

Why do Children Gain Too Much Weight?

Selected References

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Anliker JA, Laus MJ, Samonds KW, Beal VA. Mothers' reports of their three-year-old children's control over foods and involvement in food-related activities. *Journal of Nutrition Education*. 1992;24(6):285-291.

Notes: Parents provided children with structured meals and snacks but controlled food choices and portion sizes at those times. Between times, most children were allowed to help themselves with no limits to the refrigerator, cupboards, etc. ES note: The implications to nurturing and child development are grave. Children need their parents' presence. However, when parents were around they spoiled eating by putting pressure on it. The only way children could eat without interference was by going off on their own to do it. The learning? That to be your own person, you have to be by yourself.

Birch LL, Fisher JO, Davison KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *American Journal of Clinical Nutrition*. 2003;78(2):215-220.

Notes: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. This longitudinal study of 182 families assessed whether restrictive feeding practices foster girls' eating in the absence of hunger (EAH). Factors tested were 1) Maternal high versus low restriction, 2) Girls' non-overweight versus overweight and 3) 5, 7, and 9 years of age. Mean EAH increased from 5 to 9 y of age. Higher levels of restriction at 5 y of age predicted higher EAH at 7 y of age and at 9 y of age. Girls who were already overweight at 5 y of age and who received higher levels of restriction had the highest EAH scores at 9 y of age and the greatest increases in EAH from 5 to 9 y of age.

Birmaher B, Ryan ND, Williamson DE, et al. Childhood and adolescent depression: a review of the past 10 years. Part I. *J Am Acad Child Adolesc Psychiatry*. 1996;35:1427-39.

Notes: There is a secular increase in the prevalence of major depressive disorder, and it appears that major depressive disorder is occurring at an earlier age in successive cohorts.

Centers for Disease Control (CDC). Overweight children and adolescents: Screen, assess and manage. accessed March 31, 2005. Web Page. Available at:

<http://www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules/module3/text/page1b.htm>

<http://www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules/module3/text/page5a.htm>

Notes: Definition of Overweight

"At risk of overweight" and "overweight" are the terms preferred to refer to children and adolescents whose excess body weight could pose medical risks. Due to potential negative connotations associated with the term "obesity," "overweight" is preferred. Using the 2000 CDC growth charts, at risk of overweight for ages 2 to 20 years is defined as a Body Mass Index (BMI)-for-age between the 85th and the 95th percentiles. Overweight in children is defined as a BMI-for-age at or above the 95th percentile on the charts. BMI is weight in kilograms divided by height in meters squared (kg/m^2).

Chatoor I, Dickson L, Shaefer S, Egan J; A developmental classification of feeding disorders associated with failure to thrive: Diagnosis and treatment. Drotar D. *New Directions in Failure to Thrive: Implications for Research and Practice*. New York: Plenum; 1986:235-258.

Notes: When medically stable children grew poorly, there was a disruption in any one or all three stages of development: Homeostasis, attachment or separation-individuation. The newborn may be colicky and have difficulty achieving regulation of state. The 2-6 month old and parent show a lack of pleasure in each other and the child may vomit or have diarrhea. The 6-36 month old refuses food and struggles for control, peaking at age 9 months. Poorly-growing children showed no delays in cognitive or speech development.

Committee on Nutrition AAoP. Prevention of Pediatric Overweight and Obesity. *Pediatrics*. 2003;112:424-430.

Notes: ...few studies on prevention have been performed. The enormity of the epidemic, however, necessitates action using the best information available.

Pediatricians need to proactively discuss and promote healthy eating behaviors for children at an

early age and empower parents to promote children's ability to self-regulate energy intake while providing appropriate structure and boundaries around eating.

Significant changes in growth patterns (eg, upward crossing of weight for age or BMI percentiles) can be recognized and addressed before children are severely overweight.

Dietary practices should be fostered that encourage moderation rather than overconsumption, emphasizing healthful choices rather than restrictive eating patterns.

Regular physical activity should be consciously promoted, prioritized and protected within families, schools and communities.

