COMMENTARIES

The Trust Model: A Different Feeding Paradigm for Managing Childhood Obesity

Ihuoma U. Eneli[1,2], Peggy A. Crum[3] and Tracy L. Tylka[4]

Obesity (2008) **16,** 2197–2204. doi:10.1038/oby.2008.378

A common assumption is that small portion sizes, fat restriction, and calorie awareness are necessary in controlling weight gain for overweight children and will lead to weight loss if these behaviors are pursued rigorously. However, dietary restriction has been shown to backfire, as it is associated with preoccupation with food, eating in the absence of hunger, poorer self-esteem, and further weight gain (1–4). The efficacy of current dietary treatments, particularly for long-term weight maintenance, is doubtful. Most of these interventions rely on dietary restriction as their primary strategy. Hence, there is a compelling need to investigate pediatric obesity intervention paradigms without a core focus on dietary restriction. One such paradigm is the trust model proposed by Satter, a dietitian and social worker with experience in child–caregiver feeding dynamics (5). This paper will review the model constructs and examine its applicability as a dietary intervention for preventing and managing childhood obesity.

The trust model emphasizes the division of feeding responsibility between caregivers and children and trust in the child's ability to self-regulate food intake by recognizing hunger, appetite, and satiety cues within the context of regular eating patterns (i.e., pleasant and structured meals and snacks) (**Figure 1**). The model deemphasizes portion sizes, the food pyramid, calorie or carbohydrate counting, eliminating certain foods, or overreliance on low-fat or low-calorie food options. No type of food is restricted; the trust model posits that dietary restriction creates feelings of deprivation, which lead children to crave and overindulge in the restricted food when an opportunity arises. Pressuring children to eat also is strictly discouraged because it can disconnect children from their hunger, satiety, and appetite cues. Specifically, caregivers are responsible for selecting foods to present at meals and snacks, the timing for meals and snacks, choosing the place to eat, sitting and eating with children, and keeping the atmosphere pleasant. Children are responsible for what to eat and how much (or even whether) to eat from the food provided. Food selection is emphasized only within the scope of creating meals and snacks of increasing variety and balance within the context of the family's abilities and preferences. Caregivers are taught to plan and serve a balanced meal with protein, carbohydrates, fruits and/or vegetables, dairy/calcium, and fat.

The trust model is implemented within an environmental context of recognizing children's physical and emotional stages of development, children's natural growth patterns, food choices and availability, the medical and psychosocial characteristics of the caregiver and the child, and shared responsibility for physical activity (**Figure 1**). Satter (5) stresses that caregivers not misinterpret children's natural growth pattern as a manifestation of a feeding problem per se, as children will be of different sizes and shapes due to their genetic constitution.

Four behaviors interfere with caregivers' ability to guide (nurture and preserve) the development of children's trust in their internal hunger, appetite, and satiety cues: misinterpretation of normal weight, restriction of food intake, pressures to eat when children refuse food, and using food as a calming agent (5). Satter contends that some caregivers overcontrol children's intake because of underlying conscious or subconscious anxieties about weight, body image, appearance, nutritional quality of the diet, specific food group or nutrient consumption, or inconsistent food supply. Others undersupport children's feeding by not providing regular feeding opportunities or appropriate modeling for eating, which leads to a chaotic food environment. Satter believes overcontrol and undersupport are the core of nonorganic child weight and growth problems and must be addressed in order to treat or prevent these problems (5).

The difference between the trust model and traditional dietary methods is *not* external vs. internal control, but rather caregivers taking leadership by structuring feeding opportunities and giving their children autonomy within that structure (**Table 1**). In the trust model, the caregiver takes responsibility for the feeding environment, yet honors children's self-regulatory processes, thus building trust. It postulates that children who are not permitted to control their food intake learn self-doubt, ambivalence, and dependency with regard to eating and regulating their food intake. Children who are trusted to regulate how much to eat develop positive self-esteem, learn responsibility and self-care skills, appreciate their bodies, and do not become preoccupied with food (6).

[1]Center for Healthy Weight and Nutrition, Nationwide Children's Hospital, Columbus, Ohio, USA; [2]Department of Pediatrics, The Ohio State University, Columbus, Ohio, USA; [3]Department of Pediatrics and Human Development, Michigan State University, East Lansing, Michigan, USA; [4]Department of Psychology, The Ohio State University, Columbus, Ohio, USA. Correspondence: Ihuoma U. Eneli (Ihuoma.eneli@nationwidechildrens.org)

Received 31 October 2007; accepted 20 March 2008. doi:10.1038/oby.2008.378

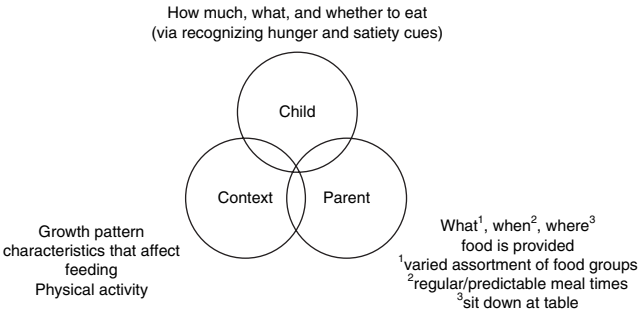

Figure 1 Schematic representation of the trust model.

