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Indulgent Feeding Style and Children's Weight Status in Preschool

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Abstract

Purpose—The primary aim of this study was to examine whether parent affect and child temperament characteristics differ across feeding styles in low-income families, given suggestive evidence. The secondary aim was to examine whether feeding styles were still related to children's body mass index independent of parent affect, child temperament, and known correlates.

Methods—Participants in this study were 718 parents of childrens attending Head Start programs across two sites (Texas and Alabama). Parents were categorized into feeding styles of authoritative (n = 118), authoritarian (n = 219), indulgent (n = 240) and uninvolved (n = 141) using a parent-report questionnaire characterizing feeding in a general parenting paradigm. Parents completed questionnaires and measured height and weight was obtained from parents and children.

Results—Differences were found across feeding styles on parent affect and child temperament characteristics. Indulgent parents reported lower Negative Affect for themselves and lower Negative Affectivity for their children. The indulgent feeding style was significantly associated with higher child body mass index after controlling for parent affect, child temperament, and correlates (ethnicity, child age, parent body mass index).

Conclusions—The results of this study not only show a robust association between the indulgent feeding style and weight status of low-income preschool childrens, but also suggest how congruence between parent emotional affect and child temperament characteristics may contribute to excess consumption among children of indulgent parents.

Index terms

low-income minorities; feeding styles; temperament; preschoolers; weight status

It is well recognized that parenting plays a fundamental role in shaping the trajectory of the behavior and development of children.[1] Parenting style is considered a constellation of parenting behaviors that reflect a certain attitude toward the child and is stable over time.[2] A broad set of literature relates parenting styles to children's behavior and outcomes in cognitive, socio-emotional, and health related areas.[3] Little research has related parenting styles to the weight status of children until recently. A recent study showed an association between

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parenting style and childhood overweight in a predominantly White, middle-class sample.[4] However, it would be premature to apply this finding to other ethnic groups and feeding practices without further investigation. Given the notable ethnic differences in the prevalence of childhood overweight[5] and the emerging appreciation for the association between socioeconomic status and childhood overweight,[6] there is a pressing need to investigate styles of food parenting using culturally relevant measures designed for low-income ethnically diverse populations most at-risk for overweight in childhood.

Little is known about styles of food parenting. Parenting may be domain specific suggesting that parents vary their style due to concerns about specific health issues or food.[7] For example, a parent who perceives a child to have weight problems may exhibit a different style of food parenting for that child compared with other children in the family. Therefore, measuring a style of feeding as opposed to a style of general parenting may be more predictive of weight status in childhood because of the context specific impact of feeding on the eating behavior of children. Measuring feeding styles as opposed to specific feeding practices may give a more complete picture of children's feeding environments.

Although general parenting style has traditionally been conceptualized along 2 dimensions of demandingness and responsiveness[8] (Fig. 1), the feeding literature has focused predominantly on highly demanding/directive food parenting practices (i.e., restriction, monitoring, and pressure to eat).[9] Restriction is the only feeding practice, which has been consistently associated with increased intake of undesired food and higher weight status in children.[10]

To conceptualize parenting in the feeding context, Hughes and colleagues[11] focused on both demandingness and responsiveness to describe a feeding typology similar to general parenting.[8] Demandingness refers to how much the parent encourages eating and responsiveness refers to how the parents encourage eating, that is, in a responsive or nonresponsive way. Parents are assigned to four feeding styles based on the 2 dimensions. Authoritarian type parents encourage eating using highly directive behaviors (i.e., physically struggling with the child, using rewards, and punishments). These parents are highly demanding in their feeding practices but do so in a nonresponsive way with their children (high demandingness, low responsiveness). Authoritative type parents actively encourage eating by using predominantly nondirective and supportive behaviors (i.e., reasoning, complimenting, and allowing choice of appropriate foods). These parents are also demanding in that they actively encourage their children to eat, but do so in a responsive way (high demandingness, high responsiveness). Indulgent type parents make few demands on their children to eat, but the demands they make are nondirective and supportive (low demandingness, high responsiveness). Uninvolved parents also make few demands on their children to eat, but the few requests they make are unsupportive (low demandingness, low responsiveness). The indulgent feeding style has been associated with higher weight status of children with low-income parents.[11] This feeding typology is depicted in Figure 2.

