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Positive parenting approaches and their association with child eating and weight: A narrative review from infancy to adolescence

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Abstract

Parents play a critical role in the development of children's eating behaviors and weight status, serving as providers, models, and regulators of the food environment. Many research reviews have focused on the robust body of evidence on coercive control in feeding: how parenting practices such as restriction and pressure to eat increase children's risk for developing undesirable eating behaviors and unhealthy weight outcomes. Fewer reviews adopt a strengths-based perspective focusing on the ways that parents can actively support the development of healthy eating behaviors and weight trajectories. Emerging research on such positive parenting styles and practices offers solutions beyond the avoidance of coercive control, as well as opportunities to highlight parallels between research on food parenting and the broader, well-established developmental literature on positive parenting. The focus of this review is to summarize what is known regarding benefits of positive parenting styles and practices for child eating and weight outcomes and discuss recommendations for future research. Current evidence supports starting with responsive feeding and parenting during infancy and incorporating structure and limit setting in early childhood, with mealtime structure remaining important during middle childhood and adolescence. Areas for future research include: 1) further examination of the implications of identified food parenting practices and styles among diverse groups and caregivers; 2) increased consideration of child

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Author Contributions

KNB, SAF, LAF, and AKV conducted the literature search and wrote the manuscript. JOF drafted the conceptual model. JOF and SLJ provided critical feedback. All authors contributed to editing the manuscript and approved the final submission.

Conflicts of Interest

The authors report no conflict of interest.

factors (e.g., temperament) as moderators or mediators; and 3) further clarification of the relationship between general parenting and food parenting.

Keywords

Positive parenting; parent feeding; infancy; childhood; adolescence

Introduction

Currently, 18.5% of children ages 2–19 years have obesity, with prevalence differing by race and socioeconomic status (SES) ¹. While obesity is a multifactorial disease, parents have a substantial influence on child weight status ². In fact, parent weight status remains one of the most robust predictors of child weight status ³. In addition to their genetic contribution, parents play a critical role in the development and maintenance of children's weight outcomes as well as their eating behaviors by shaping the eating environment ⁴ through several roles ⁵. Parents control home food availability (e.g., buying food, controlling access to food, preparing food), serve as role models, adopt feeding styles that set the overall emotional climate related to feeding, and use goal-directed feeding practices to shape the types and amounts of food their children consume ⁵.

A critical question when considering the substantial influences of parents on children's eating and weight outcomes is: on which aspects of parenting should we focus? Many research reviews have focused on the robust body of evidence on coercive control in feeding: how parent feeding practices such as restriction and pressure to eat increase children's risk for developing undesirable eating behaviors and unhealthy weight outcomes ^{5–7}. Fewer reviews adopt a strengths-based perspective focusing exclusively on the ways that parents can actively support the development of healthy eating behaviors and weight trajectories. Emerging research on such parenting styles and practices offers solutions beyond the avoidance of coercive control, as well as opportunities to highlight parallels between research on food parenting and the broader, well-established developmental literature on positive parenting.

As literature linking parenting with eating and weight has grown, disagreement in the identification, definition, and measurement of key constructs has become evident. A food parenting working group was formed to address these issues, and in 2013, the working group published their consensus report, which included the identification and definition of three separate constructs – general parenting styles, feeding styles, and food parenting practices⁸. General parenting styles reflect parent-child interactions across all domains, whereas feeding styles reflect parent-child interactions specific to the feeding domain. Both general parenting styles and feeding styles are assessed by examining parents' demandingness and responsiveness. Demandingness is defined as behavioral control and monitoring (i.e., structure and limit setting), and responsiveness is defined as warmth and awareness of a child's specific needs and requests to help foster autonomy ⁹. Feeding styles describe the degree to which a parent's approach reflects demandingness and responsiveness within feeding contexts ¹⁰. Within research on general parenting styles and feeding styles, these

dimensions are often used to classify parents into one of four feeding styles, which are based on Maccoby and Martin's general parenting styles classifications¹¹: authoritative (high demandingness, high responsiveness), authoritarian (high demandingness, low responsiveness), permissive/indulgent (low demandingness, high responsiveness), and neglectful (low demandingness, high responsiveness)¹⁰.

In contrast to the overarching nature of general parenting and feeding styles, food parenting practices include specific behaviors that parents use when feeding their child. Food parenting practices are goal-oriented behaviors used in the context of feeding that reflect overarching constructs of coercive control, structure, and autonomy support⁷. Some researchers have argued that general parenting styles should be conceptualized as contextual moderators of the impact of specific parenting practices, both in and outside the feeding domain^{12,13}. Parents' food parenting practices, such as limit setting, may be more likely to be successful and predict healthier outcomes in the context of a generally authoritative parenting style that couples demandingness and responsiveness. However, application of this idea in the realm of food parenting is newer, and research is limited.

The most commonly-used food parenting constructs are outlined in Table 1. In this review, we use the term food parenting to encompass both feeding styles and food parenting practices. We focus on positive general and food parenting constructs, using "positive" to refer to general parenting styles, feeding styles, and food parenting practices that are developmentally appropriate and contribute to an effective balance between parental demandingness and responsiveness. This parallels terminology used in the developmental psychology literature, in which there is a robust evidence base on "positive parenting" approaches that promote adaptive child outcomes more broadly¹⁴. Looking to the developmental literature can move child feeding research forward. A focus on positive parenting is one way to do this and builds upon prior influences of the developmental literature on the understanding of child feeding, such as in the realm of measurement.

Given that the early food parenting literature sought to elucidate effects of coercive control such as pressure to eat and restriction, it is not surprising that first generation of measures of food parenting, such as the Child Feeding Questionnaire (CFQ)¹⁵, the Comprehensive Feeding Practices Questionnaire¹⁶, and the Infant Feeding Style Questionnaire¹⁷, typically focused on these negative aspects of feeding. More recently, new survey instruments such as the Structure and Control in Parent Feeding¹⁸ and the Food Parenting Inventory¹⁹ have been developed that expand upon classic measures by allowing measurement of other potentially more supportive aspects of control in parent feeding, such as structure and limit setting²⁰, as well as practices that provide support for children's autonomy in eating, including responsiveness to children's hunger and fullness. This development follows the differentiation among types of parental control in the broader parenting literature²¹. These refined child feeding measures provide opportunities to deepen our understanding of these more positive aspects of food parenting.