Table 1 Comparism between the trust model and traditional dietary approach

Trust model	Traditional dietary approach
Division of responsibility between caregiver (food choices) and child (food intake)	Caregiver control of food choices and food intake
Topics	
Scheduled, predictable eating times	Controlling environmental triggers
No portion control/restriction	Portion control
Family meals	Low-fat meals/restriction of foods
Building trust	Food choices using MyPyramid
Respecting child's hunger, appetite, satiety cues	Reading labels/calorie awareness

In summary, the trust model emphasizes feeding dynamics (i.e., appropriate division of responsibility between caregivers and children) and shuns any coercive feeding strategies (i.e., food restriction, pressures to eat). Satter's model proposes that, for prevention and treatment of child eating and growth problems, the primary focus of change must be altering caregivers' maladaptive feeding behaviors. The change desired in children's eating will emerge from (i) their innate drive to eat, self-regulate their intake, and grow in a predictable manner and (ii) the degree to which caregivers can optimize feeding (5).

Is the trust model applicable for preventing or managing childhood obesity?

Although proposed in 1986 (7), the trust model has not been tested with methodological rigor in an experimental setting for either childhood obesity prevention or treatment. Most research that has supported its constructs has focused on preschoolers, feeding behaviors, or obesity prevention (8–13). Extant data have not revealed a consistent association between parental feeding behaviors and children's overweight across age (14,15), gender (14,16), socioeconomic status (SES) (17), maternal characteristics (e.g., obesity) (10,18–20), or within families (16,21,22). These variables (in addition to others such as ethnicity, culture, parental dieting history, parental eating behaviors, and perceived self and response efficacy for changing feeding behaviors) need to be examined in a testable model using latent variable structural equation modeling. Depending on the exposure and outcome of interest within the feeding relationship, the same variable may act as a mediator, moderator, or confounder.

Reports of the efficacy of the trust model are largely anecdotal. None of the studies cited in three comprehensive reviews on interventions for preventing or treating overweight children focused on feeding dynamics, which is at the core of the trust model (23–25). A recent study used some of the trust model constructs as an intervention for overweight children aged 6–11 years (26). Its objective was to compare outcomes when the intervention was directed at parents-only vs. parents and their obese children. Parents were taught to be responsible for controlling where, when, and what food was offered to children. Family meals and pleasant mealtimes were emphasized. Children lost more weight in the parent-only group compared to the parent-and-child group. Because children's feeding responsibility, as described in the trust model, was not taught to either group, these results do not fully address or lend support for the trust model.

How or whether external characteristics (e.g., palatability, accessibility, availability, cultural practices, maternal weight) influence response to the trust model has not been investigated. Indeed, children of mothers who engage in disinhibited eating are less able to self-regulate food intake (27,28). Further studies need to examine how modifying feeding behavior or eating patterns can be effective as a dietary intervention. Accordingly, the first step is an in-depth review of extant literature of the trust model (or individual components of the model) as a dietary intervention.

Child feeding behaviors, obesity, and the trust model. Oftentimes, caregivers use one of two types of controlling feeding behaviors when attempting to encourage good nutritional habits in their children (9,10,18,22,29,30). The first, restrictive behavior, reflects caregivers controlling their children's intake of foods, especially those deemed unhealthy (e.g., high-fat, high-sugar foods). The second, pressure-to-eat behavior, describes excessive pressure placed on children to eat foods that are considered healthy (e.g., fruits, vegetables). For both controlling behaviors, caregivers excessively monitor children's food choices and intake.

These practices may disrupt children's awareness of and response to physiological cues of hunger, appetite, and satiety, thereby increasing their risk of dysfunctional eating. Researchers have shown that mothers who adopt controlling feeding behaviors are more likely to have children with poor self-regulation of energy intake (13,27,29,31) and higher body mass (9,10,27,28). More than two decades ago, Costanzo and Woody (32) provided a basis for this link between

caregiver feeding behaviors and obesity. In their model, caregiver feeding style is influenced if caregivers (i) are obese, (ii) observe the child to be overweight, (iii) perceive the child is at risk for overweight and associated problems, and (iv) express concern about the child's capability to control his/her weight. Francis *et al.* (19) supported elements of the model, reporting maternal body mass, maternal dietary restraint, and maternal perception of child overweight as significant predictors of controlling feeding behaviors. Caregivers may use these behaviors because they do not believe that children can regulate their food intake appropriately. In a laboratory study of 77 children and their mothers, Drucker *et al.* (31) noted that a majority of mothers used some form of prompting or restraint to guide their children's intake. This lack of faith in children's ability to self-regulate food intake can backfire. A study of 196 white girls (assessed at ages 5 and 7 years) found when mothers restricted their daughters' intake, the daughters were twice as likely to eat in the absence of hunger (33). Girls who ate in the absence of hunger were also five times more likely to be overweight at age 5 and 7 years (34). The protective effect of breastfeeding on subsequent obesity in the child has been partially explained by decreased maternal restriction (35), linking restrictive feeding practices to overweight, even as early as infancy.

