HANDBOOK OF

Pediatric and Adolescent Obesity Treatment

EDITED BY

William T. O'Donohue, Brie A. Moore, and Barbara J. Scott

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The Editors

William T. O'Donohue is a licensed clinical psychologist. He earned a doctorate in psychology from the State University of New York at Stony Brook and a master's degree in philosophy from Indiana University. He is a licensed clinical psychologist in Nevada and has been a full professor of clinical psychology at the University of Nevada, Reno since 1999. He is a member of the Association for the Advancement for Behavior Therapy and served on the board of directors. Since 1996 he has received more than $1,500,000 in federal grant monies from sources including the National Institute of Mental Health and the National Institute of Justice. He has edited more than 30 books, coauthored 3 books, and published more than 100 articles in scholarly journals.

Brie A. Moore is a doctoral student at the University of Reno and a psychology intern at the University of California, Los Angeles Semel Institute for Neuroscience and Human Behavior at the David Geffen School of Medicine. She has a master's degree in child development from the University of California, Davis and a master's degree in clinical psychology from the University of Nevada, Reno. For the past 10 years she has guided families in establishing new parenting behaviors that benefit their children's developmental, behavioral, and physical health. She is committed to the dissemination of cost-effective and empirically based treatments for pediatric obesity. With her coeditors, she has developed and evaluated, via a randomized clinical trial, an Internet-based pediatric obesity treatment called "Fit and Healthy Kids," which teaches children and families strategies for establishing and maintaining healthy lifestyles.

Barbara J. Scott is a registered dietitian and associate professor in the Department of Pediatrics at the University of Nevada School of Medicine. She has worked with children and families for more than 25 years and currently works with the Early Head Start Program and the Nevada Early Intervention Program, where helping children achieve their healthy weight is an important goal. She served as coinvestigator for a National Institutes of Health-funded study to examine the impact of family-based nutrition intervention on children's growth and eating habits. She is interested in providing information to health care professionals and parents regarding early feeding and parenting practices that help children develop lifelong enjoyment of healthy eating and the ability to evaluate and "filter" outside influences (such as TV advertising) on their food choices.

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Contributors

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Mark A. Adams received his master's in psychology with an emphasis in developmental psychology from CSU, Fresno in 1992 and completed his doctorate in psychology with an emphasis in behavior analysis from the University of Nevada, Reno, in 2000. For over 15 years Dr. Adams has worked, trained, published, and presented in the areas of developmental disabilities, education, psychological theory and philosophy, and organizational behavior management. He is currently a clinical director and Northern Nevada director for B.E.S.T. Consulting Inc., serving children and young adults with autism spectrum and related disorders. He is also an adjunct faculty member in the Behavior Analysis departments at the University of Nevada, Reno, and CSU, Fresno.

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John E. Blundell holds the research chair of psychobiology and is founder and director of the Human Appetite Research Unit at the University of Leeds. He has been active in research on the mechanisms of appetite control for more than 20 years. During the 1980s he was instrumental in identifying a role for the neurotransmitter serotonin in appetite control. In 1990 he established a research unit for the study of energy balance and appetite control in the University of Leeds. John is currently a member of the UK Department of Health–Obesity Social Marketing Programme Expert Review Group. He is also chair of the Expert Group of the International Life Sciences Institute (Europe) Appetite Regulation Task Force. His research is funded by the Biotechnology and Biological Sciences Research Council, Medical Research Council, and industrial partners in the nutrition and pharmaceutical sectors. Current research projects include the characterization of individuals (phenotypes) susceptible or resistant to weight gain on high fat diets, the impact of physical activity on appetite control and weight regulation, and the role of CB1 receptors in appetite and body weight.

Emma Boyland studied molecular biology at the University of Liverpool from 1998 to 2001. She earned an MBA in 2002. In 2005 she received her master's in research methods from the School of Psychology and joined the Kissileff Laboratory as a full-time research assistant. During that time she was involved in a number of human experimental studies and clinical trials of potential weight control treatments. In 2006 she commenced her postgraduate studies on the effects of media exposure and product branding on children's caloric intake, food preferences, and habitual diet.

Caroline Braet is a professor in the Department of Developmental, Personality, and Social Psychology at Ghent University in Belgium. She also serves as the coordinator, supervisor, and a therapist at the Children's University Hospital at Ghent University where she provides childhood obesity consultations, the Ghent University Child Mental Health Center, and at de Haan, a residential care institution for severely obese children. Dr. Braet is interested in the developmental and clinical aspects of childhood therapy and the development and evaluation of programs for children. She received her PhD from the University of Ghent in 1993, with a specialization in the investigation of psychological aspects of childhood obesity. She is the author or co-author of over 100 scientific publications. She has conducted a number of research investigations, including studies evaluating binge-eating in obese children and adolescents, food-related thought suppression and cognitive processing in obese and normal-weight youngsters, and most recently, evaluations of structured parental guidance, impulsivity, and dysfunctional cognitions and core self-schemas related to overeating in obese children. Dr. Braet is a member of the Belgian Association for the Study of Obesity, the European Child Obesity Group, the Eating Disorder Research Society, and the European Association for Behavior Therapy. She has served on the editorial boards or as a reviewer for numerous scientific journals including the *Journal of Clinical Child & Adolescent Psychology*, *International Journal of Obesity*, *Obesity Research*, *Obesity Review*, *International Journal of Pediatric Obesity*, *JAMA Archives of Pediatrics*, *Child Development*, and the *Journal of Abnormal Psychology.*

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John P. Foreyt is a professor in the Department of Medicine, the Department of Pediatrics, and the Department of Psychiatry and Behavioral Sciences at Baylor College of Medicine, Houston, Texas. He is the director of the DeBakey Heart Center's Behavioral Medicine Research Center, Department of Medicine. He earned his BS in psychology from the University of Wisconsin and his MS and PhD in clinical psychology in 1969 from Florida State University. He served on the faculty at Florida State University until 1974, when he moved to Baylor College of Medicine. He has served as a member of the National Task Force on the Prevention and Treatment of Obesity, National Institutes of Health; The Committee to Develop Criteria for Evaluating the Outcomes of Approaches to Prevent and Treat Obesity, Food and Nutrition Board, Institute of Medicine, National Academy of Sciences; and The Expert Panel on the Identification, Evaluation, and Treatment of Adults at High Risk for Cardiovascular Disease, National Institutes of Health, NHLBI. He is an honorary member of the American Dietetic Association and is currently a member of the editorial boards of *Obesity Research & Clinical Practice*, *American Journal of Lifestyle Medicine*, *Eating Disorders*, *American Journal of Health Behavior*, *American Journal of Health Promotion*, and *Diabetes, Obesity and Metabolism*. He is licensed to practice clinical psychology in Texas and maintains a private practice. Dr. Foreyt has published 17 books and more than 270 articles in the areas of diet modification, cardiovascular risk reduction, eating disorders, and obesity.

