

Satter E; The Satter Feeding Dynamics Model of child overweight definition, prevention and intervention . O'Donahue W, Moore BA, Scott B, . *Pediatric and Adolescent Obesity Treatment: A Comprehensive Handbook*. New York: Taylor and Francis; 2007:287-314

19

The Satter Feeding Dynamics Model of Child Overweight Definition, Prevention, and Intervention

ELLYN SATTER

The Satter Feeding Dynamics Model recommends optimizing feeding and parenting and supporting each child in growing in the way that is genetically and metabolically appropriate at any weight level. According to the Feeding Dynamics Model of child overweight definition, prevention, and treatment, the underlying cause of today's trends toward increasing child overweight is disruption in the feeding relationship and in parenting overall (Satter, 1996, 2005b). The conventional approach of diagnosing overweight, managing energy balance, and striving for weight maintenance or weight loss (Centers for Disease Control, 2000b) exacerbates those distortions in feeding and parenting.

The fundamental principle of the Feeding Dynamics Model is that, provided parents guide the feeding process based on information coming from the child and are reasonably skillful with feeding, children eat as much or as little as they need based on their internal processes of hunger, appetite, and satiety (Adair, 1984; Fomon, Filer, Thomas, Anderson, & Nelson, 1975) and grow predictably (Hamill et al., 1979; Zack, Harlan, Leaverton, & Cornoni-Huntley, 1979) in accordance with their genetic endowment (Garn & Clark, 1976; Pietilainen et al., 2001).

Effective feeding is based on a division of responsibility (Satter, 1986). For the infant, the parent does the *what* of feeding, the infant does everything else: how often, how much, at what tempo, and what level of skill. Beyond infancy, the parent is responsible for the *what*, *when*, and *where* of feeding and the child is responsible for the *how much* and *whether* of eating. Adolescents gradually learn to manage the *what*, *when*, and *where* for themselves, but they continue to depend on parents to take leadership with feeding and maintain the structure of family meals.

The division of responsibility in feeding is based on research in child nutrition and energy balance (Davis, 1928; Fomon, 1993; Fomon et al., 1975; Gesell & Ilg, 1937), child oral-motor (Morris & Klein, 2000) and psychosocial (Greenspan & Lourie, 1981) development, feeding (Ainsworth & Bell, 1969; Birch & Fisher, 1995; Birch, Johnson, & Fisher, 1995; Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004), and parenting (Baumrind, 1971; Maccoby & Martin, 1983).

The division of responsibility is an authoritative model (Baumrind, 1971; Maccoby et al., 1983) defining the parents' role as both taking leadership with feeding and giving the child autonomy with eating. According to Rhee, Lumeng, Appugliese, Kaciroti, and Bradley (2006), authoritative parenting correlates with the lowest incidence of overweight in first-grade children (3.9%) followed in overweight incidence by permissive (9.8%), neglectful (9.9%), and authoritarian parenting (17.1%). Distinctions lie in the ways parents combine the elements of leadership and autonomy. Authoritative parents balance the two, neglectful and permissive parents give autonomy without taking leadership, and authoritarian parents take leadership but do not give autonomy.

The Satter Feeding Dynamics Model as it applies to child overweight prevention and management is outlined in Figure 19.1. The Feeding Dynamics Model is competency based. It is grounded on well-supported evidence that children have a powerful and resilient ability to maintain energy balance and grow in a predictable fashion (Centers for Disease Control, 2000a; Donnelly et al., 1996; Fomon et al., 1975; Pietilainen et al., 2001; Rose & Mayer, 1968). However, for the child to maintain appropriate energy intake, the feeding relationship must be responsive and supportive (Birch et al., 1995; Crow, Fawcett, & Wright, 1980; Neumark-Sztainer, Wall, Story, & Fulkerson, 2004).

Based on this assumption of competency with energy regulation and growth, the feeding dynamics definition of child overweight is not high weight per se, but weight acceleration: abnormal upward weight divergence for the individual child. The principle of conservation of growth, which provides the theoretical basis for growth charts, indicates that most children, most of the time, grow along a particular growth trajectory (Centers for Disease Control, 2000a; Fomon et al., 1975; Hamill et al., 1979; Legler & Rose, 1998; Pietilainen et al., 2001; Zack et al., 1979). That trajectory may be low, in the middle, or high—even above the 95th body mass index (BMI) percentile defined as the cutoff point for child overweight. Thus, consistent growth at any trajectory is normal. Abrupt, rapid, and ongoing acceleration (crossing upward across percentiles) is not (Legler & Rose, 1998). This perspective avoids labeling as overweight the child whose weight/height, or BMI, is above a certain percentile but who is growing consistently. It also identifies for early intervention the child whose measurements fall closer to the mean, but whose weight is nonetheless diverging from his previously established growth pattern (Centers for Disease Control, 2000a; Committee on Nutrition, 2003; Legler & Rose, 1998).

NORMAL GROWTH AND DEVELOPMENT

From the feeding dynamics perspective, to prevent child overweight from birth, feed optimally, support normal growth and development, and avoid disruptive influences. For the infant and young child, and to a lesser extent for older children, nourishing is synonymous with nurturing. Symbolically, in terms of actual time spent, and in terms of consequences to normal growth and development, feeding is of primary importance during a child's early life. Appropriate feeding supports the child in achieving developmental tasks at every stage as well as instills positive eating attitudes and behaviors. Problems with feeding can impair normal growth and development, but on a more profound level, they can reflect distortions in parent-child interaction that interfere with the child's positive psychosocial development.

Feeding is parenting, and appropriate feeding allows children to achieve developmental tasks at every stage (Satter, 1995). Health care professionals who understand the principles and practices of optimal, stage-related feeding (Satter, 2000a) can concretely teach good parenting within the feeding context. Good parenting with feeding is observing a division of responsibility in feeding, guiding the feeding process based on information coming from the child with respect to inclinations for eating and physical abilities, and accepting the child's constitutionally endowed growth (even when that growth exceeds standard cutoff points) (Satter, 2006).

Satter Feeding Dynamics Model of Child Overweight Prevention and Treatment^{i,ii}

Ellyn Satter, MS, RD, LCSW, BCD

Many of today's children are getting too heavy. This is clearly indicated by population-wide surveys showing increasing percentages of children whose BMI plots in excess of diagnostic cutoff percentiles. Those trends indicate that environmental influences are disrupting children's ability to regulate energy balance and grow consistently.

1. *Perspective:* The feeding dynamics model of child overweight is competency-based. It is grounded on well-supported evidence that children have a powerful and resilient ability to maintain energy balance and grow in a predictable fashion, *provided* the feeding relationship is appropriate.
2. *Definition:* The feeding dynamics definition of child overweight is not high weight *per se*, but weight *acceleration*: Abnormal upward weight divergence for the *individual* child. The child is compared only to *himself*, not to statistical cutoff points established for the purpose of population-wide evaluation.
3. *Exploring causation:* The feeding dynamics model considers medical and psychosocial issues, food selection, parenting, the feeding relationship, and child development. In identifying causes of weight acceleration, the feeding dynamics question is:
 - a. *Not*, how do we get this child to lose weight?
 - b. *But rather*, what is happening in this child's environment to undermine his considerable ability to regulate energy balance and grow predictably?
4. *Typical causes:* Clinically and from an examination of the research literature, it emerges that there are four typical causes, alone or in combination, for a child's weight acceleration:
 - a. Misinterpretation of normal growth.
 - b. Restrained feeding and circumstances that mimic restrained feeding.
 - c. Poor feeding practices.
 - d. Stress.
5. *Prevention:* Preventing weight acceleration mandates supporting normal growth and development *and* avoiding disruptive influence by:
 - a. Optimizing feeding from birth and throughout the growing-up years by maintaining a division of responsibility in feeding.
 - b. Maintaining a division of responsibility in *activity*.
 - c. Supporting parents in accepting consistent weight, even if that weight is at or above levels defined as "overweight" or "at risk of overweight."
6. *Treatment:* Treatment of child overweight from feeding dynamics perspective involves:
 - a. Careful assessment *of the individual child* to identify causes of weight acceleration.
 - b. Constructing and enacting a treatment plan to correct those causes, supporting parents in optimizing feeding and activity and holding steady with feeding during their child's transition to internally regulated eating.
 - c. Letting the child's weight establish its own level in response to a. and b. Depending on the child's metabolic patterns, this weight trajectory may stabilize at the current level or gradually decrease.

ⁱ For more information, see Ellyn Satter's *Your Child's Weight: Helping without Harming*.

ⁱⁱ To find references, further information and handouts, go to www.EllynSatter.com and click on *Child Overweight*.

Homeostasis and Attachment: Infancy

Encourage parents to feed on demand, based on information coming from the infant with respect to timing, tempo, amount, and level of skill. Feeding in this tuned-in, responsive fashion allows the infant to eat as much or as little as he needs, provides the experience of eating as being pleasant and rewarding, supports the infant's ability to calm and organize himself, gives him a sense of being loved, and provides the experience of autonomy—of being respected as an individual.

Separation-Individuation: Toddler Years

Separation-individuation begins toward the end of the first year as the child begins to make the transition from the demand feeding of an infant to the meals-plus-snacks routine of an older child. The infant who has started this transition cares deeply about feeding himself. The toddler who is well into separation-individuation is skeptical of new food and tests limits by begging for food handouts between meals. Include the toddler in family meals and sit-down snacks at predictable times, allow him to eat what and how much he wants from what grownups provide, but do not let him panhandle for food between meals. Provide meals that are considerate of the child's limitations and capabilities without catering to his likes and dislikes or limiting the menu to foods the child readily accepts. Feeding in this authoritative fashion gives security, as it supports the toddler's experience of being a separate person and continues to make eating rewarding by avoiding introducing conflict and anxiety around eating. It also supports the toddler's task of somatopsychological differentiation: of learning to sort out his feelings and sensations and apply the proper solution.

Initiative and Industry: Preschool and School-Age Child

Continuing to give the preschooler or school-age child both structure and autonomy allows him to follow his own inclinations with eating at the same times as he pleases his parents. Teach parents to maintain the structure of family meals and sit-down snacks. To avoid precipitating heightened interest in "forbidden food" (Fisher & Birch, 2002), encourage parents to include a variety of food, including high-fat, high-sugar food. When the child enters the upper grades, support his eating competence by gradually teaching him to manage the timing and choosing of his own after-school snack.

Identity: Adolescent

The feeding dynamics goal is to gradually teach the adolescent to manage the what, when, and where of feeding, equipping her to manage food after she leaves home. However, this teaching is within the context of parents continuing to take primary responsibility for family food management. This responsibility includes having regular family meals and laying out the expectation that the adolescent will participate in those meals.

CAUSES OF WEIGHT ACCELERATION

Application of the Feeding Dynamics Model encourages providers and parents to avoid treating the symptom of weight acceleration with food restriction. Instead, it stresses asking the fundamental question: What is interfering with this child's normal ability to eat as much as he or she needs to grow in a consistent fashion? That is, what is disrupting this individual child's energy homeostasis and distorting his normal growth trajectory? To answer this question, the Feeding Dynamics Model considers medical and psychosocial issues, food selection, parenting, the feeding relationship, and child development (Davies et al., 2006; Satter, 1996, 2005a). Clinically, and from an examination of the research literature, it emerges that there are four typical causes, alone or in combination, for a child's weight acceleration.

1. Misinterpretation of Normal Growth

Clinical observations indicate that in many, if not most, cases the child's "weight problem" is in the eyes of the beholder: health professionals, parents or even extended families, neighbors, and society in general. Sometimes the child is not even large, but is simply the child of heavy parents and therefore perceived as being "at risk" of becoming overweight. The often casual labeling of the child as overweight sets off a chain of events, including food restriction and struggles around feeding, undermines the child's ability to regulate food intake, and creates the very problem the overweight "diagnosis" is intended to address.

However, clinical observations must be considered hypothetical until they are tested by research. Research, in fact, confirms these observations. Diagnosing overweight appears to distort feeding and growth. Irrespective of actual weight status, the weight of infants (Burdette, Whitaker, Hall, & Daniels, 2006) and children (Faith et al., 2004) tends to accelerate when parents perceive them as overweight and are concerned about it. Also irrespective of actual weight status, when children perceive themselves as overweight, even 5-year-olds try to restrict their food intake and their weight accelerates (Shunk & Birch, 2004). Associations among girls' weight concerns, body dissatisfaction, and weight status increase with age (Davison, Markey, & Birch, 2003). In a group of similar-size children, the ones who perceived themselves as overweight felt flawed in every way: not smart, not physically capable, and not good about themselves (Davison & Birch, 2001).