The associations between poor eating regulation, controlling feeding behaviors, and increased body mass has been inconsistent across age (14,15), gender (14,16), SES (17), maternal characteristics (e.g., obesity) (10,18–20), and families (16,21,22) suggesting that other variables may moderate the association between controlling feeding behaviors and weight. Perhaps controlling feeding behaviors, as currently measured, is not a single construct. Ogden *et al.* argue that control of food intake can be overt or covert based on how children perceive their caregivers' behavior (12). If the child perceives the caregiver as controlling, the behavior is overt; it is covert when the perception of control is absent. The trust model counters that the intent behind the specific feeding behavior is what distinguishes between controlling and noncontrolling feeding behaviors. In division of responsibility, caregivers are responsible for what is served; thus, they can provide healthy options and direct children's intake of less nutritious foods, exhibiting covert rather than overt control.

Studies are needed to investigate pathways through which controlling behaviors are risk factors for childhood obesity. For instance, what child, maternal, cultural, developmental, and environmental factors in the presence of controlling feeding behaviors adversely affect children's weight? Also, which of these factors in the presence of division of responsibility are likely to help stabilize/normalize children's weight while honoring their natural body size? Data gleaned from these studies will determine whether the trust model's division of responsibility is viable for preventing or treating childhood obesity.

Can children self-regulate or relearn to self-regulate food intake? In the trust model, the children's role in division of responsibility is predicated on their ability to recognize hunger, appetite, and satiety cues, or self-regulate their food intake. Most experts agree that if children are unable to internally self-regulate, their weight and subsequent food relationships are adversely affected (10,29). Studies have demonstrated that young children have an inborn ability to self-regulate caloric intake, with some individual variation (13,36). For instance, in the Feeding Infants and Toddler Study, toddlers consumed larger-than-average portion sizes at low-energy-density meals compared to smaller-than-average portion sizes at high-energy-density meals (37). The ability to self-regulate weakens as children get older and become more compliant to external pressures to eat or restrict intake (38–42).

Self-regulation, including the decision to eat, what to eat, and how much to eat are controlled by physiologic and sensory stimuli modulated by complex cognitive processing (43). Gastric distension, gut hormones (e.g., cholecystokinin, ghrelin, and adipose cell signals) peripherally lower appetite and initiate satiety by decreasing the appeal of sensory properties of the food. Neurons in the orbitofrontal cortex then interpret the taste, smell, texture, and sight of the food, sending signals to the hypothalamus about its pleasantness. The point at which there is a decline in appetite for a meal based on food cues from taste, sight, and smell is referred to as sensory satiety. Appreciation of sensory satiety overrides the initial surge in appetite that occurs early on in a meal. Recognizing the point of sensory satiety can help with self-regulation.

Sensory signals are especially relevant in the presence of hunger, which is difficult given that many individuals graze throughout the day. The trust model's recommendations to not graze between structured meals and snacks may help children better appreciate sensory satiety. Finally, dietary fat functions as a signal to the hypothalamus for gauging satiety, although the strength of the effect remains debatable (44,45). The trust model's lack of strict restriction of dietary fat may explain why it would be effective for obesity prevention and treatment.

But can overweight individuals recognize hunger cues and stop eating when satiated? During a controlled intervention of 13 thin and 9 overweight adults, hunger ratings following overfeeding were reduced by 41% among thin individuals but remained unchanged for overweight individuals (46). In fact, when adults were overfed, hunger reduced significantly in the thin individuals and they reported higher satiety ratings. An explanation with empirical support is that overweight individuals both binge eat and diet/restrict food intake more frequently than thin individuals, which lead to disordered hunger and satiety cues (47). Restrained eaters overindulge in food after perceiving that they have broken dietary rules or have eaten a forbidden food (48,49). In the study when obese participants (who had earlier reported no impact of hunger or satiety cues on their food intake) were obligated to consciously focus on their hunger and satiety signals, they reported that they were able to detect these signals and modify their food intake (50).

A weakness of the trust model is that it does not incorporate any intervention that teaches children to recognize hunger or satiety cues. Rather, it presumes that once caregivers discontinue overcontrolling or undersupportive feeding practices, children will naturally self-regulate. According to Satter (5), internal regulation takes 2–4 weeks for young children. During the transition period, children may eat a great deal of food, confirming parents' worst fears. If caregivers continue to practice the trust model, children learn to trust that they will be to eat when and as much as they want, and then begin to self-regulate. There are no studies as of yet validating this assumption. Furthermore, the trust model stresses consistency in carrying out division of responsibility for self-regulation to develop and continue. Will the process fail if the trust model's recommendations are not followed faithfully? With any behavior change, consistency builds over time as the behavior is learned and practiced. Relapse is a recognized part of any behavior change process. The model suggests that reverting to restrictive or pressure-to-eat behaviors, even for a short period, may reduce the efficacy and nullify any prior gains.

Can all children learn to self-regulate their food intake? The trust model may be inappropriate for the very small number of children who have obesity-related genetic syndromes with hyperphagia, hypothalamic obesity, or early-onset morbid obesity (EMO) before age 4. Miller *et al.* found children with EMO had abnormal pituitary morphology comparable to children with Prader-Willi syndrome (PWS), a genetic syndrome characterized by hyperphagia, developmental delay, and morbid obesity (51). At its core, the dietary treatment for PWS children is strict external restriction. It will be difficult to teach children with these disorders how to self-regulate their food intake, without strict external control. Second, obese children demonstrate deficits in impulse control (52,53), with greater vulnerability to sensory food signals such as taste and smell (54). Thus, using the trust model for children with conduct problems, impulsive behaviors, or lack of emotional regulation in other domains will be challenging. Parents of children who display these behaviors will need significant training in order to optimize interactions with their child. For any weight-directed intervention to be successful, it can not focus solely on changing feeding behavior.