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Patrick C. Friman is the director of clinical services at Girls and Boys Town and a clinical professor of pediatrics at the University of Nebraska School of Medicine. He has published more than 150 scientific articles and chapters and two books involving behavioral pediatrics and behavior disorders of childhood. Dr. Friman's research addresses the well-child gap between pediatrics and clinical psychology. The gap includes behavior problems that bedevil parents, are outside the core curriculum used to train pediatricians, and yet are not sufficiently serious to warrant a psychopathological interpretation. Dr. Friman is editor of the *Journal of Applied Behavior Analysis* and serves on the editorial boards of nine other scientific journals. He is a fellow in Divisions 25 (behavior analysis), 37 (Child, Youth, and Family Services), and 54 (pediatric psychology) of the American Psychological Association.

Lien Goossens is a PhD student at the Department of Developmental, Personality, and Social Psychology at Ghent University, Ghent, Belgium. Her research interests include the prevalence, characteristics, risk factors, and consequences of pathological eating behaviors, especially loss of control over eating and emotional eating, in overweight children and adolescents. She is (co-)author of some internationally published scientific articles within the domain of eating disorders and obesity. Her clinical experience includes several years of practice in the assessment and treatment of children and adolescents with eating disorders and obesity at the Ghent University Mental Health Centre.

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Craig A. Johnston is a member of the faculty of Baylor's Department of Pediatrics. He obtained his doctorate degree in clinical child psychology from the University of Kansas. His research interests include translational research especially as it relates to childhood obesity. The program he is

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Karen M. Kaphingst is deputy director for the Healthy Eating Research program of the Robert Wood Johnson Foundation. She is based in The Division of Epidemiology and Community Health at the University of Minnesota School of Public Health. Most recently she worked as a research assistant to Dr. Mary Story, researching issues related to childhood obesity. Prior to coming to the University of Minnesota, she was at the Center for Community-Based Research at the Dana-Farber Cancer Institute in Boston, where she worked as program coordinator for studies in a variety of content areas, including healthy weight, tobacco use, prostate cancer, and clinical trial recruitment. Other prior research experience includes working at the Education Development Center in Boston on a national study of high-risk alcohol use among college students. Ms. Kaphingst earned a BA in sociology from the University of St. Thomas and an MPH from the University of Minnesota School of Public Health.

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Ellyn Satter pioneered the concepts of the feeding relationship and eating competence. She is the author of the division of responsibility in feeding. Her books, journal articles, consulting, and training have made her an internationally recognized authority on eating and feeding. Satter integrates her 40 years of experience in helping adults be more positive, organized, and nurturing in caring for themselves and their children. She emphasizes competency rather than deficiency: providing rather than depriving, and trust rather than control. Her theoretically grounded and clinically sound methods allow the individual's own capacity for effective and rewarding food behavior to evolve.

Madeleine Sigman-Grant is a maternal and child health and nutrition specialist and professor with the University of Nevada Cooperative Extension. Her primary areas of interest include nutrition guidelines for feeding children, as well as childhood obesity prevention and community lactation programs. She works with health professionals to understand and apply techniques to help facilitate behavior change in their target audiences and also works with families to help them facilitate behavior change in their food and physical activity choices. Dr. Sigman-Grant earned a BS in Nutritional Sciences (specialty: dietetics) from the University of California at Los Angeles (1966), completed a dietetic internship at the Veteran's Administration, West Los Angeles (1967), earned an MS in nutrition from Loma Linda University (1982) and a PhD in nutrition from the University of California at Davis (1988). She has been a public health nutritionist as well as a clinical, administrative, and community dietitian for almost 30 years. She was an associate professor at The Pennsylvania State University from 1989 to 1997. She is a member of the American Society of Nutrition, the American Dietetic Association, the Society for Nutrition Education, the FDA Food and Nutrition Advisory Committee, and the Partnership to Promote Healthy Eating and Active Living. Dr. Sigman-Grant is a frequent speaker at meetings and conferences for health professionals, academicians, and scientists as well as for consumers. Her publications have appeared in *JNEB*, *Pediatrics*, and the *Journal of the American Dietetic Association*. As an extension educator, she has published numerous

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Meghan Sinton is a postdoctoral research scholar in the Department of Psychiatry at Washington University School of Medicine in Saint Louis, Missouri. Her research has focused on the developmental influences, including individual, family, peer, and cultural factors, associated with disordered eating and overweight in children and adolescents. She has a specific interest in elucidating the different etiological pathways associated with distinct forms of eating pathology and on examining how overweight is a risk factor for disordered eating. Dr. Sinton earned her PhD in human development and family studies from The Pennsylvania State University, University Park campus, in 2006.

Barbara Soetens is an academic lecturor, researcher, and research coordinator at the Department of Applied Psychology at the Lessius University College of the Catholic University of Leuven, Antwerp, Belgium. She earned her PhD in 2006 at Ghent University, Department of Developmental, Personality, and Social Psychology. Her primary research interests include thought suppression and attention bias in obese and normal-weight restrained and unrestrained eaters, emotional eating, precursors of dysfunctional eating patterns, and body image disorders. She is the (co-)author of several internationally published scientific articles within the domain of obesity and eating disorders and she has served as a reviewer for scientific journals, including *Appetite*. Her clinical experience includes several years of practice in the treatment of adolescents with eating disorders, body image disorders, and obesity, at the Ghent University Mental Health Centre.

Mary Story is a professor in the Division of Epidemiology and Community Health, School of Public Health, and an adjunct professor in the Department of Pediatrics, School of Medicine at the University of Minnesota. She is the director of the National Program Office for the Robert Wood Johnson Foundation Healthy Eating Research program. Dr. Story has her PhD in Nutrition and her interests are in the area of child and adolescent nutrition, and obesity prevention. Her research focuses on understanding the multiple factors related to eating behaviors of youth, and community- and school-based interventions for obesity prevention, healthy eating, and physical activity. She is currently on the editorial boards for the *Journal of the American Dietetic Association*, *Journal of Adolescent Health*, and *Nutrition Today*. She was a member of the Institute of Medicine Committee on Food Marketing and the Diets of Children and the Institute of Medicine Committee on Nutrition Standards for Foods in Schools.

Ann Tanghe has a master's degree in clinical psychology and is a behavioral therapist. Since 1990 she has worked at Zeepreventorium, a residential pediatric care center for chronically ill children in Belgium. In 1994 she started a project for the residential treatment of severely obese children. At that time the project was unique in Europe and around the world. Tanghe is coordinator-psychologist of a continuous population of 120 severely obese youngsters between 5 and 18 years old. There is a continuous waiting list of about 160 youngsters. Since 1994 she has collaborated with Professor Caroline Braet from the University of Ghent to evaluate and improve the treatment program. This scientific work is described in several publications of which Tanghe is co-author.