Crawford PB, Shapiro LR; How obesity develops: a new look at nature and nurture. Berg FM. *Obesity & Health*. Hettinger, ND: Healthy Living Institute; 1991;5:40-41.

Notes: Longitudinal study of 185 of an original sample of 450 San Francisco Bay area children followed from age 6 months to age 16.5 years. Fat infants are at no greater risk than thin ones of growing up fat. Risk of remaining obese only exceeds 50% at age 6-9 or older. Children who later became fat compared with children who remained slim: Ate no more calories, low nutrient-density or sweet foods; were no more likely to have been bottle feed; were started no earlier on solid foods; were no more likely to have been given high-fat milk; were no more likely to have been raised in single-parent families. However, the risk of later obesity increased: With toddler lack of structure in feeding times; with increased parental concern about obesity; with increased incidence of toddler feeding problems; with decreased activity prior to the onset of obesity; with parental wish that a child would be more active. **ES note:** This study also observes how distortions in eating attitudes and behaviors develop early on and persist. This fine study has not been published in its entirety and is available only as the occasional newsletter or workshop summary. The nine-year cohort is reported in Shapiro, *American Journal of Public Health*. 1984;74(9):968-972.

Davison KK, Birch LL. Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics*. 2001;107:46-53.

Notes: Parents' concerns about their child's weight status and restriction of access to food are associated with negative self-evaluations among 5-year-old non-Hispanic white girls. Independent of girls' weight status, parental concern about overweight in their child was inversely associated with perceived cognitive and physical ability and lower body esteem. The association between concern about overweight and lower body esteem was particularly marked for fathers. Girls who were overweight and whose parents restricted their access to food reported low perceived physical and cognitive ability. Girls who were overweight and whose parents did not report restriction and girls who were not overweight reported approximately the same level of self-concept-which was higher than the girls who were overweight and restricted. **ES note:** Children who are labeled overweight feel flawed in every way: not smart, not physically capable and not good about themselves.

Eisenberg ME, Olson RE, Neumark-Sztainer D, Story M, Bearinger LH. Correlations Between Family Meals and Psychosocial Well-being Among Adolescents. *Archives of Pediatric and Adolescent Medicine*. 2004;158:792-6.

Notes: 1998-1999 school-based survey of 4746 11- to 18-year-old middle school and high school students from ethnically and socio-economically diverse communities in metropolitan Minneapolis/St Paul, Minn.

Family meals eaten together per week:

Never: 14%
1-2 : 19%
3-4 22%
5-6: 19%
7: 10%
>7: 18%

As family meals and family connectedness went up, grade point average and self esteem went up and negative parameters went down: depression, suicidal ideation and attempts, cigarette, alcohol and marijuana. Authors dropped out family connectedness in an attempt to illustrate that family meals alone affected dependent variables. Associations with all parameters were considerably weakened and remained significant only between boys with substance use and depressive symptoms.

All items were self-report from the adolescents. Frequency of family meals was assessed with the question, "During the last 7 days, how many times did all or most of your family living in your house eat a meal together?" Family connectedness was measured with two questions, worded to consider

each parent separately and therefore add up four questions: "How much do you feel your (mother, father) cares about you?" and "Do you feel you can talk to your (mother, father) about your problems?" Epstein L.H., Myers MD, Raynor HA, Saelens BE. Treatment of pediatric obesity. *Pediatrics*. 1998;101:554-570.

Notes: Reviews diets alone; diet and exercise; diet and exercise plus behavioral modification; protein-sparing modified fast (PSMF) and surgical treatments. Many treatments produce no weight loss. At most treatments produced 10% weight loss. Most losses were not maintained. Actual weight loss is not reported nor is it readily apparent from reading the article. To arrive at generalizations about weight loss, examine table 2. *When data is given*, compare BW with BW change. In many cases actual results are not reported as BW and BW changes but as %OW, then weight loss as %change of %OW. Thus, Epstein's reported 17% weight loss comes down to a loss of 17% of 68%OW of a child weighing 129 lb. Translated into BW and BW change, the figures are 129 lb and 12.9 lb for a loss of 10% of body weight. No relationship was found between self-esteem or depression and changes in weight. Improvement in self-esteem in obese children in treatment may be better accounted for by nonspecific treatment effects than by improvement in weight status.