Parent Affect and Child Temperament

Specific parent and child characteristics have been shown to influence both the parenting process and weight status of children. Parent affect has been associated with parent's behavior in an extensive set of literature on parenting[12] and with children's weight status in studies with nonorganic failure to thrive (NOFTT).[13] Parent negative affect, in particular, has been associated with lower weight status in young children.[13] Mothers of NOFTT toddlers were more hostile, intrusive, and less flexible (exhibiting tension and anger in interactions) compared with mothers of NOFTT infants.[13] A recent study also associated parent negative affect (specifically anger) with overweight status in low-income children in a large nationally representative study.[14]

Child temperament also plays a role in the parenting process[15] and has been shown to be associated with externalizing behavior[16] and weight status in children and youth.[17,18] Because children differ in responsiveness to parental socialization strategies and the capacity to control emotional reactivity,[19] children's ability to redirect, reduce, and augment parent's behavior is an important part of the parenting process.[20] Infants with difficult temperaments (i.e., fussy, easily distracted, difficult to soothe) have more rapid weight gain, up to age 3 ½when compared with infants who do not display such patterns.[17,18] Multiple prospective studies have found that attributes in early childhood including withdrawal, low adaptability, high intensity, and negative mood were associated with overweight in later childhood and youth.[21,22] A robust association between childhood emotionality and subsequent risk for overweight in adulthood remains even after controlling for multiple recognized risk factors such as birth weight and parental body mass index (BMI).[22]

Aims and Hypotheses

The primary aim of this study was to examine whether parent affect and child temperament differ across feeding styles in low-income families given the suggestive evidence shown in previous studies. Because parent affect and child temperament play a role in the parenting process, it was expected that differences would be found across the feeding styles. Specific associations were not hypothesized because our conceptualization of feeding styles is relatively new and it was unclear how these variables played a role in feeding.

The secondary aim in this study was to examine whether feeding styles were still related to children's BMI independent of parent affect and child temperament. Based on previous work, it was expected that the indulgent feeding style would be positively associated with child BMI. [11] However, unlike our previous work, the current model examining this relationship also included: (1) parent affect; (2) child temperament; (3) known correlates of child BMI (e.g., ethnicity, parent BMI); and (4) other variables that have been shown to be associated with child BMI (e.g., child gender). By controlling for parent and child characteristics shown to be associated with both parenting and child overweight, we were able to examine the independent association of parental feeding and child overweight.

Based on our conceptualization of feeding styles, indulgent type parents make nondirective and supportive requests for their children to eat; however, they make fewer eating demands on their children compared with other styles of feeding (i.e., authoritarian and authoritative). Because styles of parenting/feeding constitute ways that parents establish and maintain a manageable environment, it is expected that parents who display an indulgent feeding style are trying to control the emotional climate of the dinner meal by being nice. Indulgent parents may be supportive and nondirective when attempting to get their children to eat but do not spend a lot of time at this parenting task. This feeding pattern may result in children's overeating and higher weight status.

METHODS

Participants

Parent–child dyads participating in this study were part of a larger project, designed to investigate the facilitators and barriers to fruit and vegetable intake among preschool children. This study focused specifically on African-American, Hispanic, and White caregivers whose children were enrolled in Head Start facilities in Texas and Alabama. The Head Start program serves children from 3 to 5 years of age and is child-focused with the overall goal of increasing the school readiness of young low-income children. In our study, 718 caregivers of Head Start children completed the parent-report measures. Of these caregivers, 95% were female (92.7% mothers, 6.3% grandmothers, 1% other). The primary caregiver (referred to as parent hereafter)

was defined as the person who was most often responsible for what the Head Start child ate outside of school. All families were eligible for Head Start, which serves a population whose family income is equal to or below the federal poverty level. Characteristics of the sample are provided in Table 1.

Procedures

Parents were recruited at the Head Start centers before and after school. At the time of recruitment, parents were asked if they would like to participate in a study about mealtimes and family food choices. Staff members from our study explained that the purpose of the study was to determine the best way to promote fruit and vegetable intake in Head Start families. Consent forms were signed by the parents and confidentiality was assured. Questionnaire packets containing self-report measures (available in English and Spanish) were given to parents at the Head Start centers. Parents returned the completed packets to the centers in sealed envelopes. Staff members from our study measured heights and weights on the parents and children at the centers. Ninety-five percent of parents (n = 718/758) participating in the larger project completed the questionnaires. Parents received a gift certificate upon completion of the study. All questionnaires in the study were designed to be understood at the literacy of a 5.6 grade level (both English and Spanish). Of the 209 Hispanic participants in the study, 85% completed the questionnaires in Spanish. The study was reviewed and approved by the Institutional Review Boards at Baylor College of Medicine and the University of Alabama at Birmingham.

Measures

Caregiver's Feeding Styles Questionnaire—Consistent with a parenting paradigm based on dimensions of demandingness and responsiveness,[8] the Caregiver's Feeding Styles Questionnaire (CFSQ) measures feeding styles of low-income parents.[11] Compared with other instruments that assess specific feeding practices, this instrument measures the parent's overall feeding pattern by teasing apart the dimensions that underlie parental influence on children's eating. Demandingness and responsiveness dimensions are derived through 7 child-centered and 12 parent-centered feeding directives measured on a 5 point likert scale. Child-centered feeding is defined as directives that promote internalization of parental values (e.g., reasoning, complimenting, and helping the child to eat) whereas parent-centered feeding is defined as directives that promote externalization or control of children's eating through external means (demands, threats, and reward contingencies). A cross classification of high and low scores based on median splits on the 2 dimensions identifies four feeding styles. A more complete discussion of the scoring procedure can be found in a previous study.[11] Coefficient alphas for parent-centered and child-centered items were 0.86 and 0.71 in the original sample and 0.83 and 0.67 in the current sample. Alphas did not vary by site or ethnicity. Convergent validity of the CFSQ has been demonstrated by associations with independent measures of general parenting and authoritarian feeding practices.[11] Differences have been found among the feeding styles on an independent measure of children's BMI.[11] Evidence of test-retest reliability, internal consistency, convergent validity, and predictive validity has been shown with a low-income sample.[11] Confirmatory factor analyses support the factorial invariance of this measure.[23]