Despite the fact that no cure exists, early diagnosis of child overweight is emphasized (Committee on Nutrition, 2003) and clinicians decry parental refusal to accept the overweight diagnosis (Jain et al., 2001). According to expert committee consensus, at risk of overweight for children ages 2 to 20 years is a BMI for age between the 85th and 95th percentiles and overweight is a BMI for age at or above the 95th percentile. According to the expert committee, "An appropriate final goal for all children and adolescents who are overweight or at risk for overweight is a BMI for age below the 85th percentile" (Barlow & Dietz, 1998). A child is also considered at risk for overweight if one or both parents has a BMI of 30 or greater (Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, 1998). A currently convened expert committee is considering reclassifying children whose BMI is at or above the 85th percentile from "at risk of overweight" to "overweight" (Moynihan, 2006).

Arbitrary BMI cutoffs deliver false positives. While statistical cutoff points are appropriate for the purpose of population-wide evaluation, they are not appropriate for the diagnosis of individual children. According to the Feeding Dynamics Model, that diagnosis can only be made on the basis of longitudinal growth tracking and identification of weight acceleration. Children growing at the 85th and 95th percentiles are unusual, but not necessarily abnormal (Hamill et al., 1979). Five percent of a given population of children normally plot at the 95th percentile or above and 15% plot at the 85th percentile or above. According to 2003–2004 National Health and Examination Survey (NHANES) data, 18% of children currently have a BMI at the 95th percentile or above (Ogden et al., 2006). The reality is that 5% of children belong statistically in that category, reducing the actual incidence of disproportionately high BMI to 13%, a figure that is still concerning.

Body mass index cutoffs deliver false positives for physically dense children as well. Since BMI measures body density, not body fat, lean children with relatively heavy bones or high muscle mass may plot in diagnostic ranges. This is particularly evident in certain ethnic groups. Hispanic children are short, broad, and solidly built, and as a result, their median BMI falls at roughly the 85th percentile of Centers for Disease Control (CDC) growth charts (Ryan, Roche, & Kuczmarski, 1999). The same applies to Navaho children (Eisenmann et al., 2000). Peruvian children have low body fat, but high weight/height because of their short stature, high muscle mass, and a resultant high percentage of body water (Boutton et al., 1987). As Wright, Parker, Lamont, and Craft (2001) found in the Thousand Families longitudinal study, while BMI—that is, body density—tracks from childhood to adulthood, body fatness does not.

Concern about tendencies for “overweight” infants (defined as weight/length in the 95th percentile or greater) to become overweight adults (BMI 25 or greater) is based on similar flaws in statistical logic, as well as misunderstanding of normal growth processes. Body weight tends to be transmitted genetically (Bouchard et al., 1990; Garn & Clark, 1976; Pietilainen et al., 2001; Stunkard, Harris, Pedersen, & McClearn, 1990). Given genetic transmissibility, it is logical for large infants and children of large parents to grow fast and become large adults. Such patterns, rather than being a warning sign of impending adult obesity (Stettler, Kumanyika, Katz, Zemel, & Stallings, 2003; Stettler et al., 2005; Stettler, Zemel, Kumanyika, & Stallings, 2002), simply describe normal growth. (The logical likelihood that an “overweight” child would become an “overweight” or “obese” adult becomes particularly apparent when cutoff points for both child and adult “overweight” are expressed in similar, nonpejorative terms. The 95th percentile is roughly two standard deviations above the mean. The current cutoff point for the diagnosis of adult overweight is set at the mean: a BMI of 25. Little wonder then that a child whose BMI is +2 SD would grow up to be an adult whose BMI is above the mean!

While large parents tend to have large children, growth also tends to diverge toward the mean. Relatively small infants become larger later in childhood, and relatively large infants become smaller (Garn, Pilkington, & Lavelle, 1984). Unless the process is disrupted by food restriction, the tendency in childhood is toward slimming. Less than 25% of infants who plot in the 95th percentile weight/length plot in that same percentile as young adults. The percentages of overweight retained into adulthood among preschool children was 26% to 41%, and among 9- to 15-year-olds was 42% to 63% (Serdula et al., 1993; Whitlock, Williams, Gold, Smith, & Shipman, 2005). Conversely, there is no basis for the assumption that a person who leaves childhood slim will be slim for life. More than 79% of obese 36-year-olds first became obese in early adult life. Individuals who became obese at between 11 and 36 years of age were often not the most overweight in childhood (Braddon, Rodgers, Wadsworth, & Davies, 1986).

2. Restrained Feeding and Circumstances That Mimic Restrained Feeding

Clinical observations show that the onset of a child's weight acceleration often coincides with the institution or exacerbation of food restriction. Children whose food intake is restricted become preoccupied with food and are prone to overeat when they get the opportunity. Even during infancy, parents who perceive their child as being overweight are at risk of restricting food intake (and being given advice to restrict), thereby creating the very condition that they fear. Children are a captive audience with respect to food access. Children become afraid of going hungry when their food intake is restricted for the purpose of weight management, because of erratic or unreliable feeding, or when economic circumstances limit the parents' ability to provide. Parents who are chronic dieters and overconcerned about their own weight or health are particularly prone to restrict a child's food intake, either consciously or unconsciously.

When distortions in feeding and parenting are corrected and stay corrected, children change and stay changed. Children recover their sensitivity to their internal regulators of food intake when parents restore a division of responsibility in feeding, provided parents extinguish all efforts, direct and indirect, to manage the amount and type of food the child eats. Once children experience parents as being trustworthy, they rediscover their internal regulators of hunger, appetite, and satiety. How long that takes depends on the child's age. Toddlers, preschoolers, and young school-age children take 2 to 4 weeks. Older school-age children take 6 to 8 weeks and benefit from being in sessions with their parents so together they can work out the kinks in establishing the division of responsibility in feeding. Adolescents take 10 to 12 weeks and do best when parents and children are seen separately from one another. Parents address feeding and parenting; the child learns to internally regulate within the context of the parents' supportive limits.

Research verifies these clinical observations. Restrained eating and feeding—the chronic tendency to eat and provide less food or less-appealing food than desired—has become normative in

our culture, with 64% of men and 78% of women attempting to lose or maintain weight at any one time (Serdula et al., 1999). While food restriction may be normative, it hardly represents “competent” eating. Competent eating is providing regular and reliable access to ample and rewarding food and eating enough to be satisfied, both aesthetically and calorically, based on the utility of biopsychosocial processes: hunger and the need to survive, appetite and the desire for subjective reward, and the biological tendency to maintain a preferred and stable body weight (Satter, 2007).

Food restriction with respect to either amount (Faith, Scanlon, Birch, Francis, & Sherry, 2004) or type (Fisher & Birch, 2002) of food precipitates a counterregulatory effect and the child’s weight accelerates. Girls who were classified as at risk for overweight at age 5 years reported significantly higher levels of restraint, disinhibition, weight concern, and body dissatisfaction by age 9 years (Shunk & Birch, 2004). The Eating in the Absence of Hunger (EAH) protocol measures disinhibition with eating by giving children a standard lunch, then giving free access to snack foods. In EAH trials, young girls (ages 5 to 7 years) whose access to “palatable” foods (high-sugar, high-fat snack foods) was restricted by parents were more likely to eat those foods—and feel badly about it—than girls who were not restricted. Negative feelings were associated not with the amount eaten, but with the feeling that parents did not want them eating those foods (Fisher & Birch, 2000). Restricted girls were also more likely to be overweight than unrestricted girls (Birch & Fisher, 2000). Being overweight at age 5 years potentiated parents’ tendency to restrict and children’s tendency to eat in the absence of hunger at 7 and 9 years of age (Birch, Fisher, & Davison, 2003). Food restriction, in turn, increases the tendency in adults and children to use food for emotional reasons (Herman, Polivy, & Esses, 1987). Interpersonal stress increases snacking in children whose food intake has been restricted, but decreases it in unrestrained children (Roemmich, Wright, & Epstein, 2002).

The counterregulatory impact of food restriction on body weight is particularly evident in pre-adolescents and adolescents. The BMI of 12- to 14-year-old girls was significantly correlated with the degree of dietary restraint: as restraint went up, so did BMI (Hill, Rogers, & Blundell, 1989). In the 4 years of high school, girls who identified themselves during their freshman year as using dietary restraint, self-labeled dieting, exercise for weight-control purposes, and appetite suppressant/laxative abuse were at increased risk for obesity onset (Stice, Cameron, Killen, Hayward, & Taylor, 1999). Thirteen- to 16-year-olds who restricted themselves became heavier, whether their weight reduction efforts were healthful (more fruits, vegetables, and whole grains, less fat, more activity) or unhealthful (extreme food restriction, diuretics, laxatives, diet pills, vomiting) (Neumark-Sztainer et al., 2006). Sixteen- to 19-year-olds who were told by their doctor that they were overweight were more likely to initiate food restriction (Kant & Miner, 2007). Professionally administered weight management programs appear to have similar limitations with respect to achieving target eating and weight outcomes. Among children 8 to 13 years of age, intensive, generally family-based, short-term (1 year or less) behavioral approaches produced modest to no changes in BMI. Extensive reviews of weight management interventions found, at most, a 10% decrease in participant BMI values, a decrease that was rarely maintained for more than 1 year (Epstein, Myers, Raynor, & Saclens, 1998; Whitlock et al., 2005). To arrive at these generalizations about weight loss, all reported outcomes were converted to reduction in BMI. For instance, a reported 17% reduction in percent overweight converts to a 10% reduction in BMI.

For a child, any feeding practice that fails to reassure the child of getting enough to eat mimics restrained feeding and precipitates a counterregulatory effect. Erratic or inconsistent family meals correlate with increased rates of child overweight (Taveras et al., 2005). Food-insecure children—those whose parents cannot feed them reliably—also display food preoccupation and tendencies to weight gain (Alaimo, Olson, & Frongillo, 2001). Food insecurity growing out of poverty correlates with increased child overweight in 15- to 17-year-olds, but not 12- to 14-year-olds (Miech et al., 2006). In low-income children, tendencies to overweight are neutralized by access to food assistance programs, such as food stamps, school nutrition, and Women, Infants, and Children (WIC) (Jones, Jahns, Laraia, & Haughton, 2003).

Parents' own eating attitudes and behaviors impact children's eating and body weight. In the Framingham Children's longitudinal study, parents who displayed high levels of disinhibited eating, especially when coupled with high dietary restraint, appeared to foster the development of excess body fat in their children. Children whose parents had particularly high scores on both restraint and disinhibition had particularly large increases in BMI (Hood et al., 2000). Overweight mothers felt responsible and were likely to monitor the amounts and types of food their children ate. Mothers' bulimia correlated with controlling feeding practices in daughters and fathers' body dissatisfaction correlated with monitoring of sons' food intake (Blissett, Meyer, & Haycraft, 2006). Infants (Burdette et al., 2006) and children (Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002) of mothers who had high concern about their child's overeating or becoming overweight produced children with greater fat mass than did those mothers who did not have high concern.

3. Poor Feeding Practices

Poor feeding practices cross the lines of division of responsibility in feeding and, in the process, undermine children's eating capability, including their ability to regulate food intake and grow appropriately. Based on clinical observations, children react to poor feeding practices by becoming upset—*anxious, angry, rebellious*—and their emotional arousal precipitates errors in food regulation. Once internal regulatory processes have been undermined, the child is vulnerable to errors in food regulation and may undereat or overeat. Uncorrected, these errors persist into adolescent and adult life.

Certainly, restricting a child's food intake is a poor feeding practice. There are others. Failing to feed in a developmentally appropriate way is a poor feeding practice: giving solid foods too early, failing to wean when the child is developmentally ready, letting the toddler graze for food, or failing to maintain the structure of meals and snacks for the older child or adolescent. Poor parenting with feeding is another. Parents may be permissive or neglectful with feeding on the one hand, or authoritarian with feeding on the other. A toddler who is allowed to graze for food may overeat and gain too much weight, undereat and grow poorly, or be such a good regulator that he grows consistently. A headstrong toddler is likely to undereat and grow poorly when his drive for autonomy is thwarted by overbearing feeding tactics. He becomes so anxious and angry that he simply cannot sense that he is hungry. In contrast, a compliant toddler in a similar feeding situation may deny his drive for autonomy, overeat, and gain too much weight.