Finally, can children be taught self-regulation despite years of restrictive parental feeding practices? Johnson showed that preschool children were able to self-regulate their energy intake following a 6-week intervention (13). Children were taught about hunger and satiety using age-appropriate video, discussion, and doll play. They were then asked to relate how their stomachs felt after a snack by comparing their experience to three dolls: one with an empty stomach, one with a half-full stomach, and one with a full stomach. Self-regulation of energy intake was calculated as the extent to which children adjusted their *ad libitum* intake relative to a predetermined high-energy drink. At baseline, there was a wide variation in how children self-regulated their energy intake. Heavier children and children of mothers who engaged in disinhibited eating were less likely to self-regulate. Following the intervention, the correlation between self-regulation and maternal eating was no longer significant. In addition, children who had originally overeaten improved their ability to self-regulate. This study provides support for children's ability to relearn how to self-regulate, but further studies are needed to prove or reject this assertion.

Developmental stages. The trust model addresses the various developmental stages of childhood with interventions geared toward fostering positive eating attitudes, self-regulation skills, and good mealtime habits (5). As children grow older, the trust model expands their feeding responsibilities. Children gradually learn how to structure and prepare balanced meals, which will aid their eating and positive eating attitudes as adults.

The trust model recommends that caregivers should feed infants on-demand, waiting and becoming attuned to signs of their readiness to eat (5). In doing so, caregivers teach infants to trust rather than mistrust, a pivotal characteristic of Erikson's first developmental stage (55). Erikson suggests that if children mistrust the environment, they struggle throughout life with developing healthy relationships, self-esteem, and self-identity (55). This is consistent with the trust model's premise that the school-age child's ability to eat in response to physiological hunger and satiety cues is contingent on the achievements in the earlier stages of life (i.e., regular meal and snack times, division of feeding responsibility) (5).

The trust model recommends that children 7–15-months old transition to solid food within the context of family meals and snacks. During toddlerhood, a central developmental task is imitation (5); thus, adult modeling of a pleasant eating environment while sitting with children would have a significant impact. Family-style meals, pleasant meal times, and exposure to a variety of foods signal to young children expected norms related to eating. As toddlers transition into the preschool years, it is important that they learn how to politely refuse food. This skill will assist them in maintaining awareness of and honoring their hunger, appetite, and satiety cues when confronted with environmental influences that attempt to disrupt such signals. Through late childhood, the trust model begins to expand children's autonomy to select snack foods and meals at both at home and other settings (e.g., school cafeteria, restaurants, friends' homes). If the trust model has been applied in childhood, Satter (5) argues that adolescents will have developed positive attitudes about eating, good food acceptance and management skills, and good food regulation skills. They will be able to plan and prepare more family-style and independent meals to care for themselves after leaving home.

Adolescence is an intense period of identity development; hence, more variables interfere with feeding dynamics. The trust model continues to provide a framework for eating relationships during this stage; however, it is less specific about normal conflicts between

adolescents, peers, and caregivers. Even if the trust model has been practiced from childhood, messages from the media and peers will challenge adolescents' prior eating experiences. The emphasis on family mealtimes is pivotal at this time, as this structure provides an opportunity for adolescents to continue to receive support from family members in a nonthreatening environment. Adolescents who eat meals with their family exhibit fewer social risk behaviors and have healthier food habits regardless of gender or socioeconomic class (56).

Parenting styles. Developmental psychologists agree that parents substantially influence children's development. Based largely on the work of Baumrind (57,58), four parenting styles, which capture variations in parents' attempts to control and socialize their children, have been recognized. The parenting styles are categorized as uninvolved, indulgent, authoritarian, and authoritative and are based on the balance of parental responsiveness and demandingness. Responsiveness reflects the extent to which parents intentionally foster individuality, self-regulation, and self-assertion in their children by being attuned, supportive, and acquiescent to their children's needs. Demandingness reflects the control parents exert on their children to become integrated into the family (e.g., parental supervision, disciplinary efforts, and maturity demands).

Uninvolved parents are low in both responsiveness and demandingness by not offering support to their children or boundaries for their behaviors. Indulgent parents are responsive but not demanding. They are permissive, nondirective, and lenient by not requiring mature behavior, allowing considerable self-regulation, and avoiding confrontation. Authoritarian parents are very demanding but not responsive. They expect their children to obey their orders without explanation. These parents provide highly ordered and structured environments with clearly stated rules. Uninvolved and indulgent parenting are associated with child alcohol abuse (59), impulsivity (59), gambling (60), and aggression (61,62); while authoritarian parenting has been related to children's overt and relational aggression (61–64). On the other hand, authoritative parents are responsive and offer/monitor standards for children's conduct. They are assertive, but not intrusive or overly restrictive.

Children's inability to internally self-regulate food intake is another behavioral problem that may emerge from indulgent, uninvolved, or authoritarian parenting. Indulgent and uninvolved parents would likely undersupport their child's feeding by not providing regular feeding opportunities or appropriate modeling for eating, leading to a chaotic food environment (5). As such, they should have difficulty implementing most trust model constructs. Authoritarian parents may encourage dieting because it involves high levels of punitive control. Indeed, authoritarian parenting styles were associated with higher levels of food restriction and pressures to eat, which can lead to difficulty with regulating energy intake and reduced responsiveness to the energy density of foods (29,65). Consequently, authoritarian parents may find division of responsibility difficult; they may want to overcontrol by not granting children responsibility in feeding interactions.