The focus of this narrative review is to use strengths-based and developmental perspectives to examine associations between the use of positive parenting styles and practices and child eating and weight outcomes from infancy to adolescence, and to offer directions for future

research. While decades of research in developmental sciences illustrate that the parent-child relationship in the feeding domain is bidirectional, with the parent influencing the child's behavior and the child influencing the parent's behavior²², we focus primarily on parent contributions – both general and food-specific -- in the current review. Figure 1 presents central dimensions of positive food parenting from infancy to adolescence that support the development of healthy eating behaviors and weight outcomes. Across development, there is a need for both parental demandingness (e.g., structure and limit-setting, monitoring) and responsiveness (e.g., autonomy support, encouragement). However, the expression of each changes as the child's needs and abilities change. We propose that exposure to positive parenting styles and practices - both general and food-specific - can shape children's food preferences and acceptance, responsiveness to hunger and satiation, healthy eating behaviors, and intake of nutrient-dense foods over time. These child factors may, in turn, confer protection from obesity. Additionally, given that behavior change precedes weight gain, it may be that positive behavior change (e.g., increases in fruit and vegetables, decreases in sugar-sweetened beverage consumption) is observed without any weight change in the short-term, but rather the attainment of optimal weight observed over the long-term. As such, we focus on both eating and weight outcomes. Following discussion of links between general and food parenting and these outcomes in each developmental stage, directions for future research are presented.

Methods

Authors with expertise in each developmental period under consideration (infancy: AKV; early childhood: SAF; middle childhood: LAF; adolescence: KNB) developed the initial draft of the corresponding section. These authors reviewed seminal and recent review articles and perspectives and also identified relevant empirical articles with rigorous designs. For example, in drafting the early childhood section, recent and key reviews and perspectives on food parenting in early childhood were reviewed (e.g.,^{7,23,24}) and given the availability of studies with rigorous designs during this time period, the author of this section focused on longitudinal studies that included observational measures of parenting constructs and subsequent eating and/or weight outcomes, as well as randomized studies of general parenting interventions as described below. Because the extant research and parenting considerations differ by developmental period, this approach allows us to represent and articulate these differences. The writing team reviewed and refined each other's sections, allowing for a consensus about the definition and organization of constructs, key take-home points, and areas for future research across developmental periods.

As noted in other key narrative reviews in the field (e.g.,⁷), there are strengths and limitations to such an approach. This work is not a systematic review and should not be interpreted as such. However, we would argue that there is value in bringing together a diverse team of content experts and arriving at a consensus about the state of the field and directions for future research. In addition, general and food parenting are often studied separately, and the present review uses the concept of “positive parenting” from the developmental sciences to bring together constructs like authoritative parenting styles, authoritative feeding styles, structure, and autonomy supportive practices. We argue that there is much to be learned from the decades of successful parenting research in the

developmental sciences, and as such, we also discuss available evidence regarding how evidence-based general positive parenting interventions might impact child eating and weight status. We also apply developmental perspectives to illustrate how central dimensions of feeding styles and practices change with development, communicating which components of responsiveness and/or demandingness become particularly relevant with each new developmental period.

Infancy

When considering Maccoby and Martin's parenting framework¹¹, the dimension that is most relevant during infancy is parental responsiveness. A primary goal of early feeding interactions should be to support the infant's developing abilities to self-regulate within feeding and eating contexts. Previous research suggests infants exhibit some evidence of intake regulation in response to growth needs from birth²⁵. However, this compensation is only partial in the first few months postpartum, improving across the first year and as the infant matures²⁶, with evidence of subsequent decline in eating self-regulation by 15 months of age²⁷, though there is likely individual variation in this timeline.

Optimal feeding styles and food parenting practices during infancy ensure the infant is fed in a way that preserves and promotes his or her developing capacities to self-regulate (see Figure 1). To this end, current recommendations focus on promoting responsive food parenting, defined within this developmental period as feeding styles and food parenting practices that are infant-led and responsive to infant cues (e.g.,^{23,28}) across all modes of infant feeding (e.g., breastfeeding, bottle feeding, introduction of complementary foods). During the period of exclusive milk feeding (for the first 4–6 months), a caregiver engaging in responsive feeding is attentive to the infant's cues. The caregiver only offers the breast or bottle and engages the infant when s/he is receptive and also allows the infant to disengage or take breaks as needed. Thus, the caregiver paces the feeding, as well as the social interaction that occurs during the feeding, in response to infant cues. The caregiver may gently prompt the infant to eat, especially during the introduction of complementary foods and beverages when the infant is exposed to novel foods, but the caregiver withdraws if the infant refuses or shows clear disengagement cues and refrains from using coercion or force to encourage the infant to eat.

During early feeding, potential bidirectional influences between feeding mode (at the breast versus via a bottle) and food parenting styles and practices are important to consider; caregivers' food parenting styles and practices likely influence feeding choices, but feeding mode may also influence food parenting styles and practices. There is some evidence that mothers who initially exhibit greater levels of sensitivity to their infants are more likely to initiate breastfeeding and have longer breastfeeding durations^{29,30}. Moreover, studies comparing feeding interactions of breastfeeding and bottle-feeding dyads during early infancy demonstrate breastfeeding mothers exhibit more warmth, sensitivity to infant cues, and behavioral synchrony during infant feeding compared to bottle-feeding mothers³¹. However, the experience of breastfeeding may also promote responsive feeding because, to a certain extent, successful breastfeeding is inherently infant-led, requiring the infant to play an active role in initiating the feeding by signaling hunger and effectively latching onto the

breast, and maintaining the feeding by sustaining proper positioning, suction, and nutritive sucking³². In addition, because the breastfeeding mother cannot readily assess the amount consumed by the infant at the breast, she must learn her infants' cues and behaviors to decide when to terminate the feed and whether the infant is satiated. Longitudinal studies consistently demonstrate that longer durations of breastfeeding are associated with self-reports of higher responsive feeding practices and styles, greater use of structure-related food parenting practices during complementary-food feedings, and lower pressuring feeding style during later childhood³¹. Although the largely correlational nature of this evidence precludes the ability to disentangle potential bidirectional effects and confounders, it is possible that mothers with greater propensity toward responsive feeding are more likely to breastfeed and that the experience of breastfeeding further promotes use of responsive food parenting practices and styles.

