

**A Thinking Person's
WEIGHT LOSS
and EXERCISE PROGRAM**

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A Thinking Person's **WEIGHT LOSS** and **EXERCISE PROGRAM**

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A THINKING PERSON'S WEIGHT LOSS AND EXERCISE PROGRAM
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To Mastee Badii, Roshan Alemi and Yara Alemi for creating the loving
and productive environment for my success.

—Farrokh Alemi

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Introduction

FARROKH ALEMI
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There are many who wish to lose weight—and cannot. Some do not even try anymore. A few fortunate individuals, however, seem to be able to pull this off with no effort at all. They never diet, yet they remain fit. They do not try hard but they succeed. One fills with wonder watching the lucky few. Is it possible that they owe their success to some genetic advantage? Certainly genes matter, but they are not the entire picture. Nor is it their intelligence or willpower. A close examination shows that it is their environment that matters most. The secret of their success is in the buildings, people, and routines that are around them. In other words, there is something in the way they have arranged their lives that makes them fit. This book is about how to organize your life—your environment—so that you can join the “lucky few.”

What can we possibly say about weight loss and exercise that hasn't been said before? The advice on weight loss is simple—eat less and exercise more—and is repeated over and over in the ever-multiplying books on dieting and exercise. From calorie-counting diets to “Zone” diets to the Mediterranean diet, the basic advice is succinct and clear. So when it came for us to write a book on this subject, we asked ourselves if there was actually something new we could add. What is there to add to “eat less and exercise more”?

Here, then, is what sets this book apart from others: it focuses on how habits are formed and maintained. It focuses on willpower and one's ability to carry out resolutions. To succeed, you should of course want to eat less and exercise more. You must know how to diet and what forms of exercise are safe. But knowing what you have to do and wanting to do it are not by themselves enough. People fail in their resolutions every day. This book seizes on that part of the equation—willpower, specifically, sticking with your diet and exercise resolutions—rather than focusing on any specific diet. While many books have been written on diet and exercise, little is known about how to keep at it. Many people diet and as a result manage to lose 10 or 20 pounds—only to gain those back shortly afterwards. Others start exercise programs—they join gyms, for example—only to find a year later that they have hardly used the facilities they so enthusiastically joined. This book helps people stay with their resolutions.

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When it comes to diet and exercise, what really matters is staying with your plans for the long term. Most people think of willpower as some untapped reservoir inside their mind, a part of their personality—they either have it or they don't, it's their luck in life. Many talk of lack of willpower as a character flaw, a personality trait. But nothing can be further from the truth. Willpower is not part of you and it is not something you are born with. Everyone can have it—because it is something that can be manufactured, bottled, and sold. It is a commodity of which you can keep getting more. You can create willpower; it is crafted out of your daily routines. This book will show you how. It will give you the tools so that you can stay with your resolutions.

A recent survey shows that the proportion of Americans who are overweight is 56 percent. In short, one in two people is heavy. The same survey shows that one in five is obese. These are amazing statistics, and they prove that overweight and obesity are more prevalent than ever.

Eating poorly and lack of exercise are leading to various diseases, including diabetes. The number of people with diabetes in the United States has nearly doubled in the last decade, rising from 9 million in 1991 to 15 million in 2001. Obesity raises the risk for diabetes 10-fold for men and an astonishing 20-fold for women. Over a single decade we have gotten a lot fatter and sicker, even though during the same decade we have seen the growth of a weight loss industry, the introduction of low-fat foods, and a growing number of books on how to lose weight. Why is it that we are gaining weight at a time when we are doing our best to lose it?

It seems that the ordinary person is caught in a callous spiral of events. He is told to lose weight and exercise. He does his best and makes many valiant attempts. But invariably, year after year, he gains weight. As if he's under a curse, no matter what he does, whose advice he follows, which diet he participates in, which foods he eliminates, he gains weight. It reminds us of the tale of Sisyphus in Greek mythology. The gods condemned Sisyphus to push a boulder up a mountainside, which by law of nature would plummet to the bottom from the top. Sisyphus was forced to flee downhill, dejected and feeble. Then he would have to start once again from the bottom, with the same result, repeated over and over. Just like they did to Sisyphus, it seems the gods are punishing us. They have condemned us to gain weight no matter what we do. We are trapped in a series of invariably futile and pathetic attempts, which only serve to depress us. This book aims to break through this hopeless cycle by giving you new tools that enable you to keep your resolutions. This book can help Sisyphus get to the top—and stay there. Our promise to you, therefore, is that you can lose weight and keep it off.

We are a group of scientists, who since 1990 have been talking twice a month with one another about personal improvement efforts. Duncan Neuhauser is an epidemiologist; Linda Headrick is a medical doctor; Bill Fallon is a surgeon; Shirley Moore, Linda Norman, and Laura Benson are nurses; Nancy Tinsley and Laura Benson are directors of quality improvement programs; and Farrokh Alemi is a system analyst. We form an interdisciplinary team of people bent on solving the puzzle of willpower. We have many different perspectives on weight loss but what unites us is the application of system analysis to personal problems, a process we call “system thinking.”

System analysis started with the examination of computers and their fit with business processes. You may ask what system analysis has to do with weight loss. A nurse’s or a physician’s role is understandable—after all, excessive weight gain leads to disease—but what does a system analyst contribute to weight loss? Plenty. As it turns out, weight loss and exercise are heavily influenced by our lifestyles, and the tools of system analysis can be used to understand how our environment affects and maintains our habits. System analysis is the core guiding principle of how we look at the environment and its link to diet and exercise.

We did not arrive at this thinking easily; in fact we were at first skeptical. Like most other people, we thought that changing habits would be a matter of personal motivation. When a person opens the refrigerator and eats a slice of cheesecake, it is difficult to imagine the role of the environment. But, over time, we came to realize the role of one’s environment in putting the cheesecake there and in creating the conditions that lead to making the person hungry for it. Over time, we came to see beyond the motivation of the individual and thus were able to create an approach that helps people restructure their environments. When we tried to teach this approach to others, its effectiveness surprised us. Eighty-three percent of the people who were exposed to the approach succeeded in keeping their resolutions over a relatively long period (several months). The success of our approach led to our writing about it, and ultimately to this book.

Since those early days numerous people have succeeded by following our advice. In a later chapter, we present a summary of the experiences of a large number of people. We are scientists and we look for evidence for our claims. Our advice is based on data and the experiences of a large cohort of people.

Perhaps most interestingly, many participants have succeeded *despite* themselves. Later in this book you will read about the case of a person who reduced his junk food consumption by joining a car pool. You will read about a person who stayed trim by raising the height of his work table; he worked standing up. These people succeeded in weight loss without dieting

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and calorie counts. They succeeded with little effort. For the most part, they were not even aware that they were losing weight. The participant who joined a car pool and ended up reducing his junk food intake did not do so in a direct way. He just never needed junk food anymore. He seemed to have succeeded with little effort. Even when he would eat junk food on occasion, he never went back to his previous habit of eating it *regularly*. In this book you will read numerous such examples of people succeeding in ways that are counterintuitive. Few people who diet or exercise would think that tables' heights or car pools could stand in as methods of weight loss. But they are doing just that. Life is an interconnected set of decisions. Every decision could matter. We show you how to change certain aspects of your life and start losing weight. We show you how to lose weight not by increasing your motivation, which invariably will change over time, but by changing your environment so that weight loss and exercise become inevitable. If you have been able to draw on enough motivation to read this book and make changes in your environment, you will succeed without us cajoling you to have unwavering commitment to weight loss or exercise.

An easy way to think of the advice in this book is to picture it in terms of biking uphill versus downhill. If you are going downhill, bicycling is no effort at all. It is easy, fun, and inevitable. You have to do something only if you want to stop going downhill. In contrast, bicycling uphill is lots of sweat and frustration—quite hard. If you stop at any time, you are likely not to want to continue. You may even roll backwards. If you rely on your own motivation, weight loss is like bicycling uphill. It is hard and you have to put a lot of effort just to stay at your current weight.

In the first chapter of this book, we lay out our ideas and give you the various tools that you need. We provide you with simple tools, such as making a list, as well as complex graphical data analysis tools, such as control charts. Don't worry, even the most sophisticated tools we provide are easy to use. We show you how to collect and analyze data to see if you are progressing toward your goals. We show you how to put together a team to help you. In short, we give you the requisite skills and then set you loose in analyzing your own life. Throughout, we ask you to think hard about how your environment (not your motivation) affects your behavior.

Smart people like you first understand their world before they plunge into changing it. If you have failed to keep your resolution, you must first understand why. What in your environment has worked against you? We help you move away from seeing your success and failure as functions of your motivation. Instead, we help you see the role of your environment in your behavior. We ask you to analyze each time you fail to keep your resolution

with the objectivity of a scientist. To help you do this, we give you the tools of the scientist. The first chapter helps you think much harder about your life and how to change it.

In the second chapter, we examine the experiences of a large number of people to see if our claims are supported by how these individuals fared. These data support the importance of system thinking in bringing about lasting change.

In the third chapter we return to the principle of system thinking. Most people see their success or failure in terms of motivation. It is hard to break away from this method of thinking. System thinking puts a bigger emphasis on your environment. This chapter shows you how all of your decisions are interrelated. How what you do at night and at work affects your eating. How what you shop for affects what you eat. How friendships and social patterns affect your diet and exercise.

In the fourth chapter we take a deeper look at getting others to help you. Of course, losing weight and exercising are personal tasks. You would not need others if all you needed was to be motivated. But when you have to change your environment—which affects not only you but also others—you do need help. But how do you ask for help, whom do you ask, and what do you do together? By answering these questions this chapter enables you to organize a team to help you achieve your goal.

In the fifth chapter we help you examine your life and find specific processes that could be linked to your weight and inactivity. We provide tools such as flowcharts and lists of periodic events to help you analyze your existing lifestyle.

In the sixth chapter we take a more in-depth look at how you could monitor your progress. We provide you with control charts for weight and length of exercise. We also show you how to examine patterns of missed days. Throughout the book we ask you to be a problem solver and to look at data to see why you fail or succeed. This chapter provides you with detailed instructions on how to analyze data.

In the seventh chapter, we report on the case of Mary, who wanted to lose weight through exercise. Most people advise you that to lose weight you need to diet. Mary wanted to lose weight without dieting. She was exercising, but not enough to make a difference. She had to do a lot more. What is striking about this example is how well she succeeded and for how long. In the end, exercise became the norm for her.

In the last chapter, we provide a review. The Appendix to the book includes an examination of the ethics of self-help books as a category and addresses our concerns about how this particular book may cause harm. Self-help books have been criticized as promising results without providing evi-

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dence that such results can be accomplished by ordinary people without unrealistic expectations. We present data from a large number of people regarding the effectiveness of our advice. Self-help books have also been criticized for overindulgence. For example, everyone would be concerned if an anorexic followed the advice here in order to lose more weight. The behavioral modification technologies in this book are very powerful, capable of changing our personal habits and lives as pervasively as the advent of the automobile. But this technology can be misused to lose weight to unhealthy levels. We must constantly be aware of, and headed for *better health*, as opposed to a fixed goal provided by marketers or the extremes of our own personality. Let us not forget that unbalanced by other concerns, the technology of cars can lead to disabling pollution, congestion, a tyranny of transportation options, and isolation. Unguided by human intelligence and awareness, all technologies are as capable of ill as well as good.

The potential of misuse of this behavioral technology is lessened by the fact that it promotes integration and linkages among people. Central to the power of process improvement is our own awareness of the connections among ourselves, our environment, and the people around us. It is our hope that this awareness and your thoughtfulness will keep this technology working for your health and not against it.

This is not just a book to read and set aside. We hope that you use it as a workbook, recording your progress on these pages, analyzing your setbacks in various tables and forms provided. We include throughout the chapters as well as at the end of the book a number of worksheets—along with instructions on understanding graphs and using Web sites for personal improvements.

The promise of discipline and willpower is never to be taken lightly, and to say that you can—that pretty much anyone can—lose weight and exercise is an especially tall order. To say that you can do so with ease is an even bigger pledge. Can we keep our promise to you? This book has set out to tackle a big step. We do not want you to work hard or be terribly motivated while you are accomplishing this big change. All we are asking of you is to be smart and focus on problem solving. If *you* promise to act objectively to understand the reasons why you fail, *we* promise you that you will lose weight and keep it off.

Keeping Up with Diet and Exercise

A WORKBOOK

CHAPTER 1

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SHIRLEY M. MOORE
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Douglas was concerned about his weight gain and lack of regular exercise; he set out to change his life based on what he had learned about process improvement. He posted a calendar on his refrigerator and checked it each day he exercised. He created a flowchart of how daily routines affected his exercise patterns. He studied causes of variation in exercising. Instead of blaming himself and focusing on his motivation he looked for life processes and environmental influences that affected his success. He found that scheduling the exercise time on his work calendar helped him, that he could exercise on Sunday mornings if he did not stay out late on Saturday nights, and that he could run around the field while he watched his daughter's soccer game. He created a storyboard to report his results over 12 weeks. During weeks one and two he managed to exercise three times a week. For the next 10 weeks he exercised four or five times a week. He used a control chart to track his weekly performance. After 12 weeks, he had higher self-esteem, his energy level had bounded, and his clothes fit more comfortably. He continued to get positive feedback from his wife and co-workers and thinks that it is easy to keep up with his healthier lifestyle. Douglas' story and success is typical of several hundred people who have applied process improvement to their lives. This chapter presents a workbook you can use to help organize your own exercise and diet routines so that you can enjoy similar results.

Unkept Promises?

As noted in our book's Introduction, many people fail to do what they wish to do. They make resolutions but do not keep them. They plan to change

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their lives but over time relapse into old habits. This is common but to us seems odd. Why should people fail this way?

It is difficult to stay with diet and exercise plans, especially when faced with temptations and desires to the contrary. Certainly many scientists, clinicians, advertisers, and consultants have worked on the idea of motivating people to stay true to their plans. But few manage to do it—and all this collective effort has failed to produce a definitive understanding of what is missing. The situation is even odder when those who fail are highly motivated individuals. As scientists we are surprised by this because, in the absence of any external barriers, people theoretically should be able to do what they want. From a strictly scientific point of view, if a force for change exists, the change should result. In physics, if a force is exerted on a ball, the ball moves in the direction of the force. When it does not, it signals that our understanding of what forces are in play is at fault. Let's apply this simple and incontrovertible fact to the matter of personal change, then: When a person wants to change, knows how to change, has the skills to change, is motivated to change but in the end does not, this means *something is wrong with our understanding of what it takes to change*. We must have missed an important force that is at play.

The second fact that strikes us as odd is that although many *people* are stymied in their efforts, *organizations* often change, and despite some failures, many organizations change successfully. Remarkably, then, organizations seem more likely to bring about change than individuals. Well, organizations are made up of people—how is it possible that the same employee is able to change major work habits but fails to make modest personal changes? The answer to this question, we believe, lies in modern management techniques.

Management scientists have studied how people change and turned it into a science. W. E. Deming, for instance, devised Total Quality Management (Continuous Quality Improvement), a step-by-step guide to improving organizations. Organizations have applied these techniques to change the behaviors of their employees. The technique is successful in bringing about lasting behavior change. You almost never hear that an organization has changed work processes for months and then suddenly gone back to old habits. When it comes to work behaviors, relapse is less frequent. If continuous quality improvement can be used to bring about lasting change for work behavior, perhaps you can use it to keep up with your diet and exercise plans. In this chapter, you will learn to unlock the secrets of modern management and apply it to your own life.

We assume that you know about nutrition or that you will find through other sources more information about what foods are good for you and what your ideal weight is. We have no advice to give regarding what to eat or how

to diet. We assume that you know about the ideal activity level that is best for you, and that you will keep in mind that extremes in diet or exercise can create additional problems. We have no advice for you regarding how much or when you should exercise, or what types of exercise are best. We leave these questions up to you and your clinicians. You need to sort out what diet or exercise plan you want to be on first. But once you have done so, we can help you keep up with your plans. In a nutshell, this is where we can make a difference for you: we assume that you have a set of plans and we help you implement them successfully.

Our approach is not based on motivating you to exert more effort but on helping you build your diet and exercise plans into the fabric of your life. We assume that you are motivated enough. What is enough? We expect you to want to change and be willing to change your environment. In this approach, you act more like a detective looking for clues and less like an enforcer insisting on compliance. We do not want you to *do* more (enough has been asked from you); we want you to *think* differently. In this sense, we provide a smart approach to keeping up with your resolution.

Steps in Process Improvement

We recommend the following steps in conducting a personal process improvement program:

1. **Put together a team** of process owners willing to work with you.
2. With your team, **describe what you want to accomplish.**
3. As a team, **describe life processes** and how they affect your diet and exercise plans.
4. As a team, **make a list of possible systemic (lifestyle) changes.** Implement several of the changes.
5. Gather data and **monitor progress.** Check if change has led to improvement.
6. **Engage in cycles of improvement.**
7. **Tell your story** as you go on.

Each of these steps is described below.

Step 1: Put Together a Team

Our central thesis is that to change your diet and exercise you need to change *the system around you*. By the system around you, we mean your environment and the routines in your life. A system contains any person or thing that

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affects your behavior—in short, the world around you. If changing yourself was difficult, then changing the world, which involves many more people, should be much more challenging. Fortunately, modern management has thought through this and has a solution: Get together with the people closest to the system that you want to change. If you want to change your diet, these will be people who prepare the food at home, people who shop for the food, those who arrange for social events, and so on. These individuals are not necessarily your buddies but people who share your diet or preparation of the food. Work on defining the problem and seeking solutions together. In management this is called “organizing cross-functional teams.” In your life, of course, you probably call it “getting together.” When you involve others, you see the change from their perspectives, you get reinforcement and help, and you become more committed to the change you want to accomplish—and perhaps most important, the focus of attention changes from individual effort to elements in the shared environment.

The secret in getting teams to work on a problem is to have them come up with the definition of the problem, not just solutions to it. This means you may need to focus on a shared problem and not aspects that affect you uniquely. What food is put on the table is a shared problem while which food items you choose to eat seems a private matter. In defining the problem you need to move away from personal choices to issues that affect everyone living together. In time, any joint problem will affect all of you, so the mere admission that you are in this together will help team members become closer and more aware of how they influence one another.

We need to make a distinction between a process owner and a buddy before we go any further. A *process owner* is a person who contributes to the production of the exercise activities or food. A *buddy*, by contrast, is a friend who may have the same goals as yours but often does not participate in the production of the items you need. For example, when a friend diets with you we call him or her a “buddy,” but when your spouse prepares your food we call that person a process owner, even though this person is not dieting. We are asking you to involve process owners as opposed to buddies in the improvement team. The purpose is to avoid bringing together people who want to diet with you, gathering instead those whose decisions affect your diet.

For most people, a spouse or significant other is the most likely person to involve in your effort to lose weight or exercise more. Again, this does not mean that the spouse should also lose weight or exercise. All it means is that collectively you and your spouse will look at changes in the environment that could help. If you do not have a spouse, other members of your household or a close friend or family member can also help.

Do not confuse the team's role with support groups. Social support from family members and friends is important; having people around who know you are trying to bring about change can make your task easier. But that is not why you meet with process owners; you meet with them because the solutions you are seeking will affect them too. Changing the environment has an impact on everyone sharing it. Thus if you are going to change shopping patterns, everyone eating with you will be affected. To be sure, support groups can offer understanding and encouragement. But what you need and want from your team is more. You need their active engagement in coming up with possible changes.

Still not sure who is a process owner? The survey in Table 1 will help you rate individuals around you to see if they could be considered process owners.

Because of the importance of selecting the right person to help you out, we have organized a separate chapter on this topic. You can read more about this in Chapter 4, titled "Improvement Teams."

Step 2: Describe What You Want to Accomplish

As a team, you need to define the problem you are going to work on. When it was just you, settling on the problem you wanted to solve was easy. It was what you wished it to be. Now, with several people involved, defining the problem requires more finesse. Some people insist on defining the problem by themselves and proceed to other tasks—but remember: your friends and family members won't participate if they do not see it as *their* problem too. Fortunately, the management literature has some advice on how to define problems. First, do not blame anyone. A statement such as, "We want to get mom to cook better," succeeds in acknowledging the interdependency among the people who eat at home, but at the same time it blames one person for the problems of another—hardly in line with the productive approach you want.

Second, describe the problem in terms of the experience of the people involved, not the action needed. Thus the problem should not be defined in terms of the need to cook with less fat but in terms of excessive weight, not in terms of your needing free time so you can exercise but of your lack of activity. When you start with the impact of the problem on you and not the solution, you can later collectively come up with creative options acceptable to everybody involved—and everyone has a sense of ownership of the ideas and it is easier to go from discussions to implementation.

Third, state the problem from varying perspectives. Different wording of the same problem will trigger different ideas in your mind. So if you have

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TABLE 1 / **Who Is a Process Owner?**

A buddy is a person who can participate in your diet or exercise plan. A process owner is a person who shares a common environment with you and can influence your diet and exercise plan, *even when he or she is not dieting or exercising with you*. This exercise helps you decide whether the person you have in mind is a buddy or a process owner.

PLEASE WRITE THE NAME OF THE PERSON YOU ARE CONSIDERING:

	YES	NO
1. Do you share food with this person on a regular basis?	_____	_____
2. Do you have joint responsibility for maintaining a household?	_____	_____
3. Do you need to consider this person's timetable when you are deciding on the best time to exercise or eat food?	_____	_____
4. Does this person help you in carrying out daily living activities (bathing, eating, cleaning, washing clothes, commuting, etc.)?	_____	_____
5. Can this person's decisions affect time, equipment, sports clothes, or other resources needed for your exercise?	_____	_____
6. Does this person's decision affect what options are available to you for food or exercise?	_____	_____
7. Do you see each other on a daily basis?	_____	_____
8. Does this person affect how and when you socialize with others?	_____	_____
The person with the highest number of positive responses is the most ideal person as a process owner for you.	TOTAL NUMBER OF YES RESPONSES _____	

Please note that the following are not important considerations and should not influence your decision:

- *Whether you like the person or not.* Process owners may not be on your list of favorite people; nevertheless they must be included if they are good candidates as determined by the questions above.
- *Whether the person participates in your diet or exercise plans or not.* A process owner participates in your system, but not necessarily in your diet or exercise activities.

focused on a *problem*, state it now as an *opportunity*. If your problem was that you were gaining weight, state it now as the opportunity of fitting into your old clothes. If the problem was that smoking was increasing your risk of disease, state it now as the opportunity to smell the garden. The point is that problems should be stated from a variety of perspectives so that different kinds of ideas could be pursued.

To help you define a problem, we want you to focus on some fundamental questions. Langley, Nolan, and Nolan (1994) have written extensively on how health care organizations improve. They believe all improvements require answers to underlying questions, two of which are:

1. *What are we trying to accomplish?*
 - Provides an aim for improvement efforts.
 - Keeps effort focused.
2. *How will we know that a change is an improvement?*
 - Provides criteria or measures for determining if the change resulted in an improvement. (Not every change leads to an improvement.)

They also raise a third question: *What changes can you make that will result in improvement?* We will raise this question later when we search for solutions. Table 2 gives some examples of personal improvement efforts according to these three basic questions:

TABLE 2 / Examples of Improvement Efforts		
I. WHAT ARE YOU TRYING TO ACCOMPLISH?	2. HOW WILL YOU KNOW THAT A CHANGE IS AN IMPROVEMENT?	3. WHAT CHANGES CAN YOU MAKE THAT WILL RESULT IN IMPROVEMENT?
Aim	Criteria or measure	Potential ideas for change
1 To get home on time so that I can cook.	– Number of times I arrive on time.	– Take calls at the end of the day in the car. – Join a car pool, so that I leave on time.
2 To exercise more frequently.	– Number of minutes of rigorous exercise.	– Commute by bicycle to work. – Add exercise appointments to work calendar.
3 To eat healthier food.	– Number of sweetened beverages each day. – Type and number of snacks.	– Change the placement of water dispenser at work. – Change what is shopped for and is available at the household.
4 To stop smoking.	– Number of cigarettes smoked each day.	– Carry gum. – Make new friends who do not smoke.

