in front of them. The researcher repeated the answers and the mother could see where the researcher noted the answers.

Analysis

The Pearson chi-square test or Fisher's exact test was used to test for differences between the categorical variables. A threshold for statistical significance was set a priori at 0.05 and with 95% confidence intervals. From the questionnaire (Appendix) proxy-variables were created and allocated points: 1 point = completely agree, 2 points = partly agree, 3 points = do not agree. In order to evaluate the character of the relationship, in the subsequent analyses a cut-off point of ≤ 6 points was used for each category. Four mother-child pairs were initially characterized as don't know, but with subsequent researcher triangulation they were re-categorized as diffuse. Control of input errors in the database was applied to a randomly chosen 23% of the mother-child pairs. An input error rate of 0.3% was found. Corrections were made in accordance with the original data. Double data entry was excluded because the input error rate was under 1%. The statistical analyses were performed in SPSS (Statistical Package for the Social Sciences, Inc. Chicago, IL, USA) software version 16.0/17.0.

Results

In both groups MOC and MNC the most common prototypical relationship was the complementary one. In total, 77% of the mother-child pairs showed a uniquely complementary (70%), or a mostly, complementary (7%) relationship (Table 1), both of which are considered the most appropriate form. In all, 7% of the relationships were split between complementary and asymmetrical. The 21 mothers in the category *diffuse* represented approximately 10% of the population.

In the remaining questions we found no significant differences between MOC and MNC answers. Neither did we find differences in who the mothers most hoped the child would take after, in looks and personality, since approximately 80% of each group had never thought about it. In total 71% of both MOC and MNC already felt bonded to their children dur-

ing pregnancy. Similarly, there was no difference in how bonded the mothers felt with their children at the time of the study; 95% MOC and 97% MNC responded that they felt bonded to a high degree. Likewise 77% MOC and 79% MNC considered that at the time of the study their children were most bonded to them as opposed to their fathers or others. The way MOC and MNC felt about having to take care of the children from birth to the present showed no significant difference (Table 2). However, about 20% found it hard or very hard (Table 2). MOC and MNC felt to an equal degree that they were good at interpreting their children's signals and needs (Table 3).

Discussion

In this study, mother-child relationships, characterized by prototypes (Figure 1) showed

Table 1. Results for prototypical mother-child relationships.

Prototype*	Number of mother-child pairs		
	Case (n=111)	Control (n=149)	Total (n=260)
Uniquely complementary (A)	72	111	183 (70%)
Uniquely asymmetric (B)	5	6	11 (4%)
Uniquely symmetric (C)	-	-	-
Uniquely confluent (D)	-	-	-
Split between complementary (A) and asymmetric (B)	10	8	18 (7%)
Split between complementary (A) and symmetric (C)	2	2	4 (2%)
Split between complementary (A) and confluent (D)	2	-	2 (1%)
Mostly complementary (A) - not complementary	8	11	19 (7%)
Mostly asymmetric (B) - not complementary	1	1	2 (1%)
Mostly symmetric (C) - not complementary	-	-	-
Mostly confluent (D) - not complementary	-	-	-
Diffuse (not specific)	11	10	21 (8%)

*See Figure 1 for the illustration of the 4 models.

Table 2. How the mothers felt about having to take care of the children from birth to today.

Feeling	MOC (n=111) (%)	MNC (n=149) (%)	P
Very easy	41 (37)	49 (33)	0.130
Easy	46 (41)	81 (54)	0.130
Hard	22 (20)	18 (12)	0.130
Very hard	2 (2)	1 (1)	0.130

Table 3. The extent to which mothers feel they are good/bad at interpreting their children's signals/needs.

Extent	MOC (n=111) (%)	MNC (n=149) (%)	P
High	71 (64)	98 (66)	0.895
Some	36 (32)	47 (32)	0.895
Less	4 (4)	4 (3)	0.895

no pattern as to whether the children were overweight or not, since there was no significant difference between the two groups (MOC and MNC). The uniquely or mostly complementary relationship, *i.e.* the more equal one, is that where the mother respects the child in the child's space and recognizes the child in relation to its development.^{10,16} This prototype was represented by more than 2/3 of MOC and MNC and their children. This finding is supported by Ainsworth's work,¹⁶ as well as other studies,¹⁵ which also found the complementary relationship to be the most frequent form of association (55-65%). However that is without bearing any relation to the child's weight status. A study of family stress and BMI in young children identified attachment styles, but they did not find an independent association between attachment style and overweight, even though they found a statistically significant association between high scores on Swedish Parenthood Stress Questionnaire (SPSQ) and overweight with an odds ratio of 4.61.³² This could indicate that the inter-familial culture with maternal stress level is more predictive of childhood overweight than attachment styles.