In contrast, mothers who report more controlling feeding practices at birth are more likely to formula-feed³³, perhaps because bottle-feeding affords the caregiver more control over the feeding and assurance about how much the child has consumed^{32,34}. The caregiver can exert more control over the initiation or pacing of the feed by pushing the nipple into the infant's mouth or positioning the bottle in a way that increases milk flow and reduces the amount of infant effort exerted. When using clear bottles, caregivers have more information about how much expressed breast milk or formula is offered and consumed and thus may be less reliant on infant cues and behaviors to decide when to terminate the feeding. This may lead to overfeeding and poorer infant self-regulation of intake if the caregiver encourages the infant to consume more milk than needed. However, bottle-feeding does not lead to overfeeding for all dyads as greater levels of responsive feeding are associated with lower intakes during bottle-feeding³⁵. Recent experimental research illustrates that, in the short term, replacing conventional, clear bottles with opaque, weighted bottles promotes maternal sensitivity to infant cues and helps mothers feed their infants less expressed breast milk or formula at a slower rate³⁶. Thus, strategies to promote responsive feeding during bottle-feeding may help reduce risk for overfeeding and excess weight gain during infancy, and offer the potential to reach vulnerable families who are more likely to bottle-feed formula given contextual barriers to breast-feeding (e.g., need to return to work, lack of resources such as time and supplies for using a breast pump, or maternal obesity that are associated with lactation challenges³⁷).

During the introduction to complementary foods and beverages, responsive feeding remains important for supporting infant self-regulation of intake while also promoting preferences for nutrient-dense foods²⁸. Because this developmental period is characterized by significant oral-motor development³⁸ and a rapid transition in the child's dietary exposures, components of responsive feeding expand to include feeding practices that are infant-led, while guiding the infant to accept and enjoy a wide array of nutrient-dense foods. As humans are predisposed to prefer sweet, umami, and salty tastes over bitter and sour, preferences for novel flavors and foods develop via learning, including: 1) repeated exposure, wherein foods are repeatedly offered to and consumed by the child, increasing their familiarity; 2) associative conditioning, wherein a novel food is paired with a familiar, already preferred food or with a positive social context; and 3) social modeling, wherein the child observes parents, siblings, or peers consume and enjoy the food³⁹.

Baby-led weaning (BLW) is a less commonly used approach to the introduction to complementary foods. At the heart of BLW is the concept of infant self-feeding and autonomy. In strict BLW, infants self-feed only finger foods, whereas other adaptations of BLW allow for the infant to self-feed using utensils and pureed food. This emphasis on self-feeding is congruent with responsive feeding, including the ideas that: 1) the infant should be provided the autonomy to explore novel foods by him or herself and at his or her own pace and 2) the infant's initial rejection of novel foods is reframed within the context of trusting the child to eat when he or she is ready with repeated exposure. Within BLW, parents wait to introduce complementary foods and beverages until their infant exhibits developmental signs of readiness to self-feed (i.e., ability to sit-up unsupported, with good head and neck control), which generally occurs around 6 months of age. While BLW is increasing in popularity, research on this approach is limited and is confounded by the fact that many children who primarily self-feed may also be spoon-fed to some extent by caregivers⁴⁰. Some evidence for potential benefits of BLW on infant eating outcomes (such as improved satiety responsiveness in later toddlerhood⁴¹) exists, as well as evidence that BLW may have other benefits for the family, such as lower maternal anxiety related to feeding⁴². Findings on implications for weight outcomes are mixed^{41,43}. Given that 4–6 months may be a sensitive period for food and flavor learning⁴⁴ as well as an important time for early and frequent consumption of foods for allergy prevention⁴⁵, delaying introduction of complementary foods until an infant displays all of the necessary readiness signs of BLW may have some downsides. Thus, more research on this approach and its congruence with responsive feeding and healthy eating and weight outcomes is warranted. Notably, BLW was included in the recent National Academies of Sciences, Engineering, and Medicine expert report on feeding infants and children from birth to 24 months as a research gap in the infant feeding domain⁴⁶.

Taken together, support for infant self-regulation of intake through responsive feeding and parenting comprise an important foundation for supporting healthy weight gain trajectories during early infancy⁴⁷. Indeed, randomized controlled trials illustrate that promoting responsive feeding and parenting styles and practices promotes healthy weight gain trajectories during infancy and lower risk for overweight during infancy and early childhood⁴⁸. The promotion of responsive parenting beyond the feeding domain during this period may further support healthy eating and weight^{49,50}, which highlights an opportunity for further integration between the developmental and obesity sciences.

Early Childhood

As children move from infancy to early childhood, the demandingness dimension of Maccoby and Martin's framework¹¹ becomes increasingly relevant. It is recommended that parents continue responsiveness to child cues, coupling it with structure and limit setting to achieve a parenting style that is authoritative, rather than indulgent/permissive. As shown in Figure 1, this structure should be developmentally appropriate.

Emerging evidence shows that parental provision of structure predicts healthy eating and weight in young children. In a longitudinal study of 207 Australian families, reports of greater structure-related food parenting practices, including family meals and structured

meal timing, at 2 and 3.7 years of age predicted lower food fussiness later in early childhood⁵¹. Findings from a large cohort study also support the importance of structure in the form of routines with positive outcomes across multiple domains: three-year-old children who had regular bedtimes, mealtimes, and screen-time limits had increased emotion regulation; poor early childhood emotion regulation was predictive of obesity 8 years later⁵². Yet in a prospective, longitudinal study assessing structure in feeding with mothers of 2- to 5- year-olds, mothers who rated children higher on satiety responsiveness at age 2 were more likely to report structured meal timing later in development, suggesting a potential bidirectional association between the child's ability to self-regulate intake and the family's propensity toward structured meals.

One possible mechanism linking structure and limit setting with eating and weight is that young children encountering fewer demands on feeding may grow up in environments in which energy-dense salty and sweet foods are routinely available and accessible, though this still needs to be examined. Such foods correspond with children's genetic taste predispositions, making it likely that children would select them over healthier alternatives, potentially interfering with repeated exposures to nutrient-dense foods³⁹. In contrast, incorporation of limit setting through approaches like constrained or guided choices (in which the parent provides developmentally-appropriate food and decides when it is time to eat while the child can self-serve and decide what and how much to eat) is an example of a feeding style that couples demandingness with responsiveness to the child's hunger, satiation, and growing autonomy⁷. Such approaches may also support children's development of self-regulation around eating.

The literature on general parenting styles corroborates the importance of parents' provision of structure and limits. Of the four styles from Maccoby and Martin's framework¹¹, the indulgent/permissive style is most consistently linked with poorer dietary patterns and elevated weight status in early childhood⁶, suggesting that in early childhood, responsiveness in the absence of demandingness confers risk for unhealthy eating and weight outcomes. In a longitudinal study combining observational and self-report measures of general parenting style, children experiencing a permissive/indulgent parenting style at age 4.5 years were most likely to be at risk for subsequent elevated weight outcomes⁵³. Evidence in support of causal pathways comes from an intervention promoting authoritative feeding styles within a sample of primarily Black, low-income mothers of preschoolers⁵⁴. This intervention resulted in decreases in children's daily consumption of solid fats and added sugar and increases in authoritative parenting practices during a laboratory test meal⁵⁴.