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You might ask yourself the same three questions. Let's look at the first two. First, **what are you trying to accomplish?** You obviously want to focus broadly on losing weight and exercising more. Sometimes it helps to have a more specific diet or exercise change in mind. For instance, some have focused on smoking cessation. Others have focused on reducing junk food intake. Still others have focused on reducing calories. This does not mean that you need to focus on one aspect and forget the other. You can have multiple focuses or move from one to another over time. The point is to be clear to yourself regarding what you want to do.

Second, **how will you know that a change is an improvement?** It is not enough to say that you *know it* when you have succeeded. In weight loss, random variations in weight cloud our judgment regarding true success and failure. Once you have identified an area to be improved, select a key variable that you will measure and *immediately* begin to keep data on the process. For example, if you want to reduce your weight, start today by taking your weight and writing it down in your diary! Do so before you start changing your behavior. This data can serve as a benchmark of where you started. As you go, you will collect more data to see if the changes you have introduced are leading to real improvements. You are in for surprises. Many activities that you are sure will work come to naught. Other activities that seem trivial and minor events do, in fact, help you. *Data*, not your intuition, should be the judge of what works for you. As soon as possible, keep a regular and frequent schedule for collecting the data. Then, over time, you can examine the data to see what works for you. (See Chapter 5 for details.)

The survey in Figure 1 helps you define the problem you are going to work on.

Step 3: Describe Life Processes

We want you to focus on your life processes and not on your motivation or effort. We define a *process* to be any series of events, circumstances, or physical influences that affect your diet and exercise. Most people do not see their lives in terms of processes. If we ask you, for example, why you do not keep your resolution, you are likely to say that it has to do with what you do or fail to do. If we ask, "Why do you smoke?" you may say, "Because I do not want badly enough to stop." If we ask, "Why are you overweight?" you might say, "Because I do not have the discipline to stick to my diet." If we ask, "Why are you inactive?" you might say, "Because I am tired." These answers have one theme in common. They see you as the central force behind your behavior. Surely that is true to some degree, but it is not the whole picture. Human behavior is also

FIGURE 1 / STATING THE PROBLEM

*This exercise helps you select a personal improvement project.
There are seven steps you need to think through:*

1. WHAT DO YOU WANT TO ACCOMPLISH?

What is the habit that you would like to change? A habit (e.g., overeating) is a repetitive behavior that you have tried to maintain or tried to avoid unsuccessfully in the past. Make sure that you do not suggest a solution or blame anyone in your statement of what you plan to accomplish.

2. WHO WILL HELP?

Who will help you in thinking through this behavior and making the necessary changes in the environment so that you will succeed? Please note that we are not asking for a buddy who will share the activity with you but a person who can help you adjust your environment. This individual could be your friend, your family member, or your work partner—the key is that he or she must be a significant player in adjusting your environment. For example, if you are trying to lose weight you need to include the person who cooks or shops for you as your process owner.

3. WHEN DO YOU PLAN TO MEET?

Schedule a regular period (a half to a full hour) in which you can meet with your team to work on the improvement. List here when and where you plan to meet.

**4. HOW WOULD YOU KNOW IF CHANGES
HAVE LED TO IMPROVEMENT?**

You need one single measure that will tell you how you are proceeding and how well you are doing. You need to use it *daily or at least two to three times a week*.

(Continued on the following page)

16 A THINKING PERSON'S WEIGHT LOSS AND EXERCISE PROGRAM**FIGURE 1 / STATING THE PROBLEM (CONTINUED)**

The measure could be as simple as checking to see if you have accomplished a task. It could measure your effort or it could measure the outcome you are seeking. It should be something that you and your partner agree best represents your success in what you are trying to accomplish.

5. WHEN WILL YOU START COLLECTING DATA?

You need data on the extent of the habit before you make any improvements. So start collecting data as soon as possible; then when you introduce the change you are planning, you will be able to see the change in your data.

- | | |
|--|---|
| <input type="checkbox"/> Already started | <input type="checkbox"/> In a week |
| <input type="checkbox"/> In a few days | <input type="checkbox"/> In more than a week
(not recommended) |

6. HOW OFTEN WILL YOU MEASURE YOUR PROGRESS?

You need to measure your progress on at least a daily basis or two to three times a week. Frequencies lower than this will not give you sufficient data to judge your progress over the next 10 weeks.

- | | |
|---|---|
| <input type="checkbox"/> Daily | <input type="checkbox"/> 4–7 times a week |
| <input type="checkbox"/> 2–3 times a week | <input type="checkbox"/> Less frequently than 2 times week
(not recommended) |

7. WHEN WILL YOU START YOUR STORYBOARD?

A storyboard is a place where you keep track of your progress. As soon as you choose the problem, we want you to select a public place where you and your team can review the progress to date. Here we want you to post the habit you are working on. Over time you will also display here what elements in the environment affect the habit and how you are doing in changing the habit.

- | | |
|--|---|
| <input type="checkbox"/> Already started | <input type="checkbox"/> In a week |
| <input type="checkbox"/> In a few days | <input type="checkbox"/> In more than a week
(not recommended) |

affected by a host of environmental influences. You may be the actor but you do not act in a vacuum—your environment affects you.

It is unfortunate that people blame themselves when much more than they are behind their behavior. Continuous Process Improvement trains employees to see the system around them. Such management programs blame the system and not the person. In modern management, if employees do not change successfully, it is not their fault—a system should be organized to encourage them to change. Employers bring about successful change by changing the process of work, not by blaming employees for their effort. Likewise, if you do not succeed, it is because you have not mobilized the system around you to help.

Very personal decisions, such as what you eat tonight, are not entirely yours to make. Sure, you choose and it is your hands that put the food in your mouth. But your decision is not completely yours; nor is it made tonight. If you share food with others, they influence what is on the table. If you worked long hours and you are tired, maybe you are too exhausted to prepare food. What you bought at the grocery store a few days ago determines what you can eat now. The ease with which you can prepare food influences you, and technology that is in your kitchen determines in part the outcome of your decision. The temperature in your room affects how much energy you consume. The steps between your floors affect your exercise. The list goes on and on about all the factors that influence your decision. You open the refrigerator and it seems that you have made a decision about what you want to eat tonight, but in reality a series of decisions made by you and others earlier have pretty much determined what you will do at that point. You are caught in a pyramid scheme in which your own and other people's earlier decisions limit your options.

Now, we are not saying that life is deterministic and what you do is your fate. No, surely, not that at all. We want you to change. But change is not about what you do now. To change successfully you must set out to change the system around you. You must come to realize how the past and the present are intertwined.

It is counterintuitive not to blame your will for your actions. But you should not. Change is not easy. Your habits have been learned over many years and are reinforced by many events around you. Changing these habits is difficult and you cannot succeed unless you mobilize the system around you.

There is also another reason why you should not blame yourself. We know that to succeed you must try and try again. People who blame themselves give up on this. They fail because they blame their willpower. One of the principles of Continuous Quality Improvement is to avoid blaming others. When you apply process improvement to staying with your weight loss

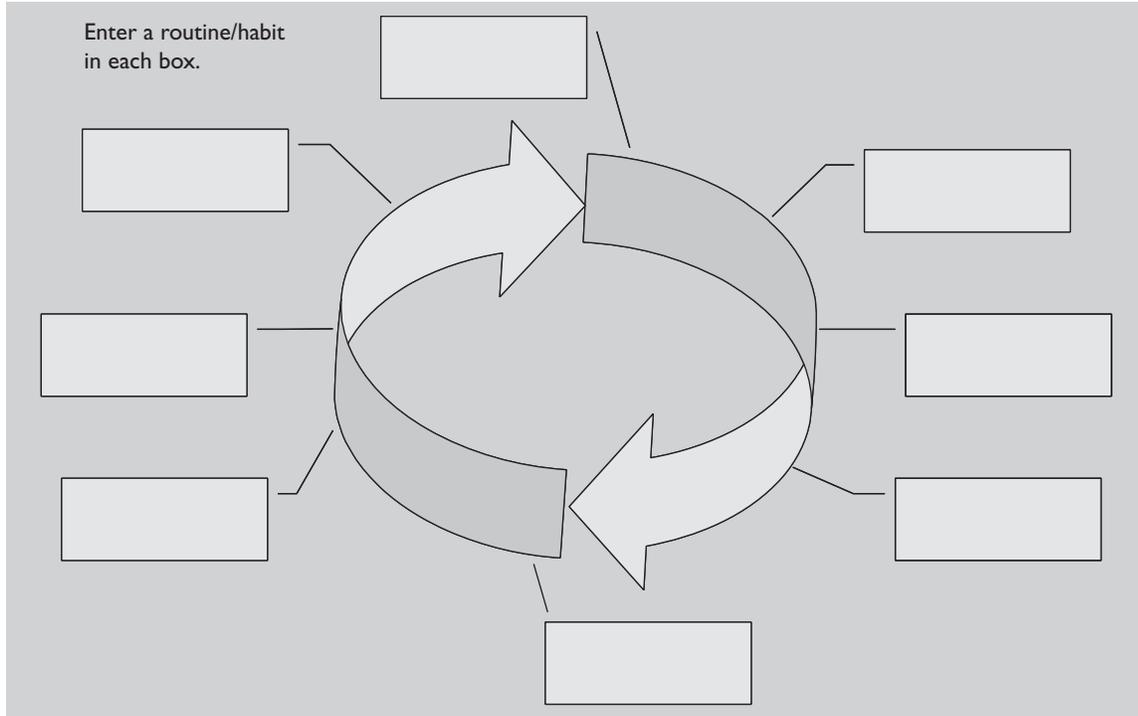
Complete instructions for completing a list of periodic recurrences is given in Chapter 5 on “Tools for Understanding Complex Processes.” These instructions include the following:

- If an activity occurs at different times, list it as a periodic event with the average time of recurrence.
- Ask each person to individually and silently generate items for the list.
- Check that all major living activities (eating, cleaning, sleeping, shopping, commuting, etc.) are listed even if these activities do not occur with specific periods. List the most likely time for their occurrences.
- Include any activity that is part of food production (e.g., shopping, preparing food, placing snacks around the house, etc.) or part of exercise preparation (e.g., washing exercise clothes, getting exercise equipment, making appointments, paying for gym membership, arranging to meet team members).
- Include events and activities that prevent you from exercising or dieting. For example, include getting home too late from work to go to the gym, or having too little time to cook because you are helping the kids with homework.
- Include social activities. For example, eating out may affect your diet.
- Include any rituals associated with exercise and food consumption (e.g., eating together, driving kids to games, etc.)

We also ask you to look for stable cycles of activities, where a routine leads to another set of routines that eventually lead back to the starting routine. Cycles show how one routine reinforces another. These cycles are the building blocks that hold our lifestyles together. They create inertia, hampering change. When one routine is changed, the remainder of the cycle works against the change and encourages the routine to return to original habits. For example, going to work late leads to staying late at work, which leads to getting home late, and preparing food late, which leads to staying up late to watch television in order to allow for digestion, which leads to sleeping late, getting up late, and to the start of the cycle of going to work late. If someone tries to change his or her dinner plans, he or she may succeed at first but soon the cycle of getting up late and coming home later takes over. Soon the person will run out of time for cooking a reasonable meal and be forced, by other routines in his or her life, to return to old dinner habits. Figure 2 provides a form for entering repeating cycles. Lifestyle changes begin with detecting these cycles and modifying them. Please use Figure 2 to analyze as many cycles in your life as possible.

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FIGURE 2 / A Form for Entering Cycles of Routines



Step 4: Make a List of Possible Changes

The first piece of advice in generating a list of possible changes is “don’t do it right away.” Delay and postpone any suggestions for change until you truly understand the problem. People love to solve problems—so much so that some rush to suggest solutions to you even before they know the details of your problem! Whenever you tell people you have a problem, they want to suggest solutions to you. Here is a typical exchange:

“What’s wrong?”

“Oh, I feel down, a little bit unhappy...”

“Well, why don’t you call a friend and go to a movie? It will perk you up.”

In this example, the solution seems obvious. But in reality the problem is far more complex than can be solved by a movie. If the problem is so simple that within seconds you can think of a solution for it, you should ask yourself: *How come the problem has persisted? Why has it not been solved already?* Many do not really know what the problem is but they have solutions for it. People love

to suggest solutions, even if suggestion does not solve any real problem. In jest, maybe we should agree that instead of asking what is wrong, we should bypass the burden of asking and start suggesting solutions to imagined problems. This tendency to prematurely suggest solutions is very common, and therefore it is important that you consciously fight against it. One way to do so is to spend more time understanding the problem. Making lists of periodic *routines and looking for cycles*, as outlined by the steps described in the previous section, delays making changes until we understand the problem. Once the problem is understood, and only then, you need to make a list of possible solutions.

To list the possible solutions, get your team together for an hour on a specified date. Ask each team member to silently write on a piece of paper changes all of you collectively can make. Ask for changes in the environment and not more effort or stronger motivation. Go around the room and collect the ideas and make a list without evaluating the ideas or their practicality. Do not ridicule or praise the ideas. Do not discuss the ideas until all have been collected. Ask each person to give one idea at a time. Keep going around until all ideas have been listed.

When a large set of solutions have been identified, ask the team to rate the ideas. It bears repeating: look for ideas that are process changes and avoid ideas that lead to more effort or require strong motivation. To help you evaluate the possible changes, we have developed a survey instrument, shown in Table 4.

Step 5: Gather Data and Monitor Progress

When you make a change, a key question to continue to ask is, “How would I know if this change is an improvement?” Collect data that will verify that the change has led to improvement. Many ask, “What for? If I change, I will know that I have changed.” Ironically, research shows that people, sure as they may feel in their assessment, frequently misread their own lives. If random chance leads to success, many assume that it was because of their effort. And if they fail, many assume that it was because of external forces. They attribute their success to their effort and their failures to others. While this is a reasonable way of remaining optimistic, it is a poor way of judging change. To examine change over time you need data. Only then can you be sure that change is occurring.

For most people this is a very hard piece of advice to swallow. In essence, we are advising you not to trust your own judgment. We are asking you to verify what you are accomplishing. It is hard to question your own intuition—especially when dealing with the obvious. You’re saying, “If I feel I am

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TABLE 4 / Evaluating Possible Changes

STEP 1 COLLECT IDEAS ON HOW TO CHANGE YOUR ENVIRONMENT AND LIST THEM BELOW.

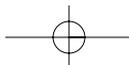
IDEA FOR CHANGE	IDEA FOR CHANGE
A	G
B	H
C	I
D	J
E	K
F	L

STEP 2 CHECK ANY RESPONSE THAT APPLIES TO THE IDEA.

	A	B	C	D	E	F	G	H	I	J	K	L
1. Focuses on events that happen prior to eating or exercising.												
2. Does not primarily rely on personal motivation or commitment.												
3. Changes the person indirectly by changing the environment.												
4. Once done, stays done. No need to make the change again.												
5. If it fails to affect exercise or diet, it is no one's fault.												
6. If it fails to affect plans, no point in trying to do it again and harder.												
7. The activity is initiated by others and not me.												
8. It does not rely on a person's memory.												
9. Indirectly affects food and exercise.												
10. It is a change in a recurring life routine.												
11. Requires more than one person to bring it about.												
12. If done today, it will affect exercise and food in the future, not today.												
13. Leads to diet or exercise as part of another task.												
14. Involves a physical change.												
15. Provides resources (time, equipment, etc.) for diet and exercise.												
16. Changes whom I spend time with.												
17. Affects others who live with me.												
18. Changes what I do for fun and social gatherings.												
19. Forces one to exercise or diet.												
20. Changes a group activity.												
21. If it fails to work, it gives me new insights about what to do next.												
22. Rearranges the sequence of my daily living activities.												

STEP 3 LIST TOTAL CHECKS AND SELECT THE IDEA WITH HIGHEST VALUES.

For each idea, check which criteria are met. Then select the top two or three ideas, set a date, come up with a ritual to mark the start, and make several of the changes simultaneously.



overweight, I must be.” Well, the truth could be very different. To change successfully, you need to know whether your efforts are paying off. If they are not, you need to return to your list of solutions and choose several new ones to try. If they are, you need to convince yourself and others on your team that real improvement is happening.

True, collecting data takes time. And it certainly seems frustrating to see how little you are changing. But real change requires understanding, not attitude. Data discipline your intuitions. They help you see through your feelings and find out what is really going on. Remember what we said at the beginning: you are changing a system, not just yourself. Changing a system cannot be willed or wished. It needs the coordinated action of many people. If you are working on the system, you and others need to know that, no matter how slowly, the system is indeed changing. You are like Sherlock Holmes searching for a solution that will bring about the changes you need. Without data you have no clues.

Table 5 shows a form that is useful for gathering data on diet and exercise.

In order to analyze the data collected using the form in Table 5, you can use a run or control chart. We give detailed examples of control charts in Chapter 6. Here it may be useful to focus on the key aspects of these tools.

TABLE 5 / Exercise and Diet Data Collection Tool

DAY OF THE WEEK	DID YOU KEEP TO YOUR EXERCISE PLAN?		TOTAL MINUTES OF EXERCISE	DID YOU KEEP TO YOUR DIET PLAN?		WEIGHT IN POUNDS
	Yes	No		Yes	No	
Monday	Yes	No		Yes	No	
Tuesday	Yes	No		Yes	No	
Wednesday	Yes	No		Yes	No	
Thursday	Yes	No		Yes	No	
Friday	Yes	No		Yes	No	
Saturday	Yes	No		Yes	No	
Sunday	Yes	No		Yes	No	

Note: The table shows the set-up for one week of several weeks of data collection. If exercise is not planned for certain days, shade out the area. Weight is to be measured once a week, on the same day and under the same circumstances.

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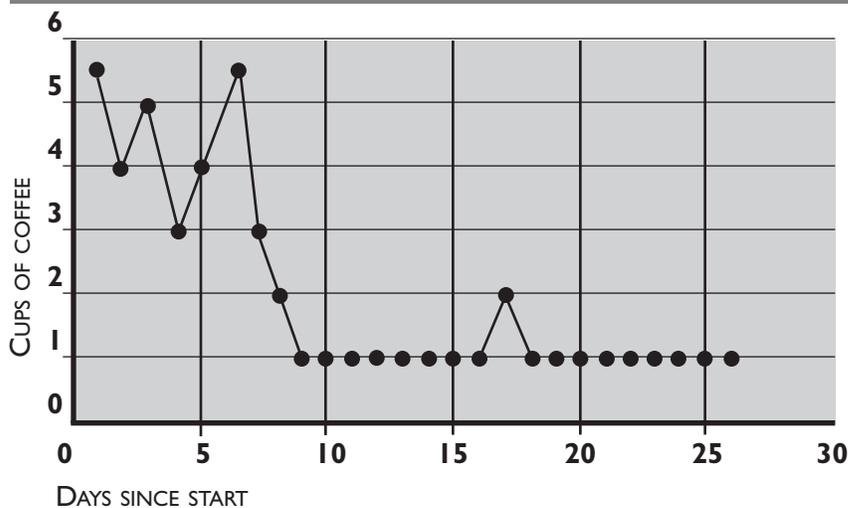
Run Charts

A run chart is a simple plot of data to provide an instant interpretation of the weight loss or exercise results. Time is plotted on the x-axis. The value measured (e.g., weight) is plotted on the y-axis. The advantage of a run chart is that it is a quick way to examine your progress. The disadvantage is that it does not help you decide whether changes are due to chance or are real. For example, Michelle decided to reduce her caffeine consumption. Her plan was to substitute coffee, tea, or cocoa with decaffeinated beverages. She stopped buying coffee and had only decaffeinated drinks at home. She prepared a run sheet to chart her progress. She recorded caffeine consumption in cups of coffee (others who want to be more precise can use milligrams). Figure 3 shows Michelle's coffee consumption over a 28-day period. After the initial week of observation, we see a marked decrease.

Control Charts

Control charts look at sources of variation in a data set and allow you to distinguish which observations are due to chance events and which ones represent real changes in your weight or exercise patterns. You calculate an upper and a lower control limit; values that fall outside these limits represent real changes. Observations that fall within these limits represent random fluctuations in weight or exercise time. You can use different types of control charts depending on whether you have continuous or discrete variables. A continuous vari-

FIGURE 3 / Michelle's Coffee Consumption

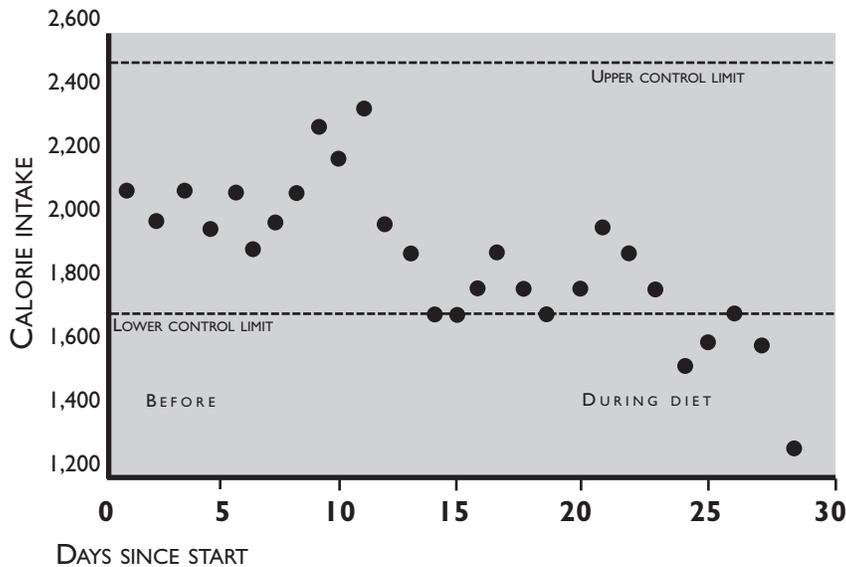


able produces numbers where the values between assigned numbers are meaningful. For a discrete variable, the values between assigned numbers are not possible. For example, exercise time and weight are continuous variables while missed exercise (yes=1, no=0) or lapse in diet (yes=1, no=0) are discrete measures.

The advantage of a control chart is that it helps detect if a process has changed (outside historical limits). It distinguishes between random variation and real improvement. The disadvantage of this type of chart is that it does not suggest the cause or how to eliminate (control) the variation. Also, control limits must be reset if the process has changed. For example, if you are charting your speed at jogging, over time your speed may change (you are getting better). If you are getting better, a reevaluation of the chart (mean, upper, and lower control limits) is necessary.

Let's look at another of Michelle's personal improvement projects. She wanted to lose weight. Her plan was to chart her caloric intake. She began by keeping track of total calories consumed on a daily basis for the first 20 days, the active period of her diet. For her control chart she calculated the limits using the formulas in Chapter 6. She used these limits to examine data for later weeks to see if she had been able to keep up with her pattern from the first three weeks. Figure 4 shows one month of data.

FIGURE 4 / Michelle's Calorie Intake over One Month



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What do the numbers in her control chart tell Michelle? If she monitors her calories by plotting them on the chart, she can determine if the drop has been large enough to depart from her pre-diet pattern. The first 10 days indicated her calorie intake before dieting. There is an immediate drop followed by a slight increase in calorie intake during the diet. The best days are after day 24, which are all lower than the lower control limit and thus indicate a departure from her pre-diet calorie intake. Obviously calorie intake fluctuates from day to day. She can use the control chart to understand if her intake is lower by more than what can be expected from random chance variations. If the point in the chart falls below the lower control limit, this pattern cannot be explained just by chance events and represents a real reduction in calorie intake. All points within the upper and lower control limits could be due to chance.

A self-help guide on how to create control charts for exercise and diet is presented in Chapter 6, "Control Charts for Diet and Exercise."

Step 6: Engage in Cycles of Improvement

The Plan-Do-Study-Act (PDSA) cycle is a method by which one or two ideas for change can be tried out on a small scale and examined for success prior to continuing with further changes. Since you need to study the success, you must continue your measurement. The PDSA also is referred to as the PDCA (Plan-Do-Check-Act) cycle. To begin a PDSA cycle, start by looking at your list of ideas for change. Select a few ideas that you really would like to try and that you believe will help you lose weight or exercise more. Develop a *Plan*: determine when you will start, what you will do, and who will be involved in bringing about the change. Write down the plan delineating clear goals. Make sure that you continue with your data collection effort. The next step is to implement the plan. At start time, engage in a small ritual to mark the new era and carry out (Do) your plans. After you have pursued the plan for a period of time, *Study* the results. Ask yourself, *What am I learning as I am doing? Do the data support my impression that change is leading to improvement? Do I need to modify the plan or make alterations?* If modifications are necessary, make them and *Act*. Also important in the "act" phase is positive action to consolidate, strengthen, and support the gains to date. This may mean celebrating your success to date.