Chermaine Tyler is interested in pediatric obesity prevention. Her research has focused on assessing the effectiveness of community-based, multi-component physical activity and nutrition intervention for middle school aged children and adolescents. Her interventions involve behavioral approaches to weight management and stress the importance of balancing exercise and healthy nutrition in a family-based environment. These programs target both normal and overweight youth, especially those with a high risk of developing obesity and related disease (i.e.,

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Kashunda L. Williams is an assistant professor of school psychology at Texas A&M University–Commerce. She is a board certified behavior analyst and a nationally certified school psychologist. She earned her doctoral degree in psychology from Louisiana State University. Her research interests include academic and behavior consultation, applied behavior analysis, behavioral and academic intervention, and parent and school collaboration.

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1

Overview

BRIE A. MOORE, WILLIAM T. O'DONOHUE, AND BARBARA J. SCOTT

We are now facing a new international problem: a growing number of children and adolescents who are overweight. The percentage of overweight children in the United States, ages 6 to 11 years old, has more than tripled in the last 30 years (National Center for Health Statistics, 2002). A dramatic increase in the incidence of obesity has been seen in both sexes and in children of all ages, with Mexican-American, African-American, and Native-American children disproportionately affected (Dietz, 2004). Childhood obesity is rapidly becoming a public health problem worldwide. According to the International Obesity Task Force report (2005), approximately one in five children in Europe is overweight, with a rapidly accelerating increase in prevalence (2% annually). Cross-national epidemiological studies suggest that the prevalence of obese and overweight individuals in Russia is between 6 and 10%, while the prevalence is less than 5% for children in China, with a relationship between obesity and socioeconomic status (SES) seen across countries (Wang, 2001). We are faced with the prospect that as other nations become richer they will also become less physically active, and traditional diets will be replaced with "westernized" processed, packaged diets resulting in excess calorie consumption and eventually childhood obesity. These unsettling trends have prompted public health researchers to call childhood obesity a crisis and a pandemic (Kimm & Obarzanek, 2002).

We decided to edit this book because the magnitude of this problem is escalating, because its consequences are quite serious, and because successful prevention and treatment have proven to be challenging. It is our wish to bring the field's leading scholars together into one compendium of the best current thinking and research regarding this problem. This book aims to emphasize several factors we feel are necessary for the highest standard of care in treatment delivery: 1) adopting public health and prevention strategies because of the scale of this problem; 2) adopting empirically validated treatment approaches from multiple disciplines including behavioral health, medicine, and nutrition; 3) recognizing unique developmental considerations; and 4) understanding fundamental process variables. In addition, we hope that this book will provide an impetus for professionals from a wide variety of disciplines to adopt a fully integrated approach to treatment—one that synthesizes biological, psychological, sociocultural, and public health perspectives—to effectively address this complex public health problem.

We also chose to edit this book because a review of the trends for both the rate of childhood obesity and what we believe are the most important causal factors indicates that this problem will

get much worse before it gets better. We claim this not to be hyperbolic or alarmist but to call attention to this important problem. We know that obesity and overweight hurts children in many ways. The following chapters document how children's physical health is compromised, how their social functioning is hurt, how their self-esteem and experience of life is worsened, and how their longevity is shortened. In addition, this problem hurts others (e.g., parents worry, and health care costs associated with obesity-related disorders such as diabetes soar). This raises the question of why was this not much of a problem a few decades ago and why is it a growing problem now? Therefore, in this introductory chapter we will briefly examine some of the major trends we believe have caused and will continue to cause childhood obesity. These trends can be categorized into economic, technological, and psychobiological.

ECONOMIC TRENDS

According to the World Health Organization (WHO), for the first time in history the number of overfed people in the world has at least matched, if not surpassed, the number of hungry and malnourished individuals (Gardner & Halweil, 2000). Simultaneously, the world is becoming much richer. The per capita gross domestic products (GDPs) of many countries are increasing at a fairly healthy rate. This is not only true of the traditionally richer North American and European Union countries, but the recent trend is that it is also true of second world countries such as China and India. In general, this increased wealth is a good thing. Billions of people have less painful, more enjoyable, and longer existences. However, as economists teach us, there are tradeoffs.

The relationship between obesity and socioeconomic level is highly variable. In the United States, low socioeconomic groups are disproportionately affected (Dietz, 2004). However, in countries such as China and Russia, persons from higher SES groups are more likely to be overweight or obese. One hypothesis for rapid increase in the prevalence of childhood obesity internationally is that as individuals become richer they can afford more food. They also become marketing "targets" of the food industry and can be choosier about the types of food they consume. Individuals who were starving or malnourished are, as the world becomes richer, increasingly becoming well fed. In general, this is a good thing. However, an unfortunate psychobiological fact (see below) is that many individuals, when given the opportunity to choose the foods and activity levels that wealth provides, choose foods that are more fatty and sweet, and choose to become much more sedentary. Thus socioeconomic health may not translate into physical health in many cases. As the world becomes even richer (more individuals transitioning from subsistence existences as well as higher standards of living for individuals who have already made this transition), we predict that the problem of childhood obesity will increase.

China is an interesting case in point. China has approximately 20% of the world's population. Its GDP growth in 2005 was estimated to be 10.2% (compare that to a more than healthy rate for the United States of 3.2%). China's GDP has been doubling every 9 years (Fang & Meiyan, 2002). This change in wealth is particularly dramatic because during the 1960s and early 1970s famine and malnutrition were problems in China. It is estimated that 30 to 40 million people died in the famine produced by the Cultural Revolution (Becker, 1996).

In order to control population size, China instituted the now infamous one child policy. Because of societal values, the Chinese want this child to be a boy. It appears that this policy has had the unintended negative effect of producing a large number of overweight boys. A report from a recent Chinese newspaper states:

> Official statistics show that 10 percent of the children in China suffer from obesity and the number is increasing by 8 percent per year. Some 14.8 percent of boys in primary schools in China are obese, and some 13.2 percent of them are overweight, with the proportions for girls standing at 9 percent and 11 percent, respectively. Some 13.2 percent of children in northeast China are obese, the largest

> proportion in the country, followed by 12.2 percent in east China and 10 percent in central and south China. In big cities like Beijing and Shanghai, there is an average of one obese child in every five. Taking less outdoor exercises and indulging in watching television and playing games at home are the main reasons behind the child obesity, said experts (www.worldpress.org/Africa/1961.cfm).

In addition, as China becomes more technologically advanced, cars are replacing bicycles, and factory jobs are replacing more physically demanding agricultural jobs. Thus China is making a transition that is following the development of Western countries. Although many advantages accrue with wealth and technology, inadvertently the Chinese environment also becomes obesogenic.

We spend some time focusing on China, not only because the 21st century has been predicted to be "China's century," but because some of the trends seen in this developing country will also be seen in other developing countries such as India, Russia, and Malaysia.