Parents may do poorly with feeding because they do poorly with their own eating, because they do not know appropriate feeding practices or are getting inaccurate advice, because they react to a child's illness or poor appetite by urging food, or because they are characterologically or situationally too controlling or too chaotic to maintain the division of responsibility in feeding. Failure to provide the structure of family meals and sit-down snacks is an increasingly common and particularly destructive poor feeding practice.

The research substantiates these clinical observations. An estimated 25% to 45% of typically developing children and up to 80% of developmentally disabled children present with feeding problems. Problems include food refusal, difficulty in accepting various food textures, disruptive mealtime behavior, rigid and bizarre food preferences, less-than-optimal growth, and delays in self-feeding (Linscheid, Budd, & Rasnake, 2003). From birth, relatively small but healthy children attract more feeding pressure from their parents and grow less well as a result (Crow et al., 1980). Some toddlers eat more when they are urged by their parents (Crow et al., 1980; Klesges, Malott, Boschee, & Weber, 1986), others eat less (Chatoor et al., 2004). Preschoolers who have difficulty regulating food intake have parents who are controlling of their food intake (Johnson & Birch, 1994). In a study of almost 200 children followed in detail from age 6 months to 16½ years, children who later became fat compared with children who remained slim ate no more calories and no more low nutrient-density or sweet foods, were no more likely to have been bottle fed, were started no earlier on solid foods, were no more likely to have been given high-fat milk, and were no more

likely to have been raised in single-parent families. However, the risk of later obesity increased with toddler lack of feeding-time structure, with increased incidence of toddler feeding problems, and with increased parental concern about obesity (Crawford & Shapiro, 1991).

Failure to provide family meals is a particularly pervasive feeding problem. Currently, one-quarter of surveyed adolescents report two or fewer family meals a week, half report four or fewer (Eisenberg et al., 2004), and the incidence decreases as children progress through adolescence (Center on Addiction and Substance Abuse, 2005). Children with regular family meals do better nutritionally (Gillman et al., 2000), socially, emotionally, academically (Eisenberg et al., 2004; Center on Addiction and Substance Abuse, 2005; Council of Economic Advisors, 2000), and with respect to resistance to overweight (Taveras et al., 2005), drug and alcohol abuse, and early sexual behavior (Center on Addiction and Substance Abuse, 2005; Council of Economic Advisors, 2000). Meal time is far more powerful in predicting positive outcomes for adolescents than time spent in school, studying, church, sports, and art activities, irrespective of parents' race and ethnicity, education and age, family structure and employment, income, and family size (Hofferth, 2001).

Adolescents who have been exposed to poor feeding practices are vulnerable to weight reduction dieting as a way of managing their own food intake, and in fact, 65% of girls and 70% of boys reported dieting to lose weight. Extreme dieting methods were employed by 31% (Neumark-Sztainer, Hannan, Story, & Perry, 2004; Neumark-Sztainer, Wall, et al., 2004). As reported earlier, adolescents who diet using either moderate or extreme methods are heavier 5 years later than those who do not diet (Neumark-Sztainer et al., 2006). On the other hand, adolescents appeared to be protected from weight control behaviors when they feel their parents assign a high priority to structured family meals and maintain a positive atmosphere at family meals (Neumark-Sztainer, Wall, et al., 2004).

Parents' own eating attitudes and behaviors as well as their ability to take appropriate leadership with parenting is reflected in their ability to maintain the structure of family meals. As noted earlier, the division of responsibility in feeding is authoritative parenting, which in turn correlates with the lowest incidence of overweight in first-grade children (Rhee et al., 2006). Parents have trouble giving children appropriate autonomy with eating when they have their own limitations in eating competence. Heavier mothers and mothers with disinhibited eating have greater concern for their children's future health and weight independent of the children's current weight status (Saelens, Ernst, & Epstein, 2000). Maternal body dissatisfaction, internalization of the thin ideal, dieting, bulimic symptoms, and maternal and paternal body mass prospectively predict the emergence of childhood eating disturbances (Stice, Agras, & Hammer, 1999). Parents who have heightened concern about food selection tend to put pressure on their children to eat vegetables or restrict fat, pressure that produces the opposite results of those intended (Galloway, Fiorito, Lee, & Birch, 2005; Lee, Mitchell, Smiciklas-Wright, & Birch, 2001).

4. Stress

Clinical experience indicates that stress can cause excessive weight gain, provided the individual has previously learned to misuse food for emotional reasons. It is normal to use eating as one of a variety of ways of coping. We all eat to celebrate, soothe ourselves, or find pleasure. However, eating is misused when it is done reflexively in an attempt to address or avoid emotional arousal, especially when the individual depends on eating as virtually the only means of coping.

Eating for emotional reasons is most powerfully instilled in childhood. For stress to cause weight acceleration, children must have learned to substitute food demands and eating for what they actually feel, want, and need. That learning grows out of distortion in the feeding relationship. Most often that distortion is restrained feeding, but other poor feeding practices can teach stress-related eating as well, such as indiscriminately feeding a fussy infant, giving constant food handouts to a fractious toddler, or failing to provide older children the security and support of rewarding family meals.

For a child whose food intake is restricted, hunger is the constant and pervasive reality. Chronic hunger profoundly disrupts the child's social and emotional development and undermines parent-child relationships. The hungry child has great difficulty achieving developmental tasks at every stage, and parents who feel obligated to make their child go hungry are handicapped in meeting their child's needs. The hungry and chronically dissatisfied infant cannot achieve homeostasis, become attached, or build trust in herself and other people because what she most wants and needs is the very thing that parents are reluctant to give her: enough to eat. The hungry, clingy, and demanding toddler cannot gain autonomy because exploring and defying carries the risk of alienating the people who control the food supply. The hungry, self-preoccupied older child has trouble with initiative, industry, and identity because she is caught in a dilemma: does she comply with parents, gain their approval, and continue to go hungry, or defy, risk shame and punishment, and get enough to eat?

Research verifies the connection between stress and excessive child weight gain. In previously normal weight 8- to 11-year-old children, clinically meaningful behavior problems were independently associated with an increased risk of becoming overweight (Lumeng, Gannon, Cabral, Frank, & Zuckerman, 2003). Compared with children who gained weight at an appropriate rate, 7- to 13-year-old children who gained weight at an accelerated rate experienced elevated levels of psychosocial stress. The association between stress and weight gain was particularly marked for children between 10 and 13 years of age (Mellbin & Vuille, 1989). Compared with children who had no psychiatric disorder, BMI was two points higher after 10 to 15 years in children who had been diagnosed with major depression at age 6 to 17 years (Pine, Goldstein, Wolk, & Weissman, 2001).

Less-than-optimal parenting stresses children, which in turn correlates with increased child overweight. As noted elsewhere, authoritative parenting tends to produce fewer overweight children than permissive, neglectful, and authoritarian parenting (Rhee et al., 2006). Repeated parent interviews as children aged from 6 to 22 years revealed both obese boys and girls were four to five times more likely to have been exposed earlier in life to low parental education, physical neglect, and poverty. Among girls only, additional early adversities were harsh maternal punishment and loud arguments between parents. Poor parental maintenance of the home appeared to be particularly obesogenic for girls (Johnson, Cohen, Kasen, & Brook, 2002). Compared with mothers of nonobese children, mothers of obese children ages 8 to 16 years reported significantly greater psychological distress and greater family conflict. Both mothers and fathers reported negative mealtime interactions (Zeller et al., 2007).

Indirect measures of child stress correlate with higher levels of child overweight. Those indirect measures include disturbance in children's sleep patterns (Beebe et al., 2007), school children's dirty and ragged clothing (Lissau & Sorensen, 1994), child constipation (Pashankar & Loening-Baucke, 2005), and parents not knowing about children's sweets intake (Lissau, Breum, & Sorensen, 1993).

Hunger creates impairment in all ways—physically, emotionally and socially (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950)—and directly increases stress on food-insecure parents and children. According to data from NHANES, 86% of low-income parents and 14% of middle-income parents describe themselves as being food insufficient (Alaimo, Olson, Frongillo, & Briefel, 2001). With increasing food insecurity, a greater percentage of mothers experienced major depressive episodes or generalized anxiety disorders. The percentage of children with a behavior problem also increased with increasing food insecurity, even after adjustment for maternal mental health issues (Wang & Zhang, 2006). Irrespective of family income level, U.S. adolescents show a strong association between food insufficiency and depressive disorder and suicidal symptoms (Alaimo, Olson, & Frongillo, 2002). As noted earlier, younger but not older adolescents appear to be protected against poverty-related overweight (Miech et al., 2006), perhaps because parents give younger but not older children preferential access to limited family food supplies. Ironically, for more than two-thirds of adolescents, hunger is a chronic reality as the result of self-imposed food restriction in the pursuit of weight loss (Neumark-Sztainer, Hannan, et al., 2004).

THREE CASE EXAMPLES OF DISTORTED FEEDING DYNAMICS

Case 1. Mary: Misinterpretation of Normal Growth, Restrained Feeding, Poor Feeding Practices, Stress

Nineteen-year-old Mary was referred by her psychotherapist for treatment of her bulimia and overweight. As indicated in Figure 19.2, Mary's current weight for age plotted at the 97th percentile. (Weight for age is used instead of weight/length or BMI because lengths and heights were not taken according to prescribed practice.) From her longitudinal pattern, it appeared that her weight problem had begun with a rapid gain when she was 10 years old. Mary could explain her weight

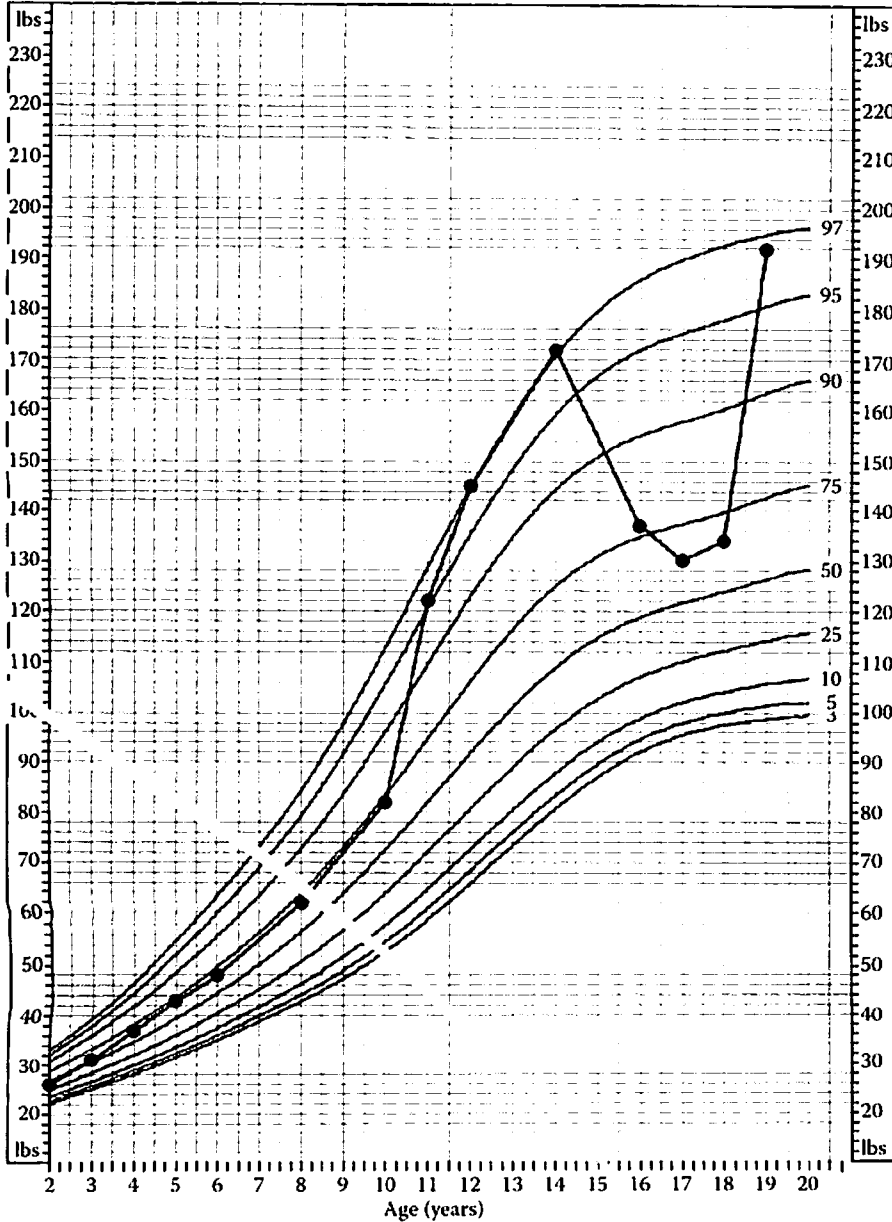


Figure 19.2

inconsistencies after age 14 years: she joined Weight Watchers and lost almost 50 pounds by age 17 years. Then, as Mary put it, "the minute I hit bottom I started eating again and gained it all back and more besides. Then I started throwing up." But explaining what had happened before age 14 years was more complicated.