Once done with one cycle, you start all over again (improvement is an ongoing process; it never really ends, remember?). As changes are made to the initial plan, the procedure is similar to developing a new plan and, therefore, the process continues: Plan, Do, Study, and Act once again. If the change you made has not led to improvement, go back and try out another one of the solutions. Keep doing this until you hit on the solution that works for you. Be patient as lasting change will not come immediately.

Step 7: Tell Your Story

Even though we talk of creating a storyboard last, it really is a step that you should do throughout your effort to change your weight and exercise frequency. At the very beginning, when you and your team have decided on what you want to accomplish, you should post a storyboard in a place that you can all see.

You may ask, “Why should I tell the story of my change to myself and my friends? Obviously, we all know what is going on. We do not need to read it on a piece of paper.” The funny thing is that people do not know themselves. They forget how they felt when they started on a path of change. Circumstances change and a decision a month earlier to work on something may be forgotten. You and your team may lose attention and interest. An unfolding storyboard keeps you focused on the change at hand.

How to Construct a Storyboard

A storyboard is a communication vehicle to display your project to the public. It generally presents information in a standardized format facilitating understanding. There is no one “right” format, but typically the following information should be displayed:

- Your name and your team members’ names
- Your objective
- A description of your PDSA cycles
- What is measured and the data to date
- Results (Was the change an improvement?)
- Next steps

Listed below are additional guidelines on how to construct a storyboard; you may use Microsoft PowerPoint slide templates or pieces of paper.

Slide 1

<p style="text-align: center;">Project Title</p> <p style="text-align: center;">Your name (and, if you like, the names of your team members)</p>

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Publicly post your first slide when you start. This will remind others that the project has started. It also facilitates the future implementation of suggestions.

Slide 2

Statement of the Problem

- Define the problem
- How do you know this is a problem?
- Provide benchmark data
 - Be brief
 - Describe only one problem
 - Identify how improvement will be measured

Define your problem without suggesting a solution or blaming others.

Slide 3

Lifestyle

- Describe the routines that contribute to your diet and exercise
- Show cycles among the routines

When you post the team's flowchart or list of daily routines, you create a consensus regarding how things happen around your house.

Slide 4

Ideas for Systemic Change

- What changes did you consider?
- Do these rely on systemic change or increased personal effort?

Having a list of ideas posted reassures team members that their contributions are not lost or ignored. It enables you to go back and select new ideas as you engage in new PDSA cycles.

Slide 5

Pilot Study

- What was the intervention?
- Who was involved?
- Who collected the data?
- How were the data analyzed?

Posting the PDSA cycle marks the start of your intervention.

Slide 6

Did It Work?

- Has change led to improvements?
- Display control charts that are most appropriate for your data

Posting the control chart helps everyone get insights into progress to date. Do not wait until you have all the data you need. Start posting the chart as you go along.

Slide 7

Lessons Learned

- What did you learn from doing this project?
- What is next?

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Whether you succeed or fail in your improvement efforts, it is important to post your results to the storyboard and to celebrate the fact that you are still at it. When you celebrate your success, when you tell others (and yourself) what you have accomplished, you become more committed. You are less likely to relapse into old habits. If you do, you have data and information that can help you understand what has changed. You can more effectively engage in problem solving when you can see the data over time and get insights into your own behavior.

Conclusions

In 1993, Roberts and Sergesketter suggested that personal improvements could follow the same principles as workplace process improvement. The techniques first proposed by them and further detailed here provide additional strategies for achieving desirable behavior. The addition of the basic tenets of process improvement—identifying specific measurable processes that are important, mapping the existing processes, counting and keeping track of data about the process, designing and implementing short systemic changes, evaluating success, and making provisions for holding the gains—enlarges the repertory of methods available for personal improvement.

As an individual with minimal free time, you may naturally ask, “What is in it for me? Why should I try this new approach?” There are two benefits. First, you are more likely to accomplish your resolution. Second, the benefits you gain will last as your accomplishments do not depend on your motivation—which may waver at any point in time.

If you are interested in the “big” picture, the experience and the tools described here will also provide you with a new way of thinking. You can apply this now to eating and exercising habits, but you could just as easily apply it later to other areas of your life. This translates into a variety of improvements such as more free time, better health, a better work environment, improved student or patient or client satisfaction, or improved workflow.

Many readers will wonder how long it will take before they can expect a significant improvement. The bottom line is that improvement is an ongoing process; it never really ends. The good news is that by working in small cycles, we ensure that gains or improvements are long term and the likelihood of failure is minimized. Keep in mind that while trying something, you also are learning from doing. Positive results generate additional improvement projects, typically on a larger scale, by applying the same principles and tools to larger issues. Before you know it you will have several improvement projects running simultaneously.

Does Process Improvement Work?

CHAPTER

2

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DUNCAN NEUHAUSER
LINDA NORMAN

Critics of self-help books, e.g., Polivy and Herman (2002), point out that these books exaggerate the “ease, speed, likely degree of change, and presumed benefits” of improvement efforts. We have designed a method of personal improvement that we claim helps participants stay with their resolutions. The idea is that by examining one’s life as a system of interrelated habits one could set out to make environmental changes that promote one’s resolutions. Here we report the experience of a large number of students with our proposed approach and provide preliminary data in support of our claims.

To help people make systemic changes in their lives we suggested the following seven steps:

1. Make a resolution that is realistic and that you care about.
2. Put together a team of “process owners,” people who live with you and who help you carry out daily living activities.
3. Together describe life processes and ecological factors that affect your habits.
4. As a team, list possible environmental changes and simultaneously make several changes.
5. Monitor progress.
6. Engage in cycles of improvement: Plan, do, check, and act—repeat.
7. Publicly post your story so that all team members have access to your progress.

People who follow these steps, i.e., people who seek ecological and systemic solutions to their habits, are more likely to achieve their resolutions. From this perspective willpower is not a characteristic of the person but a feature of the environment. When the individual modifies his environment, he

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changes his ability to stay the course and succeed—he engineers his own willpower. Of course, willpower is elusive. Eventually it wavers and people sometimes fail to achieve their resolutions. We claim that people who follow our advice are more likely to stay the course. This chapter provides the data for our claims.

The central idea behind our proposed method is that one can change the environment to accomplish personal goals. For example, a person can reduce the room temperature to increase energy consumption. Another person may join a car pool in order to make it home in time to cook. Still another person may commute to work by bicycle. Yet another person may raise his work desk and work standing up. A large number of studies support the role of one's environment in habit formation. Most of these studies focus on maintaining recovery from drug abuse.

No one can guarantee success. Some people follow our advice and still do not accomplish their goals. Others readily succeed, even when they are not following our advice. The empirical question is whether our advice improves the likelihood of success. It is a game of chance and the question is whether the probability of success is improved when people follow our advice. The answer to this empirical question is not simple. Some people do not follow our advice even when exposed to its logic. For example, we asked participants to modify their environment but they may have misunderstood us; or even when they understood us they may have been unable or unwilling to do so. The very definition of success is murky. Some people will consider modest weight loss a success, others, or the same person at a different time, will consider such weight loss inadequate. We asked participants to set their own goals and define what they consider to be success. Obviously the probability of these individuals' success depended on how difficult their goals were and how long they had to achieve it. Short and long follow-up periods affect the probability of success.

Methods

Nearly 300 graduate students at George Mason University, Vanderbilt University, Lehman College and Case Western Reserve University made a resolution and followed our recommended steps to accomplish it. Among these, 73 students at George Mason University were asked to provide more details about their experiences. The students at George Mason University came from diverse backgrounds including nursing, nutrition, and health system management. The students were told that their grade would not depend on their success or failure. All students who were asked participated in the studies.

We began collecting data from December 2001 to May 2005. During this time the instructors as well as the content of what was taught changed. Later classes put a bigger emphasis on systemic changes as opposed to increased motivation or effort. Later classes also put more emphasis on the use of control charts to test if apparent improvements could be due to random chance variations.

It is natural for any intervention delivered over several years and several sites to have differences in emphasis. The changes in the intervention make

TABLE 1 / The Evolution of the Intervention over Time		
	EARLY INTERVENTIONS	LATER INTERVENTIONS
Workbook	Provided a workbook about quality improvement tools	Provided an online workbook about quality improvement tools plus other Web resources
Population	Mostly at Vanderbilt and Case Western Reserve Universities	Mostly at George Mason University
Grading	Did not depend on success	Did not depend on success
Self-selection	All students asked to participate	All students asked to participate
Improvement team	Mostly individual effort	A bigger emphasis put on engaging process owners (people who shared the same environment)
Storyboard	Reported to the class	A bigger emphasis put on reporting to process owners
System change	Mostly relied on increased motivation and effort	System change was better defined and a bigger emphasis was put on it
Statistical analysis	Few analyzed data using control charts	Control charts were better defined and given bigger emphasis
Exit interviews	On paper	On the Web

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the interpretation of the findings difficult. At the same time, these changes provide preliminary data on the impact of intervention components.

Participating students had 5.29 years of education post-high school graduation (number of respondents= 69, standard deviation=4.18), which is significantly higher than the general population average.

We followed the students for 8 to 15 weeks and asked them to complete a private self-evaluation regarding what their resolution was, whether they succeeded, and whether they had data supporting their claim of success. All were required to hand in a storyboard containing their personal goals, their analysis of their lifestyle, and their evidence that changes they had introduced had led to improvement.

Results

What Did the Participants Do?

Of the 73 participants, all reported their resolution. Among these, 30.14% (n=22) had resolved to reduce their weight or change their diet, 49.32% (n=36) had resolved to exercise and become more active, and 27.4% (n=20) had made other resolutions (e.g., improving their time management or reducing stress in their lives.).

Not all of the 73 participants kept up with our recommendations. Given the variety of instructors involved, the diversity of the participants' backgrounds and resolutions, and changes in the nature of the intervention, it is not surprising that participants followed some but not all of the advice given:

- We recommended that the participants make a resolution on a topic that was important to them so that they could sustain their effort over time. Out of 73 participants, 3 were not asked, did not answer, or were not sure of their response about the importance of their resolution. Among responders, 92.75% reported that they had chosen a personal improvement goal that was important or very important to them. The rest, 7.25%, reported that they made a resolution about a topic that was somewhat or not at all important to them.
- We recommended to the participants that they display their progress publicly and share it with their improvement team. Our expectation was that such displays would remind the participant to remain on task. We asked the participants whether they publicly displayed their storyboard. Of the 73 participants, 2 were not asked the question. Among respon-

ders, 42.25% created a storyboard only at the end of their effort and therefore did not benefit from a public display of the storyboard throughout their effort. Among responders, 53.52% followed our recommendation and displayed their story publicly throughout their effort.

- The participants were asked to collect data and report how many data points were collected. Of the 73 participants, 4 were not asked the question, did not answer, or were not sure of their response. Among responders, 26.18% collected between 1 and 5 data points, 5.88% collected 6 to 10 data points, 16.18% collected 11 to 20 data points, and 61.76% collected more than 20 data points. The participants were asked to analyze the data they had collected using control charts. (Control charts help distinguish between random variations and real improvements—see Chapter 6 for details.) Among responders, 60 analyzed their data using a control chart, 2 made scatter plots, 11 made a histogram of their data.
- We encouraged the participants to make systemic changes in their lives and rely less on their own motivation. We asked them whether they had relied on their motivation or on changes in their environment. Out of 73 participants, 65.15% followed our advice. The remaining group, nearly 1/3 of participants, did not follow our advice and relied on their motivation to stay the course and achieve their objectives.
- We encouraged the participants to engage other process owners (people living with them or who share an environment with them) in the effort. Most participants were familiar with going through a resolution with someone else with similar objectives. Our advice was to move away from getting help from a buddy or friend to getting help from people who live with the participant and share their environment. Out of 73 participants, 3 were not asked, did not answer, or were not sure of their response. Among the responders, 65.22% engaged process owners, 30.43% asked for no one's help, and 4.35% joined with another buddy with a similar resolution.
- We encouraged the participants to study their lifestyle using flowcharts and lists. Out of 73 participants, 44 made a flowchart of their lives, 52 made a list of factors that contributed to their habit, and 17 made a Fish Diagram (a visual display of a stratified list of causes).

In the real world, advice on self-improvement is given but not always followed. It is important to evaluate whether the participants were able to succeed even though they did not follow all of the advice given.

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Did It Work?

Of the 73 participants, 70 were asked how often they had been unsuccessful in changing their habit. In the past, respondents had tried 3.03 times (Standard deviation = 3.53) but failed to accomplish their resolution. Against this backdrop of repeated failure, success would come as a surprise. Nevertheless, using the new method, participants reported high success rates.

89.86% made a measured improvement.
Among these 69.57% made a measured and significant improvement.

We asked the 73 participants if they had made an improvement in their lives and accomplished their resolution. Three did not answer or were not sure. Among the responders, 5.8% said that they had not measured their outcomes; 4.35% reported that they had not seen any improvement yet, 20.29% reported that they had made an improvement but either it was insignificant or they did not check for its statistical significance, and 69.57% reported that they had made a measured and statistically significant improvement in their lives.

We asked the 73 participants if the advice we had given to them was helpful. Three were not asked, did not answer, or were not sure. Among the responders, 91.3% said it was helpful (with some saying it had helped "a lot"), the remainder (7.25%) said it was only somewhat helpful or not helpful at all.

We also assessed our participants' intent to continue with the improvement effort past the 15-week study period. Of the 73 participants, 5 did not answer the question, were not asked the question, or were not sure about their response. Among the responders, 98.57% planned to continue with their efforts.

One of the central themes in our proposed approach is that resolutions are more likely to be accomplished if one brings about changes in the environment as opposed to simply relying on motivation. To address this question in more detail, we asked the participants to describe the nature of the change they had undertaken. Our hypothesis was that success would turn out to be more likely among people who had made environmental changes. Table 2 shows the relationship between the nature of the intervention and success rates.

Data in Table 2 can be used to calculate the likelihood of success for different types of interventions. For example, the likelihood ratio of success for environmental intervention was measured by dividing the proportion of environmental interventions in successful cases by the proportion of environmental interventions among failed resolutions. A likelihood ratio higher than one shows that participants were more likely to succeed than fail; a ratio less than one shows the reverse. Analysis of the data in Table 2 shows that the

TABLE 2 / Nature of Change and Chances of Success

NATURE OF THE CHANGE	MEASURED AND RECORDED SIGNIFICANT IMPROVEMENT	NOT MEASURED OR NO SIGNIFICANT IMPROVEMENT	TOTAL
Change in the environment of the person	33	10	43
Change in the motivation or commitment of the person	13	10	23
Total	46	20	66

participants who made environmental changes had a likelihood ratio of 1.43; they increased their odds of success by a factor of 1.41. In contrast, the participants who relied on their own motivation changed their odds of success by a factor of 0.57. Thus changing the environment increased the odds of success 2.51 times as much as relying on one’s motivation. These data support our claim of the importance of ecological change in bringing about significant improvements.

Discussion

The data we have presented have a number of limitations. First, they were collected from graduate students, whose experiences and skills may not generalize to the larger population. On the other hand, the selection of graduate students to test our ideas may be reasonable because we do not recommend our approach to everyone. To successfully implement this approach, the participants need skills in problem solving, data collection, and data analysis. Therefore, our approach is recommended to groups in the population that are comparable in skills and training to the participating students.

The study is also limited because there was no control group and no random assignment. Students who analyzed their data using control charts acted as their own controls. But not all students used control charts and therefore lack of randomization and controls could lead to a number of problems. The

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observed changes in behavior may be due to self-selection. For example, students more likely to change their behavior may have joined the classes (even though the class was a required course). The observed improvements may be due to other causes besides our advice. For example, during the course of the study years, the media's focus and emphasis on dieting and exercise grew steadily. Despite these study limitations, the fact that the course was taught in three different locations and over several years by different instructors—in other words, environmental variation—reduces the probability that our findings are an artifact of changes in the environment. Furthermore, keep in mind that these participants were repeatedly making resolutions and failing before they started the course. Their success in achieving their resolutions is more meaningful when compared to their earlier failures.

The study is also limited because it is based on data collected by participants. It is possible for individuals to alter their data in order to look good to their colleagues and even to themselves. We tried to reduce this possibility by asking respondents to measure their success or failure against an objective criterion. We also clearly emphasized that the student's grade did not depend on success. Furthermore, we tried to reduce the possibility of reading too much into small improvements by asking the participants to test whether the improvement they had observed was statistically significant.

Despite the limitations, the study established several facts. First, the participants did not follow all advice given. People are not automatons. They take the advice given and adapt it to their circumstance. Second, despite variations in how the advice was adopted, the participants reported high success rates. Furthermore, success rates were higher for those participants who did follow our advice of relying on environmental changes.

Further research is needed to confirm our preliminary findings. In particular, research should be based on random assignment of study participants to intervention and control groups. The study should more rigorously control for the individual characteristics of participants and it should go beyond participants' reporting of data. Finally, our data do not compare the performance of our recommended actions to that of other methods of behavior change. Therefore additional comparative data are needed. Until then, the data we have presented suggest that the proposed approach works well and helps increase the odds of success.

System Thinking in a Personal Context

CHAPTER

3

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NANCY TINSLEY

Earlier in this book we suggested that weight loss and increased exercise can be accomplished by making systemwide changes and de-emphasizing personal exhortations. Little is known, however, about what is meant by systemwide change, especially in the context of *personal* change. We tackle this problem here. The chapter lays out ways to distinguish systemic change from personal effort, and provides a case study and numerous other examples to clarify the task of bringing about systemic changes in one's lifestyle.

We and others have used the terms “system thinking,” “system change,” “ecological change,” “environmental change,” “lifestyle changes,” and “structural changes” interchangeably. These words are used often and without a precise definition. Naturally, the first step is to define these terms and to distinguish the changes they describe from change through increased personal motivation, increased effort, and more commitment. We define system thinking—and all related words—as the process of accounting for the influence of various people, circumstances, and historical choices on the behavior we wish to modify. System thinking is the process of understanding how people and circumstances are linked.

Many people have heard that they should change their lifestyle but are not clear about what this means or how the change is to be accomplished. We believe that everyone's life is organized as a system of interrelated events,

We acknowledge the assistance of Mary Fittipaldi, who helped us sharpen the arguments in this chapter. A portion of this chapter is based on F. Alemi, L. Pawloski, and W. F. Fallon, Jr., 2003, “System Thinking in a Personal Context to Improve Eating Behaviors,” *Journal of Healthcare Quality* 25(2) (Mar.-Apr.): 20–25.

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“An ecological approach regards obesity as a normal response to an abnormal environment.”
(Johnson 1990)

people, and influences. Making a system change is the same as creating a new lifestyle—these are different words for the same idea.

System thinking helps to see how earlier choices may limit later options. Individuals are affected more by their own choices than by others. If a person decides to live far away from work and commute, he or she may not be able to exercise as much as he or she wants. Thus one can see that the earlier decision of where one chooses to live or work can affect one's exercise patterns.

A key component of system thinking is the recognition of the environment's lasting and silent role in behavior. Every person is affected by his or her environment. Even people who live alone are connected to their environment—and through the environment to other people. Take for example an asthmatic who lives by himself. He may be alone but others still influence his behavior: pollution in the air affects his breathing, which affects his ability to exercise, which affects his metabolism and his food intake. In the end, the very air around him connects him to others and opens him to persistent influences. In our view there is no exception to this rule. All people are linked to their environment and to others. No one is isolated.

In this book, we use the concept of system thinking in a personal context. The words personal and system, at first glance, seem contradictory: *personal* focuses on the individual, while *system* implies a world of interacting events beyond the individual's realm of control. Juxtaposing these words helps us emphasize that humans live in a complex mesh of activities. Each activity is affected by the individual's decisions—and likewise the environment, the system around us, triggers changes in our behavior. It is personal in the sense that it is a unique set of circumstances that we live in and it is a system because it involves others and many factors beyond a person's control.

Perhaps the best way to define system thinking is to describe what it is not. We asked a colleague to describe how she loses weight. She gave a description provided in Table 1. If you examine her advice, you see very common themes. You see repeated slogans urging the individual to remain committed. It is as though the individual has to compel and pressure himself/herself to keep up with a diet or regimen. The vocabulary is one of controlling urges and restricting behaviors. In the end, the person is fighting himself or herself. The enemy is within. The focus is to tame one's desire. System thinking is different. System thinking is about changing the environment and then letting the new world you have created guide you. When the environment is reorganized, weight loss is not about resisting but accepting and fitting in.

TABLE 1 / **System Thinking Is Not Built on Following Slogans****EXAMPLES OF ADVICE BASED ON INCREASED COMMITMENT:**

- Face the facts; you have been fooling yourself
- Give up the pleasure you receive from eating, in return for better health
- Accept that losing weight will be a good thing
- Set firm limits on areas such as sweets
- Stop making excuses
- Delay satisfying your urge to eat
- Make sure you are hungry and not just tired, thirsty, nervous, stressed, or upset
- Slow down your eating, you will eat less
- Positive feedback from yourself or others will keep you on track
- Close your eyes and eliminate sensory stimulation, it can help you focus your thoughts on what you need to do

Current Approaches Are Not Working

In the United States, billions of dollars are spent each year by individuals trying to lose weight. Yet approximately one in three adults is obese, and overweight and obesity rates are rising. Few solutions appear to have an effect on the spread of obesity. Most medications and surgical procedures are not effective, unless a person adheres to a nutritious diet and incorporates an exercise program in conjunction with these therapies. Diet and exercise regimens are not working as many people cannot keep up with their own resolutions. And while many Americans are careful about reading food labels and purchasing foods that are low in fat and calories, they are still getting fatter.

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Most of us know what we are doing wrong. We know that large portion sizes are not healthy, we know that snacking often is not good for us; we know that drinking too many sweetened sodas is not reasonable. We know this and more. We know that we do not exercise enough. Though we are aware of the problem, we are unable to solve it. The advice to people who want to lose weight, as noted in this book's Introduction, is straightforward: eat less and exercise more. The controversy arises concerning *how* to follow this advice. What we do not know is how to keep at it. The real issue is how to lose weight and keep it off, since many individuals lose weight temporarily, only to gain it later.

System thinking might be a solution to a problem that we have not been able to solve for decades.

Beyond the Precede-Proceed Approach

Applying system thinking to personal issues is not a new idea. In 1990, Green and Kreuter suggested one of the earliest methods to come out of system thinking principles. They called their approach the Precede-Proceed model, emphasizing that people should look at what precedes a behavior and what follows to understand the barriers and reinforcements. Their approach focuses personal improvements on three key areas:

- *Predisposing factors.* These include knowledge, attitudes, beliefs, and sense of self-efficacy.
- *Enabling factors.* These are infrastructure factors such as equipment, reminders, availability of time, and so on.
- *Reinforcing factors.* Examples include positive comments from friends, data on weight loss, rewards, helping others, and incentives.

Clinicians and public health professionals use the precede-proceed approach to understand behavior. We advocate a method of system thinking that goes beyond the work of these investigators.

Description of Case Study

To exemplify how system thinking can be used in a personal setting, we will use a recent case in which a physician taking a course at George Mason University was able to reduce his junk food consumption by joining a car pool. How could joining a car pool affect one's diet? On the surface, the two seem unrelated. But an analysis of this person's life established a relationship between these two events. He was able to see that his junk food habit was

affected by various work and home habits. Working late, for example, was interfering with his ability to find the time to cook, which led to a counter-productive cycle. Armed with this kind of knowledge, our student was able to break the cycle and reduce his junk food intake. Joining a car pool, since it had a fixed schedule, forced him to leave work on time. We will use his case to demonstrate how system thinking can bring new insight to people who want to go on diet or exercise regimens.

The student in our case study used the steps that we proposed in the workbook (Chapter 1). He selected a team of process owners, set goals that would benefit the entire team, described his personal system of life, polled the team for a list of ideas (making sure these would address the system, not one's own activities), decided to undertake a change, monitored the change by gathering data, and continued to tinker with the system as necessary, all the while keeping his story and progress out there for the team to follow and comment on.