In contrast, authoritative parenting is related to child behavioral adjustment and positive feeding interactions (66). Authoritative parents use appropriate but not highly restrictive controls of high-density food in the feeding environment, relying on child-centered techniques (e.g., allowing the child to choose among the foods presented) (66). Such authoritative strategies may be successful in the development of self-regulation and healthy eating practices if parents direct children toward the consumption of healthy foods and do so in a way as to encourage internal (i.e., focus on physiological hunger and satiety cues) vs. external (i.e., diet rules) controls. For instance, fruit consumption was found to be higher among children raised with an authoritative parenting style (67). Thus, the trust model incorporates various aspects of authoritative parenting within its structure. However, it is challenging to change parenting practices that are ingrained from caregivers' own childhood experiences and that reflect their own impulsivity and anxiety about food. The trust model provides little direction on how to translate its recommendations when parents struggle with mental health disorders and restrained or disinhibited eating.

Family meals and eating patterns. The family has a strong influence on children's diet and food-related behaviors, which may impact their weight (68–70). The trust model recommends that meals should be a family event, eaten at a table, with pleasant dialogue, in order to promote social meaning and importance of eating. When families eat meals together, children have a greater intake of fruits, vegetables, and milk and lower intake of fried foods and soft drinks (71). Despite the busy lifestyle of US families today, family-style meals can be implemented. Family meal participation increased in low-income families following an educational intervention program (72).

The trust model recommends that children serve themselves from the food provided, rather than the parent fixing their plate. Interestingly, a study of 2–5-year-olds indicated that they ate 25% less of a large meal when they served themselves compared with when an adult served them (41), supporting the trust model. However, over the last two decades, the percentage of calories from meals eaten away from home has almost doubled, from 18 to 36% (73). Does the trust model remain effective or potentially preserve self-regulation when meals are eaten away from home or on the run? In addition, as caregivers work and leave their children at daycare and preschool settings for long hours, nonfamily members and nonhome environmental factors may shape dietary habits.

Portion control. The trust model espouses that having children honor their physiological hunger, appetite, and satiety cues circumvents caregivers' need to impose rigid external limits on food intake, as toddlers usually do not eat more than what their bodies physiologically need. In a laboratory setting, 3-year-old children ate similar quantities of macaroni and cheese despite being offered different

portion sizes (39). Yet not restricting portion sizes conflicts with current understanding of how portion size relates to both increased energy intake and higher body mass (74,75). Individuals who are easily influenced by external food cues may overeat when larger portion sizes are available (41,76,77). In these contexts, would the trust model preserve children's focus on internal hunger and satiety cues rather than external food cues? Nevertheless, the trust model's lack of attention to portion control may be an area of weakness.

Similarity to an adult-eating model: intuitive eating. Tenets of the trust model are similar to intuitive eating, an adaptive eating approach that has been studied with adult women (47,78,79). Three central features of intuitive eating are (i) unconditional permission to eat when hungry and what food is desired, (ii) eating for physical rather than emotional reasons, and (iii) reliance on internal hunger and satiety cues to determine when and how much to eat. The presence of each component is necessary for intuitive eating (80). Thus, similar to the trust model, the major characteristic of intuitive eating is the attention to physiological hunger and satiety cues to govern eating behavior (79,80).

The three features of intuitive eating were found to be negatively related to body mass, restrictive eating, body dissatisfaction, and pressure for thinness, whereas they were positively related to awareness of hunger and satiety cues, well-being (e.g., self-esteem, life satisfaction, proactive coping), and body appreciation (47,78,79). Because the trust model emphasizes children's responsibility in attending to their hunger and satiety cues (5), it is closely aligned with intuitive eating. In the trust model, caregivers are instructed to not use food as a reinforcement and to help children learn to regulate and cope with stress without using food (5). These interventions could encourage children to eat in response to physical hunger rather than emotional needs, one central aspect of intuitive eating.

Caregivers following the trust model provide a healthy assortment of food for their children at meal and snack times, but are not encouraged to restrict types of food offered (5). This philosophy is consistent with intuitive eating's unconditional permission to eat. When division of responsibility has been emphasized and valued within the family, children learn to trust their ability to eat intuitively and apply it to their eating situations as they age. Thus, intuitive eating can be conceptualized as an outcome of following the trust model.

Yet the structure of family meals and snacks and division of responsibility are not clearly articulated in the intuitive eating approach. A reason for this absence may be that intuitive eating has been largely conceptualized and studied in adults and, unlike the trust model, has not been mainly considered from the perspective of the caregiver–child feeding relationship. It is important to note that the efficacy of the intuitive eating model for obesity intervention has not been empirically tested. Hence, the intuitive eating model does not provide collaborating evidence from which one can infer that the trust model will be an effective intervention for childhood obesity prevention or treatment.