ES note: Close examination of the data reveals that for the pediatric population, as for the adult population, significant and sustained weight loss is virtually non-existent. However, there may be some helpful information in this article. The more moderate approaches that produced small amounts of sustained weight loss could be construed as resembling the *Satter Feeding Dynamics Approach*: parents established and maintained a division of responsibility in feeding. These Feeding-dynamics-like approaches included: parent targeting (eight sessions over 15 weeks) with behavioral techniques of stimulus control (Structured meals and snacks? Putting food out of sight?), nutrition education (meal planning?). However, these models also appeared to intrude into the child's prerogative of what and how much he ate with techniques like contingency contracting (food avoidance for a reward?) and general behavior management. Approaches that didn't produce weight loss included child self-control training (essentially managing the child's prerogative of what and how much) and techniques that did not directly target eating and activity management. These indirect techniques included cognitive therapy techniques and family therapy.

Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent-Child Feeding Strategies and Their Relationships to Child Eating and Weight Status. *Obes Res*. 2004;12:1711-1722.

Notes: Of 22 studies isolated from a comprehensive literature review, parental feeding restriction was associated with increased child food intake and body weight. Child's rate of eating... but no other feeding domain

Field AE, Austin SB, Taylor CB, et al. Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics*. 2003;112:900-6.

Notes: Prospective study of 8203 girls and 6769 boys who were 9 to 14 years of age in 1996 and completed at least 2 annual questionnaires between 1996 and 1999. In 1996, 25.0% of the girls and 13.8% of the boys were infrequent dieters and 4.5% of the girls and 2.2% of the boys were frequent dieters. During 3 years of follow-up, dieters gained more weight than nondieters. Among the girls, frequency of dieting was positively associated with increases in age- and sex-specific z scores of BMI ($\beta = 0.05$ and $\beta = 0.04$ for frequent and infrequent dieters vs nondieters). Among the boys, both frequent and infrequent dieters gained 0.07 z scores of BMI more than nondieters. Conclusions. For many adolescents, dieting to control weight is not only ineffective, it may actually promote weight gain.

Fisher JO, Birch LL. Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *American Journal of Clinical Nutrition*. 2002;76:226-231.

Notes: Young girls (age 5 to 7 years) whose access to palatable foods was restricted by parents were more likely to eat those foods in the absence of hunger than girls who were not restricted. The restricted girls were also more likely to be overweight than the unrestricted girls. Earlier work (JADA 100:1341, 2000) showed the girls who ate in the absence of hunger felt bad about themselves. Another study extended the age range to 9 years (A J Clin Nutr 78:215, 2003)

Garn SM, Clark DC. Trends in fatness and the origins of obesity. *Pediatrics*. 1976;57:443-456.

Notes: Based on the Ten-State Nutrition Survey. Levels of fatness of children rise progressively with the level of fatness of parental mating combinations. Both boys and girls with two lean parents tend to be the leanest, those with two obese parents tend to be the fattest, and those with both obese and lean parents in between. Overall patterns show preschool losses (in boys), a clear prepubertal gain, an

adolescent loss (boys), and a later adult gain which reaches a peak at age 50 to 60 years and decreases thereafter. ES note: This very significant piece of work on the genetic origins of body fatness--and one would assume, the conclusion that fatness is a normal condition for some people--is contaminated by the caveat that follows: "the extent to which fatness runs in families represents the challenge in the identification of the obese, the prevention of obesity, the management of those who are obese and the reversal of obesity...." The moral of the story, particularly in today's weight obsessed climate, is not to settle for reading the author's conclusions.

Hamill PVV, Drizd TA, Johnson CL, Reed RB, Roche AF, Moore WM. Physical growth: National Center for Health Statistics percentiles. *American Journal of Clinical Nutrition*. 1979;32:607-629.