Principle I: Look to the Environment

System thinking starts when a person looks beyond his or her motivation and examines the environment. By environment we mean people and machines and buildings and weather and whatever other factors that might affect diet or exercise. Most people who decide to diet and exercise emphasize their motivation. They come up with resolutions such as the following: *I am going to eat less. I am going to count calories. I will follow my diet. I will exercise more.* A person can say he or she will do something, and will mean it, yet will not be able to do so. An individual can beat himself into frenzy over a resolution, but unless a positive environment is created it would be hard to keep the promise over time.

A more sustainable approach is to change the environment and search for system solutions—not personal exhortations. When a person emphasizes motivation and willpower he is not examining how the world affects him. Certainly motivation matters, but what makes it remain a constant force and what brings about willpower is the environment. Creating a positive environment can lead to success even if a person is not fully motivated. This type of environment ensures that a person retains healthy habits. In contrast, a poor environment can eventually lead to failure, no matter how hard a person tries. To really succeed, in a way that is sustainable, there needs to be a change in the system. System thinking starts when one seeks solutions and causes in the environment—not in one's commitment or motivation.

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Obviously, to change the environment you need to be motivated. But this is a different kind of motivation. When you are dieting by relying on your own motivation, you need to constantly tell yourself what you want; you need to be vigilant and committed because every slip-up matters. When you change the environment, you are still working on your motivation but indirectly. Now the motivation emerges because of the new environment; even if you are not vigilant, it still influences you. So you do not need to remain terribly motivated, the world around you takes care of that.

Principle 2: Focus on the Cycles among Routines

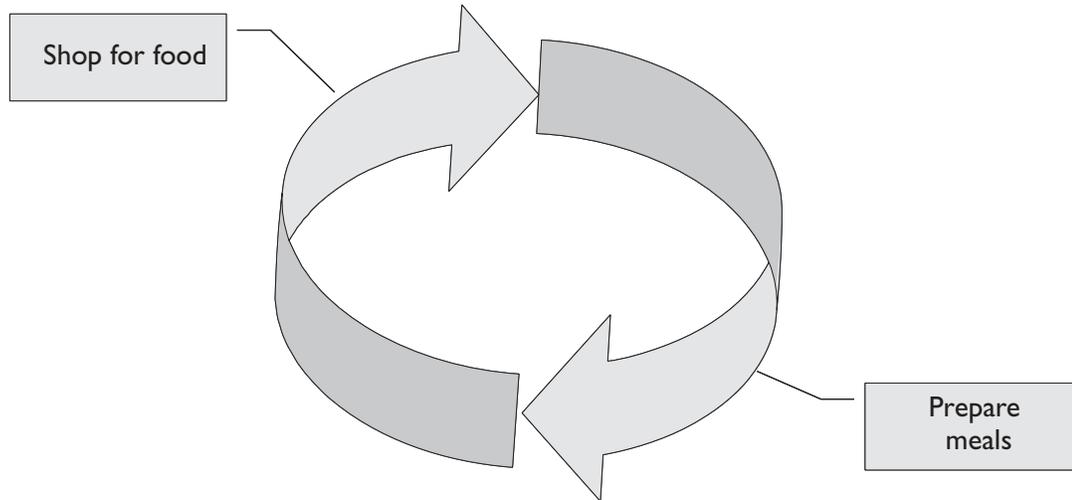
The previous principle emphasized that a system is a wide open concept and entails everything in the environment. But it is not reasonable to try to conceptualize everything, and no one can do so without heroic effort. To say that everything affects a person's diet is not effective analysis—it's paralysis. We need to simplify system thinking, make it more practical. One way to do so is to focus on recurring routines and events in the environment—not just bad habits but also all life routines.

While systems are expansive, one identifiable aspect of a system is that it is an organized structure with recurring characteristics—it is not a random heap of events. Recurring events are the “steady state” of the system. A daily routine can articulate the organizing principles of an individual's life. By listing these routines, a person can see the steady state for his or her system of life. The process reveals the direction in which he or she is heading (and will continue to do so, if no new influences are introduced).

Most people sleep and wake up according to a routine schedule. Even end-of-week socialization and partying follow certain routines. Many events happen periodically—some daily, others weekly, still others with longer periods. A key principle in system thinking is to focus on these periodic events. It is not that non-routine events do not matter—they do. But their effects are unlikely to assist in making permanent changes. One way to examine a person's daily routine activities is to make a list of periodic events. Table 1 in Chapter 5 shows one such list.

Once routines have been listed, it is important to examine cycles among them. Systems naturally return to their steady state. When lifestyles are examined, it is important to find these steady states and understand how they occur. Life routines are interrelated. For example, what you eat is related to what you shop for and vice versa (see Figure 1). These linked routines are called cycles and provide the building block of lifestyles. We can change our

FIGURE 1 / Shopping and Meal Preparation Are Related



lives by changing the cycles among repeating events. Cycles create inertia and resistance to change in the sense that if one element in the cycle is changed, the rest resist the change and encourage a return to old habits. So if you change your food habit but not your shopping habit, the relationship between these two routines encourages relapse: old shopping patterns encourage a return to old eating habits. In this sense there is a conspiracy among life routines. They all work together to defeat our efforts to change our lifestyle. Understanding where life cycles are occurring is one of the first steps in understanding system change.

Cycles among the routines are not always apparent. Some are complex and involve several routines. Figure 2 shows the cycle for the case study in this chapter involving work, sleep, and eating routines.

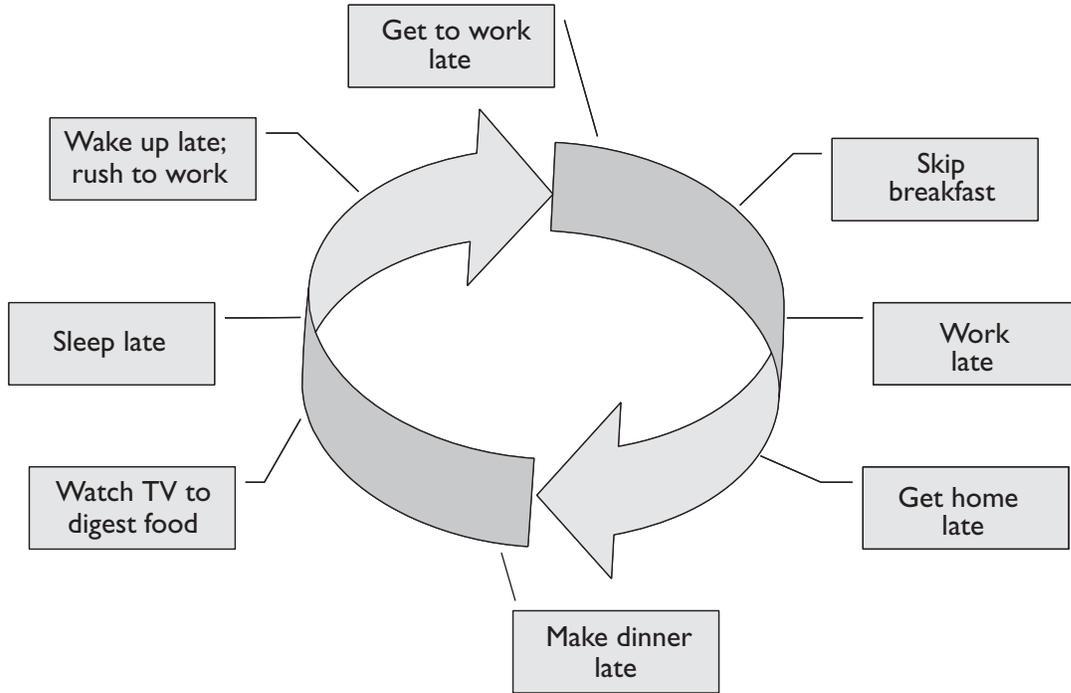
In the Figure 2 example, the cycle is self-perpetuating. Changes in any element of the cycle will be resisted by others. But if somehow the cycle is broken, as when the person joins a carpool, the routines break free from the constraints and can be more easily adjusted.

Principle 3: Examine Causes and Effects

System thinking requires us to examine the influence of recurring habits on diet and exercise. This is done by parsing diet and exercise into various small-

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FIGURE 2 / A Cycle Connecting Work, Sleep, and Diet Routines



er activities and finding a link between daily routines and these smaller components. In order to exercise, a person must have the ability to exercise and the potential to be healthy, he or she must want to do so, he or she must have the time to do so—and there is often a need to have specific exercise clothes and equipment. There are many factors to consider when trying to eat a healthy diet. For example, one needs access to healthy foods at the right time. To avoid high-fat, high-calorie meals, which are available at most fast food joints, a person needs time to prepare his or her meal at home. Finally it is important that individuals eat with friends and family in a setting that is hospitable (rather than alone, parked in front of the television).

To understand how daily routines affect behavior, we recommend making a list of what is necessary for exercise or diet. Once the list is complete, it is important to go through each routine and see how it affects the items on the list. Some routines create barriers. For example, working late reduces the time available for exercise or meal preparation. Other routines, such as going to vacation on the beach, may encourage diet and exercise. By sorting out how routines affect exercise and diet, an individual can understand what he or she needs to do to change his or her environment.

One commonly used method for understanding the relationship among various events is to create flow diagrams of causes and effects (this tool is further discussed in Chapter 5). Figure 3 shows a flow diagram of our student's daily life routines. The diagram depicts the way the student in our case study perceived how his junk food habit was affected by various work and home habits.

Note that the late departure from work is related to late dinner, which is related to failing to fall asleep, which is related to waking up late and getting to work late, which is related to missing breakfast and eating junk food to compensate, which is related to missing lunch, which leads to leaving work late. A vicious cycle is created. The flow diagram relates the junk food habit to awakening times, work habits, television-watching habits, and a number of other activities. It helps relay how daily routines are affecting this person's diet.

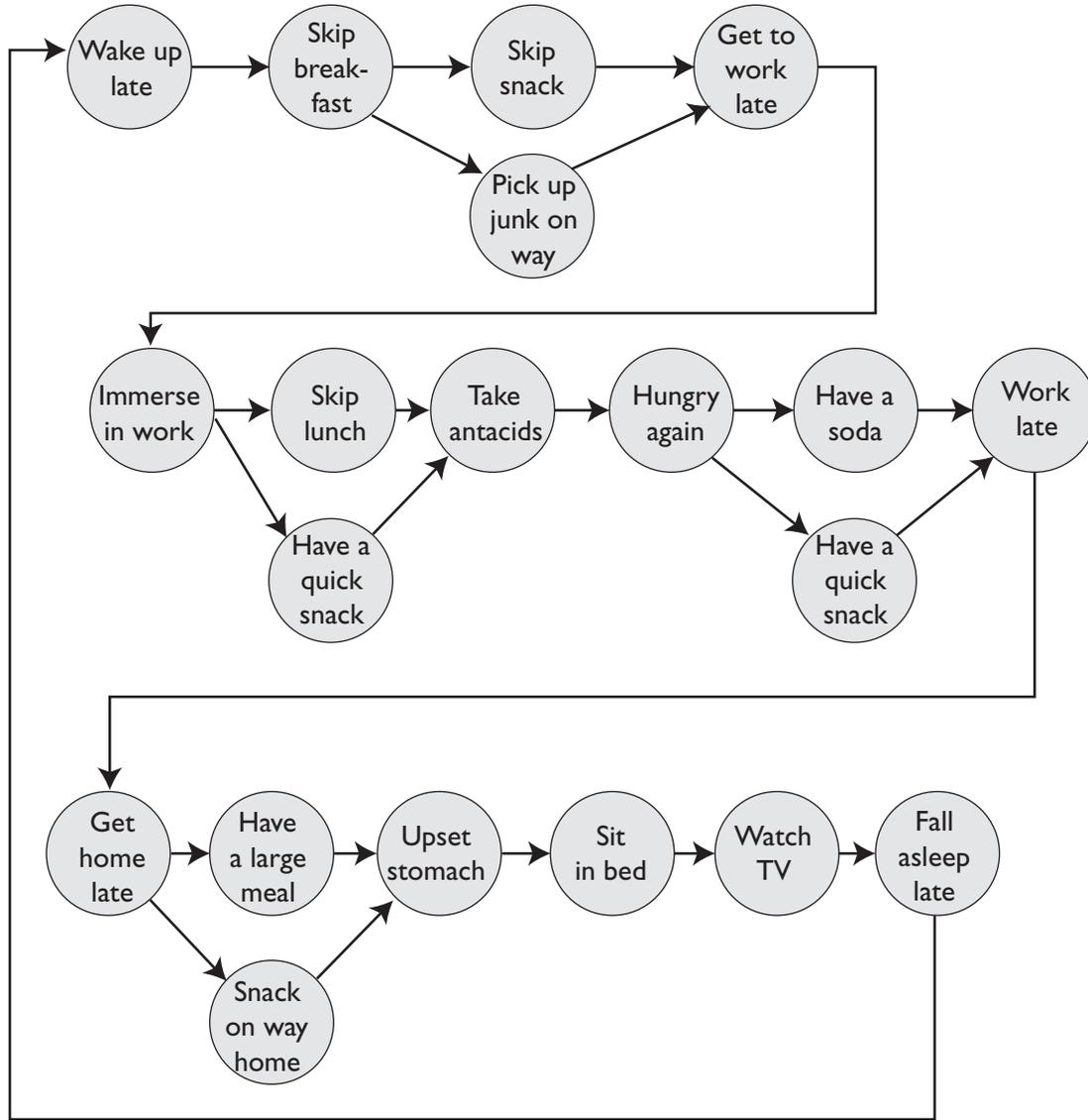
Principle 4: Change Routines

Any systemwide solution to diet and exercise problems involves changes in daily life routines. But not all changes are systemic readjustments. A systemic change can be distinguished from personal solutions in four ways:

1. A system solution affects many others besides the individual. For example, if the system solution is to shop better, it affects everyone at home and not just the person dieting.
2. A system solution often affects one's behavior through a chain of events—some of which are not immediately obvious to an outside observer. A system solution requires the individual to repeatedly ask, "Why is that so?" For example, one may ask why he eats too much. The answer may be because he takes comfort from food. Then he might ask why he is comforted by food and determine that the reason is fatigue. Asking about why he is tired will help the individual see a chain of actions and reactions that ultimately lead to weight gain. Thus, a system solution often involves a chain of events; a personal solution does not.
3. A system solution can be distinguished from personal solutions by who initiates the action. A system solution tends to force the activity on the person and does not rely on the individual's initiative.
4. A system solution often requires a one-time change as opposed to an ongoing effort. Considerable effort goes into changing a system and

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FIGURE 3 / Flow Diagram for the Case Study



finding a new equilibrium for the system, but once changed, the system continues to influence the individual. Often, no new effort is needed.

Table 2 shows examples of solutions that are increasingly more system-oriented.

In the case study, working late was interfering with finding the time to cook. The solution chosen was to leave work earlier. But this was easier said than done. Sure, our student could resolve to leave work earlier, but sooner or later work pressure would take over and he would begin to leave late again. In the next step, we will see how he built leaving work into his routines so that it would occur without his initiative.

People who want to apply system thinking should examine the solutions they are promoting to see if they are based on personal effort or systemic changes. The above criteria can help distinguish between the two. In Chapter 1, we provided a questionnaire that could be used to assess the extent to which a change is based on a system solution as opposed to personal effort. This questionnaire is shown in Table 3.

Solutions that require more commitment and do not involve changes in the environment are not systemwide solutions; they are solutions that rely on increased personal effort and motivation. The purpose of system thinking is to come up with systemwide solutions. System solutions break the cycle of interdependent routines. One way to do this is to analyze routines and embed parts of exercise and diet activities into existing routines. Specifically, the goal is to embed a component of a new habit into an existing routine so it occurs without much effort. The new habit will recur because the routine itself will recur. For example, take the case of a computer programmer who

TABLE 2 / Solutions Ranging from Personal to System Oriented					
MORE PERSONAL		←—————→			MORE SYSTEM-ORIENTED
I will exercise more	I will prepay my club fees ahead of time	I will make a standing appointment in my calendar to run with a co-worker	I will buy the equipment and arrange for the shower so that I can bicycle to work	I will sell my car and have no choice but to bicycle to work	

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TABLE 3 / Evaluating Possible Changes

STEP 1 COLLECT IDEAS ON HOW TO CHANGE YOUR ENVIRONMENT AND LIST THEM BELOW.

IDEA FOR CHANGE	IDEA FOR CHANGE
A Lower room temperature	G Eat less
B Shop better	H Get a dog
C Join a car pool to get home early to cook	I
D Store exercise clothes in car after wash	J
E Move coffee machine to exercise room	K
F Subscribe to automated healthy food shipments	L

STEP 2 CHECK ANY RESPONSE THAT APPLIES TO THE IDEA.

	A	B	C	D	E	F	G	H	I	J	K	L
1. Focuses on events that happen prior to eating or exercising.	+	+	+	+	+	+		+				
2. Does not primarily rely on personal motivation or commitment.	+		+		+	+						
3. Changes the person indirectly by changing the environment.	+	+	+	+	+	+		+				
4. Once done, stays done. No need to make the change again.	+		+		+	+		+				
5. If it fails to affect exercise or diet, it is no one's fault.	+		+		+	+		+				
6. If it fails to affect plans, no point in trying to do it again and harder.	+		+		+							
7. The activity is initiated by others and not me.		+	+	+	+	+	+	+				
8. It does not rely on a person's memory.	+		+		+	+						
9. Indirectly affects food and exercise.	+	+	+	+	+	+		+				
10. It is a change in a recurring life routine.	+	+	+	+	+	+		+				
11. Requires more than one person to bring it about.	+	+	+									
12. If done today, it will affect exercise and food in the future, not today.	+	+	+	+		+						
13. Leads to diet or exercise as part of another task.	+	+	+	+	+	+						
14. Involves a physical change.	+		+	+	+							
15. Provides resources (time, equipment, etc.) for diet and exercise.			+			+						
16. Changes whom I spend time with.			+									
17. Affects others who live with me.	+	+	+		+	+						
18. Changes what I do for fun and social gatherings.			+									
19. Forces one to exercise or diet.	+	+	+			+						
20. Changes a group activity.	+	+	+		+	+						
21. If it fails to work, it gives me new insights about what to do next.	+	+						+				
22. Rearranges the sequence of my daily living activities.	+	+	+	+	+	+						
STEP 3 LIST TOTAL CHECKS AND SELECT THE IDEA WITH HIGHEST VALUES.	18	13	21	9	15	16	2	7				

must sit for hours in front of a computer. He may resent the sedentary nature of his work. To solve the problem he can create a standing table so that he no longer must sit for hours. He can do most of his work standing and occasionally sit down to relax. In this fashion, the ergonomics of his work changes so that he is less deskbound. By making a physical change in his environment he is able to lead a more active life. This increase in activity is built into his daily work and is automatic. Ironically, this person initially blamed his lack of activity on his work, but now he is actually more active *because of* his work.

Another example that can assist in increasing activity is to put exercise clothes in the car after the wash. This makes the routine of washing clothes contribute to the ability to exercise. When one has to exercise, it is a lot easier if all equipment needed is ready and in the trunk of the car. Then one can drive to the gym and start without much planning. Sometimes the very fact that your exercise clothes are in the car reminds you and propels you to exercise. Surely these changes seem small at first. Standing up a few more hours a day may seem trivial and having the exercise clothes ready may seem like a small consolation, but keep in mind that these are changes in daily routines. They repeat day after day. Like an avalanche, they start small but over time they may gather strength. Small changes in daily routines can result in big payoffs. Furthermore, the payoff comes not only in the direct benefits that these tasks produce but also in the environment they create. For example, standing up may enable a person to be more ready to leave work and join an exercise class. If in the pull and push of daily events, one is ambivalent about exercise, a small event like having the workout clothes in the car could be the feather that tips the scale.

Coming back to the student in our case study: he needed to leave work on time, but it was not enough to resolve to do so. He needed to embed leaving work into existing routines. He chose to join a car pool. Because a car pool has a fixed schedule, it forced him to leave work on time. We consider his solution to diet and exercise a systemwide solution because these events would occur independently of his initiative. His friends would show up for their ride at the designated time, whether or not he was ready.

When habits are distributed over other activities, the effort becomes easier. Let's take a smoker, for example. If you ask him how difficult it might be to stop smoking, he might reply, "No problem at all. I can stop anytime I want to." Ask him six months after quitting and he might reply, "It was easy. I decided to stop and I did it. It was a snap." But if you asked him *during* the time that he is trying to quit, he would give an entirely different answer. He might complain about how difficult it is. He might be short-tempered and frustrated and say that it is the hardest thing he has ever attempted. If stop-

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ping smoking involves a certain amount of physical effort, how is it that at different points in time they seem to involve different amounts of energy? The cynical view is that the required energy level does not differ at all, but that over time we distort the difficulty involved. But this is an unsatisfactory answer as so many people could not all have distorted perceptions. Others may say that overcoming a real chemical addiction is harder at first. Certainly there is some truth to this if we are talking about smoking—but it doesn't apply to the same degree if we are talking of other habits such as exercising. Something else is at work here. We think that habits become easier to maintain because the effort gets distributed into other activities. In other words, the effort to exercise or eat properly seems easier because so much of it is accomplished *as part of other tasks*.

System thinking embeds solutions into other routines, by doing so some of the effort is moved from one activity to another. In the case we have been following, the effort of leaving work on time was embedded into the routine of car-pooling. It was no longer a diet-related activity. When asked if he was dieting, our student replied, "No," he was merely commuting in a new way. He was not changing his diet. But at the same time he seemed to have effortlessly created more time to cook (and thus avoided eating high-calorie fast foods), found more time to exercise, and was able to go to sleep earlier and get up on time to go to work. All of this was achieved with almost no effort. It was considered effortless because the energy expenditure was attributed to car-pooling and not to dieting.

Principle 5: A Lot of Small Changes Add Up

The environment is complex and sends many mixed messages to the individual. To change the environment, one needs to make multiple small changes. Once success occurs, it is important to continue pursuing other ways to build the new behavior into various existing routines. We hypothesize that the effect of routines on one another is cumulative. As more and more daily routines point to exercise and proper diet, success becomes more likely. Building more of the wanted behavior into existing routines can lead to easier maintenance of that habit. The secret is to continue searching for system solutions even when the system is effective. When you do this, exercise and diet take a life of their own and become a stable part of daily routines.

Even with occasional failures, it is important to continue. The ongoing search for systemwide solutions involves avoiding blaming yourself for occasional lapses. Many people cannot keep up with their own resolutions. There

is no guarantee of success. Occasionally there are failures, and when they occur it is important to search for a new change in daily routines. Relying on personal resolve and discipline can deliver a blow to one's morale and personality with every failure, and as a result, sooner or later one may abandon the effort in disappointment and frustration. In contrast, when making systemwide changes, every failure is a new lesson on how various routines are interconnected. It provides us with new insight. Every failure can constitute the seed for a greater effort. Instead of abandoning that effort, one can put energy in prolonging the time between failures. Rather than giving up one's diet, it is important to look at the time between the lapses and see what might influence it. For example, perhaps a person has failed to perceive that she tends to eat out often and she does not have many choices when looking for a place to eat. Keeping a diet in these circumstances would be hard. Yet after discovering how her diet is affected by eating out, she can start to rethink her socialization routines.

Table 4 shows the data collected by the student in our case study. In Table 4, the first column represents the number of days. The second column indicates success or failure, and the third column provides the duration of consecutive failures. The table shows that on the first day, the student ate junk food, so in the second column it indicates that he did not succeed. On the second day, however, he did succeed. Failure on the first day is one day of failure. Failure on the fourth day is two days of failure because there were two consecutive days of eating junk food since the last day of success.

Figure 4 plots the length of relapse against days since our student started his monitoring. This chart can assist us in understanding whether a person is improving over time. The figure shows how the student fared over 57 work days (roughly three months). The horizontal axis shows the passage of time. The vertical axis shows the number of continuous junk food days. Early on, one can see a number of occasions where day after day he was eating junk food. In one stretch, he ate junk food five days in a row. But as time passes we see fewer lapses. Furthermore, the lapses are of shorter lengths. In the second half of the chart, there is only one day when he ate junk food. Sure, he may relapse from time to time but these occasional lapses are not a return to his days of continuous junk food consumption. Over time, relapses became rare. His joining the car pool helped him avoid junk food.