TECHNOLOGICAL TRENDS

Part of the reason the world is becoming richer is that technology makes workers more productive. An oxen-powered plow is more productive than a hoe; a small tractor is more productive than an oxen-powered plow; and a modern combine is more productive than a small tractor. But when washing machines replace hand washing, when cars replace bicycles, and when computer use replaces hard physical labor, fewer calories are expended. Thus a second piece of the obesity problem is seen when one unpacks the phrase "labor-saving devices." Much of our technological search is for labor-saving devices and better labor-saving devices (the move from a manual lawnmower to a self-propelled lawnmower to a riding lawnmower is such an example). But these change day-to-day experiences from activities involving large caloric expenditures (digging ditches by hand) to activities with relatively little caloric expenditures (digging ditches with a backhoe). Although this mostly affects adults, it also affects children in that the need for activity decreases with use of technology. In addition, some of these jobs were performed by children, making them more physically active (cutting lawns, helping around the farm, newspaper routes).

The second technological advance has been that we have entered the "information age." Many jobs now have nothing to do with physical labor (the assembly line is becoming extinct in the West) and more and more to do with developing, processing, and using information. People who work at information-based jobs expend very few calories. Children now spend large amounts of time in sedentary activities such as using the WorldWide Web, watching DVDs, listening to iPods®, and playing electronic games. Thus information technology, which will increase in power, scope, and reinforcing ability, will continue to promote low-calorie pursuits, which again will contribute to childhood obesity.

The third negative technological advance is the development of highly processed foods that are tasty to both children and adults. This includes the proliferation of fast food restaurants around the world (from McDonalds to Starbucks), as well as the development of microwavable foods so that the cost in time and effort to prepare food is minimized. The upside of this is that we can spend less time in meal preparation and more time in activities we generally value more, such as reading, being with family, working, etc. However, it makes any food urge more easy to fulfill, thus making food more accessible (and particularly calorie-dense foods) and contributing to childhood obesity.

PSYCHOBIOLOGICAL FACTORS

The economic and technical developments would not result in childhood obesity if we were not made as we are. Thus we also believe, roughly speaking, that human nature contributes to childhood obesity, and more accurately it is the interaction of human nature with these economic and technical trends that has produced so many obese children. We conjecture that human nature contributes to this

problem in two main ways. First, changes in our external food environment are occuring at lightning speed, while our bodies continue to function essentially the same as those of our distant ancestors. As discussed throughout this text, we evolved in environments that were often characterized by food shortages. Thus we evolved to prefer high-calorie foods such as fats and sugars, as these kept us alive in food shortage environments. However, now we operate with these proclivities in increasingly food-rich environments. The unfortunate result is high rates of obesity. If we continue to base our diets primarily on the types and amounts of "invented" (flavored, shaped, colored, synthesized) food currently being thrust on us by the modern food industry, it is likely that rates of pediatric obesity will continue to rise. Second, we also evolved to conserve energy. Psychologists have studied optimal foraging theory and suggest that we seem to have genetic mechanisms that make us efficient food gatherers (i.e., we are good at making optimal tradeoffs between the calories required to gather food and the caloric value of the food we gather). Thus it is in some ways "unnatural" to expend energy for the sake of expending energy (as we do when we go to the gym or take a daily walk). However, in our modern technological environment we have to schedule in and commit to such energy-consuming workouts because our daily tasks no longer require much energy expenditure.

There may also be important changes in the family. There is a trend in many countries toward longer work hours. Parents may be interacting with children less and searching for technological babysitters. More research needs to be done regarding how lifestyle changes contribute to obesogenic environments for children.

OBESITY, PROGRESS, AND HUMAN FREEDOM

It might be tempting to look at these trends and respond that it should be the role of government to pass laws against or to tax certain foods, to mandate physical exercise, or to restrict or tax Gameboys® and iPods or anything else that interferes with exercise and health. However, such measures would also restrict freedom. A critical part of a free, open society is that individuals should be allowed considerable latitude in their "pursuit of happiness," even though such pursuits may harm them in the long run. We think it would be Orwellian for the government to be highly involved in these matters.

However, the argument for a government role is that usually freedom is restricted when behaviors have third-party effects. Thus someone can play their stereo as loud as they like when they live in a remote area and no one else can hear it, but when it affects other parties, such as in an apartment building, one has restrictions on the volume. Obesity leads to higher medical costs, and these medical costs can be borne by third parties, especially the government, through insurance programs like Medicaid and Medicare (and hence eventually taxpayers). However, the idea that individual "free" decisions are the primary cause of obesity, resulting in large social and health care costs, largely ignores the role of industry, marketing, and biology as causative influences. So, what does the government have the right to regulate? This is a difficult balancing act. What exactly would we do to a 200-pound, 8-year-old child who refuses or whose parents refuse to get him on an exercise program or have him eat more healthily? Are we willing to terminate his health insurance and then watch him suffer or die? We think not. However, this type of case illustrates the rub: How do we offer incentives and disincentives related to production and marketing of healthy foods, safe communities, healthy eating, and exercise in a way that does not restrict freedom and does not produce socially unacceptable outcomes such as children without health insurance?

TOWARD A SOLUTION

Health professionals can play a primary role in helping parents and children create a new paradigm (really returning to an older paradigm) and set a foundation for healthy eating through the following actions:

- Recognize and then break the food industry's stranglehold on our taste buds and pocketbooks.
- Reengage with the food system and food producers (not food processors) with lessons learned from the local food and slow food movements.
- Replace the majority of processed foods with fresh, basic, simple, tasty foods.
- Reprioritize our time and attention to include food preparation and family meals.

For many families, trying to decide what and how to eat well can seem overwhelming and confusing at times, with often conflicting advice coming from all directions. However, there are some simple basic ideas of sound nutrition that remain constant and that can be very helpful:

- Know what's in the food you eat: read labels and check ingredients.
- Follow rules of food safety.
- Base most of your diet on simple, fresh foods with about one-quarter of your plate including foods that provide good protein, one-quarter with foods that provide carbohydrates from whole grains, and the remaining one-half being covered with fruits and vegetables.
- Prepare most of your own foods: limit eating out to special occasions.
- Eat when you're hungry, stop when you're full.

Using a positive, "big picture" approach can help parents and children develop a comfortable and happy attitude about healthful eating. Food is meant to be both health enhancing and pleasurable—tasting good, fostering sociability, and providing for creativity in cooking and food combining. A realistic goal of treatment is to consume foods that are healthful and enjoyable. It is not realistic to ask or expect overweight children to adhere to a limited or restrictive diet of unappetizing, uninteresting food and then to declare noncompliance or treatment failure when they are unable to maintain this type of diet.

Sustainability, in the short and long terms, is key to achieving success in turning the tide of pediatric obesity. Short-term sustainable actions support overweight children in learning about and experiencing healthy eating that is satisfying and nourishing, and that allows them to achieve and maintain their healthy weight. Longer range sustainability recognizes that we are all (including future generations) ultimately dependent on maintaining the health of the food system through protecting the livelihoods of farmers and food producers, protecting the environment—the land, water, and air—and ensuring the safety of the food supply.