There are several rigorously-tested, evidence-based positive parenting training programs in early childhood that can provide insight as to how general parenting, eating, and weight status may be linked. Studies of these general parenting interventions, which incorporate elements of demandingness and responsiveness, have strong internal validity supporting linkages between positive parenting and adaptive child outcomes, traditionally those in the socioemotional domain. Strategies promoted in these general parenting interventions include child-directed play; verbal responsiveness; allocating attention to positive behaviors and ignoring undesirable behavior; and descriptive, task-oriented praise (e.g., "I really liked how

you cleaned up your blocks when you were done playing”) ⁵⁵. Secondary data analyses reveal the potential of such general parenting interventions to impact weight over time. A randomized study using the Parent Program of the Incredible Years Series to promote parenting competence and child socioemotional development was conducted in a sample of low-income parents of preschoolers at high risk for conduct problems ⁵⁶. Findings included that intervention-group children had lower BMI z-scores than controls in middle childhood ⁵⁶. Similarly, at-risk children randomized to a ParentCorps intervention group during pre-Kindergarten had lower BMIs than controls at age 8 years ⁵⁶, and implementation of the Family Check-Up intervention during toddlerhood impacted children’s BMI trajectories into middle childhood, with evidence of mediation by parents’ positive behavior support (e.g., structuring play periods, prompting and reinforcing positive behavior) during toddlerhood ⁵⁷. In contrast, when implementing parent, child, and classroom components of Incredible Years in an attempt to improve self-regulation and weight outcomes among preschoolers enrolled in Head Start, Lumeng and colleagues ⁵⁸ did not observe effects on preschoolers’ weight outcomes. The authors noted that these null results may have been due to low parent participation in this trial, with another possibility being that effects on weight could emerge at a later time. Overall, these randomized studies of well-established general parenting interventions suggest the potential of general parenting styles to impact eating and weight through either direct effects or interactions with more proximal predictors like feeding practices. It is possible that impacts on weight may emerge when the child becomes even more autonomous and with the transition to school entry.

In sum, when considering implications of parenting during early childhood, there is evidence to support recommendations to: provide structure (such as a structured eating environment and consistent meal time routines), set limits (such as setting the range of nutrient-dense food options that are available), and incorporate both demandingness and responsiveness into general parenting, to support child development of healthy eating and weight ²⁴.

Middle Childhood

Middle childhood refers to a time in which school-aged children are undergoing a period of tremendous growth in autonomy, identity development, and perceived competence across various domains of development ^{59,60}. With the transition to school comes newfound independence, giving children greater responsibility for *what*, *how much*, and *whether* they eat, while ideally *when* and *where* children eat remains structured and fixed. Children’s food preferences are likely well-established in middle childhood, and requests for energy-dense foods high in sugar, sodium, and fat are often at odds with parents’ desires for dietary variety and children’s intake of nutrient-dense foods. Furthermore, self-regulatory capacity and appetitive traits become more established in middle childhood and give rise to more autonomous eating ⁶¹. As such, parents’ food parenting strategies should shift towards increasing support for children’s autonomy with continued structure (e.g., establishing rules regarding the purchase of unhealthy foods at school) and responsiveness (e.g., increased child involvement in food shopping and cooking). As shown in Figure 1, with increasing independence in middle childhood, positive food parenting strategies encompass limit-setting and rules regarding food and eating (devoid of harsh psychological or behavioral control and monitoring), along with developmentally appropriate autonomy support,

provision of ample opportunities for children to make their own choices, and inclusion of children in decisions about food and eating. With the shift towards increased child autonomy, parents may start to increase their monitoring (tracking and surveillance of child behavior) of the child's food intake. Parental monitoring has been consistently linked to positive child outcomes in the general parenting literature⁶². Monitoring is important as it allows the parent to notice early signs of concerning behavior and to make adjustments accordingly.

Studies linking general parenting styles to obesity in middle childhood suggest that eating behavior, appetitive traits, food parenting practices and other food- or eating-related factors may be potential mechanisms through which parenting influences obesity risk⁷. Research has provided evidence for lower rates of emotional eating behaviors in children with authoritative parents, and in children who rate their parent-child relationship as more positive⁶². Burke and colleagues⁶³ measured dietary quality using the Healthy Eating Index in a low-income, food insecure sample of youth ages 9 to 15 years. An authoritative parenting style was associated with greater dietary quality, while authoritarian (controlling) and permissive (indulgent) parenting styles were associated with lower dietary quality. Likewise, findings from related studies showed that both controlling and permissive parenting styles were associated with lower fruit and vegetable consumption and greater consumption of sugar-sweetened beverages^{64,65}.

Relations between general parenting style and dietary intake and patterns may also be linked to the family mealtime environment. Family mealtimes have been shown to be an important context for family socialization and functioning⁶⁶. Mealtimes provide an opportunity for transmission of family routines, values and customs related to food and eating, as well as an opportunity for parents to model healthy eating behaviors and dietary practices. Lopez and colleagues found that in parents of 8- to 12-year-old children, authoritative parenting was associated with the presence of more positive mealtime structural practices (e.g., more frequent family dinners; less eating during television viewing) and reports of greater parent modeling of healthy eating behaviors (e.g., child sees parent eating healthy snacks)⁶⁵.

There also is evidence that feeding style has an impact on child weight. In a mixed-methods, cross-sectional study with 174 Mexican parents and their 8- to 10-year-old children⁶⁷, parents' greater use of positive parental involvement practices (e.g., monitoring intake, limiting high-calorie foods) was associated with lower child BMI, whereas restriction of children's intake was associated with increased child BMI. In a study with 99 rural parents and their children (average age = 9 years), a permissive feeding style was associated with greater energy intake in children, while parents with an authoritative feeding style had children with lower intakes of energy-dense foods⁶⁸.

Findings from studies linking feeding styles and food parenting practices to children's dietary intake and quality are mixed. In a longitudinal study with more than 1200 parent-child dyads in the Netherlands, the authors measured parents' overt control (e.g., deciding how many snacks the child should have), and covert control (e.g. avoiding buying unhealthy foods) and their relation to weight- and eating-related outcomes in 9-year-olds⁶⁹. Greater use of both forms of control was associated with decreased energy-dense snacking and

intake of sugar-sweetened beverages, and covert control was related to increased fruit consumption. Moreover, this study provides some evidence that general parenting may moderate the relationship between food parenting and child outcome. Covert control was related to increases in BMI over a 1-year period in children with parents who reported using a high degree of psychological control (e.g., guilt/shame).