MOC and MNC stated they felt bonded to the child as early as in pregnancy. This was strengthened by time, as seven years later nearly all the mothers felt closely bonded to their children. Interestingly, Andersen and Whitaker in an American population found obesity to be associated with many of the same covariates as insecurely attached children.³ They found children's attachment security at two years of age and the risk of obesity at 4.5 year of age to be 1.3 times higher for the insecurely attached children than for the children with secure attachment.³ Other studies have shown a 75-85% stability in the bonding pattern around one year of age,¹⁵ which underpins the fact that the mothers' bond and relationship with their children is not exclusively an expression of momentary validity but is of manifest character.

The complementary bond was further underpinned in findings from an in-depth interview, where the mothers described a *great togetherness, a very close, good, loving and harmonious relationship* with their children.^{33,34} In contrast, Schwartz and Puhl report that parents' negative attitude to overweight children can mean that they communicate stereotypical expectations about weight to their children at home, which affects the children's self-esteem and may contribute to stigmatization.³⁵ However, the MOC and MNC with a uniquely complementary mother-child relation generally have a dialogue-based method of bringing up their children. This is in accordance with the convention on children's rights, where the children have the right to influence over their own lives and learning.³⁶ Since the relation-

ships are laid down early and are characterized by the context,¹⁵ and since we *are* our relations in life, relationships with other people are the most significant factor in a person's life and consciousness,¹⁰ regardless of development phase or age. In contrast to that, our findings regarding the overall mother-child relation show no distinction between MOC and MNC and their children, Trombini *et al.*³⁷ from Germany found a significant difference in the insecure attachment style of mothers of obese children compared to mothers of non-overweight children. Additionally, Pott and colleagues from Italy,³⁸ showed that overweight children with an avoidant attachment attitude, should be provided with special support intervention. Furthermore two studies by Lissau and Sørensen,³⁹ and Whitaker *et al.*⁴⁰ found an increased risk of childhood overweight when the parents themselves or teachers reported neglectful behavior in the parents. There are no findings in our study that would suggest bonding problems for the overweight children or that they were neglected. However, our findings do suggest that the mother-child relationship, categorized according to Andersen's prototypes, does not influence the children's BMI, which points in the same direction as a study by Bennett *et al.*,⁴¹ who find similar BMI in neglected and comparable children of age 7-9. The studies that found an association are either rather old or from other countries, which could suggest that time or culture could influence the outcome.

This is supported by a new study of Kocken *et al.*,⁴² who found ethnic differences between the parental beliefs of prevention and management of their children' overweight to be essential, and they therefore advice future interventions to pay attention to cultural aspects of the targeted group.⁴² So far interventions have mostly focused on what Resnicow *et al.*⁴³ describes as *surface structure* where interventions mostly fit the language and cultural aspect of the target group more than *deep structure* interventions with a psychological and social-cultural approach to childhood overweight.⁴³ Furthermore, future change of population complexity with increase of different ethnic minorities within different countries will endorse multicultural in deep structure focus.¹⁸ When it comes to how the mothers experienced the way they have taken care of their children from birth to now and how they look upon themselves as caregivers no difference were found between MOC and MNC. The finding reflects the mothers' attention, attitude and capacity to read, interpret and act on their children's signals and needs, as essential to the complementary form of association and to the quality of the relationship.¹⁵

This is the Western way of thinking, thus, as mentioned in the theoretical framework section the Japanese approach to mother-child

attachment and family relations could just as well be the best and most desirable practice. However, the Japanese approach to bonding and relationships has no more favorable impact on the childhood overweight problem since the prevalence of overweight and obesity in Japanese children is high,¹ showing increasing trends and tracking effect.^{44,45} On the other hand this bonding approach could also be the reason for a higher prevalence of childhood overweight. Thus, childhood overweight should also have been an issue in Japan before the overweight and obesity epidemic became a worldwide public health concern. In the same way as in Japan, Chinese culture emphasizes interdependence rather than and independence.^{18,46} Even though Hong Kong is a heavily Westernized city food and bonding have a strong place in Chinese culture.⁴⁶ Where expressing love through food is common in parents and grandparents and in all families serving and receiving food bond the giver and receiver in the family context.⁴⁶ In this way relationship is tied to food and is important in families.⁴⁶ Food is not only important in an Asian culture, it is essential for human beings existence and therefore of great significance for people in all cultures worldwide, no matter if the approach for the individual/family are eating for living or living for eating. Despite the mothers expression of being more bonded to their children than their fathers or others and a good relationship between mother and child the underlying attachment style could be of importance. A possibility is, that it is easy for the mothers to feed and over-feed the children,⁹ since feeding it is an extension of the infancy relation with breastfeeding and in many cultures worldwide is the home and food still the woman's domain. Furthermore, when the mothers believe they read their children' signals well without doing it, it could be related to challenges for the mothers in setting limits to the children or being worried that limits might give the children an experience of not being accepted, or feel themselves they are bad parents for not giving their children a good time *e.g.* eating all the food they want.⁴⁷ Finally, bodily unrest in the children, could also be related to feelings that are unconscious, resulting in a feeling of hunger and eating behavior.