Retrieving Mary's growth records from birth and reconstructing the story from her medical records filled in the missing pieces. As indicated in Figure 19.3, for her first 5 months Mary's weight and weight/length (which is not shown; while they are based on faulty length and height data, the weight/length and BMI values indicate that Mary was relatively heavy; had Mary been tall as well as heavy, her weight/length or BMI would have plotted closer to the 50th percentile) plotted just above the 97th percentile. At age 5 months, according to the family's story, Mary's doctor warned her

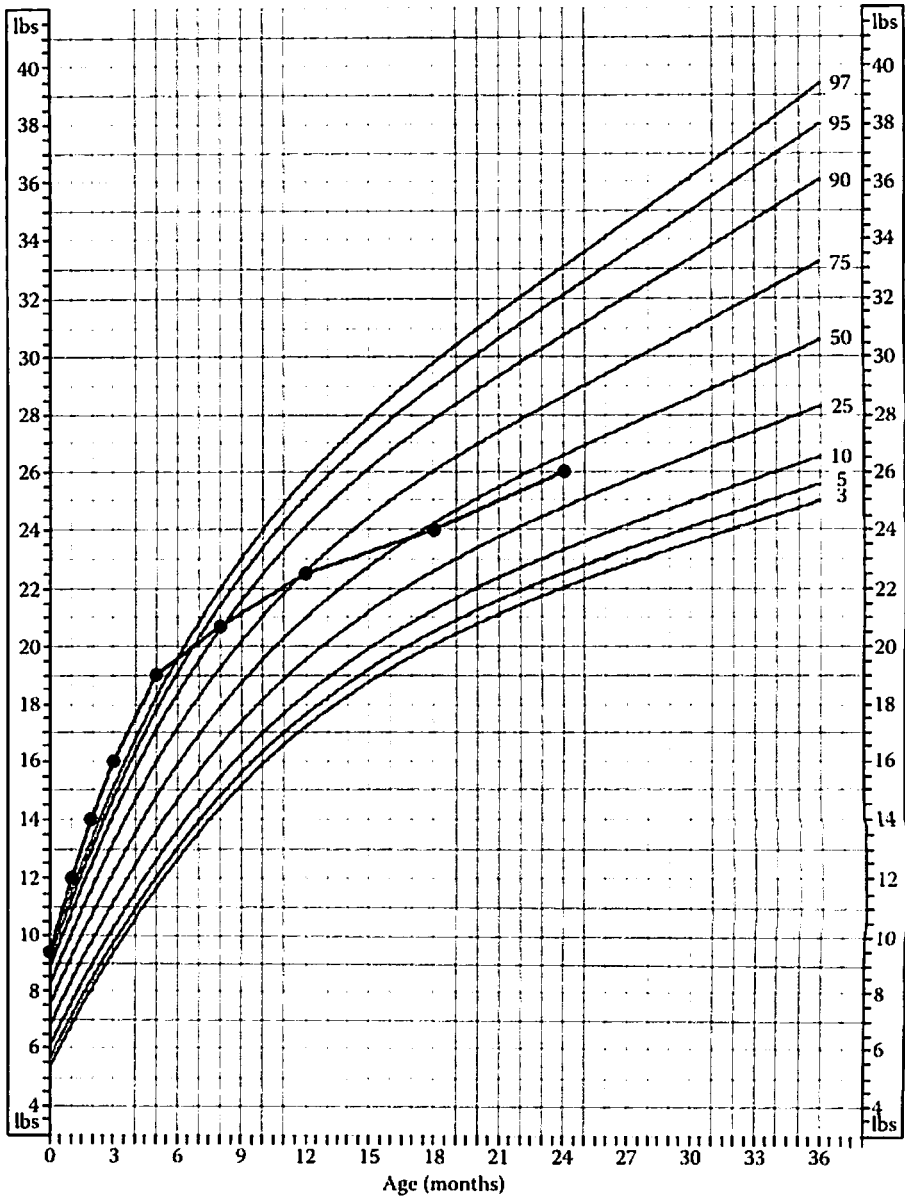


Figure 19.3

mother, "if you let her stay obese, she will develop too many fat cells and she will be fat for life." The doctor was talking about Hirsch's fat cell theory of obesity, popular in the late 1970s and periodically revived since. Hirsch may have been right about "fat cells," but he was wrong about people. Fat babies have no greater risk of growing up fat than thin ones (Crawford et al., 1991; Serdula et al., 1993.) From then on, Mary's parents restricted her food intake, forcing her weight down to the 50th percentile by the time she was 18 months old and keeping it between the 50th and the 75th percentile until she was 10 years old. At that point, a crisis so serious erupted between her parents that Mary's father left the family. Mary's mother became so depressed and overwhelmed that she not only stopped restricting Mary, she stopped feeding her as well. It was disastrous for Mary emotionally, and disastrous for her weight. After years of food restriction, Mary had long since lost touch with her internal regulators of hunger, appetite, and satiety. Without her mother's external controls, she was left with no controls at all. Her weight climbed rapidly, then leveled off back where she started—just above the 97th percentile. Could that have been where her weight belonged all along?

On the other hand, most relatively fat infants and toddlers slim down as they get older (Whitlock et al., 2005). Restricting Mary's food intake may have deprived her of that natural slimming process.

Causes of Mary's Weight Acceleration.

Misinterpretation of Normal Growth. Despite 5 months of consistent growth, and therefore evidence of her ability to maintain energy homeostasis, Mary's doctor and mother colluded in interpreting her high body weight as overweight.

Restrained Feeding. In response to this misinterpretation, Mary's food intake was restricted beginning at age 5 months and persisting until age 10 years. In the process, she lost track of her internal regulators of hunger, appetite, and satiety. When her mother stopped controlling her eating, Mary unsuccessfully tried to restrict herself.

Poor Feeding Practices. When Mary was 10 years old, feeding changed from deprivation to neglect. Her mother stopped feeding her at all, the ultimate in poor feeding practices, and Mary was left to fend for herself. Years of restrained feeding taught Mary that the way to manage food intake was with food restriction. However, she lacked the skills and determination to deprive herself the way her mother had deprived her and she rapidly gained weight.

Stress. At age 10 years, Mary's loss and anxiety were extreme, past and present food restriction exacerbated her tendency to eat for emotional reasons, and she showed stress-related eating and weight gain. Mary's father was gone, her mother was incapacitated, and Mary was on her own emotionally. She turned to eating to try to ease her misery and anxiety.

Intervention with Mary's Eating and Weight

The assessment helped Mary to understand what had happened to her with respect to her eating and weight and to forgive herself for her weight gain. From the feeding dynamics perspective, here were the recommendations for intervention:

Avoid Food Restriction and Striving for Weight Loss. Food restriction would represent more of the same with respect to Mary's eating and weight. Further dieting would likely exacerbate her pattern of reactive overeating and weight gain. Focusing on dieting would also divert Mary's emotional energy from psychotherapy.

Address Psychosocial Issues. In psychotherapy, Mary was addressing her lack of trust in other people, low emotional self-awareness, and low self-confidence. However, psychotherapy could not correct the distortion in her eating attitudes and behaviors.

Address Eating Attitudes and Behaviors. To address Mary's conflict and anxiety about eating, as well as help her learn internally regulated eating, Mary was coached in regulating her food intake based on hunger, appetite, and satiety.

Address Activity. Mary pursued activity at a high level when she dieted, then suspended activity when she stopped dieting. The task was to help Mary find rewarding, realistic, and therefore sustainable ways of being active.

Let Weight Find Its Own Level. Rather than striving for a particular weight outcome, let Mary's weight find its own level in response to competent eating and sustainable activity. Only time would tell what that weight level would be. However, in view of Mary's past history, weight would likely remain at or near where it was when she presented for assessment.

Outcome with Mary

Mary chose to address her eating and activity and let her weight do what it would in response to her changes in behavior. It would not have been surprising had she chosen to reject the assessment and recommendations and try still again to lose weight. She was young and slimness had been an ideal for as long as she could remember. But in psychotherapy she was learning to replace her hope for weight loss with hope for what mattered more and what she could achieve—feeling good about herself, discovering her capabilities, and having rewarding relationships with other people.

Mary worked hard and successfully achieved internally regulated eating. She learned to make feeding herself a priority, developed the ability to eat what and as much as she wanted without going out of control, and she found rewarding ways of moving her body. Her weight remained about the same as it had been at the assessment, and she came to terms with that. Her physical self-esteem had improved somewhat as a result of the eating intervention, but the major improvement came as a result of psychotherapy. Clinical experience demonstrates that physical self-esteem is closely related to self-esteem overall, and self-esteem can only change through corrective life experience or psychotherapy.

Case 2. Wellington: Poor Feeding Practices, Restrained Feeding, Misinterpretation of Normal Growth, Stress

According to the weight-for-age plottings in Figure 19.4, 6½-year-old Wellington's weight was accelerating rapidly from the 97th percentile. Wellington's growth record from birth (Figure 19.5) shows that he grew appropriately from birth until age 12 months, then his weight began to accelerate.

While growth chart plottings outside the percentile curves are graphically impressive, they tell nothing about the magnitude and pattern of growth. To get an accurate longitudinal picture of his growth pattern, Wellington's weight-for-age values were calibrated by converting them into z-scores, or standard deviations above the mean. Then z-scores were plotted against his age, as in Figure 19.6 (Krick, 1986). To compare z-scores with growth records, consider that the 50th percentile is the median, or 0 SD, the 85th percentile is close to 1 SD, the 95th percentile is 1.6 SD, and the 97th percentile is 1.8 SD above the median (Krick, 1986). Figure 19.6 shows that Wellington's weight remained around the median for the first year, then rapidly accelerated to more than +4 SD by age 2 years. His weight stayed at that level for a year, then gradually decreased until, at age 6½ years, it plotted at +3.3 SD. In contrast to the apparent continuing weight gain conveyed by weight/height plottings in Figure 19.4, Wellington's weight was gradually decreasing. His major weight acceleration was between ages 1 and 2 years.

Wellington was breast fed on demand for the first 3 years. Breast-feeding was conducted appropriately for the first year. He regulated well during the time he was exclusively breast fed, when semisolid food was introduced, and when he started eating from the family table. But he was inap-