Notes: Growth is within normal limits by current standards when values follow central or intermediate percentiles. For the purposes of nutrition and health screening, measurements between the 10th and 25th, and the 75th and 90th %tiles may or may not be normal depending on the pattern of earlier measurements, genetic and environmental factors. Children whose weight-for-stature (or length) is below the 5th %tile or above the 95th %tile should be checked, followed up and possibly referred. ES note: This guideline is often used to define the upper and lower cutoffs for obesity and failure to thrive, respectively. However, note that the article says "followed." Presumably, the following is to determine whether children grow consistently at those extremes and, therefore, demonstrate the internal integrity of that growth pattern.

Hill AJ, Rogers PJ, Blundell JE. Dietary restraint in young adolescent girls: A functional analysis. *British Journal of Clinical Psychology*. 1989;28:165-176.

Notes: The BMI (body mass index) of 12-14 year old girls was significantly correlated with degree of dietary restraint: As restraint went up, so did BMI. They not only expressed a wide range of dieting motivation, but showed the same patterns as identified in adults in breaking restraint and overeating.

Hood MY, Moore LL, Sundarajan-Ramamurti A, Singer M, Cupples LA, Ellison RC. Parental eating attitudes and the development of obesity in children. The Framingham Children's Study. *International Journal of Obesity*. 2000;24:1319-1325.

Notes: 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 high increases in BMI. Children of parents who "successfully" restrained, ie, had no disinhibition, had no increases in BMI. This 6-year longitudinal study of ninety-two 3-5 year old children and their parents was of subjects enrolled in 1987 in the Framingham Children's Study. Self-reported levels of parental dietary restraint, disinhibition and perceived hunger were estimated using Stunkard and Messick's Three Factor Eating Questionnaire. Parental scores on the perceived hunger scale (one of the three factors on the questionnaire) had no clear effect on body fat change of children.

Jahns L, Siega-Riz AM, Popkin BM. The increasing prevalence of snacking among US children from 1977 to 1996. *Journal of Pediatrics*. 2001;138:493-498.

Notes: Used data from the 1977-78 National Food Consumption Survey (NFCS77) and the Continuing Surveys of Food Intake by Individuals for 1989-91 (CSFII89) and 1994-96 (CSFII96). The sample consisted of 21,236 individuals aged 2 to 18 years. The prevalence of snacking increased in all age groups. The average size of snacks and energy per snack remained relatively constant; however, the number of snacking occasions increased significantly, therefore increasing the average daily energy from snacks. Compared with non-snack eating occasions, the nutrient contribution of snacks decreased in calcium density and increased in energy density and proportion of energy from fat. **ES note:** This study gives evidence of grazing. This is problematic from the point of view of lack of necessary structure in child feeding and, instead, giving children unlimited access to food.

Johnson SL, Birch LL. Parents' and children's adiposity and eating style. *Pediatrics*. 1994;94:653-661.

Notes: A previous self-regulation trial (Birch et. al, *Appetite* 20:83, 1993) showed most children were able to compensate for caloric variations in meal preloads. Some were not. This study examined the parents dieting patterns and child feeding practices. It found that parents who were controlling of their own and their children's food intake had children who were less able to self-regulate.

Klesges RC, Malott JM, Boschee PF, Weber JM. The effects of parental influences on children's food intake, physical activity and relative weight. *International Journal of Eating Disorders*. 1986;5:335-346.

Notes: If parents merely offer/present food, children spend more time eating but don't weigh any more. If parents encourage eating, children spend longer eating and weigh more.

Legler JD, Rose LC. Assessment of abnormal growth curves. *American Family Physician*. 1998;58:158-168.

Notes: An important part of well-child care is the assessment of a child's growth. While growth in the vast majority of children falls within normal percentile ranges on standard growth curves, an occasional child demonstrates worrisome deviations in weight, height or head size. A single growth percentile value at any particular point in a child's life is only of limited usefulness to the physician. More important is the child's rate of growth. Children whose growth parameters are at the extremes of the growth curve but whose growth rates are normal are likely to be healthy. Conversely, accelerated or slowed growth rates are rarely normal and warrant further evaluation. This article addresses the initial steps to be taken when evaluating children with suspected growth abnormalities, the guiding principles that apply to all growth problems, and the most common growth curve deviations and approaches to their management.