Discussion

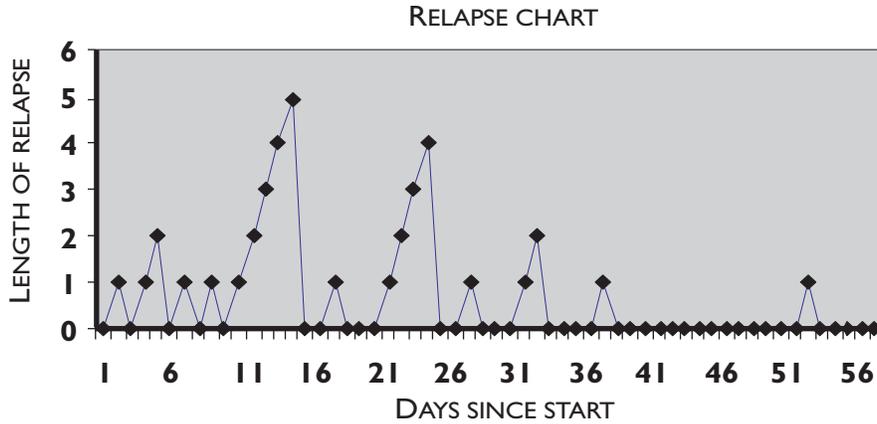
People who diet think of what to eat and what to avoid. They see their eating and exercise habits as their own decision exclusively. When health profes-

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TABLE 4 / Snack Patterns by the Person Who Joined the Car Pool (Yes means the student did not snack)

DAY	DID YOU SUCCEED TODAY?	LENGTH OF FAILURE SINCE LAST SUCCESSFUL DAY	DAY	DID YOU SUCCEED TODAY?	LENGTH OF FAILURE SINCE LAST SUCCESSFUL DAY
1	No	1	31	No	1
2	Yes	0	32	No	2
3	No	1	33	Yes	0
4	No	2	34	Yes	0
5	Yes	0	35	Yes	0
6	No	1	36	Yes	0
7	Yes	0	37	No	1
8	No	1	38	Yes	0
9	Yes	0	39	Yes	0
10	No	1	40	Yes	0
11	No	2	41	Yes	0
12	No	3	42	Yes	0
13	No	4	43	Yes	0
14	No	5	44	Yes	0
15	Yes	0	45	Yes	0
16	Yes	0	46	Yes	0
17	No	1	47	Yes	0
18	Yes	0	48	Yes	0
19	Yes	0	49	Yes	0
20	Yes	0	50	Yes	0
21	No	1	51	Yes	0
22	No	2	52	No	1
23	No	3	53	Yes	0
24	No	4	54	Yes	0
25	Yes	0	55	Yes	0
26	Yes	0	56	Yes	0
27	No	1	57	Yes	0
28	Yes	0			
29	Yes	0			
30	Yes	0			

FIGURE 4 / Days between Snacking Based on Data in Table 4



sionals tell them this is not the case, their first reaction is often one of ridicule. They claim that the professionals are abetting individuals in avoiding personal responsibility. After all, who could be responsible for a person’s actions but himself or herself? Let us be clear here: System thinking does not state that a person is not responsible for his or her actions. Even though the environment influences us, this does not mean we are not responsible for our lives. On the contrary, the environment we select is our choice—at some level that is our true choice. People are responsible for their behavior to the extent that they choose their environment and can modify it.

No one acts in a vacuum. Often a person fails to succeed because he or she fails to see how certain actions are interconnected. System thinking makes one responsible for the entire constellation of actions around a behavior, instead of a single eating habit or exercise activity.

System thinking allows us to approach weight loss like we would any other problem. It allows us to seek causes and effects and engage in cycles of improvement. There are more than claims of willpower at play here. System thinking forces people to confront and solve the problem of why they cannot maintain their resolutions.

It is a statement of obvious fact that a person’s environment affects him or her, and that earlier decisions affect later ones. What many do not understand is how to think about personal systems. We have tried to remedy this shortcoming in this chapter by proposing a method for thinking about diet and exercise that relates these activities to daily routines. The proposed

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approach is designed to assist a person in targeting factors that influence diet and exercise patterns. The approach emphasizes a search for systemwide solutions instead of personal exhortations. It helps put into place solutions that continue to assist you even when you are not motivated. It helps you to examine how large decisions in life (e.g., where you live) affect diet and exercise. It helps you see how numerous small decisions can snowball into major diet and exercise changes. It aims to open your eyes regarding patterns in activities that you might otherwise ignore. Finally, it helps you build solutions into routines that will force you to implement wanted behaviors.

The beauty of the proposed system solutions is that the more a person does, the easier a task becomes. The more integrated the tasks are into existing daily routines, the more automatic the approach becomes, and the less independent effort is needed. If you recall, the student in our case study stated that he did not feel like he was dieting. To him, the change in his diet seemed to have emerged with little effort. He was not running around frenzied and trying to fight his own desire to eat junk food. He ate less junk food with no apparent conscious effort at the time. This process of redistribution of tasks necessary to maintain a habit can work for most people in making them believe that diet and exercise are easy. It is possible, at least in theory, that one can distribute the effort needed for exercise and diet into so many daily routines that the desired outcomes seem inevitable. The promise of system thinking, therefore, is *seemingly effortless* diet and exercise.

Improvement Teams

GETTING HELP FROM FAMILY AND FRIENDS

CHAPTER

4

FARROKH ALEMI
LAURA BENSON
ROBERT DILL

When we want to make lasting improvements in our lives, to be successful we must involve family and friends in making necessary changes. Rarely do we as individuals stand alone. Our lives are intertwined with those closest to us; what we do affects them, and what they do affects us.

The effects are sometimes direct and obvious; at other times they are indirect, are difficult to see, and work through the manipulation of the environment we live in. Their direct influence is apparent—whether we are at the receiving end of an angry parent’s tirade or are enjoying a relaxing evening with a friend. Some friends and family members tell us what to do, others help us do things, and still others listen to and comfort us. Most of us have parents who have told us how to behave and set rules for us to follow.

Family and friends also affect us indirectly through shared living routines. This is a more subtle and unconscious influence but a lasting one; it makes the family environment itself an important agent of change, and highlights the importance of involving family members in the change process. In this book, we have repeatedly called for changing the environment to promote healthy behavior. But the environment is not yours to change. It belongs to people you share it with. Thus it is natural that if the environment has to change, we need to involve family and friends who share it with us.

“Family” is broadly defined here and is not limited to individuals biologically related to one another. Our focus is on family and friends who share a common environment—either a physical environment, such as a home, or a

This chapter is in part based on F. Alemi, M. R. Haack, A. Harge, R. Dill, and L. Benson, 2005. “Engaging Client’s Family and Friends in Online Counseling.” *Journal of Addiction Nursing* 16(1–2): 47–55.

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shared purpose, such as helping with daily activities like preparing meals or washing clothes.

Healthy families focus on problem solving. This chapter shows how you, your family, and your friends can solve significant problems. You will learn about group norms, adaptability, and communication methods that could help you work with your family and friends on a common task.

Realistically, of course, no one is perfect. Our family and friends have shortcomings; rarely do they live up to our highest ideals. All relationships evolve and can be improved. This chapter focuses on processes you can use to solve problems, even with those who may have some level of conscious or subconscious conflict with you. We do not assume that you are living in bliss. We acknowledge that your relationships may have conflict. Nevertheless, we show how less than perfect relations can work together to create a functional and positive environment for change. We cannot promise to help you forge closer ties—only an increased likelihood of succeeding at improving your weight and exercise habits.

Team Composition

To effect positive change, identify the people who can best help you with changes in your diet and exercise environment. These will be the people on your team. The team should consist of family members and friends who share daily routines or a physical environment with you. It might include people from different generations, such as parents and children, and even people who do not get along very well. It might include people you take care of or people who take care of you.

Assign appropriate tasks to each team member. If you want to change your diet, invite the person who prepares and shops for the food, or who typically arranges for social events, to help you out. If your circle includes someone who enjoys sports, take turns doing housework so that you can both have time to go to the gym. Your team members may not necessarily be your companions, but people who share your food system or your daily home, work, or school environment. They may not share your diet or exercise plan, but can help you determine the food you eat or serve as an exercise coach.

The members of your weight-loss team should be “process owners,” not buddies. As noted in Chapter 1, a *process owner* is a person who contributes to production within your diet or exercise system, whereas a *buddy* is someone with whom you may simply diet and exercise. In other words, a friend or a family member who diets with you is a buddy, but the person who prepares your food is a process owner and may not necessarily want to diet with

you. The purpose of forming a team is to bring together those who share the process, not the activities. In deciding whom to involve, ask yourself whether the person makes decisions that restrict what options are available to you.

Usually, your spouse is the process owner involved in your efforts to lose weight and/or exercise more. This doesn't mean that the spouse must also lose weight or exercise, but merely that together you will set out to change the shared environment. If you are unmarried, other members of your household, a close friend, or a family member can also help. The survey in Table 1 will help you rate your family members and friends in this regard and decide who is more of a process owner and can contribute to your team.

Once you have decided whom to approach to be on your team, tell those individuals what to expect:

- *To improve your weight, you need their help.*
The responsibility for your improvement, however, is yours. You will not blame them if you don't achieve your goal.
- *You will meet as a problem-solving team to determine what needs to be changed in the physical environment or the household's routines.*
This does not mean that they are committing to any particular change, only to meet regularly and to think thoroughly about the issues raised.
- *You will meet once a week for an hour, and produce an agenda and specific problem-solving tasks.*
This process may last for several months.
- *You will monitor your progress and report it truthfully to the team.*
To be effective, the team needs to have a shared understanding of its goals and functions, as well as how the meetings will function. These points are discussed in the next section.

Your Team's Goals and Procedures

The team should review the shared environment together and make suggestions that will result in positive change. During this review, describe the processes that lead to specific behaviors. Using flowcharts or lists of periodic events may be helpful (see Chapter 5). The team's goal is to adjust your daily routine activities (such as eating, sleeping, going to work) so that it is no longer possible or desirable to continue an unhealthy habit.

An example of this kind of intervention is the work being done with diabetics to help them regulate their own behavior. Many diabetics who succeed in controlling their sugar intake do so by stocking their shelves only with

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TABLE 1 / Who Is a Process Owner?

As noted in the chapter, a buddy is a person who can participate in your diet or exercise plan. A process owner is a person who shares a common environment with you and can influence your diet and exercise plan, *even when he or she is not dieting or exercising with you*. This exercise helps you decide whether the person you have in mind is a buddy or a process owner.

PLEASE WRITE THE NAME OF THE PERSON YOU ARE CONSIDERING:

	YES
1. Do you share food with this person on a regular basis?	✓ _____
2. Do you have joint responsibility for maintaining a household?	✓ _____
3. Do you need to consider this person's timetable when you are deciding on the best time to exercise or eat food?	✓ _____
4. Does this person help you in carrying out daily living activities (bathing, eating, cleaning, washing clothes, commuting, etc.)?	✓ _____
5. Can this person's decisions affect time, equipment, sports clothes, or other resources needed for your exercise?	✓ _____
6. Does this person's decision affect what food options are available to you for food or exercise?	✓ _____
7. Do you see each other on a daily basis?	✓ _____
8. Does this person affect how and when you socialize with others?	✓ _____
The person with the highest number of positive responses is the most ideal person as a process owner for you.	TOTAL NUMBER OF YES RESPONSES <u>8</u>

Please note that the following are not important considerations and should not influence your decision:

- *Whether you like the person or not.* Process owners may not be on your list of favorite people; nevertheless they must be included if they are good candidates as determined by the questions above.
- *Whether the person participates in your diet or exercise plans or not.* A process owner participates in your system, but not necessarily in your diet or exercise activities.

“legal” foods. This relatively easy change in the physical environment agreed upon by the family—buying some foods and avoiding others—will lead to a change in your behavior. This may seem simple enough, but eliminating the favorite family dessert, for example, may raise any number of issues or test the resolve of the team in working together.

As noted in Chapter 1, don't confuse the team's role with support groups. Social support from family members and friends who see you trying hard is important because they can make you feel better. But the purpose of having the process owners meet regularly is not for support; it is for problem solving. A number of people need to be involved because the solutions will affect them, too. Changing an environment will affect all of the people sharing it. For example, changing the kinds of foods you buy will affect those who share meals with you. Though support groups can offer understanding and encouragement, you need more than that from your team. You need the team's active engagement in coming up with effective changes.

The secret to ensuring that team members successfully work on a problem is to have them first define the problem and then find the solution to it. Perhaps they'll see the problem differently than you do, but after a while, any joint problem will affect all of you. The mere admission that you are in this together will help you become closer and more aware of how you influence each other. We suggest that teams follow the steps below in understanding the problem and suggesting solutions:

1. *The team lists the routines that affect you (see Chapter 5), whether they seem related to the problem or not.* For each day in the week, list what happens from the time you wake up in the morning until the time you fall asleep at night. Identify how these events recur week after week. For example, you may watch television for two hours each day, or go out to see a movie every other week. The team should take enough time to create a thorough and comprehensive list of routines.

The team identifies how daily routines may enable or prevent a specific habit from occurring. Lifestyle routines may predispose you to continue a habit by providing the means for carrying it out. For example, placement of an exercise machine in the family room will make it easy for you to exercise while you are with your family. On the other hand, if your daily routines make it difficult to set aside a specific time to exercise, you will decrease the likelihood of developing a successful exercise program by removing an essential component of the habit: a set time each day to spend on the exercise machine.

If the team meets on a weekly basis, this step will take several weeks.

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2. *Team members use their understanding of the household environment and its links to the target behavior to suggest changes in the environment and routines* (see our workbook in Chapter 1). The team collectively decides on a list of steps that can be taken and on which routines should be changed. For example, if you're in the habit of coming home from work and having a drink or two to relax after a stressful day, the team might suggest substituting a brisk walk with your spouse or taking a hot bath. This step may be completed in two weekly meetings.
3. *The team helps institute the changes and monitors them to see if they have had the desired effect.* You are expected to maintain a diary and analyze it using control charts (see Chapter 6). During its meetings, the team reviews the control charts to see if the changes they introduced have helped you modify poor habits. When relapse to poor habits are observed, the team examines the circumstances that have led to the relapse—which, incidentally, should be viewed as an opportunity to learn, rather than a failure. The team should determine the environment in which the relapse occurred, and come up with new ways to adjust the environment so that recurrence is less likely.

When a targeted undesirable behavior continues, the natural tendency is to think of it as a failure and look to blame someone for it. However, blame takes the focus away from the environment and behavioral changes. Keep the focus on making fundamental changes to the environment. Recognizing relapse behavior then becomes part of the solution-oriented process by understanding how a relapse can be prevented next time. This phase may take a few months or longer, depending on the nature of the changes the team introduces.

4. *The team recognizes success and celebrates gains, even when these are small.* Each day of success counts. Rewards build a sense of individual responsibility and stimulate a supportive climate within the group. Recognizing success helps empower and motivate you to continue the process of positive change. The team should plan to celebrate your progress at regular intervals—after seven days of success, again after 30 days, and once more after several months, for example.

In following the steps above, the team members need to communicate clearly and regularly with one another. We strongly encourage teams to schedule meetings as often as once a week at the beginning. Between meetings, use an unfolding storyboard and a control chart as a reminder of progress to date (see Chapter 6).

Your Team's Meeting Rules

Organize team meetings so that all participants can express their task-related issues without careening into dysfunctional confrontation and other relationship problems. The following rules are central to making team meetings more effective:

1. *Each meeting has a start time, an agenda, and a timekeeper.* Productivity is enhanced when meetings begin and end on time, when an agenda is prepared ahead of time, and when the team sticks to a process all members understand. Meetings should not be allowed to exceed specific times; table items that remain unresolved at the end of the meeting until the next meeting. Appoint a timekeeper to keep track of the time remaining for completing the agenda. It may be helpful to summarize findings periodically during and at the end of the meeting. The team should share its meeting agenda with outside coaches and counselors, so that these agents of change are aware of what is being planned.
2. *Meetings are for joint problem solving—not for having a party, eating together, sharing common feelings, or revisiting old conflicts.* Stay on the task. A common pitfall is allowing people to unload whatever is on their minds and ignoring the task for most of the meeting—and then approaching it when there is not enough time left to move ahead properly. If a team member needs to vent about something, accept the outburst, but validate and address it at another time and place. If conflict arises between two team members, redirect the team back to its task through the following strategies:
 - Address the whole team and not just the two people caught in conflict.
 - Validate the issues raised by both sides as relevant and important.
 - Repeat the purpose of the meeting and the focus of the team for this particular day.
 - Continue with the team's task by asking a third person for his or her ideas concerning the task.
3. *Members of the team give one another their undivided attention; each is given time to express his or her views.* Team members should not call attention to themselves by rushing to comfort when the person speaking feels pain, or by pretending to understand or share the person's concerns ("I know exactly how you feel").

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4. *Team members do not blame one another or attempt to solve relationship problems. They focus on the shared environment and how it can be improved.* Instead of giving advice (“Here is what I would do if I were you...”) team members might describe what they are willing to do to create a better environment. They should not hand the problem to someone else or refer a person to a book (“You ought to talk with X about this,” or “Have you read X? I think it will help you”). They search for solutions in the environment and not in the persons involved.
5. *The team postpones any evaluation of ideas until all ideas have been listed.* Collect ideas one at a time from each member in the room; write them down on a large sheet of paper that everyone can see. This is known as brainstorming. Just collect the list of ideas without critiquing, or editing them as you go. After the team has made the list, discuss the pros and cons of each idea and then select one or two to implement.
6. *The team does not rush to solutions.* Spend time understanding the links among diet, exercise, daily routines, and the environment. The team must solicit solutions only after the problem is understood, and take its time doing so. Keep in mind that improvement does not happen overnight; it is a process of working with outcomes and results, making changes, and monitoring progress toward goals.
7. *Team members do not take individualized action to help.* The purpose of the meetings is not to provide direct help to someone but to change a shared environment. For example, if one member asks for money to cover an unexpected expense, the others must not offer a loan or promise to help during the meeting.
8. *The team does not force anyone into any action—even when it is for the person's own benefit.* Each member is to decide how to collaborate in bringing about lasting environmental change. Support autonomy and choice rather than attempting to control one another. Ask team members who are demanding, critical, and inflexible to lead by example and to suggest environmental changes in which everyone can participate. Evaluate everyone's decisions, and then come to a consensus regarding what changes to pursue. The team needs to be careful to avoid covering up any action, making excuses for failures, or following one person's agenda. The goal should remain real problem solving; the data on targeted behavior will be the final determinant of success.
9. *Relapse into old behaviors or other failures are opportunities for learning and adjustment in the problem-solving process.* Use these experiences to make positive changes to the shared environment. It is not productive to blame or admonish others on the team.

Conclusion

You will have the greatest chance for success if you follow the advice in this chapter while undertaking team meetings. Although it is often easiest just to go down your own road, you'll create more lasting change when involving others. It is worth the effort to get the team on your side. The team may travel in a direction you wouldn't normally choose, but you may be pleasantly surprised at the end of the road.

Tools for Understanding Complex Processes

CHAPTER

5

FLOWCHARTS AND LISTS OF PERIODIC EVENTS

FARROKH ALEMI
ASHRAF ISMAIL

This chapter describes two methods used to describe life processes—(1) flowcharting sequences of events and (2) making a list of periodic events—and gives examples of how individuals have used these tools to describe their lives.

Before a problem is solved it must be understood; before an improvement is made, the current process must be examined. If people need to change their behavior, they need to understand how they maintain existing habits. Without understanding, change is a shot-in-the-dark, a wild guess at what might work. With understanding, by contrast, solutions can be tailored to one's needs—and chances of success can be improved. A person may want to change a simple behavior (for instance, being late for appointments) or a very complex one (failing to lose weight). But no matter how complex or how trivial the task, improvement starts from understanding. This chapter shows how one gets on the right path for that—by describing a life process and gaining more in-depth understanding of oneself.

As noted above, people can use either flowcharting or lists to describe their life processes. Some may prefer to use the former because it is a visual diagram that emphasizes the temporal nature of how one event leads to another. Others may find flowcharting too complex and prefer to make a list of periodic life events and the cycles within the list. Both tools help individuals understand their lifestyles. Both help us gain new insights into how we can improve. The choice between the two tools depends on individual preferences. This chapter discusses both approaches so that you can decide what is best for you.

Why Construct a Flowchart or a List of Periodic Events?

The reasons for asking people to construct either a flowchart or a list of periodic events appear below:

1. **Understand that there *is* a process.** Often people think that their behavior is a function of their own personal decisions and actions—not influenced by an external process. To help them focus on external processes and triggers in the environment, it is helpful to ask people to draw a flowchart or list periodic events in their lives. Doing so helps them see how external influences affect their behavior. It reveals the underlying process and helps them get away from a dysfunctional focus on motivation and effort.
2. **Gain insight into our lives.** We are not always aware of our own habits and life processes. When we chart our lives or list periodic events, we gain better insight into our own behavior. We often know what we are doing but not *why* we are doing it. Charting helps clarify how various events affect our behavior.
3. **Determine whether the process meets current resolutions.** In many instances, we make resolutions but fail to follow through in our day-to-day lives. Flowcharting current lifestyles or listing periodic events helps one see the discrepancy between one's intentions or claims and actual behavior.
4. **Redesign the process.** The improvement team (see Chapter 4) may decide to modify the process to achieve a desired behavior. To reach this goal, certain tasks may be added or deleted from existing processes. Steps within tasks may need to be changed or executed in a different sequence. All the proposed new changes need to be graphically represented in a flowchart or may be listed as periodic lifestyle events. These representations help the team as well as the clinicians understand the new process. In designing new life processes, flowcharting and making lists of periodic events are the starting point for planning a lasting new habit.

Making a Flowchart

A flowchart is a map of a process. It helps us understand the sequence of events that occur in a person's life. It is a visual representation that is easy to understand and interpret. It shows how one event leads to another. Once drawn it creates a common understanding on how the person's life is organized. Individuals

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have different backgrounds, cultures, and ways of thinking. Two people may have entirely different processes for a simple act such as eating breakfast. The sequence of the steps may be different (one may have coffee first, followed by toast; another may skip coffee); the importance of a step may vary (one may eat at a relaxed slow pace while the other eats in a car while hurrying to work); and the resources used may differ (cheese versus butter, for instance).

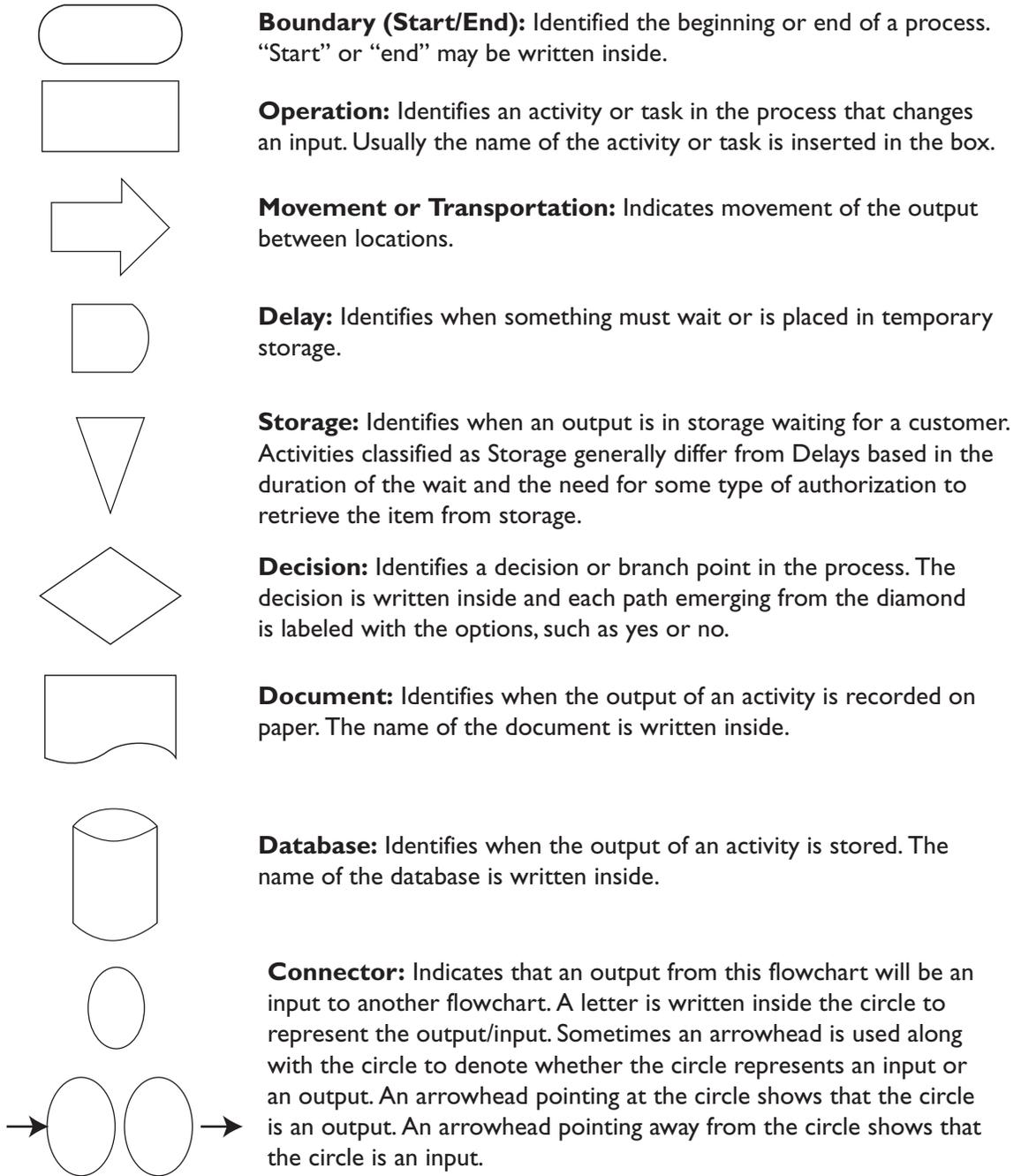
How to Construct a Flowchart

Before constructing a flowchart we need to learn about a series of symbols typically used in flowcharts. Figure 1 shows these symbols.