Future directions. Cultural or ethnic influences are not addressed in the trust model. Most data on child feeding behavior has been conducted among White upper-class families, limiting its generalizability. Anderson *et al.* hypothesized that the reasons underlying parental use of restrictive or controlling feeding behaviors may differ among ethnic groups (81). For instance, African American parents reported high levels of restriction or monitoring feeding behaviors despite low concern about their children's weights (81). Hispanic parents had indulgent feeding styles compared to African American parents, who were described as uninvolved. Findings from a recent study that family-style dinners are protective against overweight for non-Hispanic White adolescents but not for Hispanic or African American adolescents (82), further highlight the need for the trust model to address cultural and racial differences within its recommendations.

An exponential rise in US obesity rates has occurred within the last 30 years, a period in which restricting intake and dieting are common. However, the link between controlling feeding behaviors and obesity may be an "epiphenomenon" rather than a true casual relationship. Parents may have adopted increasingly controlling or restricting behaviors in response to the widespread accessibility and availability of energy-dense meals and media messages to control weight. If the link between controlling feeding behaviors and obesity is supported, many questions remain unanswered. What is the structure of an effective intervention based on the trust model? Will the child's age or developmental stage affect the efficacy of the intervention? Can the trust model be used for immigrant, African American, Hispanic, or white families? Can parents accept and implement these recommendations? Will health-care providers accept the trust model as an intervention for the overweight child? Should the model be advocated for prevention, treatment, or both? What is the optimal length of time for any intervention using the trust model? Next steps for the trust model are testing the relationship between specific risk factors, interventions, mediators, and outcomes.

In summary, the trust model alters the caregiver's role from one that controls and restricts children's food intake to one that fosters collaboration between the caregiver, child, and environment. Our in-depth review of this model and the extant literature make a strong case for conducting both qualitative and quantitative research comparing the trust model to more traditional dietary approaches for preventing and treating childhood obesity.

ACKNOWLEDGMENT

We thank Elizabeth Jackson for her assistance in the preparation of the manuscript.

DISCLOSURE

The authors declared no conflict of interest.

REFERENCES

1. Patton GC, Selzer R, Coffey C, Carlin JB, Wolfe R. Onset of adolescent eating disorders: population based cohort study over 3 years. *BMJ* 1999;318:765–768.