Taken together, authoritative parenting styles and positive food parenting strategies, such as involving children in food preparation and cooking and setting limits on food purchased outside the home, are associated with better eating-, dietary- and weight-related outcomes in school-age children. Mixed findings across studies may be due to differences in measures used to assess food parenting practices or styles, differences in diversity or composition of study population, differences in the assessment of general parenting, and/or to the bidirectional nature of parent-child interactions. A small body of work exists that illustrates positive general parenting interventions have effects on child weight status during middle childhood. General parenting interventions in early childhood have demonstrated effects on child weight status in middle childhood⁵⁷; there is also a version for middle childhood that could be examined. Given the continued emergence of autonomy during this developmental period, parents are encouraged to provide more opportunities for children to develop the skills needed to make healthy decisions about food and eating when parents are not present, such as at school and in other settings in which independent eating occurs. With the transition from middle childhood to preadolescence to adolescence, and changing roles of food and eating, a distinct shift in parenting in the eating domain is likely to occur.

Adolescence

Adolescence is a developmental time period marked by both increasing autonomy and decreased parental influence as children begin spending more independent time with peers. As such, the expression of demandingness and responsiveness shifts as children enter into adolescence. Regarding demandingness, parental use of structure and limit setting continues to be important. With respect to responsiveness, parenting that adjusts to the adolescent's need for increased autonomy can foster the successful development of independence,^{70,71} enhance parent-child communication,⁷² and may support adolescents' learning and development of healthful eating (see Figure 1 for examples). Moreover, parental monitoring becomes increasingly important, especially given that parents have less control over structure and limit setting during adolescence due to the continued widening of the child's ecology (see Figure 1). Some discussion focuses on how and whether the nature of monitoring results in effective adoption of social norms and expectations by adolescents. In the developmental literature, Stattin and Kerr⁷² suggest that monitoring based in part upon knowledge derived from the adolescent, as opposed to heavy parental surveillance and control, may facilitate better adoption of prosocial behaviors. Whether and how this applies to healthy eating habits is, as yet, undetermined. In addition, there may be a curvilinear relationship between level of monitoring and child outcome; there is emerging evidence that a moderate level of monitoring results in the most positive child outcomes among adolescents with overweight⁷³, with relationships less clear among those of other weight statuses. Levels of monitoring that are too high (i.e., controlling) can inhibit the adolescent's ability to develop autonomy. Moderate monitoring involves observance of child eating

behaviors, paying attention to any concerning behaviors, and includes direct communication with the adolescent regarding eating choices and behaviors (in a way that is not shameful or judging), and then subsequently adjusting parenting accordingly. Moreover, it is likely that the most helpful level of monitoring for any given child will depend on a number of child characteristics, such as temperament, food responsiveness, and obesity risk.

As part of their increasing independence and the diminution of parent control, adolescents often experience increased responsibilities, such as working a part-time job and spending increased time participating in extracurricular activities. Such activities often result in significant eating outside the family home. To this point, many adolescents decrease their time spent engaging in family meals and start consuming more convenience foods, partially explaining the average decline in overall diet quality from early childhood to adolescence ⁷⁴. Parents can help counter this decline in diet quality by continuing to provide nutrient-dense foods for their adolescents, though more research is needed to identify whether this approach translates into adoption by the adolescent and subsequent increases in dietary quality.

Cross-sectional studies suggest positive mealtime structure not only supports adolescents' development and maintenance of healthy eating and weight outcomes but has additional psychological benefits ^{75–77}. Research by Berge and colleagues indicated a positive association between maternal and paternal authoritative parenting style and adolescent-reported family meal frequency ⁷⁵. However, when results were examined longitudinally, the relationship only persisted with opposite-sex dyads (i.e., mothers and sons, fathers and daughters). While the average family meal frequency often decreases during adolescence, parents can still engage in efforts to make family meals a priority, as there may still be protective benefits to eating together even if less frequently, as family meals have been cross-sectionally associated with lower obesity risk and increased diet quality and fruit and vegetable intake ^{76,77}. Moreover, there is evidence that it is the quality, not quantity, of family meals during adolescence that has an impact on health outcomes ⁷⁸. However, these relationships need to be confirmed using longitudinal and intervention study designs ⁷⁹, which are limited to date and have not yet determined whether family meals are causally associated with positive outcomes or the mechanisms by which these effects may occur.

The small body of research examining the influence of general parenting style on adolescent weight status has provided mixed findings. One study by Berge and colleagues reported that an authoritative parenting style was associated with lower BMIs in both daughters and sons ⁸⁰. Another study identified a unique relationship between parenting style and adolescent weight status. While adolescents of authoritative parents had higher BMI trajectories during adolescence, they had less steep increases in BMI as they transitioned into emerging adulthood ⁸¹. This finding indicates that the skills learned via an authoritative parenting style (e.g., increased autonomy and independence that supports adoption of healthy lifestyle behaviors) may be protective against excessive weight gain as children transition out of the family home. As such, it may be that the effects of parenting are not always immediate but may become pronounced during transition periods of increased autonomy. Moreover, there may also be differences based on the sex of the parent and adolescent in the dyad. In one study, maternal parenting style only was related to their adolescent son's, but not daughter's,

BMI, with no relationship between paternal parenting style and adolescent BMI⁸². Unlike the earlier developmental periods where evidence supports that general parenting interventions may have a positive impact on child eating and weight outcomes, limited studies have examined this in adolescence. There was an indirect effect of the Family Check-Up during adolescence (age 12–15) on weight status in young adulthood (age 22). The Family Check-Up increased parent-adolescent relationship quality, which reduced maladaptive eating attitudes, which reduced obesity risk⁸³.

Less work has examined how general parenting style is associated with adolescent eating behavior. One study investigating the relationship between general parenting style and fruit consumption found that adolescents with an authoritative parent had the greatest fruit intake, followed by adolescents of indulgent parents, with adolescents of authoritarian and neglectful parents consuming the least fruit⁸⁴, suggesting a benefit of high responsiveness. However, this finding needs to be replicated in other samples and with other eating- and nutrition-related variables of interest, using longitudinal and randomized study designs.

In sum, during adolescence, parents can continue efforts to focus on structuring the adolescent's food environment so that it is responsive to their child's needs (e.g., provision of convenient nutrient-dense foods and being mindful of the availability in the home of foods that undermine healthful eating). Given the increased independence that marks adolescence, monitoring may be especially important during this time.