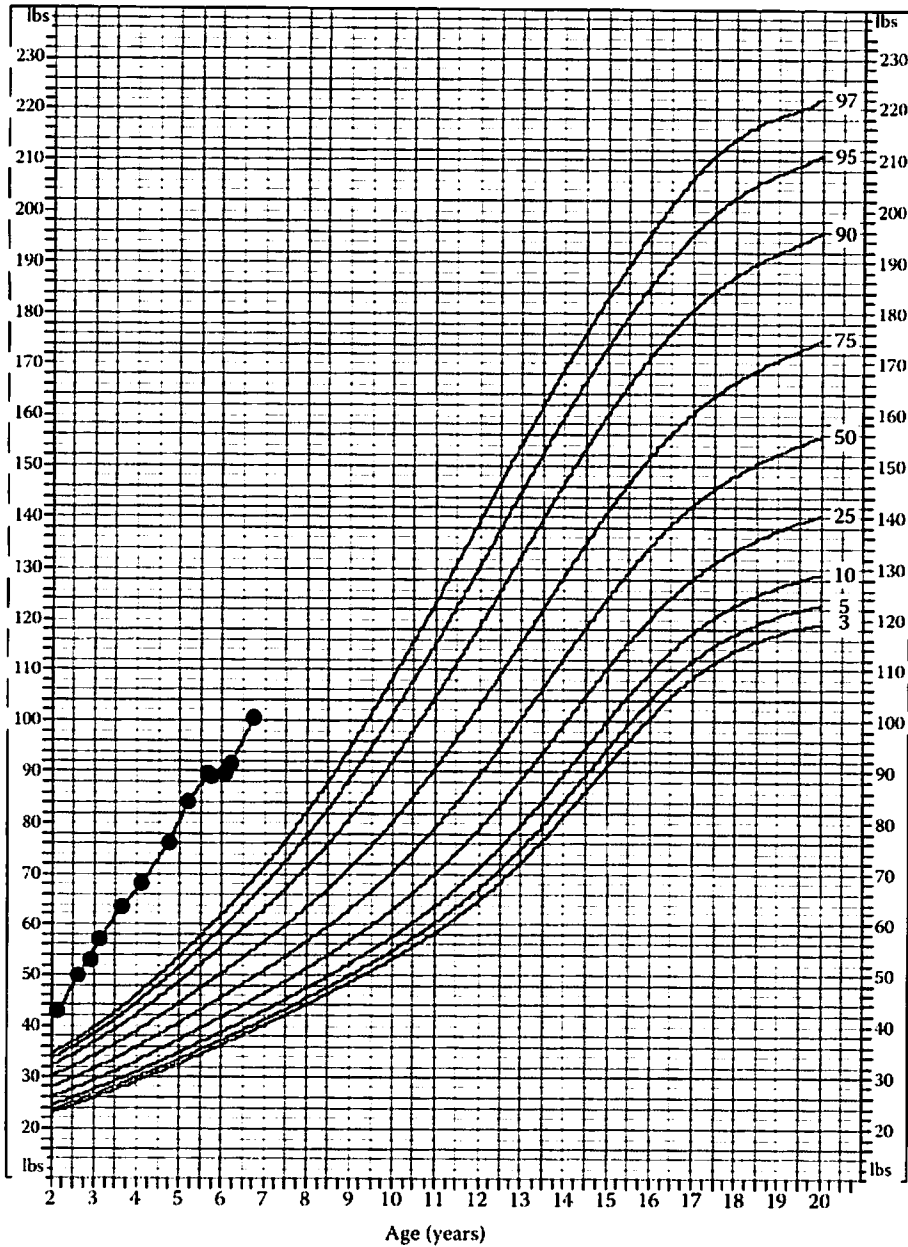


Figure 19.4

propriately fed as a toddler, and he regulated poorly. His mother continued to breast feed him on demand. She fed Wellington for nourishment, to calm him down, to distract and entertain him, and to keep him company. As a consequence, Wellington failed to achieve his toddler tasks of separation-individuation and somatopsychological differentiation.

Wellington's behavior in the family interview revealed his lack of earlier developmental mastery as well as the manner in which his lack of mastery served his parents. An overly talkative, highly active child who constantly sought attention, Wellington made an effective lightning rod for his parents' unexpressed conflict and anxiety. Wellington's father was impatient and critical with

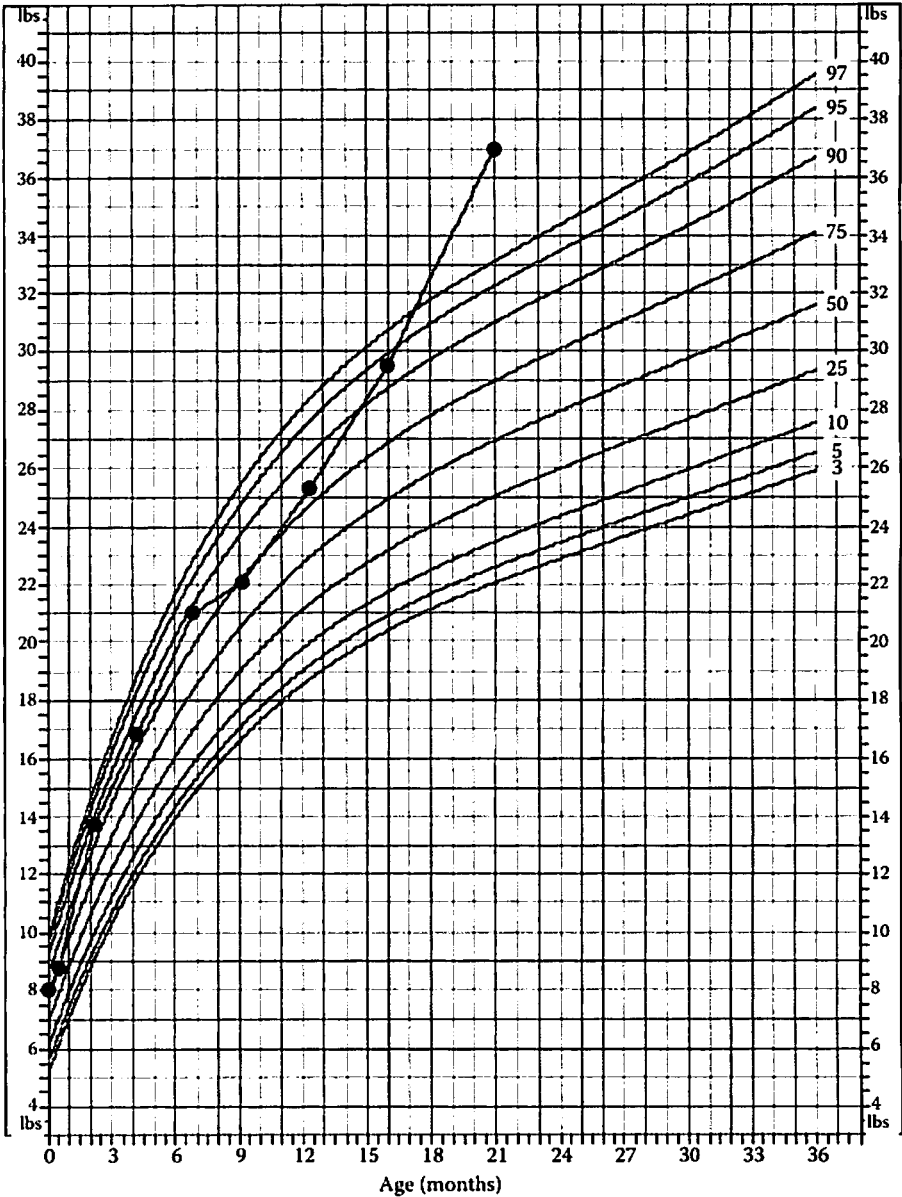


Figure 19.5

him; his mother protected him. Wellington appeared to be trying to define himself through his commotion, but got little traction because his parents' conflict left him with lax limits, low expectations, and excessive criticism.

Videotapes of family meals revealed only modest distortions in feeding dynamics. Wellington's parents provided meals at set times and they did not appear to restrict Wellington's food intake. But they filled his plate for him and made him wait at the table until everyone finished eating. Meals were tense. Wellington talked and talked, his father shushed and scolded and his mother placated. Food availability and stress could have promoted Wellington's eating more than he wanted. In addition, the babysitter reportedly ignored the parents' snacking guidelines and let Wellington graze for food.

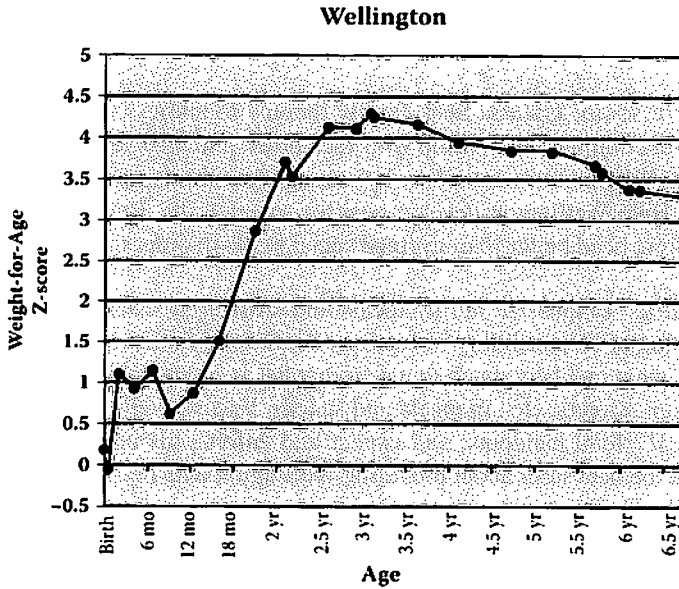


Figure 19.6

Individual, couple, and family interviews revealed Wellington's parents to be incapable of directly addressing or resolving their conflicts. Instead, they routed their feelings through Wellington by being overinvolved and overprotective. They appeared to have replicated the conditions defined as instrumental in developing and maintaining severe psychosomatic problems in children: (1) family organization that encourages somatization (enmeshed, rigid, overprotective), (2) involvement of the child in parental conflict, and (3) physiological vulnerability (Minuchin et al., 1975).

Causes of Wellington's Growth Acceleration

Poor Feeding Practices. Demand breast-feeding throughout the toddler period interfered with Wellington's achieving separation-individuation as well as his ability to regulate his food intake and grow appropriately. For his part, Wellington submitted to being overfed and allowed himself to be placated rather than insisting on being independent and maintaining his drive to explore.

Stress. Wellington was stressed by his involvement in the conflict between his parents as well as by his own immaturity. Poor feeding practices and lack of somatopsychological differentiation taught Wellington to use food to cope with stress.

Restrained Feeding. Indirect and relatively mild restriction of food intake contributed to slowing his weight loss.

Misinterpretation of Normal Growth. Assessment of Wellington was an afterthought to the assessment of his sister, who attracted most of the parents' concern. Wellington was actually heavier and had more pronounced behavioral limitations. Costanzo and Woody (1984) found a similar pattern, with parents focusing concern on daughters, even though sons showed distorted patterns with respect to weight and behavior.

Intervention with Wellington's Weight Issues

Avoid Food Restriction and Striving for Weight Loss. Food restriction would undermine Wellington's current energy homeostasis and gradual weight loss. At age 6½ years, he has a better

than even chance of continuing to slim down. Restricting his food intake would arrest and likely reverse that normal slimming.

Address Psychosocial Issues. Seek family therapy to address the parents' individual patterns of emotional functioning, relationship with each other, and involvement of Wellington in their relationship. Support Wellington's autonomy by setting clear limits, giving firm expectations, and following through. Help Wellington develop positive social skills. Relatively large children, like other unusual children, need better-than-average social skills in order to do well.

Address Feeding. Emphasize family meals and structured snacks, being meticulous about maintaining a division of responsibility in feeding. Serve food in dishes, and let Wellington serve himself and decide what and how much to eat from what is on the table and on his plate. Include preferred food—chips, sweets, etc., in meals and snacks. Excuse Wellington when he asks, do not let him come back for food handouts, and expect and enforce his entertaining himself after he leaves. Be firm with the babysitter about providing Wellington with one sit-down after-school snack at a time that the parents indicate.

Address Activity. Limit television viewing, offer a variety of rewarding activities, then let Wellington pick and choose, being as active or inactive as he chooses. Stop trying to entertain Wellington. Instead, be firm about not allowing him to pester. Let him get bored enough to find his own entertainment.

Let Weight Find Its Own Level. Rather than striving for a particular weight outcome, let Wellington's weight find its own level in response to these positive patterns. Only time will tell what that weight level will be. Wellington's weight could continue its pattern of gradually diverging downward. On the other hand, his weight could equilibrate at its current level.

What Happened with Wellington

Wellington's parents took the assessment and recommendations back to their home community. They seemed accepting of the findings, but given their facility for avoiding conflict, it is unlikely they would indicate otherwise. It remains to be seen whether they will be able to institute the recommended changes. It is asking a lot of parents who for their whole lives have been afraid of their own feelings and indirect about dealing with their issues to tackle such significant change on behalf of their child. But Wellington's parents love him and want the best for him, so maybe they will be able to pull it off.

On the other hand, it would be easy enough for Wellington's parents to find someone to help them decide that the problem is really his weight and that what he needs is weight reduction. Restricting Wellington's food intake would make him even more of a lightning rod for his parents' unexpressed issues. Children who are put on diets constantly agitate for food or become food sneaks. Given Wellington's energy and drive to keep himself the center of attention, he could take them for quite a ride.

Case 3. Marcus: Poor Feeding Practices, Stress, Restrained Feeding, Misinterpretation of Normal Growth

Fifteen-year-old Marcus came for assessment on the instigation of his foster mother, who was concerned about his food preoccupation and overeating. Marcus was placed in foster care on the grounds that his biological mother failed to restrict his food intake and get his weight down. After 1½ years of careful food restriction in foster care, Marcus lost 150 lb. But recently he had begun eating voraciously. He sneaked food at home, stole food in grocery stores, and even ate out of garbage

cans. At 150 lb below his previous weight, Marcus's biological pressure to eat and restore his usual weight had become extreme.