The Positive and Negative Affect Schedule—The Positive and Negative Affect Schedule was developed as a brief measure of two broad affect states—positive affect and negative affect.[24] Each dimension is distinct from the other and not generally correlated. Positive Affect (10 items) reflects positive feelings and emotions such as interest, determination, enthusiasm, and pride. Negative Affect (10 items) reflects negative feelings and emotions such as fear, distress, hostility, and shame. By changing the time frame of the questioning, the measure can be used as either a trait (i.e., how you feel over the last month)

or state (i.e., how you feel at this moment). In the current study, the measure was used as a trait. Good internal and test–retest reliability have been shown in large samples.[25] Coefficient alphas for Positive and Negative affect in the current sample were 0.87 and 0.86, respectively. Alphas in the current sample did not vary by site or ethnicity. Construct validity has been demonstrated through correlations with other existing multi-affect measures such as the Profile of Mood States.[25] Convergent and discriminant validity have been supported through multiple studies showing strong self-peer convergence.[26] Each of the 2 scale scores are derived by adding the 10 items scored on a 5-point response scale ranging from 1 to 5 ("very slightly or not at all" to "extremely"). Values for each scale range from 10 (low) to 50 (high).

The Children's Behavior Questionnaire (Very Short Form)—Consistent with the original long form of the children's behavior questionnaire (CBQ),[27] the CBQ very short form assesses child temperament defined as constitutionally based individual differences in reactivity and self-regulation.[28] Constitution is conceptualized as the individual's relatively enduring biological make-up, influenced over time by heredity, maturation, and experience. The CBQ very short form assesses child temperament through 3 scales of Negative Affectivity (NA), Effortful Control (EC), and Extraversion/Surgency (E/S).[28] NA is defined by Sadness, Fear, Anger/Frustration, and Discomfort (long form) and is conceptually similar to Neuroticism in adults. EC is defined by Inhibitory Control, Attentional Control, and Low Intensity Pleasure (long form) and is similar to Conscientiousness/Constraint in adults. E/S is characterized by Impulsivity, High Intensity Pleasure, and Activity Level (long form) and is similar to Extraversion in adults. The 3 scales show adequate internal consistency with previously reported coefficient alphas ranging from 0.66 to 0.70 for NA, 0.62 to 0.78 for EC, and 0.70 to 0.76 for E/S.[28] Coefficient alphas for NA, EC, and E/S were 0.65, 0.74, and 0.63 in the current sample. Alphas did not vary by site or ethnicity. The factor structure remains invariant across age groups and cultures including low-income samples.[27] Convergent validity includes parental agreement and prediction of social and laboratory behavior patterns.[27] Caregivers are asked to consider their child's reaction in the past 6 months to 36 situations (e.g., "prefers quiet activities to active games," "gets angry when s/he can't find something s/he wants to play with") and respond using a 7-point response scale ranging from "extremely untrue" to "extremely true." Each of the 3 scale scores are derived by calculating the mean of 12 items scored on the 7-point response scale. Values for each scale range from 1 (low) to 7 (high).

Body Mass Index—Height and weight measurements were obtained by trained staff members following procedures described by Lohman et al.[29] Parents and children were dressed in light clothing and asked to remove their shoes. Height and weight were measured in duplicate to assure accuracy. Height and weight scores for children were converted to age- and gender-specific BMI z scores using the revised 2000 growth charts from the Centers for Disease Control and Prevention.[30] Height and weight scores for parents were converted to BMI.

Statistical Analyses

All statistics were run using the Statistical Package for the Social Sciences (SPSS 15.0). Descriptive statistics were generated for all variables and were used to examine distributions and search for potential outliers. Missing data were handled on an analysis by analysis basis to maximize the information derived from the study. To determine significance, $p < .05$ was used for all analyses.

Feeding Style Categories—Scores for dimensions of demandingness and responsiveness were created from parent-centered and child-centered items on the CFSQ. A median score was used to differentiate between high and low scores on each dimension resulting in four feeding styles per previous studies.