HANDBOOK OVERVIEW

This handbook aims to address a comprehensive spectrum of issues relevant to understanding the treatment of pediatric and adolescent obesity. Part I presents a thorough discussion of etiology, diagnoses, and sociocultural considerations.

First, to better understand this complex, multifactor phenomena, Emma Boyland, Jason C. G. Halford, and John Blundell, from the University of Leeds, England, present in Chapter 2 the psychobiological system approach to understanding the etiology and maintenance of pediatric and adolescent obesity. Dr. Blundell presents a description of the biological and psychological mechanisms that underlie control of feeding behavior. This chapter discusses how biological regulation and environmental adaptation interact to influence the physiology, conscious sensations, and actions of individuals, including physical activity, satiety signaling, and appetite control in children. The unique implications of this model for understanding pediatric and adolescent obesity are also discussed.

After a thorough assessment is completed, the issue of diagnostic clarification often arises. In Chapter 3, "Disordered Eating: Differential Diagnoses and Comorbidity," Barbara Soetens, Lien Goossens, Leen Van Vlierberghe, and Caroline Braet, from Ghent University, Belgium, aid the

reader in the identification and diagnosis of disordered eating and facilitate an understanding of appropriate treatment formulation when comorbidities are present. Dr. Soetens and colleagues present a discussion of the clinical characteristics of eating disorders, the classification and diagnosis of eating disorders, atypical eating disorders (eating disorder not otherwise specified), and the measurement of eating disorder pathology. The authors provide the reader with a better understanding of binge eating, night eating syndrome, and the relationship between anxiety, depression, personality characteristics, and eating disorders often comorbid in pediatric and adolescent obesity.

To fully address case conceptualization and treatment formulation, cultural considerations must also be taken into account. In Chapter 4, "Culturally Sensitive Treatment of Pediatric and Adolescent Obesity," Sheila Davis and Johnnie Sue Cooper, from the University of Mississippi Medical Center, discuss the unique roles that ethnicity, culture, and socioeconomic status play in the pediatric and adolescent obesity epidemic. They discuss research on the cardiovascular risks present in ethnic minority children and present novel strategies, such as eliciting the assistance of ethnic minority nurses and faculty to educate and promote messages of health in indigenous communities. This chapter also addresses characteristics of minority populations that may impact their willingness and ability to access and benefit from typical treatment approaches. Lastly, the importance of aggressively targeting minority populations to adequately address the growing pediatric obesity epidemic is discussed.

In Chapter 5, "Anti-Fat Attitudes: A Barrier to Best Practice," Trish Freed reviews the current research exploring our implicit attitudes regarding the meaning of "being fat." Ms. Freed discusses the importance of assessing our value structure as we embark on the conceptualization of the pediatric obesity epidemic. She challenges the culturally derived link between thinness and health and questions the belief that health is a unanimously held cultural value. Rather than accepting weight as a valuable treatment target, this chapter presents a discussion of the ramifications of the "medicalization" of children who are overweight.

In Part II, relevant process variables are presented in order to facilitate a more thorough understanding of comprehensive pediatric and adolescent weight management. Experts in their fields address factors essential to successful treatment, such as the role of self-control, parent training and contingency management, stimulus control, social skills, and strength-based approaches.

In Chapter 6, "Contingency Management and Parent Training in the Treatment of Pediatric and Adolescent Obesity," Kashunda Williams, from Texas A&M University, and Elizabeth Zhe, Jennifer Resetar, Michael Axelrod, and Patrick Friman, from the Girls and Boys Town Behavioral Pediatrics and Family Services Clinic, discuss the importance of parent involvement, support, and skill development in effective treatment of pediatric and adolescent obesity. Many experts in the field hold that parenting skills are the foundation of successful interventions (Barlow & Dietz, 1998). The authors address the important role parents play in managing contingencies in the child's environment to promote healthy diet and activity behaviors. They present and discuss novel strategies for improving adherence and getting children to actively engage in health promotion behavior.

In Chapter 7, "Social Skills Training and the Treatment of Pediatric Overweight," Fred Frankel, from the UCLA Semel Institute, and Meghan Sinton and Denise Wilfley, from the Washington University School of Medicine, present new data exploring the importance of social skills training in the treatment of pediatric overweight. The authors discuss the reciprocal relationship between childhood obesity and impaired social functioning, including teasing, peer rejection, and low support for physical activity in social relationships. In addition, the authors present exciting new data suggesting that targeting social relationships, via Social Facilitation Maintenance (SFM) training, has a positive impact on weight loss and maintenance of weight loss, and may even positively augment the effects of weight loss treatment in children.

In Chapter 8, "Parent Feeding Practices and Child Overweight," Lisa Diewald and Myles Faith, director of the Weight and Eating Disorders Program at the University of Pennsylvania School of Medicine and Children's Hospital Philadelphia, discuss the essential role of parent feeding practices

in the development and maintenance of childhood feeding and weight disturbance. The authors present comprehensive modeling illustrative of the dynamic interchange that occurs between parents and children when weight issues are of concern. This chapter provides the reader with a comprehensive understanding of how altering maladaptive parent-child interactions can facilitate long-term health behavior changes.

In Chapter 9, "Ten Messages for Weight Control from Teleological Behaviorism," Howard Rachlin, from Stony Brook University, shares his considerable expertise in understanding self-control. For the first time, Dr. Rachlin extends his behavioral economic paradigm to the understanding of pediatric and adolescent obesity. This chapter provides the reader with new insights into the concept of self-control and the literature surrounding the reasons why and how individuals typically fail at self-regulation. The constructs of underregulation, misregulation, habit, willpower, ambivalence, and commitment are discussed.

Lastly, in Chapter 10, "Hedonic Approach to Pediatric and Adolescent Weight Management," Brie Moore and William O'Donohue discuss a novel way to address the problem of self-regulatory fatigue: a "hedonic" treatment approach. To minimize demands on the self-regulatory system, this chapter proposes that greater attention must be paid to the existing strengths in the child's, adolescent's, or family's repertoire. By capitalizing on these strengths, it is hypothesized that the result will be diminished resistance, strengthening of an existing behavioral repertoire, an increase in the overall capacity for self-regulation, and ultimately, better treatment outcomes. Together, these unique contributions represent a new approach to the conceptualization of pediatric weight management that integrates well-researched constructs to augment treatment outcomes.

In Part III, a wide range of approaches to pediatric and adolescent obesity treatment are presented. Our goal is to promote an individualized treatment approach that will best fit the identified child and family. These approaches are presented from most to least aggressive, in order to facilitate a progression of thought to a more public health-type model of the prevention and treatment of pediatric and adolescent obesity.