Determined digging through Marcus's voluminous records produced enough data to make the z-score graph in Figure 19.7. After growing consistently during his first year, Marcus's weight accelerated rapidly. By age 2 years, Marcus weighed 44 lb; age 4 years, 78 lb; age 6½ years, 152 lb; age 10 years, 367 lb. At age 13 years, he topped out at 447 lb. At age 13½ he was placed in foster care, and food restriction brought his weight down to 406 lb at age 14 years and 297 lb at age 15 years.

While Marcus's preadolescent and adolescent weights are extreme, Figure 19.7 gives evidence that disruptive forces began when he was between 1 and 2 years of age. What went on back then? His mother's reports were vague and contradictory. She claimed that Marcus had always been a voracious eater with out-of-control weight, but that was refuted by his consistent growth from birth to 1 year. His z-score remained high from age 2 to 6 years. His mother said he "didn't give any trouble" and was "independent and good at occupying his time," and that starting at about age 4 years he took care of his infant brother. Weight data were missing for ages 7, 8, and 9 years, and at age 10 to 11 years Marcus's weight dropped. At that time, social service workers were making regular visits to the home.

When Marcus was 8 years old, the accumulating school, medical, and social services reports showed him to be in a world of trouble. He was frequently tardy for or absent from school, poorly groomed, tired and sleepy, explosive, impulsive, and demanding too much attention. Marcus suffered from poor hygiene—dirty, ripped clothing and fecal odor. He often had no lunch money, and when his mother was contacted—with difficulty—she urged school personnel to pay for his lunch. Child protective services noted in home visits that Marcus and his younger brother were frequently left alone at night, that his mother was abusing alcohol, and that the house was filthy. Marcus's mother was jailed for failure to pay driving-while-intoxicated tickets and Marcus and his brother were briefly placed in a residential treatment facility. Marcus was enrolled in a specialized obesity management program, which his mother did not attend. Medical reports diagnosed Marcus's overweight and described unsuccessful attempts to find endocrine or genetic reasons for his high body weight.

From age 8 years, every assessment gave ample evidence that Marcus was neglected and that he was trying to do what was expected of him with little or no support from home. Every assessment summed up by blaming his problems on his weight. In reality, Marcus's weight was the least of his problems. Rather than being provided for, he had been given adult responsibilities from the time he was a preschooler.

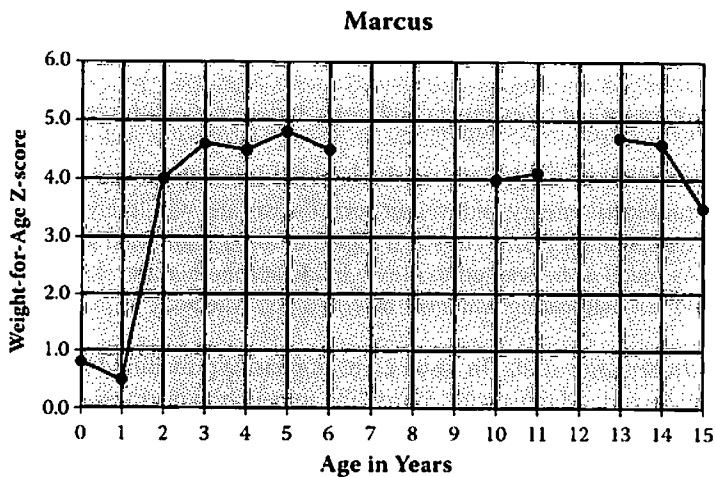


Figure 19.7

Rather than being helped by the people who were supposed to protect and support him, Marcus's teachers, principal, social workers, and health personnel blamed him for his problems: he was too fat. Ironically, when Marcus was finally placed in a foster home where he could be provided for, it was on the grounds that "efforts to have his mother supervise his food intake have not worked."

What happened? Are schools and other agencies feeling so much pressure about child obesity that they overlook basic child welfare issues? Was Marcus's mother so formidable that no one wanted to take her on? Whatever the flaw in the process, Marcus was the one who paid the price.

Causes of Marcus's Weight Acceleration

Poor Feeding Practices. Marcus's consistent growth during his first year indicated that he got enough to eat, that he was capable of regulating his food intake, and that he may have achieved homeostasis and attachment. Feeding and parenting apparently deteriorated after that. Rather than being fed in a reliable and structured fashion, Marcus likely had to beg for food handouts. Beginning when he was a preschooler, Marcus was made responsible for feeding himself and his little brother. In foster care, food restriction mimicked the food insecurity from which he had suffered his whole life.

Stress. Beyond infancy, neglect and chaos in his home made it impossible for Marcus to achieve developmental tasks. His rapid weight gain between 1 and 2 years of age indicates extreme food panhandling and failure of separation-individuation. Marcus learned to use food for emotional reasons and undoubtedly continued to use food to assuage his fear of hunger and sense of abandonment. Marcus's z-score dip at ages 10 and 11 years, coinciding with child protective services involvement and presumed improvement in the family situation, supports the stress hypothesis. When life got better, Marcus slimmed down.

Restrained Feeding. Marcus experienced profound food insecurity growing out of erratic food availability and infrequent family meals, as well as frequent lack of access to food at home and at school. In addition, Marcus's mother, as well as health and school personnel, continually criticized his weight and tried to stop him from eating so much. Marcus was also periodically enrolled in weight-loss interventions.

Misinterpretation of Normal Growth. Marcus's growth was hardly normal, but it was still misinterpreted. Rather than getting heavier and heavier, Marcus's weight stabilized at a high level. He was regulating his energy balance and body weight, the same as he had during his first year.

Treatment Plan

Extreme weight gain grows out of extreme conditions. It does not call for extreme solutions.

Avoid Food Restriction and Striving for Weight Loss. Marcus's current food restriction and weight loss disrupted his energy and weight homeostasis and will likely precipitate regain to an even higher level. At presentation, Marcus's still high, but lower than usual weight meant that he was in a starved state. As much as he wanted to please his foster mother and stay on his diet, he was so hungry that he could not help eating whatever he could get, whenever he could get it.

Address Psychosocial Issues. In foster care, emphasize providing Marcus with a good home and good parenting. Provide Marcus with counseling to help him deal with anxiety and feelings of worthlessness.

Address Feeding. Stop restricting Marcus's food intake and optimize feeding. Emphasize structure: provide substantial and filling meals and sit-down snacks, include foods that Marcus finds

rewarding, and reassure him that he can have as much as he wants at those scheduled times. Be firm about not allowing him to graze between meals. Provide Marcus with short-term treatment to help him get back in touch with his internal regulators of hunger, appetite, and satiety.

Let Weight Find Its Own Level. For a while Marcus will eat a lot and he may regain a considerable amount of weight, but eventually his hunger will not drive him so hard, he will begin to trust that he will be fed and provided for, and his weight will equilibrate. One cannot predict where this will be—it could be the same as or lower than before, or he could regain to an even higher level. Avoid trying to manage his weight gain; further food restriction will exacerbate his fear of going without and his tendency to reactively overeat.

What Happened with Marcus

Before the treatment plan could be enacted, the courts gave in to Marcus's mother's pressure and sent him back to live with her. Nothing had changed at home—it was the same chaotic, neglectful environment as ever. The message to Marcus was, "now your weight is down, we do not care what happens to you." Being back in that stressful environment will exacerbate his weight regain, but as from the time he was very young, Marcus's weight will be the least of his problems. Marcus will have a difficult time, but it will be because of his upbringing, not his weight. Not having learned what he needed to make his way, life will be overwhelming for Marcus and he will get by as best he can.

PREVENTION OF CHILD OVERWEIGHT

These three complicated cases grew out of missed opportunities. In Mary's case, the opportunity was to do no harm. The spurious age 5 months obesity diagnosis set off long-term food restriction and eventual weight rebound and destroyed her chances of slimming down as she got older. What to do instead? Teach parents appropriate stage-related feeding and support them in accepting high body weight.

The missed opportunity with Wellington was failure to do informed health supervision. Wellington's rapid weight gain at the 18 month and 24 month checkups clearly indicated that something was amiss. Asking feeding questions at those points would have revealed his mother's errors with feeding and provided openings for teaching appropriate toddler feeding, thereby correcting those errors. Breast-feeding a toddler is fine, but breast-feeding a toddler on demand is not developmentally appropriate. What to do instead? Stop the grazing. Include Wellington in family meals, let him drink from a cup, and do not breast feed at mealtime. Structure breast-feeding by offering it morning and evening and as a sit-down snack at set times between meals.

Toddlers need structured meals and sit-down snacks between times. Letting them graze for food and beverage handouts (except for water) is a common feeding error that can cause weight acceleration. Toddlers whose food intake is restricted when they were infants are particularly likely to graze relentlessly and gain too much weight. Whether the toddler's weight increases, like Wellington's, or remains low, like Mary's, depends on whether the toddler or the parent is tougher and more persistent. Wellington got the upper hand; Mary did not.

There were lots of missed opportunities with Marcus. By age 2 years his weight had accelerated more than enough to prompt questions, and those questions should have continued as he got older. What to do instead? Assume, based on his rapid weight gain, his continuing high body weight and his mother's evasive answers that something is badly amiss. Remember Marcus's consistent growth during his first year and reject his mother's facile explanation that he has no "off" button. With the possible exception of children who have Prader-Willi syndrome, children are excellent and resilient at regulating their food intake and growing appropriately. At every stage, avoid striving for weight reduction and instead stress optimizing feeding and parenting. Emphasize having three meals a

day, sit-down snacks, and no food or beverages between meals except for water. That is a doable intervention, even for a parent who is situationally challenged.

If feeding and parenting continue to be so negative that the child is endangered, consider a referral to child protective services. Be clear, however, that the referral is on the grounds of neglect and for the purposes of protecting and supporting the child, not for getting his weight down.

ADDRESSING ESTABLISHED PROBLEMS IN A PRIMARY CARE SETTING

Primary care providers who have a good understanding of feeding dynamics are well prepared to prevent childhood weight acceleration or to promptly correct disruptions before they morph into entrenched, complicated problems with long-term weight acceleration. On the other hand, once eating and weight problems are well established, fully addressing them calls for services typically not readily available in a primary care setting. Those services include multidisciplinary assessment and referrals to specialists for feeding dynamics intervention, family therapy, or individual counseling. Unfortunately it is sometimes necessary to refer to child protective services.

In the absence of such services, stick with solid primary intervention, stressing authoritative, stage-appropriate feeding. Establishing a structured meals plus snacks routine can take months or even years. Help parents resist the temptation to impose food restriction and weight loss, keeping in mind that food restriction increases the likelihood that in the long run children will be fatter, not thinner. Parents who cannot provide meals will do poorly with the far more difficult task of restricting a child's food intake. Not only that, but imposing the threat of hunger on poorly parented, already-stressed children stresses them further.

Be prepared to support parents in riding out eating extremes when they restore a division of responsibility in feeding. At first, restricted children eat a lot and continue hounding their parents for food handouts. After a few weeks, the child will settle into eating like any other child of a given developmental stage, provided parents truly apply and sustain a division of responsibility in feeding. Use of the Feeding Dynamics Model challenges providers and parents to set aside agendas and focus primarily on good parenting over the long haul. If a parent has a weight agenda for the child, that agenda will continue to distort feeding and parenting, undermine the child's ability to develop and maintain internal regulation of food intake, and in the long run, promote weight gain. To avoid instituting such an agenda, do not promise weight loss or make predictions about weight. If a child's weight has been following a consistent trajectory, it is reasonable to expect that it will continue to do so. One can always hope that a child will slim down, but trying to make it happen will distort feeding and parenting, promote weight gain, and ultimately be demoralizing for both parents and child.

The story of Erica (Figure 19.8) provides an example of a positive outcome using this model. Despite the fact that she was born big, Erica still showed rapid early catch-up growth—possibly exacerbated by her parents' tendencies to be controlling with feeding. Beginning when she was 7 months old, Erica's parents began deliberately restricting her food intake. After an initial dip, Erica's weight climbed to an even higher level and her parents complained that ignoring her pleas for food and fending off her raids on the kitchen was becoming increasingly difficult. When Erica was 3 years old her parents discovered the division of responsibility in feeding after reading *Child of Mine* (Satter, 2000a). They stopped restricting her food intake, emphasized meals and sit-down-snacks, and reassured Erica she could eat as much as she wanted at those structured and predictable times.

Initially Erica confirmed their worst fears by eating great quantities of food. However, after 2 or 3 weeks, her eating moderated and she began to eat like a normal toddler—a lot some times, hardly anything another, ravenous for snack one time, barely interested another. Over the next 3 years, Erica's weight for age dropped to the 97th percentile, where it leveled off. Her parents are content with her growth and capable of holding themselves steady with respect to accepting her stocky build and relatively high body weight.