2. Field AE, Austin SB, Taylor CB *et al*. Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics* 2003;112:900–906.
3. 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. *J Consult Clin Psychol* 1999;67:967–974.
4. Killen JD, Taylor CB, Hayward C *et al*. Weight concerns influence the development of eating disorders: a 4-year prospective study. *J Consult Clin Psychol* 1996;64:936–940.
5. Satter E. *Your Child's Weight: Helping Without Harming*. Kelcy Press: Madison, WI, 2005.
6. Satter EM. Internal regulation and the evolution of normal growth as the basis for prevention of obesity in children. *J Am Diet Assoc* 1996;96:860–864.
7. Satter EM. The feeding relationship. *J Am Diet Assoc* 1986;86:352–356.
8. Birch LL. Development of food acceptance patterns in the first years of life. *Proc Nutr Soc* 1998;57:617–624.
9. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. *Pediatrics* 1998;101:539–549.
10. Faith MS, Berkowitz RI, Stallings VA *et al*. Parental feeding attitudes and styles and child body mass index: prospective analysis of a gene-environment interaction. *Pediatrics* 2004;114:e429–e436.
11. Johannsen DL, Johannsen NM, Specker BL. Influence of parents' eating behaviors and child feeding practices on children's weight status. *Obesity (Silver Spring)* 2006;14:431–439.
12. Ogden J, Reynolds R, Smith A. Expanding the concept of parental control: a role for overt and covert control in children's snacking behaviour? *Appetite* 2006;47:100–106.
13. Johnson SL. Improving Preschoolers' self-regulation of energy intake. *Pediatrics* 2000;106:1429–1435.
14. Iannotti RJ, O'Brien RW, Spillman DM. Parental and peer influences on food consumption of preschool African-American children. *Percept Mot Skills* 1994;79:747–752.
15. Robinson TN, Kiernan M, Matheson DM, Haydel KF. Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Obes Res* 2001;9:306–312.
16. Waxman M, Stunkard AJ. Caloric intake and expenditure of obese boys. *J Pediatr* 1980;96:187–193.
17. Hupkens CL, Knibbe RA, Van Otterloo AH, Drop MJ. Class differences in the food rules mothers impose on their children: a cross-national study. *Soc Sci Med* 1998;47:1331–1339.
18. Francis LA, Birch LL. Maternal weight status modulates the effects of restriction on daughters' eating and weight. *Int J Obes Relat Metab Disord* 2005;29:942–949.
19. Francis LA, Hofer SM, Birch LL. Predictors of maternal child-feeding style: maternal and child characteristics. *Appetite* 2001;37:231–243.
20. Tiggemann M, Lowes J. Predictors of maternal control over children's eating behaviour. *Appetite* 2002;39:1–7.
21. Saelens BE, Ernst MM, Epstein LH. Maternal child feeding practices and obesity: a discordant sibling analysis. *Int J Eat Disord* 2000;27:459–463.
22. Wardle J, Sanderson S, Guthrie CA, Rapoport L, Plomin R. Parental feeding style and the inter-generational transmission of obesity risk. *Obes Res* 2002;10:453–462.
23. Stice E, Shaw H, Marti CN. A meta-analytic review of obesity prevention programs for children and adolescents: the skinny on interventions that work. *Psychol Bull* 2006;132:667–691.
24. Summerbell CD, Ashton V, Campbell KJ *et al*. Interventions for treating obesity in children. *Cochrane Database Syst Rev* 2003;CD001872.
25. Jain A. What works for obesity: a summary of the research behind obesity interventions. *Clinical Evidence*. <http://www.clinicalevidence.com> (2004). Accessed 8 February 2008.
26. Golan M, Kaufman V, Shahar DR. Childhood obesity treatment: targeting parents exclusively v. parents and children. *Br J Nutr* 2006;95:1008–1015.
27. Birch LL, Fisher JO. Mothers' child-feeding practices influence daughters' eating and weight. *Am J Clin Nutr* 2000;71:1054–1061.
28. Cutting TM, Fisher JO, Grimm-Thomas K, Birch LL. Like mother, like daughter: familial patterns of overweight are mediated by mothers' dietary disinhibition. *Am J Clin Nutr* 1999;69:608–613.
29. Birch LL, Fisher JO, Davison KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *Am J Clin Nutr* 2003;78:215–220.
30. Hood MY, Moore LL, Sundarajan-Ramamurti A *et al*. Parental eating attitudes and the development of obesity in children. The Framingham Children's Study. *Int J Obes Relat Metab Disord* 2000;24:1319–1325.
31. Drucker RR, Hammer LD, Agras WS, Bryson S. Can mothers influence their child's eating behavior? *J Dev Behav Pediatr* 1999;20:88–92.
32. Costanzo PR, Woody EZ. Domaine-specific parenting styles and their impact on the child's development of particular deviance: The example of obesity proneness. *J Soc Clin Psychol* 1985;3:425–445.
33. Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *Am J Clin Nutr* 1999;69:1264–1272.
34. Fisher JO, Birch LL. Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *Am J Clin Nutr* 2002;76:226–231.
35. Taveras EM, Scanlon KS, Birch L *et al*. Association of breastfeeding with maternal control of infant feeding at age 1 year. *Pediatrics* 2004;114:e577–e583.
36. Kral TV, Stunkard AJ, Berkowitz RI *et al*. Daily food intake in relation to dietary energy density in the free-living environment: a prospective analysis of children born at different risk of obesity. *Am J Clin Nutr* 2007;86:41–47.
37. Fox MK, Devaney B, Reidy K, Razafindrakoto C, Ziegler P. Relationship between portion size and energy intake among infants and toddlers: evidence of self-regulation. *J Am Diet Assoc* 2006;106(1 Suppl 1):S77–S83.
38. Birch LL, McPhee L, Shoba BC, Steinberg L, Krehbiel R. Clean up your plate: effects of child feeding practices on the conditioning of meal size. *Learn Motiv* 1987;18:301–317.
39. Ello-Martin JA, Ledikwe JH, Rolls BJ. The influence of food portion size and energy density on energy intake: implications for weight management. *Am J Clin Nutr* 2005;82(Suppl 1):S236–S241.
40. Johnson SL, McPhee L, Birch LL. Conditioned preferences: young children prefer flavors associated with high dietary fat. *Physiol Behav* 1991;50:1245–1251.
41. Orlet Fisher J, Rolls BJ, Birch LL. Children's bite size and intake of an entree are greater with large portions than with age-appropriate or self-selected portions. *Am J Clin Nutr* 2003;77:1164–1170.
42. Rolls BJ, Engell D, Birch LL. Serving portion size influences 5-year-old but not 3-year-old children's food intakes. *J Am Diet Assoc* 2000;100:232–234.
43. Ukkola O. Peripheral regulation of food intake: new insights. *J Endocrinol Invest* 2004;27:96–98.
44. Blundell JE, Burley VJ, Cotton JR, Lawton CL. Dietary fat and the control of energy intake: evaluating the effects of fat on meal size and postmeal satiety. *Am J Clin Nutr* 1993;57(Suppl 5):S772–S777.
45. Rolls BJ, Kim-Harris S, Fischman MW *et al*. Satiety after preloads with different amounts of fat and carbohydrate: implications for obesity. *Am J Clin Nutr* 1994;60:476–487.
46. Cornier MA, Grunwald GK, Johnson SL, Bessesen DH. Effects of short-term overfeeding on hunger, satiety, and energy intake in thin and reduced-obese individuals. *Appetite* 2004;43:253–259.
47. Tylka TL. Development and psychometric evaluation of a measure of intuitive eating. *J Couns Psychol* 2006;53:226–240.
48. Herman CP, Polivy J. *Studies of Eating in Normal Dieters*. American Psychiatric Association: Washington, DC, 1988.
49. Woody E, Costanzo P, Leifer H, Conger J. The effects of taste and caloric perceptions on the eating behavior of restrained and unrestrained subjects. *Cognit Ther Res* 1981;5:381–390.
50. Barkeling B, King NA, Naslund E, Blundell JE. Characterization of obese individuals who claim to detect no relationship between their eating pattern and sensations of hunger or fullness. *Int J Obes (Lond)* 2007;31:435–439.
51. Miller JL, Goldstone AP, Couch JA *et al*. Pituitary abnormalities in Prader-Willi syndrome and early onset morbid obesity. *Am J Med Genet A* 2008;146:570–577.
52. Nederkoorn C, Braet C, Van Eijs Y, Tanghe A, Jansen A. Why obese children cannot resist food: the role of impulsivity. *Eat Behav* 2006;7:315–322.
53. Braet C, Claus L, Verbeken S, Van Vlierberghe L. Impulsivity in overweight children. *Eur Child Adolesc Psychiatry* 2007;16:473–483.
54. Jansen A, Theunissen N, Slechten K *et al*. Overweight children overeat after exposure to food cues. *Eat Behav* 2003;4:197–209.
55. Ericken EH. *The Lifecycle Completed: A Review*. W.W. Norton: New York, 1982.
56. Neumark-Sztainer D, Hannan PJ, Story M, Croll J, Perry C. Family meal patterns: associations with sociodemographic characteristics and improved dietary intake among adolescents. *J Am Diet Assoc* 2003;103:317–322.