Multivariate General Linear Modeling—Differences across the four feeding styles on parent affect and child temperament were established through multivariate general linear modeling using multivariate analysis of variance. Mean differences were evaluated between the feeding styles. Independent variables were feeding style (4 levels) and ethnicity (3 levels). Type III sums of squares were examined to look at main effects of each independent variable along with their interaction. Approximate F statistics were calculated using Rao's transformation of Wilks' lambda. Tukey's honestly significant differences tests were used to follow-up the significant effects of feeding style.

Regression Analysis—A linear regression model was used to examine the association between feeding styles and child BMI scores controlling for demographic variables, parent affect, and child temperament. In this analysis, the independent variables were ethnicity (3 levels), parent education (3 levels), child gender, parent's age, child's age, parent BMI, parent affect (2 scales), child temperament (3 scales), and feeding styles (4 levels). The dependent variable was child BMI z score. Beta weights (standardized regression coefficients) were reviewed to assess the relative importance of each of the independent variables in prediction of child BMI z scores, beyond the contribution of the other independent variables.

RESULTS

Relationship Between Feeding Styles, Ethnicity, Parent Affect, and Child Temperament

The multivariate analysis of variance analysis yielded significant main effects for feeding styles: parent affect and child temperament, $F(15,1880) = 4.483$, $p < .001$. Univariate analyses showed a significant main effect for feeding style for both parent affect scales and 2 of the 3 child temperament scales ($p < .05$). The ethnicity by feeding style interaction was not significant.

Post Hoc Analyses for Parent Affect and Child Temperament

Tukey's honestly differences tests were used to follow-up the significant univariate effects of feeding styles yielding significant differences on both parent affect scales and 2 out of the 3 child temperament scales (Table 2). Indulgent parents reported lower Child Negative Affectivity and lower Negative Affect for themselves compared with authoritarian parents. Uninvolved parents reported lower Positive Affect compared with both indulgent and authoritative parents and lower Child Effortful Control compared with parents in the other three feeding styles.

Relationship Between Feeding Styles and Child's Body Mass Index Controlling for Demographics, Parent Affect, and Child Temperament

Results from the regression of feeding styles on child's BMI indicated that the indulgent feeding style was significantly ($p < .05$) positively associated (std beta = 0.11) with child BMI after controlling for variables known to be associated with child BMI (ethnicity, child gender, parent BMI), demographics (parent education, parent age, child age), and psychosocial characteristics (parent affect and child temperament). The model accounted for 12% of the variation in child BMI (Table 3).

DISCUSSION

The positive relationship between indulgent feeding style and children's weight status in families with low-incomes was so robust that it remained after controlling for parent affect, child temperament, and known correlates of child BMI. In addition, the high level of congruence between parent affect and child temperament appeared only within the indulgent feeding style. The parent feeding style used in this study goes beyond earlier models in the

feeding literature (that focused primarily on highly demanding aspects of feeding) by simultaneously incorporating responsiveness as shown in the model in Figure 2.

Our results were consistent with limited evidence showing a relationship between a permissive parenting style and childhood weight status. When examining both parents in the family, father's permissive parenting style and not mother's was associated with overweight in children in a large nationally representative study in Australia.[31] In an intervention study, a permissive parenting style was associated with less weight loss for the family.[32] Our results directly contrasted with recent findings showing a positive relationship between an authoritarian parenting style and childhood overweight in middle-class families.[4] Our study in families with low-incomes found an authoritarian feeding style to be related to lower child weight status compared with indulgent feeding ($p < .05$).

It is clear that children who consistently eat beyond satiety will become overweight. Thus previous research has focused on the negative association between highly directive feeding practices and children's ability to self-regulate energy intake.[33–35] These studies examined specific hypotheses about the acute effects of highly directive feeding practices on food preference, self-regulation, and weight status in children.[10] This early model of feeding focused on one end of a single feeding continuum—highly demanding/directive feeding practices. Such a model is limited in scope by not accounting for the entire set of demand practices that parents use to feed their children and only examining those that interfere with regulation. Furthermore, this early model also did not account for the way parents deliver their feeding messages in a responsive or nonresponsive way. By examining a more comprehensive model of feeding based on a combination of levels of demandingness and responsiveness, we can examine how these constructs work together to influence children's eating behavior and weight status. By broadening the focus in this way and going beyond the almost exclusive focus on highly directive feeding, a more complete picture of parents' role in the development of children's eating behavior is possible.

Other family mechanisms may explain eating behavior in children that result in eating beyond satiety. The similarities between parent and child negative affect characteristics in families with an indulgent feeding style could be an alternative explanation for children eating beyond satiety (i.e., a mutually pleasurable interaction leads to eating beyond satiety). Previous research supports an association between positive affect and food intake. Positive affect was associated with hedonic eating (tendency to eat) because of the pleasant taste of food.[36] Meals eaten in a positive mood and with other people were significantly larger than meals eaten in a neutral mood and alone.[37] Neurobiological studies support the premise that the reward process involved in pleasurable experiences like eating is enhanced through social contacts.[38,39] Our research extends previous studies on disruption of satiety cues in children by examining the congruence of parent–child emotional characteristics which may promote overeating in children. An alternative explanation is that parents may feed their children comfort food to reduce chronic stress and anxiety.[40] Parents may regulate their children's affect with food leading to more positive emotions among the pair, but also higher weight status in their children. Because families with low-income face economic pressures and more negative life events than do middle-class families,[41] regulating affect with food may be a low-cost plausible option. Future research needs to consider how congruence between emotional states of parents and children may contribute to childhood overeating and subsequent overweight.