In Chapter 11, "Intensive Approaches to the Treatment of Pediatric and Adolescent Obesity," Robert Lustig, a leading endocrinologist in the Department of Medicine at the University of California, San Francisco, discusses the data supporting intensive pharmacological and surgical treatment of pediatric and adolescent obesity. This chapter presents a new understanding of pediatric obesity as a phenotype of many different pathologies rather than a discrete disease. This chapter discusses energy balance, highlighting the roles of leptin, insulin, and the autonomic nervous system. Dr. Lustig discusses the importance of expanding our understanding of those biological factors that play a key role in the etiology and maintenance of pediatric obesity.

In Chapter 12, "Inpatient Treatment of Severely Obese Children," Caroline Braet, Ann Tanghe, and Ellen Moens, from the University of Ghent and Zeepreventorium, Health Center de Haan in Belgium, discuss inpatient treatment of pediatric and adolescent obesity. Based on their clinical and research experience, the authors describe guidelines for organizing a multicomponent inpatient treatment program for severely overweight children. This chapter provides the reader with a greater understanding of the inclusion criteria for inpatient care, including considerations of the degree of overweight, family functioning, and medical comorbidity.

In Chapter 13, "Behavioral Approaches to Childhood Overweight Treatment," Craig Johnston, Chermaine Tyler, and John Foreyt, from the Department of Pediatrics–Nutrition, Baylor College of Medicine, Houston, Texas, discuss the efficacy of behaviorally based approaches in treating pediatric and adolescent obesity. To facilitate a better understanding of behavioral approaches, the authors provide a detailed description of specific techniques, including stimulus control, self-monitoring, contingency management, social support, modeling, and goal setting. In addition, the authors outline possible adjuncts to the behavioral treatment of pediatric overweight and indicate areas for future research.

In Chapter 14, Brie Moore and William O'Donohue present an overview of the empirically based treatment of pediatric obesity. This chapter focuses on data supporting the efficacy of fam-

ily-based approaches, the gold standard of care. Limitations of this research and the importance of treatment acceptability and accessibility are discussed. In an effort to address the serious public health concern of pediatric and adolescent obesity, a stepped-care model that is mindful of cost and dissemination is presented.

In Chapter 15, "Behavioral Treatment of the Overweight Child and Families in Medical Settings," Amanda Adams and Mark Adams, from California State University at Fresno, discuss primary care approaches. Pediatric health care providers are often discouraged by the scope, magnitude, and refractory nature of pediatric obesity. In addition, health education provided in the primary care setting has not adequately addressed the current epidemic. The purpose of this chapter is to educate the reader about the effective implementation of behaviorally based obesity treatments in the pediatric primary care setting.

In Chapter 16, "School-Based Prevention of Child and Adolescent Obesity," Mary Story and Karen M. Kaphingst, from the School of Public Health at the University of Minnesota, Minneapolis, discuss the existing literature on the efficacy of school-based approaches. This chapter pays special attention to those studies that have produced the most promising results. The authors discuss the improvements that must be made to strengthen the effectiveness of the school-based approach. Approaches such as the adoption of greater school- and family-focused connections, more sensitive outcome measures, environmental approaches, and smaller scale and more innovative studies may increase the effectiveness of school-level interventions.

Lastly, in Chapter 17, "Public Health Approaches to the Control of Pediatric and Adolescent Obesity," Dr. David Katz, Professor of Public Health at Yale University, and Zubaida Faridi, from the Yale Prevention Research Center, present a treatment approach most commensurate with the scope of the current epidemic. This chapter provides readers with an overview of public health approaches aimed at the containment, control, and prevention of pediatric and adolescent obesity. This discussion of a public health approach will heighten the reader's awareness of the sociocultural factors that play a key role in the etiology and maintenance of pediatric and adolescent obesity and the opportunities present to positively impact the current epidemic.

In Part IV, nutritional approaches to pediatric and adolescent obesity treatment are discussed. In Chapter 18, "Nutrition Education Basics: Navigating the Food Environment," Madeline Sigman-Grant, from the University of Nevada–Reno Cooperative Extension, presents strategies for the practical application of nutrition guidelines. She discusses how practitioners working with children and families can assist them in navigating through an environment that promotes unhealthy eating and physical inactivity.

In Chapter 19, "The Satter Feeding Dynamics Model of Child Overweight Definition, Prevention, and Intervention," Ellyn Satter describes a family-based approach that incorporates recent literature to augment our understanding of parent-child feeding practices and childhood weight status. Satter's approach provides practitioners and families with an easily exportable model for employing behavioral strategies for weight management, while simultaneously considering the child's unique stage of development.

In Chapter 20, "Protecting Growth and Maintaining Optimal Nutrition," Barbara Scott, from the University of Nevada School of Medicine, discusses the importance of revisiting our ultimate goal of optimizing children's physical and mental health when determining appropriate treatment recommendations. This chapter provides basic guidance for what constitutes normal growth and good nutrition for children at different ages and offers practical examples, recommended readings, and useful references for practitioners and families.

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Part I

ETIOLOGY, DIAGNOSIS, AND SOCIOCULTURAL CONSIDERATIONS

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2

Psychobiological Approach to the Prevention and Treatment of Pediatric and Adolescent Obesity

EMMA J. BOYLAND, JASON C. G. HALFORD, AND JOHN E. BLUNDELL

A psychobiological approach is an orientation to human (and animal) phenomena that is different from a biological or sociological imperative. It is a way of interlinking various factors—from different domains—that contribute to energy balance and weight regulation.

The essence of a psychobiological approach is threefold. First, the psychobiological approach explains the interaction between biology and the environment in determining the expression of appetite, and therefore the likelihood of overconsumption leading to a positive energy balance and weight gain. The cause of increased consumption and weight gain is therefore not exclusively due to a biological determinant and, except in rare cases, cannot be sought in a reductionist philosophy.

Second, the psychobiological view must offer an explanation for the increase in mean body mass index (BMI) and obesity (the obesity epidemic) in most countries of the world over the last 20 years. How is the proposed existence of a weight regulatory system consistent with the demonstrated occurrence of an epidemic of massive weight gain?

Third, the psychobiological approach should account for the obvious facts of biological and psychological variability between individuals. It is fundamental to an understanding of the obesity epidemic that some individuals are more vulnerable to weight gain than others. This implies the existence of resistant and susceptible individuals. What are the processes that mediate susceptibility, and how is susceptibility characterized—genetically, physiologically, and behaviorally?