If the relationship between the mother-child is not based on a dialectical communication and the mother do not read and adjust the child appropriately, it could be due to transference of an intergenerational attachment style.^{48,49} Where the mother interpret it as normal behavior when using food as regulation based on maternal characteristics, history and experiences and then placing her child at risk for various social, psychological and health problems,⁴⁸ such as overweight. In addition, many mothers do not see their children's over-

weight,^{23,50,51} and this could also be due to regulation difficulties or neglect.³⁹ Neglect is an example of strong defense which is inappropriate and prevent the mothers' reading the child sensitively and regulating the signals relevant. However, the mothers could be sensitive but have difficult children who are specially sensitive themselves or temperamental and therefore specially difficult to down regulate *e.g.* regarding food.^{7,9} Such micro-mechanisms are not investigated in our study.

All this discussed above could suggest that it is more the culture or the universal phenomenon expressing love through food than the mother-child prototype relationship which influences the development of childhood overweight, or that the mothers are not capable of assess the true attachment style between themselves and their children.

Limitations

The results are based on the mothers' perception of their relationship to their children. Maybe this is not a strong enough predictor to determine the actual relationship, if all mothers wish to have and appear to have the best relationship with their children. In this way the mothers' perception of bonding is so strong as to override the problem of overweight. We cannot exclude the possibility that there are emotional relations that the theory and our data collection instruments do not capture and which the mothers are not aware of. If we had used a different theoretical framework from Flemming Andersen's, it is possible that our results would have pointed in another direction. However Andersen's theory is based on Bowlby and Ainsworth's theories on bonding and attachment,^{10,11} which are widely embedded in other theories on relations and are acknowledged worldwide. However, there are some associated uncertainties *e.g.* do they capture the same results when the theories are conceptualized and operationalized? Furthermore, the mothers were interviewed while the children were playing in the other end of the room, therefore it is possible they would only say positive things regarding the child and how they get along together. It could be connected to a taboo and therefore difficult for the mothers to admit that their relation to their children is not perfect. It could be embarrassing for them or they could fear being judged as losers. Thus, a possibility is that the mothers' answers are too positive about their relationship with their children. Such positive answers could be used to position themselves morally as good mothers, as they could assume that their overweight child's body is a highly visible sign of their bad motherhood.⁵² At a time when childhood overweight is often presented as the new scourge of modern civilization parents of overweight children are currently under heavy criticism among the general public, the media and politi-

cians.⁵² In addition, the mothers were selected over seven years, which could indicate that they represented a resource full group with strong mother-child relations. However, 21 (10%) represented a diffuse relation, which is in line with the background population. To improve the reliability of data on whether or not childhood overweight is dependent on the mother-child relationship would require controlled clinical studies based on direct observation of the communication, interactions and attachment between mother and child.⁴ However, carrying out such observation for days at a time is very invasive, especially since families with young children and working parents are already under all kinds of pressure and have little time to spend together. Yet observations for a couple of hours at a time are probably not exhaustive enough to get a more valid outcome.⁵² Hence, it would be interesting, and a possible predictor for the association of mother-child relationship and attachment, to carry out a Strange Situation Test, when the children are ten months old and the Adult Interview when the children are nine years old.¹⁵

Conclusions

The prototype relationship between mother and child was not a significant predictor for whether the children were overweight or not. There was nothing to suggest that the overweight children were neglected or that they had worse relationships with their mothers than the non-overweight ones. The majority of both cases: children/MOC and control children/MNC had a uniquely or mostly complementary association form and relation, which, seen from a Western perspective is considered as the most appropriate mother-child relationship. This type of relationship is commendable and an important foundation for the children's development. Therefore is it important that health professionals (doctors, general practitioners, nurses, health visitors, psychologist and others) continue to pay attention to the mother-child relationship. It is suggested that it is more the culture or the universal phenomenon expressing love through food than the mother-child prototype relation which influences the development of childhood overweight, or that the mothers are not capable of assess the true attachment style between themselves and their children. However more investigation into what leads to overweight are needed. We need more precise concepts and sufficient methods to gain in depth knowledge about mother-child relationships in the context of childhood overweight. More knowledge in this area could lead to completely new possibilities for prevention and treatment of childhood overweight, which is very necessary.

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