Discussion

Across all developmental periods, parents play a critical role in the development and maintenance of child eating behavior and weight status. Parents act as key agents of socialization for children's eating behaviors through their roles as providers (i.e., brings food into the home), models (i.e., shows the child how to eat), and regulators (i.e., decides what to purchase and serve, directs the child's behavior). While the literature has traditionally focused on the impacts of coercive control in parent feeding on child eating and weight status, researchers have started to shift toward examination of more "positive" facets of food parenting. We use "positive" to refer to general parenting styles, feeding styles, and food parenting practices that are developmentally appropriate and contribute to an effective balance between parental demandingness and responsiveness. This parallels terminology used in the developmental psychology literature, in which there is a robust evidence base on "positive parenting" approaches that promote adaptive child outcomes more broadly. We aimed to build upon a history of the parenting literature from the developmental sciences influencing the study of child feeding, adopting a strengths-based perspective in considering ways that parents can actively support the development of healthy eating behaviors and weight trajectories, and incorporating learnings from evidence-based general parenting interventions alongside our consideration of food parenting specifically. While there is evidence in support of many of the positive practices and styles highlighted in Table 1, many opportunities remain to build upon the extant research and expand the extent to which we can leverage what is known about positive parenting to promote healthy child outcomes across various periods of child development and sociodemographic groups (Table 2).

In addition to evidence within specific developmental periods, findings from the few longitudinal studies spanning developmental periods indicate that general parenting style in early life may have implications for future child weight status. For example, high maternal sensitivity during the first three years of life appears to be protective against obesity at age 15 years⁵². Other work indicates that interactions between parenting style and child self-regulation in early life have implications for weight status in adolescence⁸⁵. Among boys with poorer abilities to delay gratification at age 4, having a mother with an authoritarian parenting style increased risk for an elevated weight status at age 15. Hence, the influence of early parenting on child eating and weight outcomes may not be observed until later in development, emphasizing the need for more longitudinal studies that measure parenting, potential mediators, and weight status across developmental stages. In particular, many of the studies on parenting and eating/weight outcomes during middle childhood and adolescence are cross-sectional, precluding the ability to draw conclusions about the bidirectional parent-child feeding relationship. Future research in this area should continue to move toward examining directionality and causality in the context of longitudinal, experimental, and interventional designs, which are critical to clarify the interplay of parenting styles, feeding styles, food parenting practices, and child outcomes. Moreover, rigorous operationalization of the bidirectional nature of the parent-child relationship is needed, as well as operationalization and investigation of positive parenting constructs and eating behaviors that may mediate links between parenting and weight. As such, there is a need to continue to develop and invest in experimental and objective measures of eating behavior so that research does not rely mostly on parent- and self-reported dietary intake. Another measurement issue that the field will need to address is the paucity of measures that are developmentally appropriate across several age groups, allowing for comparison over time. It is also recommended that future research prioritize use of observational measures of parenting, with a consideration of the appropriateness and validity of these and other measures in diverse contexts, as described below.

Other potential areas of focus for future research are to build the evidence base in areas in which the evidence is more limited (see Table 2, part 2). More recently, a movement in the field to study food parenting and general parenting together has been initiated⁸⁶⁻⁸⁸, which may help clarify relationships between the two. General parenting may serve as a moderator or mediator of the impact of food parenting on weight and eating behaviors. Alternatively, for some groups differing in sex, gender, SES, and race/ethnicity, there might be direct effects of parenting style, whereas for others parenting style might moderate impacts of specific practices. To further elucidate the role of general parenting styles, food parenting research could also leverage knowledge learned from developmental science. Interventions targeting general parenting (e.g., parental warmth and sensitivity, limit setting, autonomy support) have been shown to be efficacious in reducing children's BMI and weight-related eating and activity behaviors⁸⁹ with potential effects extending into adulthood⁹⁰. Less is known about impacts of these more general parenting interventions among adolescents. Future research is needed to better understand the interplay between general parenting styles and specific food parenting practices during early childhood, including studies of families from various sociodemographic and cultural backgrounds, given some evidence that SES and race/ethnicity may moderate impacts of parenting style on weight⁹¹.

In addition, other potential moderators of the impact of parenting on child eating and weight include child temperament and appetitive traits. These child factors can be examined as potential moderators in analyses or can be considered in implementation of interventions in the first place. During infancy, interventions have been developed that promote responsive parenting to all participating families, regardless of variability in factors such as child cues or temperament. Yet this variability is acknowledged within the intervention approach itself by teaching about temperament, giving examples of child hunger/fullness cues, and demonstrating responses to these cues in the moment with the target child⁹². These positive parenting interventions have led to improvements in both infant dietary patterns⁵⁰ and weight status which have persisted into early childhood⁴⁹. Moreover, this general parenting intervention also resulted in greater maternal use of responsive food parenting⁹³.

SES and cultural influences may play a large role in feeding but often not captured or are confounded in past research. Further, while there are an increasing number of studies in underrepresented and under-resourced populations, the majority of evidence to date is based on predominantly white and well-resourced samples. Mixed findings in the extant literature may be driven, in part, by the failure to reflect cultural and socioeconomic diversity. This issue likely also impacts the sensitivity of existing measurement tools to these influences. Work in low-income Black and Hispanic samples has reported poor fit when testing for factorial invariance with common measures of parent feeding practices^{94,95}, suggesting that further clarification of the cultural appropriateness and relevance of these measures should be undertaken. Further, the experience of food insecurity and/or low SES may alter food availability, which may influence feeding style or food parenting practices in a way that cannot be captured with most existing measurement tools. Two notable exceptions to this are the Caregiver Feeding Styles Questionnaire¹⁰, which was developed for use with low-income minority parents, and the Parenting around SNacking Questionnaire⁹⁶, which was developed using qualitative studies with low-income White, Black, and Hispanic mothers of preschoolers. In addition, researchers are beginning to examine the effectiveness of parenting interventions in more diverse samples that may be at increased risk for developing obesity. Current work is investigating whether an adaptation of a responsive parenting intervention that was effective among a mostly-white population can prevent rapid infant weight gain among first-time Black parents⁹⁷. However, much more additional research is needed in diverse samples to elucidate the relationships between race, SES, general parenting, food parenting, and child eating and weight outcomes.

Another overarching challenge within the field of food parenting research is the underrepresentation of fathers⁹⁸. While half of published studies in food parenting research have included fathers, most data from these studies have been reported by the mother, with fathers making up only 17% of study participants⁹⁸. There are a variety of reasons for this, including that mothers are more likely the primary caregiver and able to attend research visits, and that mothers are often in charge, or perceived to be in charge, of child feeding. However, given that there may be gender-specific associations of parenting on child eating and weight outcomes⁸², and that multiple primary caregivers can influence the child's weight status⁹⁹, it is vital to collect data on both caregivers in dual-parent households to help elucidate the relationship between food parenting and child eating and weight outcomes. In addition, given the known relationship between parental and child weight

status², it is critical to collect and include both paternal and maternal child weight status when examining associations between parenting and child weight status. Moreover, there is paucity of research among single parents or same-gender parents.