INTRODUCTION

A psychobiological approach to motivated behavior assumes an equal role of internal and external factors in determining subjective experience and behavior response. Environmental stimuli produce marked physiological changes, and these in turn initiate appropriate behavior. For both adults

and children, a psychobiological approach to the prevention and treatment of obesity is based on our understanding of environmental and biological contributions to the expression of appetite and control of our feeding behavior. Our understanding of the physiological mechanisms underpinning appetite control has increased greatly over the last couple of decades. Despite this understanding, the obesity epidemic indicates that our biological mechanisms are not sufficiently robust to resist being overridden by environmental factors. However, it is noticeable that not everyone becomes obese or overweight. An appropriate working framework to understand this is to propose that environmental forces promote a general increase in energy intake and a decrease in energy expenditure, but the allelic variation across the population operates to determine the strength of the individual response. That is, the specific genetic makeup of each individual renders them more or less susceptible to weight gain in the face of this powerful environmental influence. This can be described as a "profile of genetic susceptibility" (Blundell et al., 2005). Indeed, a number of genes and allelic variations have already been identified as being involved in body weight gain and the development of obesity (Barsh, Farooqi, & O'Rahilly, 2000).

Our "obesogenic" environment contains potent factors able to readily overcome the biological processes that operate to maintain a healthy body weight (what is often called "energy homeostasis"). In such an environment, characterized by an abundance of accessible, highly palatable foods that are aggressively marketed, in addition to sedentary lifestyles, the psychological processes underpinning food preferences and food-seeking behavior are also capable of directing us into overconsumption and ultimately a state of obesity. This chapter provides an overview of the psychobiological system of appetite control, a crucial network for mediation of feeding behavior and body weight regulation (or dysregulation).

The concept of energy balance is key to understanding the processes involved in weight regulation (stability and instability). Based on the second law of thermodynamics, obesity can only develop if energy intake (diet) exceeds expenditure (metabolism and physical activity) over a prolonged period (Jebb, 1999). Thus energy intake > energy expenditure = positive energy balance and weight gain. This simple and universally accepted concept sometimes disguises the fact that energy balance is highly influenced by a complex interplay of genetic, metabolic, behavioral, and environmental factors, all of which are important components in the development of obesity, as they modulate the energy intake side of the equation. The way in which these factors exert their effect on energy consumption is partly due to their impact on our psychobiological mechanisms. However, currently little is known about the critical developmental periods that shape the psychobiology of appetite regulation. Do the demands of growth, development, and maturation cause the up-regulation or down-regulation of key energy regulatory systems, and what impact does this have on the individual liability to become obese?

THE NATURE OF THE PSYCHOBIOLOGICAL SYSTEM

The psychobiological system is an intricate network of interactions that govern the control of appetite. A large number of neurotransmitters, neuromodulators, pathways, and receptors are implicated in the processing of information relevant to appetite. It is helpful to conceptualize the flux of physiological and biochemical transactions that occur in the periphery, as they result in a pattern of behavioral events and associated motivational states important to the expression of appetite. For ease of understanding, it is beneficial to consider the system as consisting of three levels (Figure 2.1). The first level comprises psychological events (hunger perception, cravings, hedonic sensations) and behavioral operations (meals, snacks, energy and macronutrient intakes), the second level refers to peripheral physiological processes and metabolic events, and the third is the level of neurotransmitter activity in the brain (Blundell, 1991). Appetite is a combination of the events and processes occuring synchronously in all three levels.

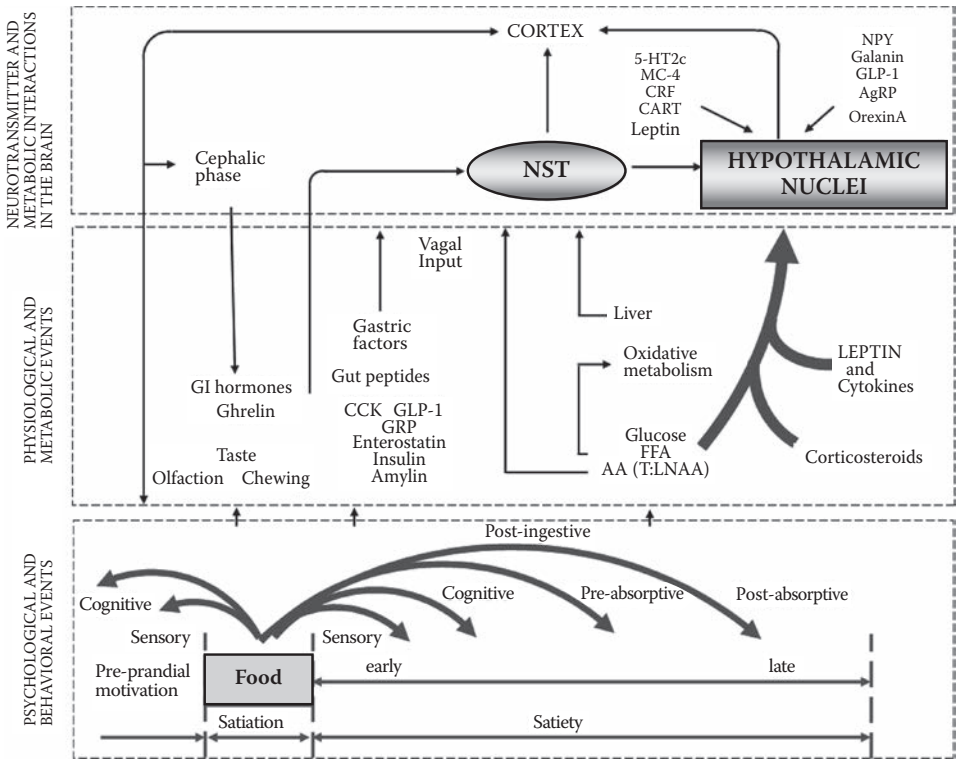

Figure 2.1 Diagram showing the expression of appetite as a relationship between three levels of operations: the behavior pattern, peripheral physiology and metabolism, and brain activity. PVN, paraventricular nucleus; NST, nuclease of the tractus solitarius; CCK, cholecystokinin; FFA, free fatty acids; T:LNAA, tryptophan: large neutral amino acids (see Blundell [1991] for a detailed diagram).

The three levels combine in a feedback loop, whereby behavior is triggered and guided initially by neural events. Each behavioral action then triggers a peripheral physiological response, which in turn is translated into further neurochemical activity in the brain via an integratory center (Kiess et al., 2006).

The first level incorporates all those events that stimulate eating or motivate an individual to seek food (a hunger "drive"), the behavioral actions that actually trigger an eating episode, and those processes immediately after termination of eating (referred to as postingestive events). This can be summed up as the "appetite cascade" (Blundell & Halford, 1994).

Hunger and Palatability

Hunger is regarded as the key internal factor triggering food intake. Traditionally hunger has been viewed as a homeostatic, deficit-driven internal drive to restore energy balance and maintain the body's supply of nutrients essential for growth, repair, and metabolism. However, in most humans who are not subjected to a scarcity of food, it is the anticipation of meal time, stimulation by food cues, or the craving for specific food items which seem to trigger intake, rather than deficit-driven hunger (Lowe & Levine, 2005). Nonetheless, while these are external, environmentally triggered feelings of hunger produce marked anticipatory physiological responses. Even prior to food reaching the mouth, there are potent physiological signals being generated by the mere sight or smell of food, or even learned contextual cues such as location and time of day (Rogers, 1999). These signals, produced in response to external stimuli exposure, comprise what is known as the cephalic

phase of appetite. The cephalic response is expressed in numerous parts of the gastrointestinal tract and acts to anticipate food ingestion.