Further findings from our study showed that emotional characteristics of uninvolved parents were theoretically consistent with characteristics of their children. Uninvolved parents reported lower positive affect for themselves and less inhibitory control (e.g., attention focusing) for their children compared with the other parent feeding groups. When parents are not involved with their children, it makes sense that children might develop less inhibition because of the

lack of parental supervision and social interaction. This type of uninvolved parenting might result in poor diet quality but not necessarily overeating and overweight. Future research is needed to investigate the nutrient quality of children, whose parents exhibit a lack of involvement with their children during feeding.

The work presented here offers an expanded picture of the parental feeding environment among families with low-income. This study relied on parent-reported measures which may have limited correspondence with direct observation. Parent reports of child temperament, in particular, have been shown to differ with alternative informants such as teachers and direct observation.[42,43] Parents may misrepresent their behaviors to reflect socially desirable and/or culturally appropriate responses. They may also have limited experience with children other than their own and thus lack a normative basis to judge child behaviors.[42] Continued work in this area may include direct observation of parent and child behaviors in the feeding environment. Our study is further limited by its cross-sectional design. This approach offers a snapshot of the association between parent feeding styles and child overweight at one point in time. No assumptions about cause and effect can be drawn from this work. Future work should include a longitudinal design to study these issues over time.

CONCLUSIONS

It has been posited that overweight is expressed when genetically susceptible children are placed in environments, which are generally believed to disrupt or diminish children's ability to self-regulate during eating such as exposure to large portions of energy dense foods coupled with a lack of structure or supervision.[44] Our research goes beyond highly directive feeding by examining feeding patterns that include a degree of responsiveness that may lead to disruption of children's self-regulation in eating. The indulgent feeding style functionally translates into letting children eat what they want. Further research is needed to examine the type of food indulgent parents make available in their home.

Our research on feeding styles with low-income families expands the literature examining feeding as a possible mechanism in the prevalence of childhood overweight. The exact mechanism through which parenting (and feeding) styles impact the weight status of children is yet to be determined. Socioeconomic status may play an important part in this relationship.

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References

1. Baumrind D. Current patterns of parental authority. Developmental Psychology Monographs 1971;4:101–103.
2. Darling N, Steinberg I. Parenting style as context: an integrative model. Psychol Bull 1993;113:487–496.
3. Steinberg, L. Beyond the Classroom: Why School Reform has Failed and what Parents Need to Do. New York, NY: Simon & Schuster; 1996.
4. Rhee KE, Lumeng JC, Appugliese DP, et al. Parenting styles and overweight status in first grade. Pediatrics 2006;117:2047–2054. [PubMed: 16740847]
5. Ogden CL, Carroll MD, Curtin LR, et al. Prevalence of overweight and obesity in the United States, 1999–2004. JAMA 2006;295:1549–1555. [PubMed: 16595758]