Lissau I, Sorensen TI. Parental neglect during childhood and increased risk of obesity in young adulthood. *Lancet*. 1994;343:324-327.

Notes: 881 (756- 86%) Danish 9- to 10 year olds who received inadequate parental support were fatter. Correlations persisted 10 years later when 756 children were followed up 10 years. Dirty and neglected children appeared to increase the risk of fatness; other family factors did not, including family structure (biological or other parents and number of siblings) or parental overprotectiveness. Comment: Parental neglect may cause a psychological state that affects energy balance by altering behavior (overeating and physical inactivity) or hormone balances influencing fat storage (corticosteroids like cortisol, catecholamines, or insulin). In a related study (Int J Obesity 17:125, 1993), mothers' *not-knowing* about children's sweets intake (not the children's sweets intake *per se*) correlated with higher body weight. **ES note:** Applying feeding dynamics principles to these results raises the possibility that these children suffered from food insecurity or erratic and unreliable feeding, thereby promoting periodic overeating and weight gain.

Ludwig DS, Peterson KE, Gortmaker SL. Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *The Lancet*. 2001;357:505-508.

Notes: 548 ethnically diverse schoolchildren (age 11.7 years, SD 0.8) from public schools in four Massachusetts communities, studied prospectively for 19 months 1995 to 1997. The Youth Food Frequency Questionnaire (YFFQ) measured average drink intake--including sugar-sweetened drinks--as well as dietary fat and total energy intake at study outset and again 19 months later. Sugar-sweetened drinks were defined as soda, Hawaiian Punch, Kool-Aid, lemonade, sweetened ice tea, and other sugared fruit drinks. Beverage intake was adjusted for BMI, skinfold thickness, dietary intake, physical activity, and television viewing. For each additional serving of sugar-sweetened drink consumed, BMI increased by a mean of 0.24. Frequency of obesity increased 1.6 times. **ES note:** Beverage studies are often interpreted to mean that food regulation doesn't work with liquids. That may or may not be true. Such interpretations ignore the contribution of feeding dynamics. What is the nature of feeding dynamics when children are allowed to drink as many sweetened beverages as they want? Are parents doing their jobs with providing structured meals and snacks, then putting limits on between-times grazing for food or beverages?

NCCP National Center for Children in Poverty . Basic Facts about Low-income Children in the United States. February, 2005; accessed May 2, 2005. Web Page. Available at: http://www.nccp.org/cat_8.html.

Notes: After a decade of decline, the proportion of low-income families is rising again and millions of children of low-income parents find themselves without the basics, despite a majority of them living in households with working parents. More than one-third of children in the United States (approximately 27 million children) live in low-income families and 17 percent (more than 11 million) live in poor families. Young children are disproportionately affected. Most children in low-income families have at least one parent who works full-time and year-round. But low-income parents who work are more likely to be employed in service occupations where they are less likely to receive benefits such as health insurance.

Pelchat ML, Pliner P. Antecedents and correlates of feeding problems in young children. *Journal of Nutrition Education*. 1986;18(1):23-28.

Notes: Half of 79 mothers of 2-7 year old children complained about their children's poor food acceptance, preference for "junk" food and poor behavior at the table. Children with high problem scores with eating grew less well, acted out more in other areas, and had mothers who prodded,

rewarded and punished more around feeding. Children who were reluctant to try new foods had mothers who presented a limited array of food and catered to the child's food preferences.

Reilly JJ, Kelly A, Ness P, et al. Premature adiposity rebound in children treated for Acute Lymphoblastic Leukemia (ALL). *Journal of Clinical Endocrinology and Metabolism*. 2001;86:2775-2778.