During and immediately after a meal, eating is controlled predominantly by afferent information, that is, both orosensory and postingestive effects of the food consumed. These influences can be considered as positive and negative feedback, respectively, whereby ingested food in the mouth contributes a stimulatory effect, whereas the entry of food into the stomach and the small intestine promotes primarily negative feedback (Blundell & Halford, 1994; Rogers, 1999). The positive feedback is essentially the stimulation of eating by eating (food consumption sustaining hunger) and can be affected by food palatability (Yeomans, 1996). While hunger is diminished with intake, the natural decline in hunger and the development of satiety is delayed if the palatability of food is increased.

What precisely determines which specific foods we find palatable is unclear. However, food preferences are both innate and learned. It is clear that children are born with innate preferences for certain flavors (e.g., sweet) and aversions to others (e.g., bitter). Moreover, these preferences and aversions change in intensity during early development. These can only serve to promote the intake of certain foods over others. It is notable that a number of studies have demonstrated that it is a preference for sweet and/or high-fat foods that characterizes obesity in both adults (Drewnowski, Kurth, & Rahaim, 1991; Mela & Sacchetti, 1991; Rissanen et al., 2002) and children, although the relationship between dietary fat and obesity is less clear in younger children (Gazzaniga & Burns, 1993; Halford et al., 2004; Maffeis, Pinelli, & Schutz, 1996; Obarzanek et al., 1994; Ortega et al., 1995). While the preferences are to some extent innate, data exist to demonstrate the critical role of exposure and learning in the development of appetite. It is far from clear whether some children are born with food preferences that make them more susceptible to obesity than others. However, the literature does suggest that early interventions can be used to modify infant food preferences. These may in turn prevent the development of obesity in childhood and adulthood.

Satiety and Satiation

It is important to note here the distinction between satiety and satiation. The term "satiety" represents simply the inhibition of hunger and further eating that occurs as a consequence of food ingestion. Satiation, however, refers to the processes that operate to terminate an eating episode. Clearly, therefore, satiation influences the volume of food consumed at a meal or a snack. Satiety and satiation provide both within-meal and between-meal controls of appetite. The level of control provided by these processes depends not only upon the properties of the food eaten and the act of ingestion itself, but also on both the quantity and quality of the food consumed. These aspects act to determine the time course of the resulting biological processes and the intensity of the signals involved. This relates to the concept of different types of food wielding different levels of satiating power, hence the importance of the diet's macronutrient content. Not all foods are equal in their impact on satiety. It is frequently argued that there is a hierarchy in the effect of macronutrients on satiety, with protein being the strongest (e.g., Blundell & Stubbs, 1999; Westerterp-Plantenga & Lejeune, 2005). The role of dietary fat in obesity will be discussed in more detail shortly, but first it is necessary to delve further into the specific role of neurochemical pathways in appetite regulation.

The physiological events triggered in response to the ingestion of food form the inhibitory processes that serve to both terminate eating episodes and temporarily prevent further eating. These processes, termed "satiety signals," are absolutely crucial to the action of appetite control mechanisms. Satiety signals include both the afferent, postingestive information and subsequent postabsorptive processes. A number of characteristics of ingested food are monitored, including taste (hedonics), energy density, and the proportion of macronutrients. The earliest indication of satiety comes from orosensory feedback, which is matched with our extensive experience of past consumption, allowing us to judge the satisfying properties of food items currently being consumed (Rogers, 1999). This means that satiety is, to some extent, learned or trained according to previous exposure.

It is self-evident that adults have consumed a far greater number of meals and a far wider range of differing food items than children. Whether this makes them better able to regulate their intake remains debatable. Other preabsorptive signals include gastric distension and preabsorption gut hormone release. Whether children differ in their endocrinological response to intestinal nutrients is unclear. However, the fact that they probably have considerably smaller gastric capacities has never been questioned.

Postabsorptive phase signals are generated when nutrients have been digested and have entered the circulation by passing through the intestinal wall. They provide an accurate reflection of the food consumed. Such products either travel to the peripheral tissues and organs to be metabolized further or alternatively can enter the brain directly in circulation. Whichever action is taken, these products act as another class of metabolic satiety signals. Digestion products or the agents responsible for their metabolism can enter the brain and bind to specific chemoreceptors, affect synthesis of neurotransmitters, or otherwise influence neuronal metabolism. Ultimately the brain receives some information about the metabolic state as a result of consuming food. The series of events following food consumption, coordinated by satiety signals, can be represented by the satiety cascade (Figure 2.2).

With regard to obesity, there is evidence that obese individuals may consume larger meals (Pearcey & De Castro, 2002), gain less satiating value from the foods they consume, and respond more strongly to the energy density of fat (Westerterp-Plantenga et al., 1998), or consume a diet

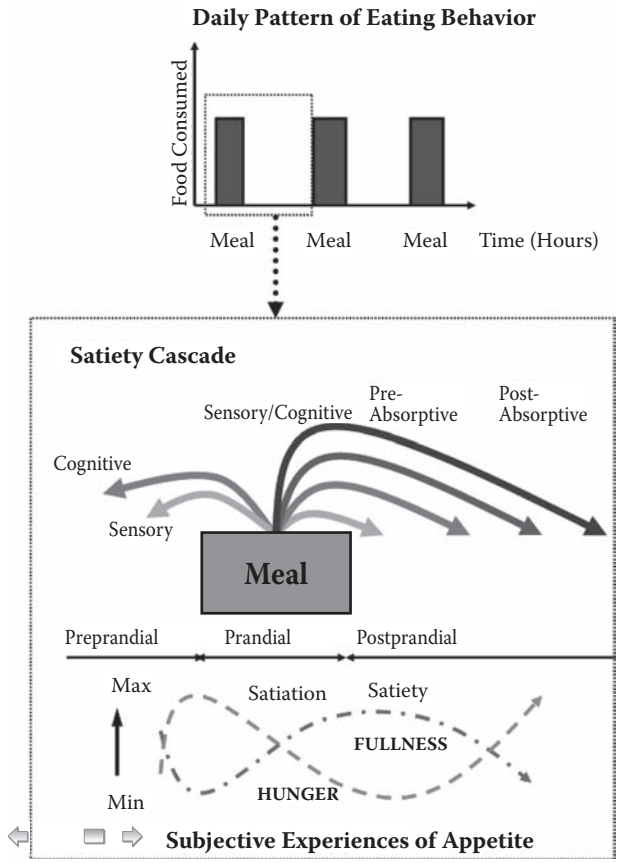

Figure 2.2 The satiety cascade illustrating the events that constitute satiety signals arising from food consumption.