6. Shrewsbury V, Wardle J. Socioeconomic status and adiposity in childhood: a systematic review of cross-sectional studies 1990–2005. Obesity 2008;16:275–284. [PubMed: 18239633]
7. Costanzo PR, Woody EZ. Domain-specific parenting styles and their impact on the child's development of particular deviance: the example of obesity proneness. J Soc Clin Psychol 1985;4:425–445.
8. Maccoby, E.; Martin, J. Socialization in the context of the family: parent–child interaction. In: Mussen, PH., editor. Handbook of Child Psychology. New York, NY: Wiley; 1983.
9. Clark HR, Goyder E, Bissell P, Blank L, Peters J. How do parents' child-feeding behaviours influence child weight? Implications for childhood obesity policy. J Public Health 2007;29:132–141.
10. Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent–child feeding strategies and their relationships to child eating and weight status. Obes Res 2004;12:1711–1722. [PubMed: 15601964]
11. Hughes SO, Power TG, Fisher JO, et al. Revisiting a neglected construct: parenting styles in a child-feeding context. Appetite 2005;44:83–92. [PubMed: 15604035]
12. Dix T. The affective organization of parenting. Psychol Bull 1991;110:3–25. [PubMed: 1891517]
13. Hutcheson JJ, Black MM, Starr RH. Developmental differences in interactional characteristics of mothers and their children with failure to thrive. J Pediatr Psychol 1994;18:453–466. [PubMed: 7692030]
14. Barlow SE, Chang JJ. Is parental aggravation associated with childhood overweight? An analysis of the National survey of children's health 2003. Acta Paediatr 2007;96:1360–1362. [PubMed: 17718792]
15. Thomas, A.; Chess, S. Temperament and Development. New York, NY: Brunner/Mazel; 1977.
16. Bates JE, Pettit GS, Dodge KA, et al. The interaction of temperamental resistance to control and restrictive parenting in the development of externalizing behavior. Dev Psychol 1988;34:982–995. [PubMed: 9779744]
17. Darlingonton AS, Wright CM. The influence of temperament on weight gain in early infancy. J Dev Behav Pediatr 2006;27:329–335. [PubMed: 16906009]
18. Niegel S, Ystrom E, Vollrath ME. Is difficult temperament related to overweight and rapid early weight gain in infants? A prospective cohort study. J Dev Behav Pediatr 2007;28:462–466. [PubMed: 18091091]
19. Rothbart, MK. Temperament and development. In: Kohnstamm, GA.; Bates, JE.; Rothbart, MK., editors. Temperament in Childhood. Chichester, England: Wiley; 1989.
20. Bell RQ. A reinterpretation of the direction of effects in studies of socialization. Psychol Rev 1968;75:81–95. [PubMed: 4870552]
21. Agras W, Lawrence D, Hammer M, et al. Risk factors for childhood overweight: a prospective study from birth to 9.5 years. J Pediatr 2004;145:247–252.
22. Pulkki-Raback L, Elovainio M, Kivimaki M, Raitakari O. Temperament in childhood predicts body mass in adulthood: the cardiovascular risk in young finns study. Health Psychol 2005;24:307–315. [PubMed: 15898867]
23. Hughes SO, Anderson CB, Power TG, et al. Measuring feeding in low-income African-American and Hispanic parents. Appetite 2006;46:215–223. [PubMed: 16504340]
24. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. J Pers Soc Psychol 1988;54:1063–1070. [PubMed: 3397865]
25. McNair, DM.; Lorr, M.; Droppleman, LF. Manual: Profile of Mood States. San Diego, CA: Educational and Industrial Testing Service; 1971.
26. Watson D, Clark LA. Self-versus peer-ratings of specific emotional traits: evidence of convergent and discriminant validity. J Pers Soc Psychol 1991;60:927–940.
27. Rothbart MK, Ahadi SA, Hershey K, et al. Investigations of temperament at three to seven years: the children's behavior questionnaire. Child Dev 2001;72:1394–1408. [PubMed: 11699677]
28. Putnam SP, Rothbart MK. Development of short and very short forms of the children's behavior questionnaire. J Pers Assess 2006;87:102–112. [PubMed: 16856791]
29. Lohman, TG.; Roche, AF.; Martorell, M. Anthropometric Standardization Reference Manual. Champayne, IL: Human Kinetics; 1988.
30. Kuczmarski R, Ogden C, Guo S. CDC growth charts for the United States: methods and development. Vital Health Stat 2002;11:1–190.

31. Wake M, Nicholson JM, Hardy P, Smith K. Preschooler obesity and parenting styles of mothers and fathers: Australian National Population Study. Pediatrics 2007;120:e1520 – e1527. [PubMed: 18055667]
32. Golan M. Parents as agents of change in childhood obesity–from research to practice. Int J Pediatr Obes 2006;1:66–76. [PubMed: 17907317]
33. Johnson SL, Birch LL. Parents' and children's adiposity and eating style. Pediatrics 1994;94:653–661. [PubMed: 7936891]
34. Birch LL, McPhee L, Shoba BC, et al. "Clean up your plate": effects of child feeding practices on the conditioning of meal size. Learn Motiv 1987;18:301–317.
35. Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection and intake. Am J Clin Nutr 1999;69:1264–1272. [PubMed: 10357749]
36. Macht M. Characteristics of eating in anger, fear, sadness and joy. Appetite 1999;33:129–137. [PubMed: 10447985]
37. Patel KA, Schlundt DG. Impact of moods and social context on eating behavior. Appetite 2001;36:111–118. [PubMed: 11237346]
38. Saper CB, Chou TC. The need to feed: homeostatic and hedonic control of eating. Neuron 2002;36:199–211. [PubMed: 12383777]
39. Esch T, Stefano GB. The neurobiology of pleasure, reward processes, addiction and their health implications. Neuro Endocrinol Lett 2004;25:235–251. [PubMed: 15361811]
40. Dallman MF, Pecoraro N, Akana SF, et al. Chronic stress and obesity: a new view of "comfort food". Proc Natl Acad Sci USA 2003;100:11696–11701. [PubMed: 12975524]
41. McLeod JD, Kessler R. Socioeconomic status differences in vulnerability to undesirable life events. J Health Soc Behav 1990;31:162–172. [PubMed: 2102495]
42. Hayden EP, Klein DN, et al. Parent reports and laboratory assessments of child temperament: a comparison of their associations with risk for depression and externalizing disorders. J Psychopathol Behav Assess 2005;27:89–100.
43. Seifer R, Sameroff AJ, Barrett L, et al. Infant temperament measured by multiple observers and mother report. Child Dev 1994;65:1478–1490. [PubMed: 7982363]
44. Hill JO, Peters JC. Environmental contributions to the obesity epidemic. Science 1998;280:1371–1374. [PubMed: 9603719]