Notes: Adiposity rebound (AR) occurs substantially earlier in children treated for acute lymphoblastic leukemia (ALL) than in healthy children. Researchers analyzed data on body mass index in 68 children treated for ALL who were in first remission, all of whom had been treated in Scotland between 1991 and 1998 and were 30 months or younger at the time of diagnosis. They also assessed the timing of AR against of cohort 889 healthy British children studied during the 1990s using the same method. Forty-three percent (43%) of ALL children and 4% of controls experience AR by age 37 months, the research team found. At 49 months, 81% and 21% of ALL patients and controls, respectively, had experience AR. Treatment of ALL is associated with a significantly advanced AR. This might, in part, explain the extremely high prevalence of obesity in long-term survivors

Rocandio AM, Ansotegui L, Arroyo M. Comparison of dietary intake among overweight and non-overweight schoolchildren. *International Journal of Obesity and Related Metabolic Disorders*. 2001;25:1651-5.

Notes: Using a cross-sectional design, 32 schoolchildren (11-y-old) were selected at random. The parents of children recorded dietary intake for a week using the food weighing method. The children were considered to be overweight when the weight for height was higher than 90th percentile. Some 46.9% of examined schoolchildren were considered overweight. Percentage energy intake reported was significantly lower in the overweight group compared to the non-overweight children (2138 vs 2292 kCal/day; $P < 0.01$).

Roemmich JN, Wright SM, Epstein LH. Dietary restraint and stress-induced snacking in youth. *Obesity Research*. 2002;10:1120-6.

Notes: After being stressed, low-restraint/low-reactive children ate fewer snacks and high-restraint/high-reactive children ate more snacks compared with the control condition. After covarying for percentage of body fat, the interactions remained ($p < 0.01$). Girls ate less than boys ($p < 0.001$), but sex did not influence eating in control and stress conditions. Children stressed, then classified as low- or high-reactive based on their *perceived* stress.

Rolls BJ, Engell D, Birch LL. Serving portion size influences 5-year-old but not 3-year-old children's food intakes. *Journal of the American Dietetic Association*. 2000;100:232-234.

Notes: By the end of the preschool period, the amount of food offered influences children's food intake. Sixteen five-year-old day care children ate greater amounts when presented with larger portions of macaroni and cheese at lunch time on the same day a week, once a week for three weeks. In contrast, food intakes of sixteen 3 1/2 year-old children were not affected by portion size; their intake varied little across the portion size manipulation. Conclusions of the authors: Anticipatory guidance to prevent overweight should include clear information on portion sizes for children. **ES note:** This article is interpreted to mean that children can be taught to overeat by large portion sizes. This interpretation overlooks both feeding dynamics and children's developmental characteristics. Large portions alone don't make children overeat but pressure to eat with *any* portion size does. Relative to development, toddlers are working on autonomy. Preschoolers are working on initiative. You can get a preschooler to do your bidding, ie, "clean your plate," because they want to please and can be shamed into doing adults' bidding. You can't do that with a toddler. Toddlers are so committed to being their own people that they would rather fight than eat.

Rose HE, Mayer J. Activity, calorie intake, fat storage, and the energy balance of infants. *Pediatrics*. 1968;41:18-29.

Notes: Infants show apparently constitutionally determined activity levels, energy intake and body type. In this observational study of 30 babies, the least active 4-6 month-old infants ate the least and were the fattest and the most active infants ate the most and were the leanest.

Ryan AS, Martinez GA, Roche AF. An evaluation of the association between socioeconomic status and the growth of American children: Data from the Hispanic Health and Nutrition Examination Survey--NHANES 1982-1984. *American Journal of Clinical Nutrition*. 1990;51:944S-952S.

Notes: Mexican American children from poor and nonpoor groups tended to be shorter, heavier and fatter than either white or black children. The norm is around 85th percentile W/H. ES note: When evaluating the size and shape of Mexican children, it is important to remember that 85th percentile weight/height is closer to normal growth than 50th percentile. In fact, rather than evaluating growth

based on any one plotting, it is far better to evaluate integrity of growth by following for several months or years.

Serdula MK, Ivery D, Coates RJ, Freedman DS, Williamson DF, Byers T. Do obese children become obese adults? A review of the literature. *Preventive Medicine*. 1993;22:167-177.