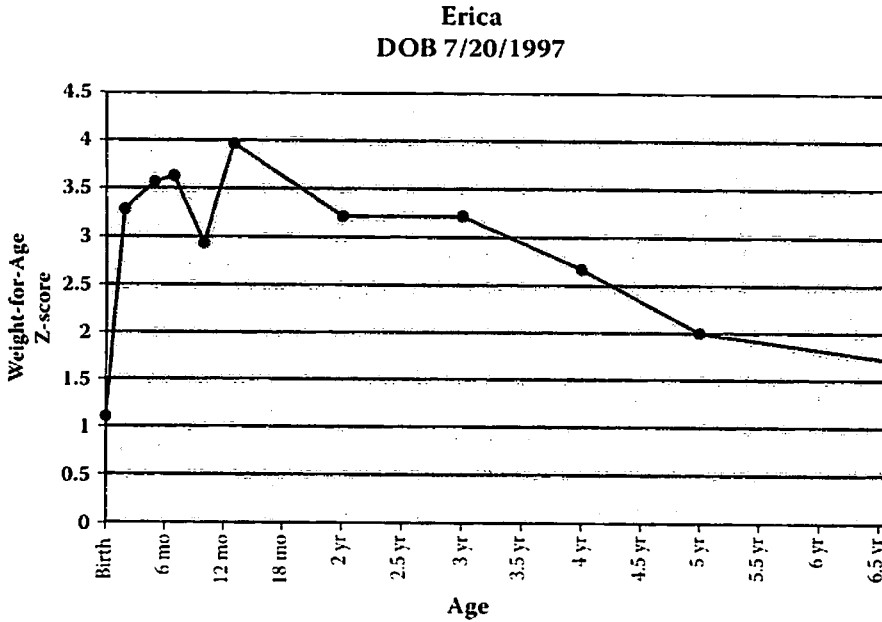


Figure 19.8

Primary intervention handouts that address child overweight can be downloaded from www.EllynSatter.com.

DOES THE FEEDING DYNAMICS MODEL WORK?

Whether or not the Feeding Dynamics Model works depends on what is meant by the question. Does the Feeding Dynamics Model work to get children to conform to arbitrary guidelines of size and shape? No, it does not. Defined weight outcome is absolutely contradictory to the model. Does the Feeding Dynamics Model work to support normal growth and development, including the development of self-esteem? Yes, it does. Feeding principles are based on child development principles. Studies and data presented in this chapter correlate positive feeding with predictable growth. Moreover, the Feeding Dynamics Model accepts children as they are and supports their capabilities, which in turn supports self-esteem.

On the other hand, what about the conventional approach of restricting food intake and increasing activity to achieve weight loss? Does the conventional approach work to get children to conform to arbitrary guidelines of size and shape? It does not. As noted earlier, there is insufficient evidence that screening and conventional interventions work, and even ambitious, multidisciplinary programs produce little or no lasting weight loss.

Does the conventional approach work to support normal growth and development, including self-esteem? No, it does not. As noted earlier, identifying children as overweight and instituting restrained feeding undermines self-esteem and distorts growth, whether children restrict themselves or are restricted by their parents. Children of all ages who diet become fatter, not thinner.

FURTHER RESEARCH

This chapter presents ample evidence correlating distortions in feeding dynamics—misinterpretation of normal growth, restrained feeding, poor feeding practices, and stress—with children's weight acceleration. The piece that remains to be demonstrated is the positive one: that optimum

feeding, as defined by the Satter Feeding Dynamics Model, prevents child overweight from the perspective of supporting each child's growth in weight along a predictable, constitutionally determined trajectory.

REFERENCES

- Adair, L. S. (1984). The infant's ability to self-regulate caloric intake: a case study. *Journal of the American Dietetic Association*, *84*, 543–546.
- Alaimo, K., Olson, C. M., & Frongillo, E. A. (2002). Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents. *Journal of Nutrition*, *132*, 719–725.
- Alaimo, K., Olson, C. M., & Frongillo, E. A., Jr. (2001). Low family income and food insufficiency in relation to overweight in US children: is there a paradox? *Archives of Pediatric and Adolescent Medicine*, *155*, 1161–1167.
- Alaimo, K., Olson, C. M., Frongillo, E. A., Jr., & Briefel, R.R. (2001). Food insufficiency, family income, and health in US preschool and school-aged children. *American Journal of Public Health*, *91*, 781–786.
- Barlow, S. E., & Dietz, W. H. (1998). Obesity evaluation and treatment: Expert Committee recommendations. *Pediatrics*, *102*(3), e29.
- Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology Monograph*, *4*(1 pt 2), 1–103.
- Beebe, D. W., Lewin, D., Zeller, M., McCabe, M., MacLeod, K., Daniels, S. R., & Amin, R. (2007). Sleep in overweight adolescents: shorter sleep, poorer sleep quality, sleepiness, and sleep-disordered breathing. *Journal of Pediatric Psychology*, *32*, 69–79.
- Birch, L. L., & Fisher, J. O. (1995). Appetite and eating behavior in children. *Pediatric Clinics of North America*, *42*, 931–953.
- Birch, L. L., & Fisher, J. O. (2000). Mothers' child-feeding practices influence daughters' eating and weight. *American Journal of Clinical Nutrition*, *71*, 1054–1061.
- Birch, L. L., Fisher, J. O., & Davison, K. K. (2003). Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *American Journal of Clinical Nutrition*, *78*, 215–220.
- Birch, L. L., Johnson, S. L., & Fisher, J. O. (1995). Children's eating: the development of food-acceptance patterns. *Young Children*, *50*(2), 71–78.
- Blissett, J., Meyer, C., & Haycraft, E. (2006). Maternal and paternal controlling feeding practices with male and female children. *Appetite*, *47*, 212–219.
- Bouchard, C., Tremblay, A., Despres, J. P., Nadeau, A., Lupien, P. J., Theriault, G., Dussault, J., Moorjani, S., Pinault, S., & Fournier, G. (1990). The response to long-term overfeeding in identical twins. *New England Journal of Medicine*, *322*, 1477–1482.
- Boutton, T. W., Trowbridge, F. L., Nelson, M. M., Wills, C. A., Smith, E. O., Lopez de Romana, G., Madrid, S., Marks, J. S., & Klein, P. D. (1987). Body composition of Peruvian children with short stature and high weight-for-height. I. Total body-water measurements and their prediction from anthropometric values. *American Journal of Clinical Nutrition*, *45*, 513–525.
- Braddon, F. E. M., Rodgers, B., Wadsworth, M. E. J., & Davies, J. M. C. (1986). Onset of obesity in a 36 year birth cohort study. *British Medical Journal*, *293*, 299–303.
- Burdette, H. L., Whitaker, R. C., Hall, W. C., & Daniels, S. R. (2006). Maternal infant-feeding style and children's adiposity at 5 years of age. *Archives of Pediatric and Adolescent Medicine*, *160*, 513–520.
- Center on Addiction and Substance Abuse. (2005). The importance of family dinners II. New York: Center on Addiction and Substance Abuse.
- Centers for Disease Control. (2000a). CDC growth charts: United States. Atlanta: Centers for Disease Control. Available at www.cdc.gov/growthcharts/.
- Centers for Disease Control. (2000b). Overweight children and adolescents: screen, assess and manage. Atlanta: Centers for Disease Control. Available at www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules/module3/text/page1b.htm.

- Chatoor, I., Surlles, J., Ganiban, J., Beker, L., Paez, L. M., & Kerzner, B. (2004). Failure to thrive and cognitive development in toddlers with infantile anorexia. *Pediatrics*, *113*(5), e440–e447.
- Committee on Nutrition. (2003). Prevention of pediatric overweight and obesity. *Pediatrics*, *112*, 424–430.
- Costanzo, P. R., & Woody, E. Z. (1984). Parental perspectives on obesity in children: the importance of sex differences. *Journal of Social and Clinical Psychology*, *2*, 305–313.
- Council of Economic Advisors. (2000). Teens and their parents in the 21st century: an examination of trends in teen behavior and the role of parental involvement. Washington, D.C.: Council of Economic Advisors. Available at http://clinton3.nara.gov/WH/EOP/CEA/html/Teens_Paper_Final.pdf.
- Crow, R. A., Fawcett, J. N., & Wright, P. (1980). Maternal behavior during breast- and bottle-feeding. *Journal of Behavioral Medicine*, *3*, 259–277.
- Davies, W. H., Satter, E., Berlin, K. S., Sato, A. F., Silverman, A. H., Fischer, E. A., Arvedson, J. C., & Rudolph, C. D. (2006). Reconceptualizing feeding and feeding disorders in interpersonal context: the case for a relational disorder. *Journal of Family Psychology*, *20*, 409–417.
- Davis, C. M. (1928). Self selection of diet by newly weaned infants: an experimental study. *American Journal of Diseases of Children*, *36*, 651–679.
- Davison, K. K., & Birch, L. L. (2001). Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics*, *107*, 46–53.
- Davison, K. K., Markey, C. N., & Birch, L. L. (2003). A longitudinal examination of patterns in girls' weight concerns and body dissatisfaction from ages 5 to 9 years. *International Journal of Eating Disorders*, *33*, 320–332.
- Donnelly, J. E., Jacobsen, D. J., Whatley, J. E., Hill, J. O., Swift, L. L., Cherrington, A. C., Polk, B., Tran, Z. V., & Reed, G. (1996). Nutrition and physical activity program to attenuate obesity and promote physical and metabolic fitness in elementary school children. *Obesity Research*, *4*, 229–243.
- Eisenberg, M. E., Olson, R. E., Neumark-Sztainer, D., Story, M., & Bearinger, L. H. (2004). Correlations between family meals and psychosocial well-being among adolescents. *Archives of Pediatric and Adolescent Medicine*, *158*, 792–796.
- Eisenmann, J. C., Katzmarzyk, P. T., Arnall, D. A., Kanuho, V., Interpreter, C., & Malina, R. M. (2000). Growth and overweight of Navajo youth: secular changes from 1955 to 1997. *International Journal of Obesity*, *24*, 211–218.
- Epstein L. H., Myers, M. D., Raynor, H. A., & Saelens, B. E. (1998). Treatment of pediatric obesity. *Pediatrics*, *101*, 554–570.
- Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. (1998). *Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report*. NIH publication 98-4083. Bethesda, MD: National Institutes of Health. Available at www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf.
- Faith, M. S., Berkowitz, R. I., Stallings, V. A., Kerns, J., Storey, M., & Stunkard, A. J. (2004). Parental feeding attitudes and styles and child body mass index: prospective analysis of a gene-environment interaction. *Pediatrics*, *114*(4), e429–e436.
- Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, *12*, 1711–1722.
- Fisher, J. O., & Birch, L. L. (2000). Parents' restrictive feeding practices are associated with young girls' negative self-evaluation of eating. *Journal of the American Dietetic Association*, *100*, 1341–1346.
- Fisher, J. O., & Birch, L. L. (2002). Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *American Journal of Clinical Nutrition*, *76*, 226–231.
- Fomon, S. J. (1993). *Nutrition of normal infants* (pp. 455–458). St. Louis, MO: Mosby-Year Book.
- Fomon, S. J., Filer, L. J., Jr., Thomas, L. N., Anderson, T. A., & Nelson, S. E. (1975). Influence of formula concentration on caloric intake and growth of normal infants. *Acta Paediatrica Scandinavica*, *64*, 172–181.
- Galloway, A. T., Fiorito, L., Lee, Y., & Birch, L. L. (2005). Parental pressure, dietary patterns, and weight status among girls who are "picky eaters." *Journal of the American Dietetic Association*, *105*, 541–548.
- Garn, S. M., & Clark, D. C. (1976). Trends in fatness and the origins of obesity. *Pediatrics*, *57*, 443–456.
- Garn, S. M., Pilkington, J. J., & Lavelle, M. (1984). Relationship between initial fatness level and long-term fatness change [abstract]. *Ecology of Food and Nutrition*, *14*, 85–92.
- Gesell, A., & Ilg, F. L. (1937). *Feeding behavior of infants*. Philadelphia: J.B. Lippincott.