The steps in constructing flowcharts is as follows:

1. **Determine the boundaries.** It is important for the team to define the process that will be flowcharted and the level of detail to be recorded. A consensus should be reached at the beginning on the boundaries of this process, that is, the starting point (“*What activity do I do first?*”) and ending point (“*What is the very last thing that happens?*”). The latter in most cases corresponds to the desired behavior.
2. **List the events.** On a shared piece of paper or flip chart, individuals and their team members should list the major events in the process. Brainstorming—a process in which ideas are sought without evaluation until all ideas are collected—should be used. Ask all team members to participate, for two reasons: first, everyone should have at least some knowledge of all pieces of the process, and second, everyone’s contribution is potentially valuable since he or she may have a unique perspective on the sequence of events that leads to the desired behavior. Make sure that events that lead to the desired behavior and those that lead to unwanted behavior are both listed. Make sure the list includes and marks all relevant events. Some participants list so few events that the tool’s usefulness is limited. If the list is too general—citing, for example, “I gain weight because I eat”—it is of little use. On the flip side, providing excessive detail—for example, providing details of how one sets the dining table—may also be prohibitive and counterproductive. It is important to list a sufficient number of events that would help everyone get a comprehensive picture; while postponing the inclusion of some details.
3. **Sequence the events.** Order the events from independent activities (activities over which you have little control) to dependent activities (usually the desired behavior). In the team’s listing of the major events, find out what happens after the initial starting point. Place this step below or next to the starting point. Find and agree on the second event

FIGURE 1 / Symbols Used in Flow Charting



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in the process. Place the step below or next to the previous activity. Continue using the same technique until you reach the step that leads to the final event. If multiple activities follow an event, draw multiple lines from that event to the events that follow it.

4. **Draw appropriate symbols.** Now, after listing all the steps, use the symbols shown in Figure 1 as appropriate to build your flowchart. Show the flow with arrows. Arrows are better than just lines connecting the symbols because they clearly lead you to the next step. Do not forget to label the arrows at the decision diamonds.
5. **Discuss the chart.** Allow sufficient time for discussion around the steps and their sequencing. This allows team members to learn from one another and better understand the process and its complexities, producing better end results when the team improves the process later.
6. **Test for completeness.** It is important before finalizing the flowchart to check for its completeness. This is often done by using the chart to analyze the events of a few days. If all major events that are relevant to the final outcome are included in the chart, it is complete. If a step needs more details, you can add them as appropriate. Spend enough time with the team to ensure that each member has the same level of understanding of the process.

How to Use the Flowchart

Here are some ways you can use a flowchart:

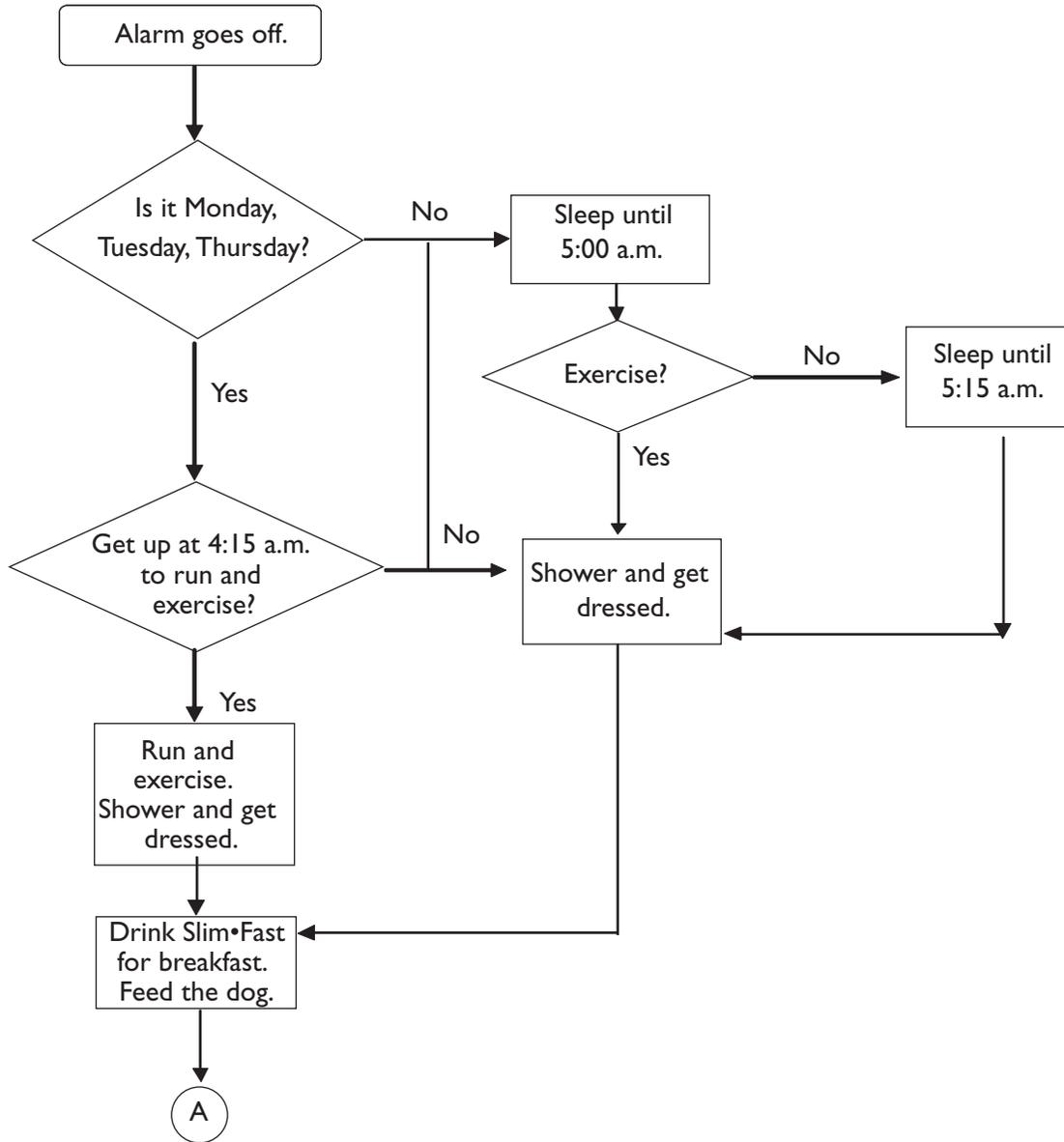
1. Analyze the flowchart, looking for process “glitches”: inefficiencies, omissions/gaps, redundancies, barriers, delays, etc.
2. Compare the current process against the *ideal* process for discrepancies. See if the events in the flowchart agree with your resolutions.
3. Look for what works to use as “best practices.”
4. Decide whether events within the current process can be influenced by noting the precedents to these events.
5. Decide whether events within a process can be instrumental in changing other events by following where they lead.

A Sample Flowchart

The chart in Figure 2 is an example of a flowchart developed by a person trying to understand his daily routines.

(Text continues on page 75.)

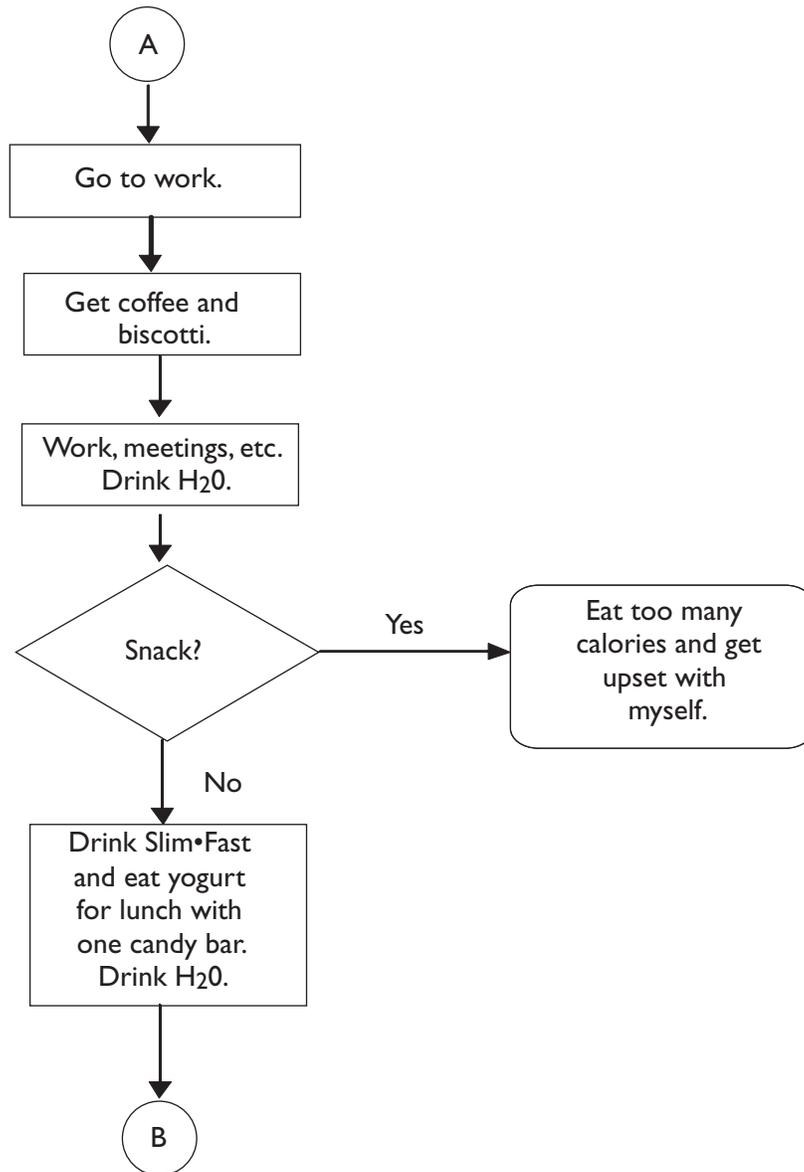
FIGURE 2 / A Simple Flowchart of One Person's Weekday Routines

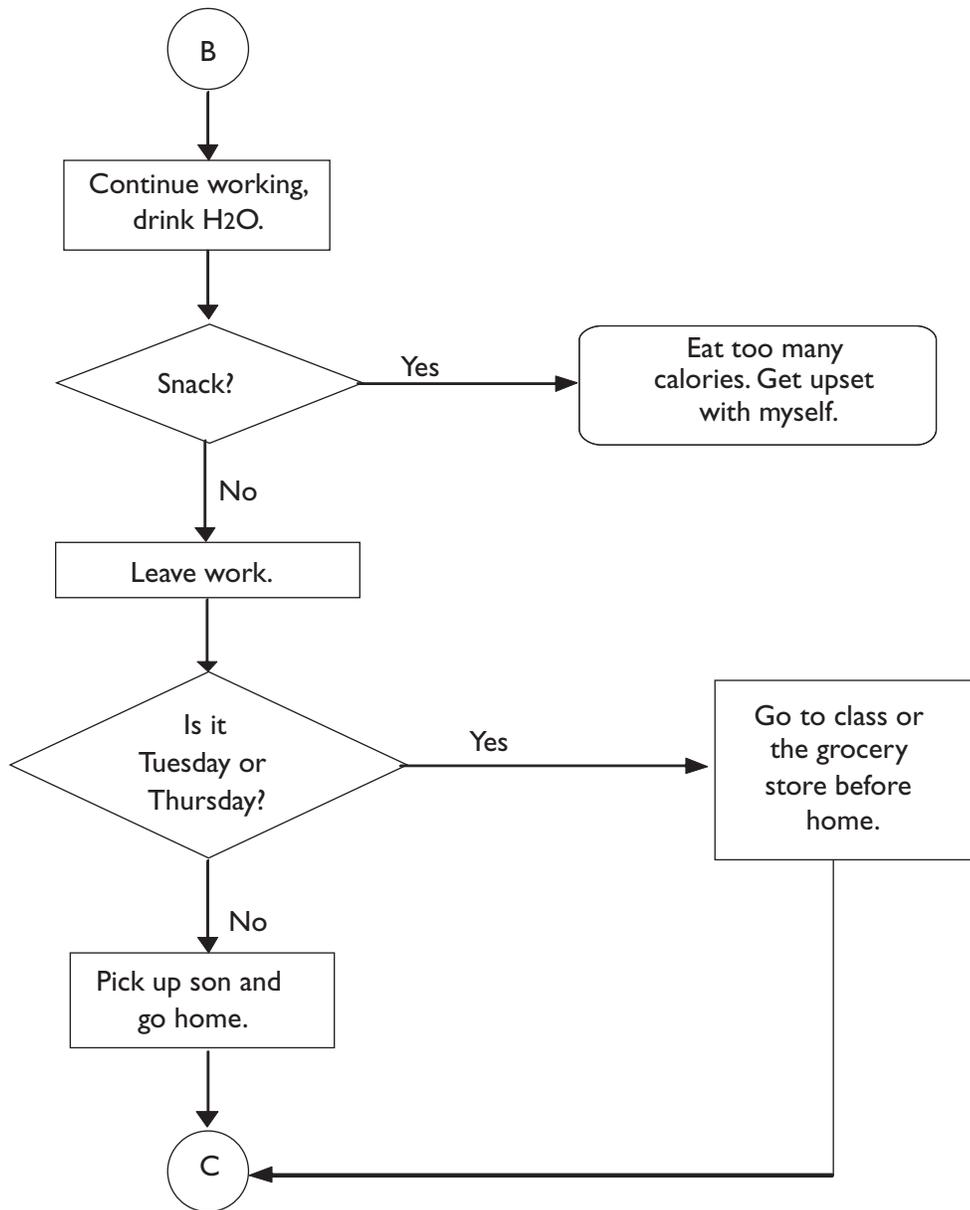


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FIGURE 2 / **A Simple Flowchart of One Person's Weekday Routines (continued)**

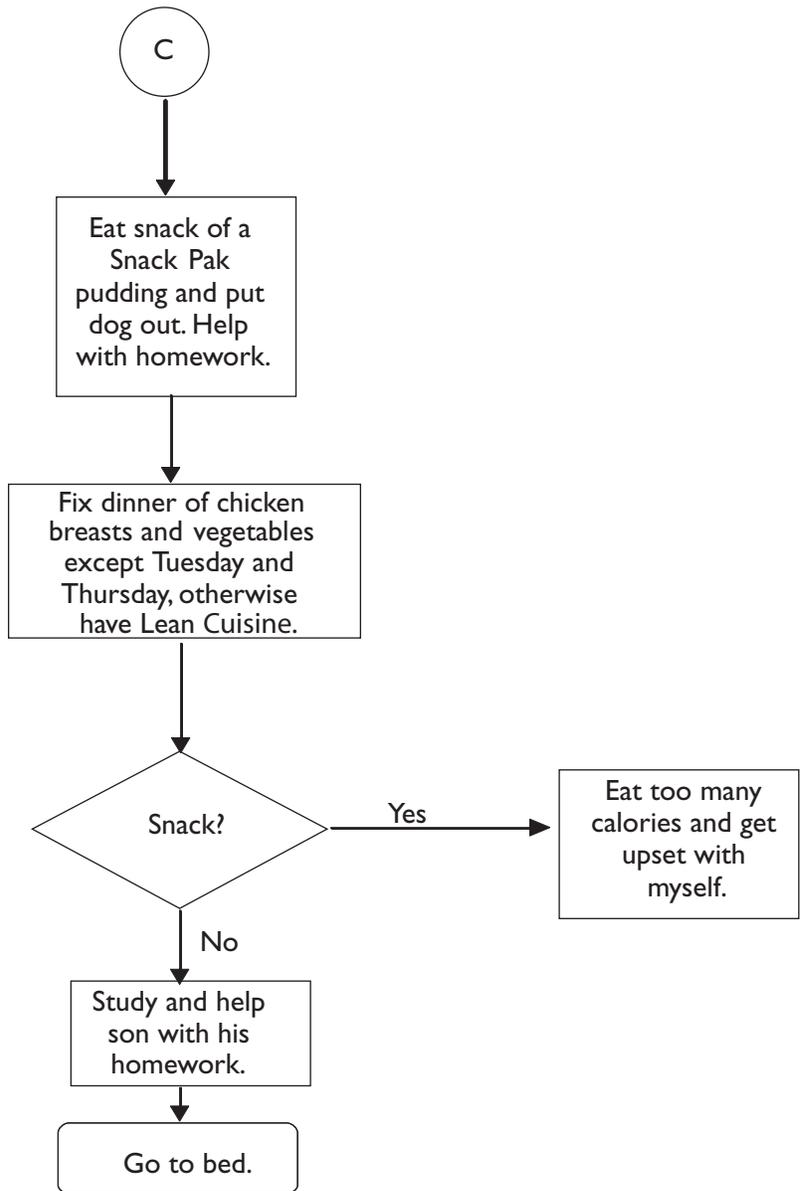




(Figure continues on the following page.)

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FIGURE 2 / A Simple Flowchart of One Person's Weekday Routines (continued)



Making Lists of Periodic Events

If you find flowcharts too hard to make, an alternative is to make a list of periodic events. Such lists are simpler to make but do not have information on sequence among the events. Despite this shortcoming, these lists may be just as useful in understanding a process. They are especially helpful in highlighting the link between daily living activities and the desired behavior change.

Periodic lists are based on the principle that any system or process is best understood in terms of its “steady states”—that is, in terms of recurring events. Some events recur, and they are referred to as routines, or as system analysts put it, “steady states” of the system. Steady states or routines are situations to which a system left to its own means will tend to return. These events are the organizing principles of our lives. By listing them, a person can see the steady states for his or her system of life. Behavioral tendencies, e.g., lack of exercise or overeating, are often expressed in or affected by these routines (e.g., shopping affects eating). Examination of the routines reveals an individual’s direction independently of his or her expressed wishes or desires. By listing the various periodic activities, it shows the structure of one’s life.

There are many recurring events in a person’s life. Most people sleep and awake according to a routine schedule. Many eat at more or less regular times. Others work regular hours. Even end-of-week socialization and partying follow certain routines. A close look at anyone’s life reveals that many events happen periodically—some daily, others weekly, still others with longer periods. The first step here is to list these periodic events. It is not that non-routine events do not matter; they do, but the impact of routine events is by definition more frequent. By understanding routine events we can comprehend a big part of life processes.

The exercise of listing routines can be more difficult than it appears. Some activities, like getting up and going to work, seem to follow a clear enough pattern. Other activities, however, like disputes with a spouse, are not so typical and may not necessarily recur with a clear frequency. It is important to include all periodic events, even if they do not always occur at the same frequency. For activities with variable periods, the average time of recurrence should be recorded. This exercise is difficult because the variability in a person’s activities must be distilled and ignored. We acknowledge that life events do not necessarily occur at fixed intervals, which makes the task of recognizing what is routine and what is a rare, one-time event difficult. Even more difficult is identifying events that occur with irregular frequencies. When the exercise is finished, however, the hard work should pay off

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and you should be able to understand your life much better. The steps in constructing a list of periodic events are as follows:

1. **Make a list of daily events.** One way to examine a person's routine activities is to make a daily calendar, such as the one shown in Table 1. The calendar should include all activities from morning to night for one week. It is important to include as many activities as possible. Special emphasis should be given to activities that might affect diet and exercise. A list of near-daily (weekday) activities may include waking up, preparing breakfast, brushing teeth, taking a shower, getting the children ready for school, preparing lunch, commuting, working, eating lunch, meetings, coffee breaks, commuting back home, preparing dinner, eating dinner, looking over the children's homework, watching television, and sleeping.
2. **Make a list of less frequent but periodic events.** The next step with the activity calendar is to list the activities that a person may not engage in every week, but are nevertheless recurring events. A list of near-weekly activity may include washing clothes, taking the garbage out, cutting

TABLE 1 / A Sample List of Daily and Other Periodic Events

AVERAGE REPEAT TIME	ROUTINE	IMPACT ON EXERCISE AND DIET
Daily	Sleeping	Late meals make it difficult to fall asleep. Late wake-up times make it difficult to eat breakfast.
Daily	Commuting	Sedentary. Exercise opportunity lost.
Weekly	Washing clothes	Unknown.
Weekly	Cleaning house	Carrying vacuum cleaner upstairs is modest exercise.
Weekly	Socializing	Usually going to restaurants. Drinking more than my diet allows.
Near monthly	Fights with spouse	Overeating because of frustrations.
Variable	Holidays	Overeating at parents' house.

- grass, going to friends' houses, calling parents, eating out, playing on a team, listening to music, and so on. A list of less-frequent-than-weekly periodic events may include having a dispute with your spouse, having stress at work, experiencing road rage, visiting a doctor, traveling, visiting parents, reading a book, and so on. It is crucial that you move away from daily living activities to include social and work-related activities that may affect your behavior.
3. **Check the depth of the list.** It is not helpful to list events in extremely broad terms (for example, "I wake up and go to work and come home and sleep"); nor is it helpful to list everything that occurs. You need to make a choice regarding what level of detail is useful. Enough details should be present that could help you understand what leads to behavior that you want to change. Enough events should be listed that could articulate what is unique about your lifestyle.
 4. **Check the list's accuracy.** The list's accuracy is monitored by carrying it around and checking that events listed actually occur and that there were no other major events. For events that cannot be directly observed, one way of checking the accuracy of the list is to share it with others who have independently observed the event.

How to Use a List of Periodic Events

Once a list has been created, the individual needs to review each item on the list and describe how the item affects the behavior of interest. Thus if you are trying to lose weight, and a list item is "shop for food," the review will establish how the time, frequency, and content of shopping affect what is eaten. If another item is "sleep," the review will establish how the time and manner of sleeping affect eating.

Once the list has been created, it should also be used to make other team members familiar with the nuances of the person's life.

Finally, when a solution is suggested, the team should examine the list to see how the proposed solution will affect existing routines. The team should take components of the proposed solution and embed them in existing routines.

