

Preface



Today's children may well become the first generation of Americans whose life expectancy will be shorter than that of their parents. The culprit, public health experts agree, is obesity and its associated health problems.

Heretofore, the strategy to slow obesity's galloping pace has been driven by what the philosopher Karl Popper calls "the bucket theory of the mind." When minds are seen as containers and public understanding is viewed as being a function of how many scientific facts are known, the focus is naturally on how many scientific facts public minds contain. But the strategy has not worked. Despite all the diet books, the wide availability of reduced-calorie and reduced-fat foods, and the broad publicity about the obesity problem, America's waistline continues to expand. It will take more than food pyramid images or a new nutritional guideline to stem obesity's escalation.

Albert Einstein once observed that the significant problems we face cannot be solved at the same level of thinking we were at when we created them, and that we would have to shift to a new level, a deeper level of thinking, to solve them. This book argues for, and presents, a different perspective for thinking about and addressing the obesity problem: a *systems thinking* perspective. While already commonplace in engineering and in business, the use of systems thinking in personal health is less widely adopted. Yet this is precisely the setting where complexities are most problematic and where the stakes are highest. Though the tools and concepts associated with systems thinking are new and advanced, the underlying worldview is extremely intuitive. Even young children can learn systems thinking very quickly.

This book aims to apply systems thinking to personal health in a form that is accessible to the general reader, with the hope that it will have a profound influence on how ordinary people think about and manage their health and well-being. The book is written to help the following readers:

- Individuals seeking to better understand how to control/manage their bodies and their well-being.
- Parents who need to address the systemic, long-term risks of this complex but slowly developing threat before children get trapped in lifestyles that ultimately result in chronic obesity.
- Public policy makers who need to move beyond the *infomercial* model to prevention, that is, aiming to stuff people’s “mental buckets” with nutritional guidelines and food pyramid images, to a customized knowledge *restructuring* model—one that challenges people’s deeply ingrained assumptions about health risk and well-being.

The Book’s Outline

The book has five parts. Part I is an introductory discussion of the problem’s scope and its burden (on people and society), and the argument for a *different* way of thinking.

Part II traces the development of the epidemic and delineates its multiple causes. One of the few reasonably reliable facts about the obesity epidemic is that it started in the early 1980s. We need to understand why. The trigger that induced obesity’s escalation was not a single factor (e.g., a sudden upsurge in moral failure), but rather the confluence of multiple socioeconomic and technological factors.

Parts III and IV focus on the solution. Reducing the national waistline will require a major shift in thinking about managing our instincts and our environment; motivation alone is not going to be enough. Effective self-regulation of health behavior, as with the regulation of any dynamic system (whether it is the energy regulation of our bodies or the energy regulation of an atomic reactor), requires two essential skills: understanding and prediction. Part III focuses on understanding—helping people think systematically about the inner workings of human weight/energy regulation so that they can better manage their own bodies and health.

Part IV discusses prediction. While understanding helps us look *backward* to make sense of the past (e.g., explaining weight gain), we need prediction to look *forward* (e.g., to devise treatment strategies and assessing treatment outcomes). The ability to infer a system’s behavior is essential if we are to know how actions influence the system, and thus is essential in devising appropriate interventions for change. Perfect understanding without a capability to predict the system’s behavior is of little practical utility. The two skills—understanding and prediction—are needed together.

Part V discusses prevention. While the attention to the treatment of obesity has heretofore overwhelmed that given to prevention, interest in obesity prevention is attracting increasing attention because of the growing realization that it may be easier, less expensive, and more effective to change behavior, so as to prevent weight gain or to reverse small gains, than to treat obesity after it has fully developed.

The great advances in systems sciences, medicine, and communication technology are converging with another powerful trend: the increase in public initiative, so that people take greater responsibility for their well-being. This is opening enormous possibilities for empowering people with the tools they need for disease prevention and personal health management. Part V discusses the possibilities.

The Story of the Book

The series of events that ultimately led to writing this book are a bit unusual. In the mid-1990s I became extremely interested in the confluence of information and medical technologies, and saw it as one of the most promising new frontiers for system dynamics research and public policy. But I had a lot to learn. So, in 1997, I took an open-ended leave-of-absence and enrolled in the master's program at Stanford University's Engineering Economic Systems and Operations Research Department, where I focused on decision analysis and medical decision making. (Returning to become a master's student while already holding a PhD was certainly a weird experience, for me and for my professors, but it was a lot of fun.) It was during my studies at Stanford that I began to see the natural fit between the obesity problem (as a dynamic system of energy regulation) and system dynamics. (Research was revealing that human bioenergetics belongs to the class of multiloop nonlinear feedback systems, the same class of system that system dynamics aims to study.)

Upon graduation, I spent a year (1999–2000) as an affiliate at Stanford's Medical Informatics Department (part of Stanford's Medical School), where I worked on developing system dynamics models of human physiology and metabolism. In December 2001, I returned to my faculty position at the Naval Postgraduate School where I continued to conduct research on medical decision making and modeling of human metabolism and energy regulation.

I started writing this book in the winter of 2003.



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Applying Systems Thinking to Weight Management

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