- Gillman, M. W., Rifas-Shiman, S. L., Frazier, A. L., Rockett, H. R., Camargo, C. A., Field, A. E., Berkey, C. S., & Colditz, G. A. (2000). Family dinner and diet quality among older children and adolescents. *Archives of Family Medicine, 9*, 235–240.
- Greenspan, S., & Lourie, R. S. (1981). Developmental structuralist approach to the classification of adaptive and pathological personality organizations: Infancy and early childhood. *American Journal of Psychiatry, 138*, 725–735.
- Hamill, P. V. V., Drizd, T. A., Johnson, C. L., Reed, R. B., Roche, A. F., & Moore, W. M. (1979). Physical growth: National Center for Health Statistics percentiles. *American Journal of Clinical Nutrition, 32*, 607–629.
- Herman, C. P., Polivy, J., & Esses, V. M. (1987). The illusion of counter-regulation. *Appetite, 9*, 161–169.
- Hill, A. J., Rogers, P. J., & Blundell, J. E. (1989). Dietary restraint in young adolescent girls: a functional analysis. *British Journal of Clinical Psychology, 28*, 165–176.
- Hofferth, S. L. (2001). How American children spend their time. *Journal of Marriage and the Family, 63*, 295–308.
- Hood, M. Y., Moore, L. L., Sundarajan-Ramamurti, A., Singer, M., Cupples, L. A., & Ellison, R. C. (2000). Parental eating attitudes and the development of obesity in children: the Framingham Children's Study. *International Journal of Obesity, 24*, 1319–1325.
- Jain, A., Sherman, S. N., Chamberlin, L. A., Carter, Y., Powers, S. W., & Whitaker, R. C. (2001). Why don't low-income mothers worry about their preschoolers being overweight? *Pediatrics, 107*, 1138–1146.
- Johnson, J. G., Cohen, P., Kasen, S., & Brook, J. S. (2002). Childhood adversities associated with risk for eating disorders or weight problems during adolescence or early adulthood. *American Journal of Psychiatry, 159*, 394–400.
- Johnson, S. L., & Birch, L. L. (1994). Parents' and children's adiposity and eating style. *Pediatrics, 94*, 653–661.
- Jones, S. J., Jahns, L., Laraia, B. A., & Haughton, B. (2003). Lower risk of overweight in school-aged food insecure girls who participate in food assistance: results from the Panel Study of Income Dynamics child development supplement. *Archives of Pediatrics and Adolescent Medicine, 157*, 780–784.
- Kant, A. K., & Miner, P. (2007). Physician advice about being overweight: association with self-reported weight loss, dietary, and physical activity behaviors of U.S. adolescents in the National Health and Nutrition Examination Survey, 1999–2002. *Pediatrics, 119*(1), e142–e147.
- Keys, A., Brozek, J., Henschel, A., Mickelsen, O., & Taylor, H. (1950). *The biology of human starvation*. Minneapolis: University of Minnesota Press.
- Klesges, R. C., Malott, J. M., Boschee, P. F., & Weber, J. M. (1986). The effects of parental influences on children's food intake, physical activity and relative weight. *International Journal of Eating Disorders, 5*, 335–346.
- Krick, J. (1986). Using the Z score as a descriptor of discrete changes in growth. *Nutritional Support Services, 6*(8), 14–21.
- Lee, Y., Mitchell, D. C., Smiciklas-Wright, H., & Birch, L. L. (2001). Diet quality, nutrient intake, weight status, and feeding environments of girls meeting or exceeding recommendations for total dietary fat of the American Academy of Pediatrics. *Pediatrics, 107*, e95.
- Legler, J. D., & Rose, L. C. (1998). Assessment of abnormal growth curves. *American Family Physician, 58*, 158–168.
- Lissau, I., Breum, L., & Sorensen, T. I. (1993). Maternal attitude to sweet eating habits and risk of overweight in offspring: a ten-year prospective population study. *International Journal of Obesity, 17*, 125–129.
- Lissau, I., & Sorensen, T. I. (1994). Parental neglect during childhood and increased risk of obesity in young adulthood. *Lancet, 343*, 324–327.
- Lumeng, J. C., Gannon, K., Cabral, H. J., Frank, D. A., & Zuckerman, B. (2003). Association between clinically meaningful behavior problems and overweight in children. *Pediatrics, 112*, 1138–1145.
- Mellbin, T., & Vuille, J.-C. (1989). Rapidly developing overweight in school children as an indicator of psychosocial stress. *Acta Paediatrica Scandinavica, 78*, 568–575.
- Miech, R. A., Kumanyika, S. K., Stettler, N., Link, B. G., Phelan, J. C., & Chang, V. W. (2006). Trends in the association of poverty with overweight among U.S. adolescents, 1971–2004. *JAMA, 295*, 2385–2393.
- Minuchin, S., Baker, L., Rosman, B. L., Liebman, R., Milman, L., & Todd, T. C. (1975). A conceptual model of psychosomatic illness in children. *Archives of General Psychiatry, 32*, 1031–1038.

- Morris, S. E. & Klein, M. D. (2000). *Pre-feeding skills: a comprehensive resource for mealtime development* (pp. 59–95). San Antonio, TX: Therapy Skill Builders/Harcourt.
- Moynihan, R. (2006). Expanding definitions of obesity may harm children. *BMJ*, *332*(7555), 1412.
- Neumark-Sztainer, D., Hannan, P., Story, M., & Perry, C. (2004). Weight-control behaviors among adolescent girls and boys: implications for dietary intake. *Journal of the American Dietetic Association*, *104*, 913–920.
- Neumark-Sztainer, D., Wall, M., Guo, J., Story, M., Haines, J., & Eisenberg, M. (2006). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later? *Journal of the American Dietetic Association*, *106*, 559–568.
- Neumark-Sztainer, D., Wall, M., Story, M., & Fulkerson, J. A. (2004). Are family meal patterns associated with disordered eating behaviors among adolescents? *Journal of Adolescent Health*, *35*, 350–359.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA*, *295*, 1549–1555.
- Pashankar, D. S., & Loening-Baucke, V. (2005). Increased prevalence of obesity in children with functional constipation evaluated in an academic medical center. *Pediatrics*, *116*(3), e377–e380.
- Pietilainen, K. H., Kaprio, J., Rasanen, M., Winter, T., Rissanen, A., & Rose, R. J. (2001). Tracking body size from birth to late adolescence: contributions of birth length, birth weight, duration of gestation, parents' body size, and twinning. *American Journal of Epidemiology*, *154*, 21–29.
- Pine, D. S., Goldstein, R. B., Wolk, S., & Weissman, M. M. (2001). The association between childhood depression and adulthood body mass index. *Pediatrics*, *107*, 1049–1056.
- Rhee, K. E., Lumeng, J. C., Appugliese, D. P., Kaciroti, N., & Bradley, R. H. (2006). Parenting styles and overweight status in first grade. *Pediatrics*, *117*, 2047–2054.
- Roemmich, J. N., Wright, S. M., & Epstein, L. H. (2002). Dietary restraint and stress-induced snacking in youth. *Obesity Research*, *10*, 1120–1126.
- Rose, H. E., & Mayer, J. (1968). Activity, calorie intake, fat storage, and the energy balance of infants. *Pediatrics*, *41*, 18–29.
- Ryan, A. S., Roche, A. F., & Kuczmarski, R. J. (1999). Weight, stature, and body mass index data for Mexican Americans from the Third National Health and Nutrition Examination Survey (NHANES III, 1988–1994). *American Journal of Human Biology*, *11*, 673–686.
- Saelens, B. E., Ernst, M. M., & Epstein, L. H. (2000). Maternal child feeding practices and obesity: a discordant sibling analysis. *International Journal of Eating Disorders*, *27*, 459–463.
- Satter, E. M. (1986). The feeding relationship. *Journal of the American Dietetic Association*, *86*, 352–356.
- Satter, E. M. (1995). Feeding dynamics: helping children to eat well. *Journal of Pediatric Health Care*, *9*, 178–184.
- Satter, E. M. (1996). Internal regulation and the evolution of normal growth as the basis for prevention of obesity in childhood. *Journal of the American Dietetic Association*, *96*, 860–864.
- Satter, E. M. (2000a). *Child of mine: feeding with love and good sense*. Palo Alto, CA: Bull Publishing.
- Satter, E. M. (2000b). Your child knows how to eat and grow (pp. 31–76). In *Child of mine: feeding with love and good sense*. Palo Alto, CA: Bull Publishing.
- Satter, E. M. (2005a). Appendix E: assessment of feeding/growth problems (pp. 396–402). In E. M. Satter, *Your child's weight: helping without harming*. Madison, WI: Keley Press.
- Satter, E. M. (2005b). Help without harming (pp. 3–22). In E. M. Satter, *Your child's weight: helping without harming*. Madison, WI: Keley Press.
- Satter, E. M. (2007). Eating competence: definition and evidence for the Satter Eating Competence Model. *Journal of Nutrition Education and Behavior*, *39*(suppl.). (In press.)
- Serdula, M. K., Ivery, D., Coates, R. J., Freedman, D. S., Williamson, D. F., & Byers, T. (1993). Do obese children become obese adults? A review of the literature. *Preventive Medicine*, *22*, 167–177.
- Serdula, M. K., Mokdad, A. H., Williamson, D. F., Galuska, D. A., Mendlein, J. M., & Heath, G. W. (1999). Prevalence of attempting weight loss and strategies for controlling weight. *JAMA*, *282*, 1353–1358.
- Shunk, J. A., & Birch, L. L. (2004). Girls at risk for overweight at age 5 are at risk for dietary restraint, disinhibited overeating, weight concerns, and greater weight gain from 5 to 9 years. *Journal of the American Dietetic Association*, *104*, 1120–1126.
- Spruijt-Metz, D., Lindquist, C. H., Birch, L. L., Fisher, J. O., & Goran, M. I. (2002). Relation between mothers' child-feeding practices and children's adiposity. *American Journal of Clinical Nutrition*, *75*, 581–586.

- Stettler, N., Kumanyika, S. K., Katz, S. H., Zemel, B. S., & Stallings, V. A. (2003). Rapid weight gain during infancy and obesity in young adulthood in a cohort of African Americans. *American Journal of Clinical Nutrition*, *77*, 1374.
- Stettler, N., Stallings, V. A., Troxel, A. B., Zhao, J., Schinnar, R., Nelson, S. E., Ziegler, E. E., & Strom, B. L. (2005). Weight gain in the first week of life and overweight in adulthood: a cohort study of European American subjects fed infant formula. *Circulation*, *111*, 1897–1903.
- Stettler, N., Zemel, B. S., Kumanyika, S., & Stallings, V. A. (2002). Infant weight gain and childhood overweight status in a multicenter, cohort study. *Pediatrics*, *109*, 194–199.
- Stice, E., Agras, W. S., & Hammer, L. D. (1999). Risk factors for the emergence of childhood eating disturbances: a five-year prospective study. *International Journal of Eating Disorders*, *25*, 375–387.
- Stice, E., Cameron, R. P., Killen, J. D., Hayward, C., & Taylor, C. B. (1999). Naturalistic weight-reduction efforts prospectively predict growth in relative weight and onset of obesity among female adolescents. *Journal of Consulting and Clinical Psychology*, *67*, 967–974.
- Stunkard, A. J., Harris, J. R., Pedersen, N. L., & McClearn, G. E. (1990). The body-mass of twins who have been reared apart. *New England Journal of Medicine*, *322*, 1483–1487.
- Taveras, E. M., Rifas-Shiman, S. L., Berkey, C. S., Rockett, H. R. H., Field, A. E., Frazier, A. L., Colditz, G. A., & Gillman, M. W. (2005). Family dinner and adolescent overweight. *Obesity Research*, *13*, 900–906.
- Wang, Y., & Zhang, Q. (2006). Are American children and adolescents of low socioeconomic status at increased risk of obesity? Changes in the association between overweight and family income between 1971 and 2002. *American Journal of Clinical Nutrition*, *84*, 707–716.
- Whitlock, E. P., Williams, S. B., Gold, R., Smith, P. R., & Shipman, S. A. (2005). Screening and interventions for childhood overweight: a summary of evidence for the U.S. Preventive Services Task Force. *Pediatrics*, *116*, e125–e144.
- Wright, C. M., Parker, L., Lamont, D., & Craft, A. W. (2001). Implications of childhood obesity for adult health: findings from thousand families cohort study. *British Medical Journal*, *323*(7324), 1280–1284.
- Zack, P. M., Harlan, W. R., Leaverton, P. E., & Cornoni-Huntley, J. (1979). A longitudinal study of body fatness in childhood and adolescence. *Journal of Pediatrics*, *95*, 126–130.
- Zeller, M. H., Reiter-Purtill, J., Modi, A. C., Gutzwiller, J., Vannatta, K., & Davies, W. H. (2007). Controlled study of critical parent and family factors in the obesigenic environment. *Obesity*, *15*, 126–136.