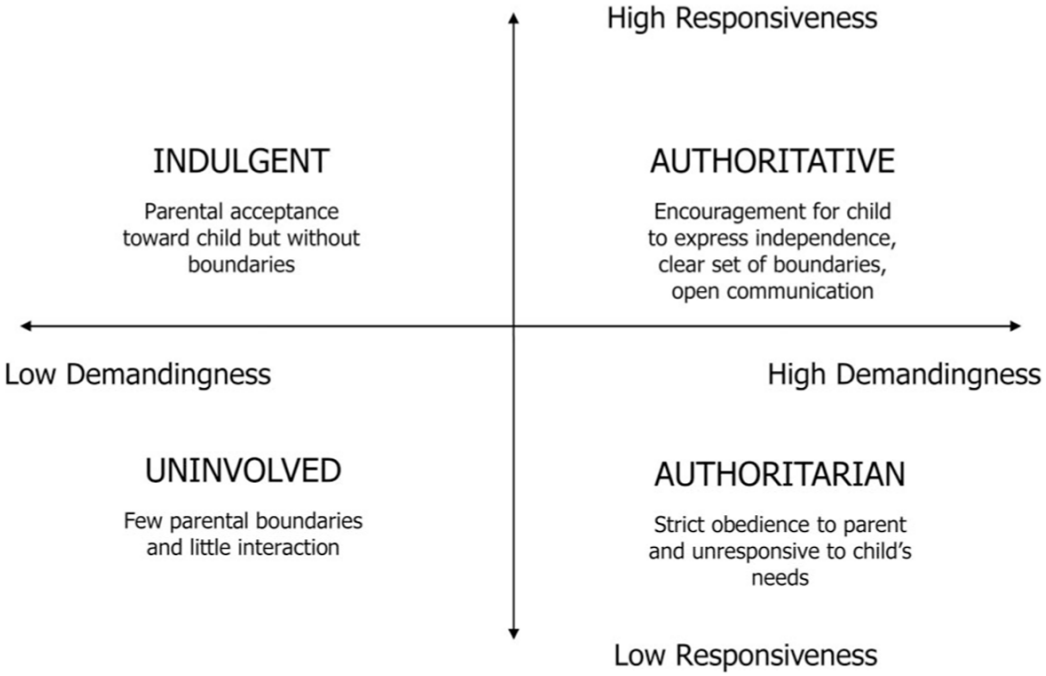

Figure 1.
Typological Approach to Parenting.

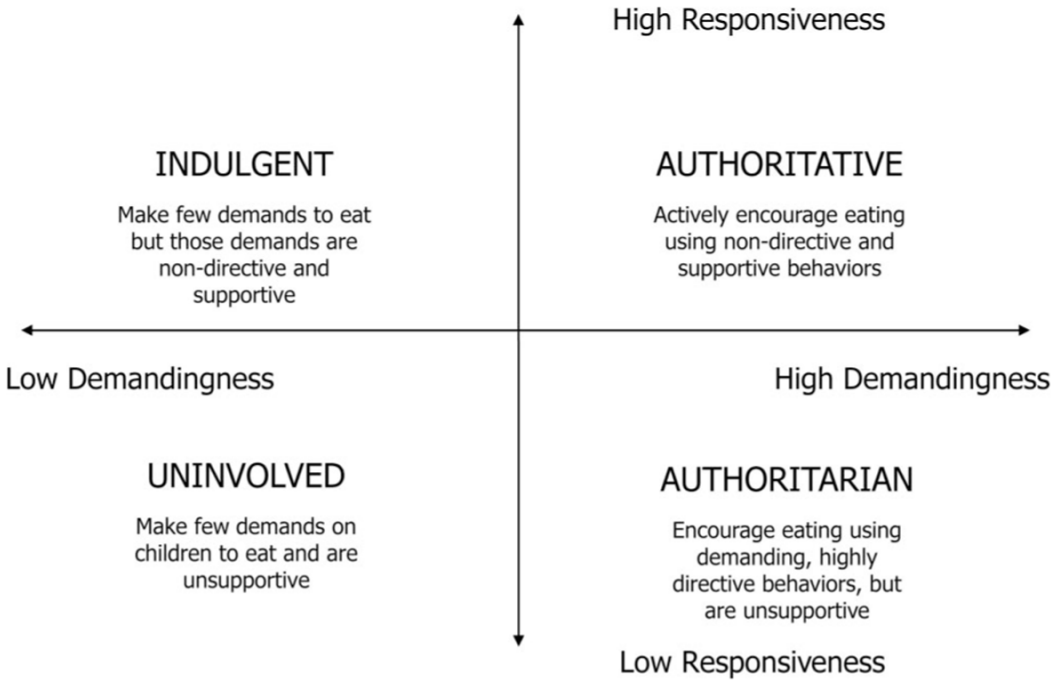

Figure 2.
Typological Approach to Feeding.