Notes: A meta-analysis of epidemiologic studies found obese children to be at higher risk for obesity as adults, but most obese adults were not obese as children. Obesity was defined by skinfold measurement, densitometry, or various calculations of W/H. Among obese infants and toddlers, less than 25% were found to be obese as young adults. Among obese preschool children, 26-41% were found to be obese as adults and among obese school-age children, 42-63% were obese as adults. The proportion of adults who were obese as children ranged from 5 to 20%. (The one outlier statistic was from France and showed that 44% of obese 18-25 years olds had been obese as preschoolers.) This is a meta-analysis of epidemiological studies conducted in either the United States or Europe between 1970 and 1992. To be included studies had to have anthropometric measurements of participants both as children who were less than 18 years of age and as adults who were 18 years and older. The literature search identified 17 published reports from 15 study populations. The age at initial obesity assessment varied between 6 months and 16 years and the age at final obesity assessment range from 18 years to 53 years. The interval between initial and final assessment ranged from 2 years to 45 years. The risk for adult obesity was greater among children who were at more extreme levels of obesity and for children who were obese at older ages.

ES Note: When evaluating this article it is important to remember the laws of conservation of growth. Children's growth tends to track--to follow a consistent growth channel. An older infant or toddler who stabilizes at the 25th percentile or the 95th percentile is likely to remain in that percentile throughout life. As a consequence it would be valid to expect a correlation between "obesity" (or any W/H category) in children and in adults of 100%. In contrast, this article found correlations of only about 5 to 63% between obesity in childhood and obesity in adulthood. *While authors emphasized the risk of retaining obesity into adult life, in reality, this meta-analysis shows that the tendency is to slimming.*

Shunk JA, Birch LL. 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*. 2004;104:1120-6.

Notes: Higher levels of dietary restraint, weight concern, and body dissatisfaction among young girls at risk for overweight were accompanied by greater weight gain from 5 to 9 years of age. This longitudinal study was done on 153 girls characterized at risk of overweight (by virtue of plotting at the 85th percentile BMI or above) from predominately middle class and exclusively non-Hispanic white families living in central Pennsylvania. Girls who were at risk for overweight at age 5 reported significantly higher levels of restraint, disinhibition, weight concern, and body dissatisfaction by age 9. Girls at risk for overweight at age 5 also showed greater increases in weight status from 5 to 9 years of age. Girls as young as age 5 years answered yes when asked, "do you try to eat only a little bit on purpose so you won't get fat?" **Caveat:** Positive alternatives to attempts at dietary restriction are essential to promoting healthful weight status among children, and should include encouraging physical activity, promoting children's acceptance of a variety of low-energy-density foods, and providing guides to appropriate portion sizes." ES note: The remedy for restrained *eating* is not restrained *feeding*.

Skinner JD, Carruth BR, Houck K, et al. Mealtime communication patterns of infants from 2 to 24 months of age. *Journal of Nutrition Education*. 1998;30:8-16.

Notes: Documented mealtime communication behaviors used by 98 Caucasian infants who were studied longitudinally from 2 to 24 months of age. Lists age-related food-acceptance and food-refusal behavior of infants. Mothers' responses to food rejection, which fell into 3 categories: "don't worry," "offers alternative" and "tries force or bribery." Percentage of related responses to each of the three categories were 16 months: 25, 70 and 5; 20 months: 30, 60 and 10; 24 months: 40, 45 and 10. ES note: The norm in feeding appears to be short order cooking. Mothers plan meals based on what they think their child will eat, then make alternatives if the child refuses the offering.

Stice E, Agras WS, Hammer LD. Risk factors for the emergence of childhood eating disturbances: a five-year prospective study. *International Journal of Eating Disorders*. 1999;25:375-387.

Notes: Data suggested that the risk for emergence of inhibited eating, secretive eating, overeating, and vomiting increased annually through age 5. Maternal body dissatisfaction, internalization of the thin-

ideal, dieting, bulimic symptoms, and maternal and paternal body mass prospectively predicted the emergence of childhood eating disturbances. Infant feeding behavior and body mass during the first month of life also predicted the emergence of these behaviors.

Stice E, Cameron RP, Killen JD, Hayward C, Taylor CB. Naturalistic weight-reduction efforts prospectively predict growth in relative weight and onset of obesity among female adolescents. *Journal of Consulting and Clinical Psychology*. 1999;67:967-974.