In conclusion, research supports the use of general parenting styles, feeding styles, and food parenting practices that are high in both responsiveness and demandingness, with benefits seen for both eating behavior and weight status across the developmental spectrum. While promotion of early positive parenting shows promise, controlling practices are a common well-intentioned response to concern about actual or perceived obesity risk⁵. Parents will likely need tools and resources to replace controlling parenting practices with positive parenting practices. Parents can benefit from anticipatory guidance on responsive feeding and the use of structure and limit setting early in the child's life to prevent the use of overt restriction and other controlling feeding practices. The existing evidence can inform continued development of related interventions and materials, and future research can build on current evidence by broadening the populations under study (e.g., fathers, single parents, same gender parents, culturally and socioeconomically-diverse samples), incorporating longitudinal follow-up and consideration of potential effect moderators, and leveraging intervention research, including well-established general parenting interventions from the developmental sciences, to bolster internal validity. Interdisciplinary collaboration between developmental and obesity sciences offers the potential to better understand how positive parenting may benefit both physical and socioemotional well-being and the mechanisms through which this might occur. Continuing to bolster the research in this area can further scientific understanding of how to help support parents and caregivers and promote healthier outcomes among populations at greatest risk.

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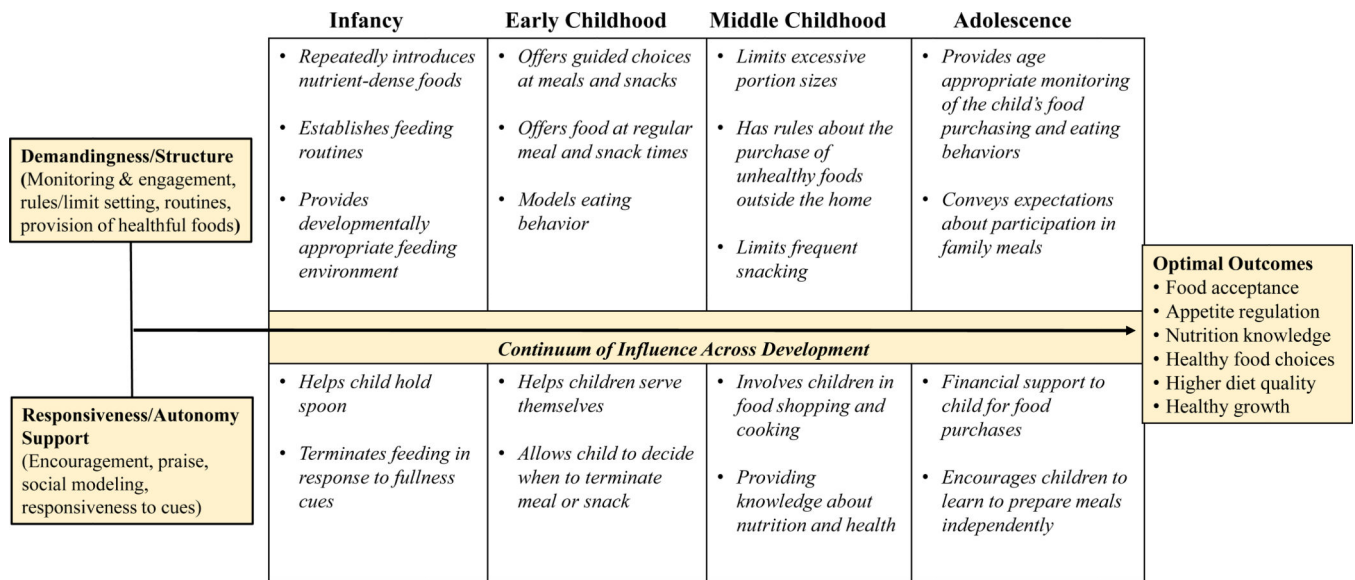


Figure 1. Examples of positive food parenting across development

Legend. Parental demandingness/structure and responsive/autonomy support are critical at every developmental stage (i.e., there is a continuum of influence). Examples of developmentally appropriate positive food parenting practices reflecting overarching dimensions of demandingness/structure and responsiveness/autonomy support. Examples are illustrative and neither exhaustive nor limited to a particular stage. There may be cumulative impact of parenting, such that parenting at early developmental stages may continue to impact children at later developmental stages.

Table 1.Definitions and examples of feeding styles and food parenting practices, adapted from Vaughn et al. (2016).⁷

Construct		Definitions and Examples
POSITIVE FEEDING STYLES		
<i>Refer to child-centered, responsive feeding styles, in which parents provide a high degree of structure, guidance, respect for children's autonomy over their eating, and promotion of independence in eating</i>		
	Authoritative Style	High demandingness, high responsiveness; high degree of involvement, structure and control, high child autonomy support responsiveness * During early infancy (i.e., the first 4–6 months postpartum when the infant is exclusively mild-fed) infancy, a style high in responsiveness and low in demandingness is appropriate
POSITIVE FOOD PARENTING PRACTICES		
<i>Include a set of practices high in structure and autonomy support which have been shown to support children's food acceptance, awareness of hunger and fullness cues (appetite regulation), nutrition knowledge, healthy food choices and diet quality</i>		
STRUCTURE	Monitoring and Engagement	Provides age-appropriate monitoring of the child's eating and food purchasing behaviors; offers guided choices at meals and snacks; offers appropriate portion sizes; allows child to make contribute ideas for meals and snacks
	Rules and Limit Setting	Places reasonable limits on the child's intake and purchase of unhealthy foods; conveys expectations regarding mealtimes and participation in family meals; limits frequent snacking
	Establishes Routines	Establishes feeding routines; provides developmentally-appropriate feeding environment; provides opportunities for regular family meals; offer meals and snacks at consistent times
	Provision of Healthy Foods	Introduces a variety of healthful foods to child; makes healthy foods available and accessible at meals and snacks
	Covert Control	Controls a child's food intake in ways that are less obvious to the child (e.g., not purchasing unhealthy foods or avoiding unhealthy restaurants)
AUTONOMY SUPPORT	Responsiveness to Cues	Awareness and respect for child's hunger and fullness cues; terminates feeding/no longer offers food in response to fullness cues; does not pressure child to eat; does not demand that children clean their plates
	Praise and Encouragement	Praises child's efforts for trying new foods or eating specific foods; encourages children to try new foods, without coercion; encourages children to develop more autonomy over eating (meal preparation, food shopping), and applauds efforts
	Social Modeling	Uses own behavior, knowledge and values to influence child's eating; provides opportunities for child to learn about healthy eating; involves child in food preparation, food preparation and food shopping; provides knowledge about nutrition and health; models a preference/liking for healthy foods
NEGATIVE FEEDING STYLES		
<i>Refer to parent-centered, coercive and unstructured feeding styles related to either a controlling or permissive general parenting style, in which parents place too many or too little demands on children's self-regulation and behavior, and enforce too much or too little control over children's eating in ways that undermine food acceptance and appetite regulation</i>		
	^a Authoritarian	High demandingness, low responsiveness; high control, low support for child autonomy in eating
	^a Permissive/Indulgent	Low demandingness, high responsiveness; low control, high support for child autonomy in eating
	^a Uninvolved	Low demandingness, low responsiveness; lack of support, structure and control
NEGATIVE FOOD PARENTING PRACTICES		
<i>Include a set of practices that are high in coercive control and low in structure which have been shown to undermine children's autonomy over their eating, and pose risk for the development of problematic eating behaviors and poor diet quality</i>		