Table 1

Characteristics of the Sample by Child Body Mass Index z Scores (n = 718)

		Mean Child BMI z Score	SD
Ethnicity			
African-American	309 (43.0%)	0.51	1.54
Hispanic	209 (29.1%)	0.92	1.20
White	200 (27.9%)	1.26	1.64
Child gender			
Female	347 (48.4%)	0.75	1.33
Male	371 (51.6%)	0.90	1.72
Education of parent			
Less than a High School diploma	183 (25.5%)	0.79	1.54
High School diploma	240 (33.4%)	0.97	1.51
More than a High School diploma	295 (41.1%)	0.76	1.48
Feeding styles			
Authoritative	115 (16.0%)	0.80	1.53
Authoritarian	214 (29.8%)	0.70	1.29
Indulgent	235 (32.7%)	0.99	1.54
Uninvolved	136 (19.0%)	0.76	1.93
Missing	18 (2.5%)		
Parent BMI			
Normal (BMI <25)	156 (21.7%)	0.58	1.61
Overweight (25 ≤ BMI < 30)	192 (26.7%)	0.76	1.36
Obese (≥30)	330 (46.0%)	0.97	1.64
Missing	40 (5.6%)		
Child BMI[a]			
Normal (<85th percentile)	423 (58.9%)	−0.10	1.06
At Risk (≥85th and <95th percentile)	103 (14.3%)	1.32	0.16
Overweight (≥95th percentile)	174 (24.2%)	2.77	0.98
Missing	18 (2.6%)		
Age, mean in years (SD)			
Parent	31.6 (8.2)		
Child	4.4 (0.6)		

[a] From age- and gender-specific cut points of the CDC growth charts. BMI, Body mass index; SD, Standard deviation.

Table 2

Post Hoc Analyses Between Feeding Styles and Parent Emotional Affect and Child Temperament

Parent Affect and Child Temperament	Feeding Styles			
	Authoritative (n = 118)	Authoritarian (n = 219)	Indulgent (n = 240)	Uninvolved (n = 141)
Parent Positive Affect	36.5_{b} (7.8)	$34.8_{a,b}$ (7.7)	36.0_{b} (7.2)	32.9_{a} (7.9)
Parent Negative Affect	$19.6_{a,b}$ (7.4)	21.1_{b} (7.0)	19.2_{a} (7.5)	$20.6_{a,b}$ (7.5)
Child Negative Affectivity	4.5_{b} (0.8)	4.5_{b} (0.7)	4.2_{a} (0.8)	$4.4_{a,b}$ (0.8)
Child Effortful Control	5.6_{c} (0.7)	5.4_{b} (0.6)	$5.5_{b,c}$ (0.7)	5.1_{a} (0.8)
Child Extraversion/Surgency	4.6_{a} (0.7)	4.6_{a} (0.8)	4.7_{a} (0.7)	4.5_{a} (0.7)

Means (SD) with different subscripts within a row differ significantly at $p < .05$.

Table 3

Regression Analysis Predicting Children's BMI From Demographics, Child Temperament, Parent Affect, and Feeding Styles

Independent Variables[a]	Coefficient	SE	Std Beta	*t*
Demographics				
Ethnicity (Ref. African-American)				
Hispanic	0.88	0.16	0.26	5.41**
White	0.96	0.15	0.28	6.44**
Parent's education (Ref. <High School)				
High School graduate	0.30	0.16	0.09	1.91
>High School	0.16	0.16	0.05	1.01
Child gender (Ref. Male)	−0.23	0.12	−0.08	−1.96*
Parent's age (yrs)	−0.01	0.01	−0.03	−0.81
Child's age (yrs)	0.27	0.10	0.11	2.74**
Parent's BMI	0.04	0.01	0.23	5.87**
Child characteristics				
Child temperament				
Negative Affectivity	−0.04	0.08	−0.02	−0.58
Effortful Control	0.06	0.09	0.03	0.64
Extraversion/Surgency	−0.09	0.08	−0.04	−1.08
Parent characteristics				
Parent affect				
Positive Affect	0.01	0.01	0.04	0.90
Negative Affect	−0.01	0.01	−0.03	−0.76
Feeding styles (Ref. Authoritative)				
Authoritarian	0.11	0.18	0.03	0.62
Indulgent	0.35	0.17	0.11	1.98*
Uninvolved	0.23	0.20	0.06	1.16

R^2 = .123; Adjusted R^2 = .101.

[a] Dependent variable: Child BMI z score.

* $p < .05$

** $p < .01$. BMI, Body mass index.