Notes: This study of 692 high school girls showed those who attempted to lose weight were fatter at the end of high school than those who did not. In the four 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.

Stunkard AJ, Harris JR, Pedersen NL, McClearn GE. The body-mass of twins who have been reared apart. *New England Journal of Medicine*. 1990;322:1483-1487.

Notes: This Swedish twin adoption study indicates that identical twins reared apart had a weight correlation of 0.70 for men and 0.66 for women. This article also reviews other twin studies that have similar findings.

Twenge JM. The age of anxiety? Birth cohort change in anxiety and neuroticism, 1952-1993. *Journal of Personality and Social Psychology*. 2000;79:1007-1021.

Notes: Two meta-analyses (college student and children ages 9-17 years old) find Americans have shifted toward substantially higher levels of anxiety and neuroticism during recent decades. Both college student and child samples increased by 20% in anxiety in the years between 1952 and 1993. The average American child in the 1980s exhibited more anxiety than child psychiatric patients in the 1950s. Correlations with social indices (e.g. crime rates, divorce rates with accompanying child poverty) suggest that decreases in social connectedness and increases in environmental dangers may be responsible for the rise in anxiety.

Whitlock EP, Williams SB, Gold R, Smith PR, Shipman SA. Screening and Interventions for Childhood Overweight: A Summary of Evidence for the US Preventive Services Task Force. *Pediatrics*. 2005;116:e125-144.

Notes: Weight loss results: Among children 8-13 years of age, intensive, generally family-based, short-term (a year or less) behavioral approaches found modest to no changes in BMI results. A few studies found, at most, a 10% decrease in participant BMI values. Some researchers inflated weight loss data above 10% by reporting percentage decrease in *overweight* rather than a percentage decrease in total body weight or BMI.

Results were similar for adolescents, showing modest to no change in BMI. Sibutramine increased weight loss by about 4%.

At age 13 years, overweight children (95th %tile W/H) have a 50% probability of adult obesity (BMI >30).

Wright CM, Parker L, Lamont D, Craft AW. Implications of childhood obesity for adult health: findings from thousand families cohort study. *British Medical Journal*. 2001;323(7324):1280-1284.

Notes: In a longitudinal study of 431 adults followed from 1947 found that before age 13 years, there was little tracking from childhood overweight to adulthood obesity *when using a measure of fatness (bioelectrical impedance) that was independent of build (BMI)*. No excess adult health risk from childhood or teenage overweight was found. Being thin in childhood offered no protection against adult fatness, and the thinnest children *tended to have the highest adult health risk at every level of adult BMI*. Data suggest that whole population interventions in childhood directed at reducing body mass index in childhood may not benefit adult health. Meanwhile, underweight in childhood should still be a focus of concern since it offers no protection against adult obesity and is associated with increased risk of adult disease.

Zack PM, Harlan WR, Leaverton PE, Cornoni-Huntley J. A longitudinal study of body fatness in childhood and adolescence. *Journal of Pediatrics*. 1979;95:126-130.

Notes: HANES (National Health and Nutrition Examination Survey) data showed children had a strong tendency to maintain their relative ranking in skin-fold thickness. 68-77% of children classified as obese in childhood were similarly classified in adolescence. 39 to 52% of lean children remained in that category in adolescence. Tracking for skinfold thickness was strongly correlated with tracking for height. ES note: The logic of this article is complicated by the authors' very common assumption that "obesity" (generally identified as W/H or BMI above the 95 percentile) is an abnormal condition. This

article strongly supports children's ability to track and, indeed, indicates a tendency to slimming.
Zlotkin S, McGowan A. *Family Dynamics Correlates With Massive Obesity in Preschoolers*. Verbal communication; 1995.

Notes: Examination of family dynamics around massively obese four and five year olds showed significant distortions in both organization and cohesion. Profoundly obese preschoolers showed marked behavioral disturbances and were more likely than normal-weight preschoolers to have been reared in extremely disorganized or extremely rigid families. Anecdotally, parents consistently failed to set effective limits and children were tyrannical.