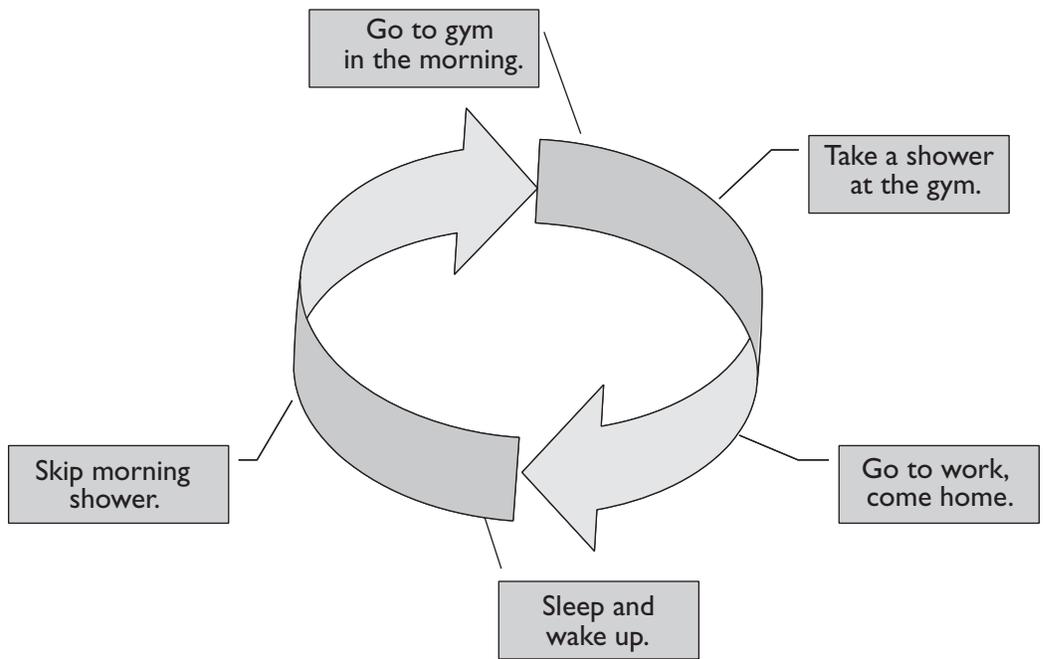
In using a list of routines, it is important to search for the relationship among them. Experience shows that routines feed into one another; they have to, for they are part of a set of repeating events that have stabilized over time and are working with one another. Modifying one will require changing many others. You can understand better the relationship of routines to one another by clarifying how they affect one another. A tool for doing so is to search for cycles among routines. The term "cycle" here refers to the path

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where you start with one routine and after going through several other steps you end up with the same routine. For example, taking your morning shower at the gym might affect the need to take a shower at home when you wake up. Thus, exercise and hygiene routines are related. If you insist on showering at home before you go to your morning workout at the gym, it will be counter-productive. In contrast, by going to the gym in the morning, you are not only exercising more but also taking a shower. Figure 3 shows this cycle.

A search for cycles among your daily, weekly, and monthly routines can help you understand why change is so hard to bring about. It will highlight for you how routines feed into an equilibrium that, once disturbed, will encourage everything to revert to historical patterns—like a pendulum returns to its natural state. To really change, to change in lasting ways, you need to not only change one habit but also to break complex cycles of interdependent routines. Only then can you have a fighting chance at settling into a new and healthier equilibrium.

FIGURE 3 / Relationship between Showering in the Morning and Exercise



Discussion

The study of systems requires new discovery tools. This chapter has introduced two methods for studying systems: flowcharts and list (cycles) of routines. Both approaches have advantages; a flowchart is more visual but listing is easier to accomplish. It is not crucial to use one method versus the other: both focus attention on the interrelationship among people, events, and the environment. Both approaches help describe a system—flowcharts do so by highlighting items that are interrelated; lists do so by focusing on steady states (routines) and cycles among them.

Control Charts for Diet and Exercise

C H A P T E R

6

FARROKH ALEMI
DUNCAN NEUHAUSER
NANCY TINSLEY

This chapter helps you construct a control chart for your diet and exercise patterns. At this point in your improvement effort, you may have made a change in your lifestyle, collected data on weight or exercise patterns and you may be wondering if the change has led to any improvement. The key question is whether the current weight and exercise time compare favorably to historical patterns.

If you are like most people, your weight and exercise time fluctuate a great deal. There are many reasons for this variation. Sometimes your weight or exercise patterns are not measured precisely. Sometimes variations are introduced because you forget to take a measure. Sometimes your weight fluctuates by a few pounds merely based on water absorption or the clothes you are wearing. All these fluctuations make it difficult to gauge whether new values are different from historical values. The five pound weight loss you might be ecstatic about might just be a random variation. Some level of rise and fall is natural; the real question is whether your new weight and exercise patterns indicate a true departure from historical levels. A control chart can help you answer this question.

This chapter assumes that you can plot data, order numbers from small to large, and calculate the square root of a number. These are relatively simple tasks but some people may have little experience with data manipulation. This

This chapter is based in part on F. Alemi, 2004, "Tuley's Control Chart," *Qual Manag Health Care*, 13(4) (Oct-Dec): 216–21. This chapter is also based on F. Alemi and D. Neuhauser, 2004, "Time between Control Charts for Monitoring Asthma Attacks," *Jt Comm J Qual Saf* 30(2) (Feb.): 95–102.

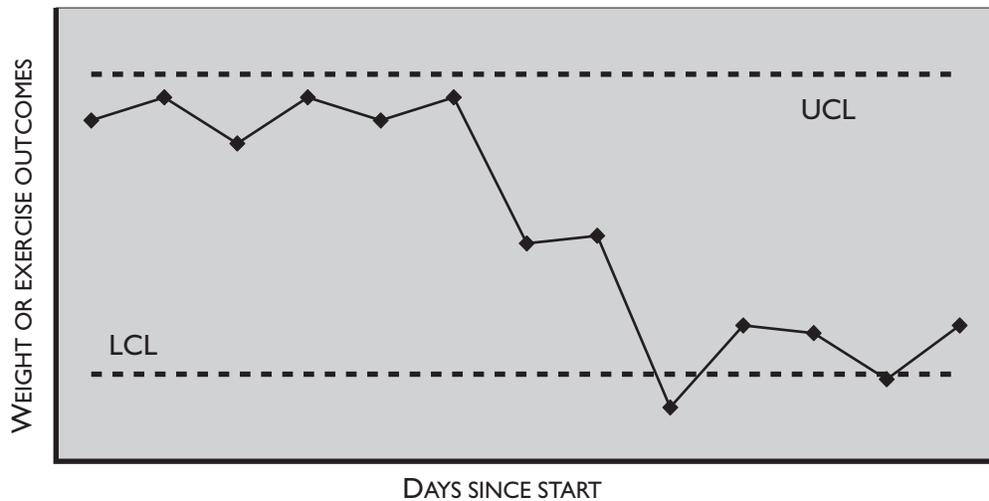
type of analysis needs time and patience. If you feel uncomfortable analyzing data, you may want to look up Web pages in which you supply your data and the site draws the control chart for you (see <http://improvement.gmu.edu>). You can also of course ask a friend or a clinician to do the analysis for you.

What Is a Control Chart?

With a control chart, you monitor your progress over time. You create a plot, where the x-axis is days (day zero being the time you started data collection, usually before you changed your lifestyle) and the y-axis is the outcome you are monitoring. To decide if your outcomes are different from historical patterns, the upper and lower control limits (UCL and LCL, respectively) are calculated. These limits are organized to constitute such a range that if your historical pattern has continued, 99 or 95 percent of the time, data will fall within these limits. The upper and lower control limits are calculated using mathematical formulas that are specific to the type of outcome you are monitoring. This chapter shows you how to calculate these limits depending on whether you are monitoring your weight, your exercise time, days of diet missed, days of exercise missed, or other similar outcomes.

Figure 1 shows the structure of a typical control chart. In this figure all points but two fall within the control limits.

FIGURE 1 / **Components of a Control Chart**



How to Read a Control Chart

A control chart is useful in many ways. Points outside the limits are unusual and mark departure from historical patterns. You have lost weight if your new measure is below the lower control limit. Two points in Figure 1 fall below the LCL—and therefore signal a weight loss. The other points do not indicate any real weight loss, even though there are a number of them showing a decrease in weight. These small fluctuations are random and not different from your historical weight changes.

You can use a control chart to see if your exercise time exceeds the upper control limit. If it does, you are reassured that you are exercising more. If Figure 1 measured length of exercise, we would conclude that there has not been any increase in exercise time, since none of the points fall above the upper control limit.

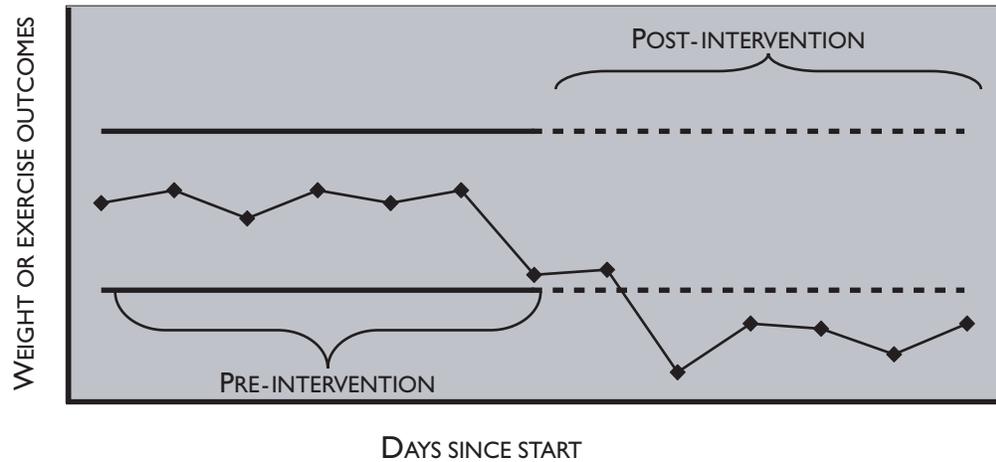
You can also use the control chart to see if you are maintaining your gains from previous time periods. If your data fall within the control limits, despite day-to-day variations, there has not been any significant change in your weight and exercise habits. If you are at your ideal weight and exercise pattern, you want your data to fall within the limits.

Minimum Number of Observations

The more data you have, the more precision you have in constructing the upper and lower control limits. At a minimum, you need at least seven data points in the pre-intervention period to start most charts. Not all of the data are used for the calculation of control limits; often the limits are based on the pre-intervention period. Subsequent post-intervention observations are then compared to the pre-intervention limits. If any points fall outside the limits, you can conclude that the intervention has changed your weight or exercise patterns. See Figure 2 for an example of setting limits based on pre-intervention periods.

Compare the chart in Figure 2 with the chart in Figure 1. Both are based on the same data, but Figure 2 sets the upper and lower control limits based on the first seven days, before the intervention. Figure 2 shows that post-intervention data are lower than LCL and therefore a significant change has occurred. When Figure 2 is compared to Figure 1, we see that more points are outside the limits in Figure 2. By setting the limits to pre-intervention patterns, we were able to detect more accurately the improvements since the intervention.

FIGURE 2 / **Post-Intervention Data Compared to Limits Based on the Pre-Intervention Period**



Calculating Limits

The mathematical formulas for the calculation of control limits depend on what you are trying to monitor. Below we list the calculation of control limits for two types of measures:

1. Limits for numerical values. These limits are used to analyze continuous numbers (for example, monitoring weight per week, number of calories per day, minutes of exercise per day, number of cups of coffee per day, number of junk food items per day, or number of cigarettes smoked per day).
2. Limits for days missed. These limits are set for discrete, mutually exclusive observations (for example, days of diet missed, days of exercise missed, days without coffee, days without junk food, or smoke-free days).

Limits for Numerical Values (Tukey's Approach)

We will use Tukey's suggested limits for the calculation of confidence intervals for medians of numerical values such as weight or length of exercise. The procedure calculates control limits from the "Fourth spread"—the difference between One-Fourth, (where $\frac{1}{4}$ of the data points are below this value) and

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PROCEDURE FOR CALCULATING TUKEY'S CONTROL LIMITS

1. List the observation values in ascending order.
2. Calculate the median, which has 50% of data below it and 50% above.
 - a. If the number of observations is odd, the median is the middle observation. For example, among the five numbers 1, 3, 4, 5, and 7, the median is 4.
 - b. If the number of observations is even, take the average of the two middle-ranked numbers. For example, among the four numbers 1, 3, 4, and 5, the median is 3.5.
3. A Fourth is the median of the lowest 50% of the data, data from the lowest value to and sometimes including the median.
 - a. If the median of the full data set is an actual data point, include it in the lowest 50% of the data.
4. A Three-Fourths is the median of the top 50% of the data, data from (and sometimes including) the median of the full data set to the highest value.
 - a. If the median of the full data set is an actual data point, include it in the highest 50% of the data set.
5. Calculate the Fourth Spread as the difference between the One-Fourth and Three-Fourths values.
6. Calculate UCL and LCL using the following two formulas:

$$\text{LCL} = \text{One-Fourth} - 1.5 * \text{Fourth Spread}$$

$$\text{UCL} = \text{Three-Fourths} + 1.5 * \text{Fourth Spread}$$

Three-Fourths (where $\frac{3}{4}$ of the data points are below this value). Most readers are familiar with the median, a value above which half the data lie and below which, again, half the data are. A Fourth is the median of the lower half of the data, and Three-Fourths is the median of the upper half of the data. The UCL is the sum of the Three-Fourths and 1.5 times the Fourth Spread. The lower control limit is the One-Fourth minus 1.5 times the Fourth Spread.

Let's look at an example where these calculations are put to work. Jane collected data in Table 1 regarding her exercise times. She planned to exercise three times a week and each time she exercised, she recorded the time in minutes. When she did not exercise, she recorded a zero for the exercise length. The first seven days recorded were pre-intervention. After this period, she and her spouse joined a mixed group volleyball team. She wanted to know whether joining the team had made a difference in her exercise time.

The first step is to sort pre-intervention data in order of length of exercise. This is shown in the last column of Table 1. Next we calculate the median—the value where half the data ($7 * .5 = 3.5 - 3$ points) are below it and

TABLE 1 / Length of Exercise

SORTED IN ORDER OF LENGTH OF EXERCISE				
DAY OF OBSERVATION	MINUTES OF EXERCISE	RANK	DAY OF OBSERVATION	MINUTES OF EXERCISE
1	30	1	2	0
2	0	2	3	25
3	25	3	1	30
4	30	4	4	30
5	35	5	5	35
6	40	6	6	40
7	50	7	7	50
8	45			
9	31			
10	20			
11	40			
12	60			
13	45			
14	60			
15	45			
16	32			
17	50			
18	60			

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half (3 points) are above. The fourth data point, with a value of 30, is the median; three data points are below it and three are above.

Since the median is an actual data point in this case, we include it in the calculations of the One-Fourth. To calculate the One-Fourth, we determine the halfway point for the first half of the data. When we include the median, we have four points in the lower data set, 0, 25, 30, and 30. The One-Fourth is halfway between the second and third points, in other words between 25 and 30, which is 27.5.

To calculate the Three-Fourths, we calculate the halfway point for the upper half of the data. Again because the median is an actual data point, we include it in the upper data set. With the median, we have four data points for the highest values. The Three-Fourths is between the fifth and sixth data points (between 35 and 40), and therefore its value is 37.5.

The Fourth Spread is the difference between One-Fourth and Three-Fourths, which is $37.5 - 27.5 = 10$. The UCL is calculated as the sum of Three-Fourths and one and a half times the Fourth Spread:

$$\text{Upper Control Limit} = 37.5 + (1.5 * 10) = 52.5$$

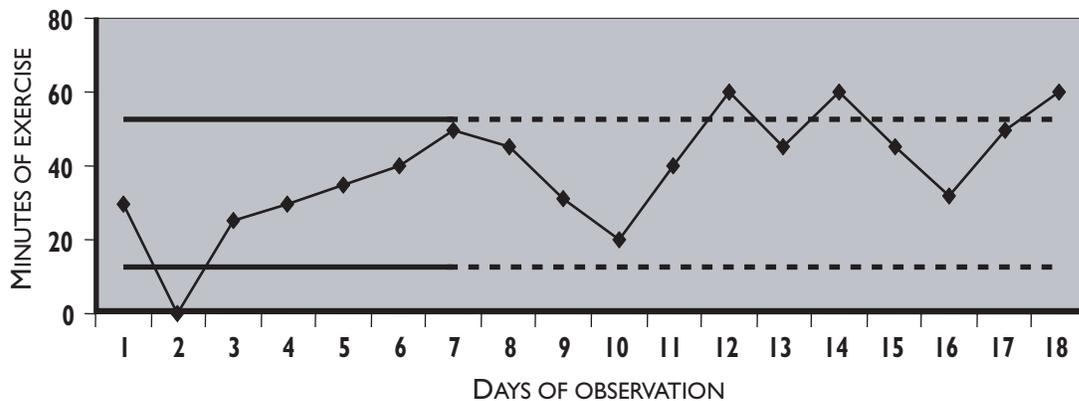
The LCL is calculated as the One-Fourth minus one and a half times the Fourth Spread:

$$\text{Lower Control Limit} = 27.5 - (1.5 * 10) = 12.5$$

A chart of the data, containing both the Upper and Lower limits, is provided in Figure 3.

The chart shows that in the first seven days, there was one very low point (of no exercise), a statistical abnormality. After the first seven days (used for

FIGURE 3 / Seven-Day Limits for Data in Table I



setting the limits), on three occasions the total exercise time exceeded the UCL. On these three days, there was a real increase in exercise time compared to the first seven days. If these days correspond to joining the volleyball team, the intervention seems to have worked.

Let us look at another example, this time on weight loss. A 48-year-old man measured his weight for eight weeks. He and his spouse then changed their food-shopping habits. They excluded all sweets from their shopping (they stopped buying colas, sweetened beverages, sweetened cereals, and chocolates). The data for this person are provided in Table 2. Weight was recorded once a week.

As before, the first step is to sort pre-intervention data from smallest amount of pounds over ideal weight to the highest value. This is shown in the last column of Table 2. Next, we calculate the median, which is the value where half the data ($8 * .5 = 4$ points) are below it and half (4 points) are above. The value should be between the fourth and fifth data points, or between 7 and 8, so the median is 7.5.

Since the median in this case is not an actual data point, we do not include it in the calculations of One-Fourth. We have four points in the lower data set, 3, 5, 5, and 7. The One-Fourth is halfway between the second and third points, in other words between 5 and 7—so it is 6.

To calculate the Three-Fourths, we calculate the halfway point for the upper half of the data. Again because the median was not an actual data point, we do not include it in the upper data set. We have four data points for the highest values. The Three-Fourths is between the sixth and seventh data points (between 9 and 10), and therefore is 9.5.

The Fourth Spread is $9.5 - 6 = 3.5$. The UCL is $9.5 + (1.5 * 3.5) = 14.75$. The LCL is $6 - (1.5 * 3.5) = 0.75$. A chart of the data is provided in Figure 4.

The examination of the chart shows that in the first eight weeks, all data points were within the limit. No weight was lost in the pre-intervention period, even though there was a considerable amount of fluctuation. Over the remaining eight weeks and compared to the first eight weeks, on four occasions the weight was lower than the LCL. Based on this analysis we can conclude that there was a real decrease in weight in the post-intervention period.

Limits for Days Missed

For the following discussion we assume that you have recorded days you stayed with your plans and days you missed. We also assume that most of the time you stayed with the plan. We then construct the limits on length of time in between missed days. The chart is constructed by plotting the number of

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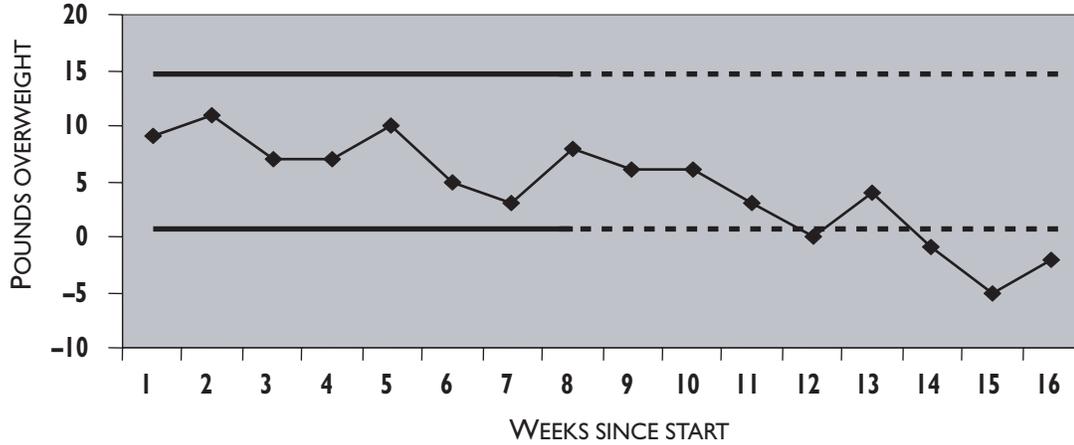
TABLE 2 / Recorded Weight Values

WEEK	POUNDS OVER IDEAL WEIGHT	SORTED VALUES	
		RANK	POUNDS OVER IDEAL WEIGHT
1	10	1	3
2	11	2	5
3	7	3	5
4	5	4	7
5	10	5	8
6	5	6	10
7	3	7	10
8	8	8	11
9	6		
10	6		
11	3		
12	0		
13	4		
14	-1		
15	-5		
16	-2		

missed days (length of time) on the y-axis and time since start on the x-axis. The rules for calculating the length of time between missed days are described in Table 3.

In Table 3, if you move from the first column to the second, one day has passed. If the habit has been kept, the length of missed days is always set to zero independently of what happened yes-

FIGURE 4 / Control Chart for Data in Table 2



terday. If the habit has been missed, we count the number of missed days. Once the length of missed days is calculated, we plot this against time since the starting point.

The upper control limit (UCL) depends on R, the ratio of missed days over days stayed with the plan. It is calculated as:

$$UCL = R + 3 [R * (1 + R)]^{0.5}$$

TABLE 3 / Rules for Calculating the Length of Time between Missed Days

YESTERDAY	TODAY	NUMBER OF MISSED DAYS
No data	Missed day	1 day
No data	Habit kept	0 day
Habit kept	Habit kept	0 day
Missed day	Habit kept	0 day
Habit kept	Missed day	1 day
Missed day	Missed day	1 + yesterday's length of missed day

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PROCEDURE FOR CALCULATING LIMITS FOR MISSED DAYS

1. Verify that days missed are fewer than days in which you kept up with the plan.
2. Plot duration of days missed against time since the starting point.
3. Calculate R, the ratio of days missed to days keeping up with the plan.
4. Calculate Upper Control Limit as: $UCL = R + 3 [R * (1 + R)]^{0.5}$
5. Check to see if the duration exceeds UCL.

In the above formula, R is calculated as:

$$R = \frac{\text{Number of missed days}}{\text{Number of days keeping up with plans}}$$

There is no LCL, as missed days are rare and the LCL will always be zero for a rare event. The UCL is typically calculated by using post-intervention data and projecting it to the pre-intervention period. We expect that in the pre-intervention period the length of missed days would be above the control limit derived from the post-intervention period. An example can demonstrate the use of missed day limits.

Table 4 shows data collected over 18 days by a 35-year-old woman trying to exercise more. She decided to take morning showers at the gym and thus combined her exercise and shower routines. The first week shows the data before the intervention. The remaining days show the data after the intervention. The question was whether this new habit had led to increased use of the gym.

To construct the control chart, we first need to use the rules in Table 3 to calculate the period of missed days. Note that the period grows in length until she goes to the gym, at which point it is reset to zero. The last column in Table 4 shows the calculated number of missed days. The control limit is calculated from the post-intervention data, the data for days 8 through 18. There is one missed day and 10 days on which she has kept up with her plans. Therefore R is calculated as $1/10 = 0.1$. The UCL is then calculated as $.1 + 3 * (0.1 * 1.1)^{0.5}$, which is 1.09. Figure 5 shows the resulting chart and control limit.