Construct		Definitions and Examples
COERCIVE CONTROL	Overt Control	Controls the child's intake in a way that is more obvious to the child (<i>e.g.</i> , strict rules regarding what and how much the child should eat); controls the amount and types of foods the child is offered
	Restriction	Restricts the child's access to or intake of certain foods, often energy-dense foods; keeps certain foods out of reach or hidden
	Intrusive Monitoring	Monitors the types and amounts of food that the child consumes in ways that correspond to overt control; keeps track of the child's intake of certain foods (sweets, snacks, high-fat)
	Pressure	Pressures the child to consume more food and specific foods (<i>e.g.</i> , vegetables); demands that the child clean his/her plate
	Emotional Feeding	Offers food in response to the child's negative emotions or distress; uses food to soothe or combat boredom
	Instrumental Feeding	Uses food as a reward, or withholds food as a punishment; uses bribes and threats to influence the child's eating
UNSTRUCTURED	Neglect	Abdicates responsibility in feeding; lacks involvement and oversight for children's eating; unaware of what, how much or how often child is eating (low monitoring and engagement); limits availability of nutrient-dense foods; lacks consistency in meal and snack times and routines
	Indulgence	Allows child complete control over eating; inconsistent mealtimes, allows child to eat/snack frequently and at will; provides large/unlimited portion sizes; provides unlimited availability of low-nutrient dense foods and low availability of nutrient-dense foods; acts as a short-order cook; does not monitor child's food purchases

Notes: Definitions and examples of feeding styles and food parenting practices were adapted from Vaughn et al. ⁷, and align with general parenting practices described by Maccoby and Martin ¹¹, and applied to the feeding domain by Hughes and colleagues ¹⁰. Within positive feeding styles and food parenting practices, structure aligns with demandingness, and autonomy support aligns with responsiveness. Within negative feeding styles and food parenting practices, coercive control aligns with high demandingness and low responsiveness. Unstructured practices are low in demandingness; neglect is also low in responsiveness, while indulgence is high in responsiveness.

Table 2.**Recommendations for Future Research on Positive Food Parenting**

<p><i>1. Improve Measurement of Key Constructs</i></p> <p>1a. Operationalize and investigate positive food parenting constructs (e.g., structure and limit setting) via observational assessments</p> <p>1b. Develop additional objective measures of child eating behavior</p> <p>1c. Develop measures that are developmentally appropriate across several age groups, allowing for comparison over time</p> <p>1d. Evaluate the cultural appropriateness and relevant of measures in diverse populations</p> <p>1e. Validate of measures of positive food parenting and child eating behavior in diverse populations</p>
<p><i>2. Expand Research on Understudied Aspects of Positive Food Parenting</i></p> <p>2a. Examine possible associations between weaning approaches (e.g., baby-led weaning) and eating and weight outcomes during infancy</p> <p>2b. Better understand the nature and role of parental monitoring in promoting healthy eating behaviors during middle childhood, and adolescence</p> <p>2c. Determine, through longitudinal and intervention studies, whether family meals are causally associated with positive child eating and weight outcomes during early childhood, middle childhood, and adolescence</p> <p>2d. Expand the body of research examining impacts of positive food parenting and general parenting on eating behaviors and weight status during middle childhood and adolescence</p> <p>2e. Across all developmental periods, increase the number of studies that include (or exclusively focus on) fathers and other non-maternal caregivers, single parents, and same-gender parents</p>
<p><i>3. Conduct Longitudinal Research to Understand Stability vs. Change in Positive Food Parenting across Development</i></p> <p>3a. Understand stability vs. change in caregivers' feeding practices and styles across early feeding modes, including breastfeeding, bottle-feeding, and introduction to complementary foods</p> <p>3b. Understand stability vs. change in feeding practices and styles across infancy, early childhood, middle childhood, and adolescence</p> <p>3c. Identify potential predictors and impacts of stability vs. change in feeding practices and styles across development</p>
<p><i>4. Employ Longitudinal and Experimental Designs to Understand Bidirectional Associations and Causality</i></p> <p>4a. Across all developmental stages, examine directionality and causality in the context of longitudinal and interventional designs to clarify the bidirectional nature of the parent-child relationship within feeding and eating contexts</p>
<p><i>5. Further Examine Possible Mediators and Moderators of Effects of Positive Food Parenting</i></p> <p>5a. Consider child temperament or appetitive traits as moderators or mediators of how parenting influences child eating and weight outcomes</p> <p>5b. Understand whether and how parental weight status mediates or moderates effects of parenting styles and practices</p> <p>5c. Incorporate measures of both food-specific parenting and general parenting to better understand how general parenting practices and styles may mediate or moderate effects of food-specific practices and styles on child feeding and weight outcomes</p> <p>5d. Examine the implications of positive parent practices and styles among diverse socioeconomic and racial/ethnic groups, single parents, same-gender parents, and fathers</p>
<p><i>6. Develop and Evaluate Evidence-Based Interventions to Promote Positive Food Parenting at Specific Developmental Stages and Across all Stages</i></p> <p>6a. Identify evidence-based strategies for promoting responsive feeding among mothers and other caregivers (e.g., fathers, day care providers) to infants</p> <p>6b. Examine the potential of existing positive parenting programs to improve children's and adolescents' eating- and weight-related outcomes</p> <p>6c. Develop and evaluate multifactorial interventions that blend the fields of developmental and obesity sciences to understand how to promote positive food parenting and healthy eating and weight-related outcomes</p>