57. Baumrind D. Effects of authoritative parental control on child behavior. *Child Dev* 1966;37:887–907.
58. Baumrind D. The influence of parenting style on adolescent competence and substance use. *J Early Adolesc* 1991;11:56–95.
59. Patock-Peckham JA, Morgan-Lopez AA. College drinking behaviors: mediational links between parenting styles, impulse control, and alcohol-related outcomes. *Psychol Addict Behav* 2006;20:117–125.
60. Vachon J, Vitaro F, Wanner B, Tremblay RE. Adolescent gambling: relationships with parent gambling and parenting practices. *Psychol Addict Behav* 2004;18:398–401.
61. Casas J, Weigel SM, Crick NR *et al*. Early parenting and children's relational and physical aggression in the preschool and home contexts. *J Appl Dev Psychol* 2006;27: 209–227.
62. Del Vecchio T, O'Leary SG. Antecedents of toddler aggression: dysfunctional parenting in mother-toddler dyads. *J Clin Child Adolesc Psychol* 2006;35:194–202.
63. Kimonis E, Frick PJ, Boris NW *et al*. Callous-unemotional features, behavioral inhibition, and parenting: independent predictors of aggression in a high-risk preschool sample. *J Child Fam Stud* 2006;15:745–756.
64. Sandstrom M. A link between mothers' disciplinary strategies and children's relational aggression. *Br J Dev Psychol* 2007;25: 399–407.
65. Arrendondo EM, Elder JP, Ayala GX *et al*. Is parenting style related to children's healthy eating and physical activity in Latino families? *Health Educa Res* 2006;21:862–871.
66. Hughes SO, Power TG, Fisher JO, Mueller S, Nicklas TA. Revisiting a neglected construct: Parenting styles in a child-feeding context. *Appetite* 2005;44:83–92.
67. Kremers SPJ, Brug J, de Vries H, Engels RC. Parenting style and adolescent fruit consumption. *Appetite* 2003; 41:43–50.
68. Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc* 2002;102(Suppl 3):S40–S51.
69. Taveras EM, Rifas-Shiman SL, Berkey CS *et al*. Family dinner and adolescent overweight. *Obes Res* 2005;13:900–906.
70. Videon TM, Manning CK. Influences on adolescent eating patterns: the importance of family meals. *J Adolesc Health* 2003;32:365–373.
71. Gillman MW, Rifas-Shiman SL, Frazier AL *et al*. Family dinner and diet quality among older children and adolescents. *Arch Fam Med* 2000;9:235–240.
72. Johnson DB, Birkett D, Evens C, Pickering S. Promoting family meals in WIC: lessons learned from a statewide initiative. *J Nutr Educ Behav* 2006;38:177–182.
73. Guthrie JF, Lin BH, Frazao E. Role of food prepared away from home in the American diet, 1977–78 versus 1994–96: changes and consequences. *J Nutr Educ Behav* 2002;34:140–150.
74. Burger KS, Kern M, Coleman KJ. Characteristics of self-selected portion size in young adults. *J Am Diet Assoc* 2007;107: 611–618.
75. McCrory MA, Fuss PJ, Saltzman E, Roberts SB. Dietary determinants of energy intake and weight regulation in healthy adults. *J Nutr* 2000;130(Suppl 2S):S276–S279.
76. Diliberti N, Bordi PL, Conklin MT, Roe LS, Rolls BJ. Increased portion size leads to increased energy intake in a restaurant meal. *Obes Res* 2004;12:562–568.
77. Rolls BJ, Roe LS, Meengs JS. Larger portion sizes lead to a sustained increase in energy intake over 2 days. *J Am Diet Assoc* 2006;106:543–549.
78. Avalos LC, Tylka TL. Exploring a model of intuitive eating with college women. *J Couns Psychol* 2006;53:486–497.
79. Tylka TL, Wilcox JA. Are intuitive eating and eating disorder symptomatology opposite poles of the same construct? *J Couns Psychol* 2006;53:474–485.
80. Tribole E, Resch E. *Intuitive Eating: A Recovery Book for the Chronic Dieter*. St. Martin's Press: New York, 1995.
81. Anderson CB, Hughes SO, Fisher JO, Nicklas TA. Cross-cultural equivalence of feeding beliefs and practices: the psychometric properties of the child feeding questionnaire among Blacks and Hispanics. *Prev Med* 2005;41:521–531.
82. Sen B. Frequency of family dinner and adolescent body weight status: evidence from the national longitudinal survey of youth, 1997. *Obesity (Silver Spring)* 2006;14: 2266–2276.