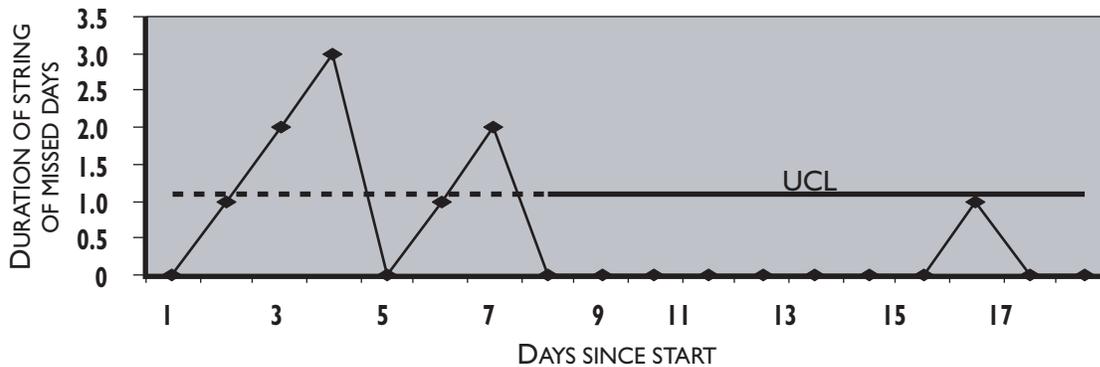
The chart in Figure 5 shows that during the pre-intervention period our subject had two strings of missed days. During the first string she did not go to the gym for three days. During the second, she did not go for two days. Both strings exceed the UCL calculated from the post-intervention period. Compared to the post-intervention period, these two strings of missed days

TABLE 4 / Missed Days of Exercise

DAY	MISSED?	DURATION OF STRING OF MISSED DAYS
1	No	0
2	Yes	1
3	Yes	2
4	Yes	3
5	No	0
6	Yes	1
7	Yes	2
8	No	0
9	No	0
10	No	0
11	No	0
12	No	0
13	No	0
14	No	0
15	No	0
16	Yes	1
17	No	0
18	No	0

R = 0.13

FIGURE 5 / Analysis of Data in Table 4



are long enough to constitute a real change in the process. Based on these findings we conclude that the intervention was working and the rate of missed days has dropped.

Conclusion

In this chapter we demonstrated how two types of control charts can be constructed. One type is for the analysis of continuous data such as weight or length of exercise, and the other is for analysis of missed days in keeping up with plans.

The point of any control chart is to help you improve. The effort put into measurement and analysis is wasted if it does not help you reach your goals. Constructing a control chart is time-consuming and admittedly, for some, it can be difficult. But is there an alternative? Eschewing one leaves us at the mercy of wishful thinking. Without a control chart, many err in detecting real changes in their weight and exercise times; they mistake random fluctuations for real progress. Control charts help discipline our intuitions.

Mary Loses Weight by Exercising

CHAPTER

7

LAURA BENSON

Look at Me, I Am Like You

I am like you and many others—smart, sensible, busy, and trying to stay healthy. But I was not able to keep to my exercising routines long enough to maintain my weight or fitness level where I wanted them to be. This is a story of how I used my intelligence to solve a personal problem. I am writing it down hoping to demonstrate to you how you can do the same. The problem I worked on or the specific steps may not be the same for you, but through my story you will be able to see how you can reach your own target.

My story will first tell you where I started—how I was already exercising but it wasn't enough. It frustrated me that I was putting in time and effort and not getting the results that I wanted. It seemed to work for everyone else around me. Well, at least it seemed to work for all of those walkers, joggers, bikers, rollerbladers, and “gym people” who look fabulous all of the time—and they seem to have never-ending time, motivation, and energy for their workouts.

You will see how I came to view my exercise habits differently, by looking at all of my daily routines and patterns, not just the exercise pieces. You can do this too, for whatever habit you are trying to change for the better. It could be dieting or de-cluttering, quitting smoking, spending more time with your family, decreasing your overtime at work, or really any type of personal improvement project. It is the process of thinking through the problem and the solution that counts, not *what* the problem is. I will show you how writing things down helped me to see things in a new light. I used certain tools to look at habits from different angles. I got help from the people around me, at home, at work, and from my friends. They had some good ideas, and they could tell me when I wasn't seeing things totally clearly.

I made a plan to change my exercise patterns and put it in motion. I was skeptical about my ability to achieve great success, but I was also excited

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about some of the insights and revelations that I had gained by really studying my habits and routines. Once I got started, there were some bumps in the road, some relapses—and some plans just didn't work at all. My feet hurt when I started walking a lot more, so I had to invest in some better walking shoes. I'd get up early in the morning to exercise, and in my head the little voice would say, "I don't THINK so!" But in trying new routines and changes, some things *did* work—and I made some progress. My weekly exercise time totals started going up, at least some of the time. My weight started slowly inching down, and my clothes got looser. People were asking about my exercise regimen and my progress. I had something good to report. Finally I was starting to reap some benefit in exchange for my efforts.

Seeing results gave me confidence in the process I was using, and the desire to stick with it. And I *have* stuck with it for many months now, and I have even more to tell you about it. I am still learning and improving my exercise habits. As I write this, I see things I didn't see even through all of those early months. I enjoy my exercise a lot more now. It doesn't feel like work—I am having fun with it. I want to do it. It has turned into one of the easiest and most preferred parts of my daily routine. If I could distill all this into a motto, it would be: change is not so hard, and if you do it right, it can last.

I Was Defeating Myself

I was exercising regularly—at least two or three times a week. I swam laps. I rowed with an indoor crew class. Sometimes I went to the weight room. I walked my dog several times a day. Occasionally I went rafting or hiking or biking. On top of it all, my job requires me to walk all over the building, up and down the stairs, all day long. Some people don't exercise at all, and here I was, very active and trying hard to stay in good shape. It didn't seem right that making a real effort wasn't enough. It seemed like I was trying harder only to lose ground.

On weekends I was able to exercise more, and for longer periods, because I had more time. This sometimes made me sore, though, and when that happened I would skip exercise for a few days. The other thing that occurs with episodes of intense exercise is injury. Last year I even had a month of physical therapy for a serious strain. The therapy was helpful because I learned the value of stretching. Before this episode I had hurt my back on a stair stepper, and for two weeks after that I could barely move, much less exercise. The lesson here was to avoid doing a lot of something brand new until my body had had a chance to adjust to it. I began to feel like I couldn't even exercise when

I had the time on weekends if I kept getting injured. This was a clue that I needed to spread my exercise more evenly—to do it more frequently for shorter periods. I needed more variation too, so that I had some cross-training. I can look back now and see these things because I finally took a very detailed look at the “process” of my exercise routines, and then the outcomes. I simply overlooked them at the time; I was trying hard, but not being smart about it.

My weight would not come down, despite all of this activity. I felt like I was fighting just to keep it stable. I’d gained about 20 pounds during my 30s, despite regular exercise. A doctor told me in my mid-30s that my body was changing. He said that the same type and amount of exercise would not maintain a stable weight as I got older. This was news to me, even though I am a nurse, and unwelcome news at that.

My colleagues and friends did not think I was overweight. They said things like, “You exercise all the time—you have to be in great shape,” or “You have nothing to complain about.” I knew differently. I knew what I looked like in the mirror, and I knew what I used to look like. I could see weight changes in photographs even over the past two years. I was wearing baggier clothes, and I am tall, both of which helped hide the weight. I had to buy larger clothes and could not fit into things I wanted to buy, which made shopping really unpleasant!

When I started this project, I went for a body composition analysis to help me see where I was and where I should be. The printout said I had 34 percent body fat, well above the recommended maximum of 28 percent. I needed to lose 23 pounds. A height and weight chart confirmed the same thing. This was not news, but I also knew that dieting had never worked in my case. Willpower and motivation were not enough to get me results. Furthermore, dieting always felt like punishment to me. I told the woman at the body composition analysis that I wanted to lose the weight through exercise. She smiled and said that would take a very long time. I smiled back and told her I was going to do it anyway. But I had to figure out how to get more effective results from my lifestyle and exercise routines.

I had to study these routines first. It was important to make some improvements without making the task harder. What follows is an account of how I went from exercising with no tangible result to exercising more, losing weight, and achieving better overall fitness—how I got smarter and more efficient in my efforts.

Picking a Goal

It took some time to figure out what my goal really was. Sure, I wanted to lose

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weight, but I also wanted to do it through exercise, because I like exercise. It really helps me manage stress. It gets me outdoors more and I sleep better. I even eat better (which means healthier) when I am exercising a lot. Some of you know this already: when you are huffing and puffing and sweating, that junk food you had for lunch suddenly does not help at all. I also wanted to avoid injury. This meant that I needed to improve my overall fitness level. So as I looked at all of my targets, I realized that losing weight alone would not cut it. While I thought that weight loss was my primary goal, writing all of these desired benefits down showed me that I was wrong. It was EXERCISE, in the right formula of amount, frequency, and type that needed to be the focus. This was the one thing that would lead me toward all of the other things I had listed. So I settled on a goal of increasing my total exercise time each week, and doing so included increasing frequency, not just total time.

I did not set a specific goal, but it might be helpful for some of you to do so. I knew that overall improvement in my total time exercising would be sufficient reinforcement to me in all of the areas I have mentioned. I also do not do well with self-improvement when I feel pressure, such as needing to meet a defined goal. I do better with small, observable gains that I can see through writing things down. It was later on for me, once I'd achieved some success, that I set more of a maintenance goal for my exercise routines. When you make your plan for change, you need to consider what you know about yourself, and what works best for you. You can learn something about this while you analyze your habits.

Writing Things Down Helped Me Focus

In order to figure out how to change my exercise habits, I had to pinpoint

PROBLEM STATEMENT

- Beginning exercise was 2–3/week, for about 30 min. each time, totaling 60–90 min./week, which maintains but does not decrease weight
- Can't always find time to exercise
- Overweight by about 23 lbs. per Body Composition Analysis
- Intensive exercise a few times per week leads to injuries and periods of less exercise overall
- Skipping exercise leads to increase in stress

what they were at the time. These too, I started to write down. I did this before I attempted any changes. I made a chart that included the date, day of the week, type of exercise, time of day, duration in minutes, any changes in weight, and whether I did it alone or with other people. These were just the things I was interested in exploring—there is no grand design to it. Writing them down enabled me to start to really think about my exercise routines, and

Personal Exercise Log

DATE	DAY OF WEEK	TYPE OF EXERCISE	TIME OF DAY		DURATION IN MINUTES	WEIGHT	OTHER INFO OR NOTES	WEEKLY TOTAL EXERCISE TIME
			-MORNING	-AFTERNOON -EVENING				
11/11	Sun	Swim/walk		M/A	30/25	-8		
11/12	Mon	Row		E	20		Class	
11/13	Tue				0	-8.5		
11/14	Wed	Walk		E	25		Sore—skip class	
11/15	Thu	Walk		M	25	-9.5		
11/16	Fri	Walk		E	25			
11/17	Sat	Walk		M	15	-8.5		
11/18	Sun	Hike		A	70			
11/19	Mon	Row		E	25			
11/20	Tue				0	-10		
11/21	Wed	Walk/row		M/E	15/25			
11/22	Thu	Swim		E	30	-10.5		
11/23	Fri	Walk		A	25			
11/24	Sat	Weight room		M	30	-9		

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to break them into smaller parts. A sample of this log is shown below.

This became my personal exercise log, one I have kept for the past nine months. Early on it was really interesting to see my efforts written down—it gave the process a new meaning. It made the work that I was doing more tangible, more real. I hoped it would show me what was happening between my weight and my exercise time. I hoped it would show me patterns in my exercise routines. There were some surprises to come!

In the beginning I did not exercise every day. The first benefit of writing things down was the difficulty in putting a ZERO down for any given day. Scribbling that zero did not help me get to my goal, I could see that right away. Occasionally it did not feel that bad when I could see a lot of exercise time logged around it. I could also see the effort I was making. I could see that even 15 minutes a day contributed to the weekly total. It looked like a lot more on paper than it seemed to be in my daily routine. This was good reinforcement. I could also look at how much I was varying my exercise, and how much it looked the same, day after day. One of the things I needed to do was to vary it more to decrease injuries from doing the same activity repetitively. Plus, if I was to exercise even more, I needed to make it more interesting. There are only so many times you can do the same thing over and over, all of the time.

I know that you, the reader, may not be familiar with the particular charts or tools or measurements that I am using. But stay with me, because the secret of my success is not in these tools—it is in the process that you have read elsewhere in this book. There are many online tools that can help you do flowcharts or diagrams. And when you have nothing else, putting pen to paper works just fine.

I Figured Out What Keeps Me from Exercising More—I Saw Myself in a New Light

Setting a goal of trying to increase my exercise time seemed like a good start. But goal or no goal, I believed that I had no more time in the day or in the week to fit in more exercise. I also used to think that lack of enough motivation and other priority obligations kept me from exercising more. Now I see the whole exercise process differently.

My life was—and is—full of routines. Working, eating, sleeping, and other daily habits affected me and my time. Socialization, household responsibilities, recreation, errands, and family obligations all seemed like priorities. I wanted to know how all of these life routines affected my exercising.

Because I thought time was a big issue, I looked at how I used it throughout the day. I chose to look at weekdays because they are the most routine and demanding of my time. I wrote down my daily schedule without going into too much detail. Even though I knew the things I did every day, accounting for my time was hard to do on paper and it really forced me to think about my routines. Again I found that writing things down helped me see things and think about them in a different way. My daily schedule is shown below.

Right away I could see places where my use of time was fuzzy. Staying in

Routine Weekday Schedule

TIME	ACTIVITY	NOTES
5:30–6:00	Wake up and listen to radio in bed	Extra time
6:00	Get up	
6:05–6:20	Walk the dog	
6:20–7:15	Have breakfast/read paper	Extra time
7:15–7:55	Shower/get dressed	
7:55–8:05	Feed dog/pack lunch	
8:05–8:15	Walk to work	
8:15–12:15	First part of work day	
12:15–1:00	Lunch	Eat at work or home or out
1:00–5:15	Second part of work day	
5:15–5:25	Walk home	Often leave work late (after 5)
5:25–5:45	Change clothes/read mail	
5:45–6:30	Take dog out to play/run errands	
6:30–7:30	Exercise or fix dinner	Variability in use of time
7:30–8:00	Eat dinner	
8:00–9:30	TV/chores/schoolwork/social/ phone/computer	Unstructured time
9:30–10:00	Walk the dog	
10:00	Go to bed	

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bed in the morning and listening to the radio was a habit that was hard to explain. The breakfast period looked like it had potential for more exercise. However, I argued with myself that early mornings have never been good for me for exercise. More than any other time, if you remember, this is when my body and that little voice in my head would say, "I don't THINK so!" In the past, I had tried running, swimming, and rowing on equipment early in the morning, and it was harder work than usual and I couldn't do it as well. So I stopped trying. Still, it was a potential time slot. My lunchtime at work was when I saw potential for running errands, or taking care of small tasks that I usually do in the evening. So while I was not finding exercise time here, I was looking at my time management of other routines that affected my exercise time. In writing down my schedule, I had trouble deciding when I usually left work. This was important because it pointed out that I did not routinely leave on time.

The early evening was a hectic time between exercising the dog and arranging dinner. This was an area where I eventually realized that I might be able to get some help from my housemate. If she could take responsibility for one of these tasks, I could do the other simultaneously. This would save about an hour, even it was only a couple of days a week. The other thing I saw here was that once I'd had dinner, it limited my ability to do certain types of exercise. Who wants to exercise on a full stomach? This was actually a big realization because I am the type of person who really needs to eat on schedule, at regular times. I had an ulcer 10 years ago and regulating meal times had helped me heal it. I also cannot go long periods without eating, so I could not postpone dinner until late evening without snacking around 5:00–6:00 p.m., especially if I was going to exercise. And if I ate dinner too late, I would get indigestion when I went to bed. Thus another revelation came to me about how my eating times and habits directly affected my exercise routines.

The biggest chunk of time that was hard to describe was the 8:00–9:30 p.m. period. I really had no routines during this time, so I just sort of drifted among the TV, the phone, and the computer. In thinking about it, I realized that once I sit down in front of the TV, I rarely get up again. Sound familiar? And it didn't even matter what was on. There were one or two shows a week that I watched regularly, but otherwise I was just getting sucked into whatever was on, even if I didn't enjoy it. Now I will not fault anyone for having some "down time" that is unstructured and relaxing. But when I looked at my written daily schedule, I could see that I had two chunks of this "down time," one in the early morning and another one in the evening. I would never have noticed this without the written schedule to help me think about my daily routines.

Looking at my daily routines and habits on paper showed me all of these

things. They may seem simple or obvious, but I was not aware of how they interacted until I had to think about my activities and write them all down. Once I could see the interactions, I could look for places to make changes in the whole “system” of my routines and habits. Forcing myself to look at them on paper also helped me stop blaming myself for lack of progress. I could begin to see how I could manipulate my time or my environment in ways I couldn’t see without writing my schedule down.

I Figured Out What Was Helping and What Was Getting in the Way

Studying my daily schedule was only one way of looking at my problem. It helped me to identify things that got in the way of exercise for me. Another way to look at my exercise habits was to try to identify things that helped me exercise more. There are many ways to tackle this part of problem solving. The simplest for me was, once again, to make a list, so that’s how I started, but this approach did not really yield any patterns right away. I tried to do a flowchart with boxes and arrows, but it just got too complicated. So I went back to my list and started to *look* for themes or groupings.

When I looked at my list of things that helped me exercise, I could sort of see three areas or groupings or categories: factors that had an impact on my time; motivation factors (or put differently, benefits); and environment or equipment factors. So I made three columns and listed the things that fit in each category. I even thought of more things to add while I was making the chart. Again, having to think about it enough to write it down in words, and then seeing it on paper helped me to see a bigger picture than I had in my head. My chart appears below.

What I found was that I could list a lot more things leading me to exercise than those I could think of as obstacles. This really surprised me, because the obstacles had seemed so big. Listing things that helped also led me to look beyond the scheduling issues. I could see other factors in my life that relate to exercise. For example, mealtimes could either help or hinder my ability to exercise, regardless of whether I had the time to exercise. My short commute to work really provided extra time for exercise that most other people did not have. The availability and proximity of recreation centers, parks, and trails could provide variety and atmosphere.

Attending a scheduled class with others, which is what I did with my rowing, was a big help. This is a good strategy to ensure that exercise happens. You look forward to seeing other people in class and watching your skills and performance improve measurably over time. You have an instruc-

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What Leads Me to Exercise?

MOTIVATION

(BENEFICIAL OUTCOMES)	TIME MANAGEMENT	ENVIRONMENT
Socializing with others	Getting up on time	Decent weather
Weight loss	Sharing cooking	Recreation centers close by
Stress management	Running errands at lunchtime	Short commute to work
Clothes fitting better	Leaving work on time	Rowing machine at home
Sleeping better	Scheduling exercise time in advance	Bicycle
Improved athletic performance	Using weekend time for longer activities	Having proper clothing/shoes
Variety in my activities	Sharing dog-walking responsibilities	Joining local recreation classes
Getting outdoors more	Combining social contact with exercise	Using local parks/trails where others are exercising
	Planning mealtimes around exercise	

tor who coaches you in your form and performance to help you improve. Plus you paid money so you have “invested” in the class—you have an additional incentive to attend regularly.

I Got Help from Others

With all of these charts and lists and diagrams I had a lot more information about my exercise habits than when I started out. I had looked at my exercise habits in several new ways, which had helped me see everything as part of a bigger picture. Wow—I thought I was almost done figuring this all out. But you know, I was the only person looking at the problem.

I started talking to others around me about my exercise habits and how I wanted to improve them. I shared my exercise successes and failures, and

talked about never having enough time. My housemate made an important observation. It seemed to her that when I let exercise time *fit in if there's time* at the end of the day, it often got “skipped.” It is so easy to stay busy and fill the time with all kinds of tasks, until you are exhausted at the end of the day. Exercise is the LAST thing you feel like doing then, even if you have the time. This was happening on both weekdays and weekends. My housemate’s observation led me to think about planning and scheduling my exercise times more in advance. On nights when I had my rowing class, this was not an issue. But especially for non-routine days when I had school or a social event, I started to look ahead. I began planning when I could exercise on those days instead of waiting to see if I could fit it in on the fly.

My housemate also suggested simplifying dinners. One of my strengths is that I like to eat nutritiously, but this had me always doing the cooking myself and trying to cook dinner each night during the week. This did not work well with exercising the dog and exercising myself during the evening—there just wasn’t enough time for everything! Needing to make dinners easier was like a light bulb coming on. I explored some ideas about getting take-out food or pre-prepared food for some weeknights. This was an additional expense—take-out food, especially when it is not fast food, can be costly. It was affordable for me, though, so I increased the frequency to a couple nights a week. Another change I made was to cook something on Sunday that would provide leftovers for a night or two during the week. Both of these ideas turned out to be a big help time-wise without compromising nutrition. Their direct impact was not necessarily huge, but they made a big difference in decreasing how pressured I was *feeling* time-wise.

I talked to a co-worker about my desire to improve my exercise habits. She was amazed that I thought I needed to improve. She thought that I exercised a lot already, and she was one of those people who insisted that I was not overweight. But she also knew that exercise helps me manage stress and keep my weight down and fitness level up, and that those things are very important to me. I explained to her about wanting to do more but not being able to find the time. The first thing she said to me was, “Try leaving work on time.” She knew that I often stay late, and she pointed out that she has to leave to pick up a child, and that helps her get out on time. She began reminding me about leaving work on time shortly thereafter.

Another thing my co-worker helped me with was really just a surprise observation I made after talking to her about her daily schedule and time management. She often ran errands during her lunch hour because she didn’t have time to do them in the evening due to kid-related activities. You will remember that I walk to work—it had never occurred to me to go anywhere

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from work because I did not have my car. Yet it was easy to bring my car to work, or to walk home and get it. Another light bulb—I could go to the bank, dry cleaner, drugstore, post office, etc. during the workday. I have since gotten so good at this that I can take care of most of my Saturday morning errands during one weekday lunch hour, and if I go at 11:00 or 1:00, the traffic is far less than it is on a Saturday, saving me substantial time. Sometimes I can even fit in an errand in the early morning before work now! I used to run errands on my way to and from work when I drove, but I had totally forgotten this option because of changes in jobs and my daily routines over time. This is important because the simplest things are sometimes the least obvious.

Other people know and share our habits with us. They will also be affected by changes we make in our habits in order to achieve improvement. It is important to get their opinions to help analyze the problem and to implement changes. My housemate now shares more of the play time with my dog, and shares cooking responsibilities more frequently. She has also started using the rowing machine and enrolled in a yoga class. She attributes her increase in exercise in part to watching me achieve successes and feel better with my own program.

I found that it is also important to talk to others who demonstrate success with the habit you are trying to improve. They will share their knowledge and experiences, and they are the experts! I used my rowing and mountain-biking instructors, who are both fitness nuts, for this. It really helps to hear their successes and failures along the way to becoming good at what they do. They told me about equipment, stretching, training schedules, cross-training, preventing injury, and last but not least, how to keep it fun. They also both talked about how having children had cut into their exercise time, and how they'd had to make daily routine adjustments to maintain their exercise schedules. One rows together with his son now, and the other has become a bicycle commuter. They both teach the activities they love, so they earn additional income while doing what they enjoy most.

I Made a Plan to Change My Daily Routines

Seeing my daily schedule on paper allowed me to see that this problem is not so overwhelming. Written down, it does not look as rushed as it feels to live it every day. It did not look that challenging to intervene. When I think about my busy days, it seems overwhelming trying to decide where to begin to make a change. In my head I cannot imagine where I even have any control to make a change. It feels more like my time controls me. When it's laid

out like this, however, I feel like I have control over just about all of it.

I looked at my schedule and the “down times.” I also looked at the barriers to exercise I had identified, such as time, injuries, responsibilities, and priorities. If you recall, my list of what leads to exercise had turned out to be longer than things that got in the way. Now I tried to identify some areas in which I thought I could realistically make some changes. These are listed below.

When I looked at this list I really, really doubted that any of these individual things would make a big difference. They looked too simple and too obvious. Most of them were things I had tried on occasion before. Now this is an important concept. Trying things once in a while does not lead to permanent change, and it usually depends on motivation. You need to build change permanently into your daily routines, so that your whole set of habits and routines changes. My plan included *all* of these simple changes, in combination. When one of them didn't happen, such as leaving work on time, the others were still present to support the change. And not all of them ended up contributing to success. I still rarely exercise in the early morning. But the option is there in my thinking, so when I have a very busy day coming up and I am trying to pre-schedule exercise, that option is available and I use it occasionally. Sometimes I still cook, and I only run errands at lunch when I need to. The point is, I do not let these things interfere with my exercise anymore. I recognized the patterns among them and now I control how the whole thing plays out.

Scheduling exercise times, instead of trying to “fit exercise in,” turned out to help a lot. I just mentioned one example: when I know I have a real-

IDENTIFY AREAS OF INTERVENTION

- Target 5:30 a.m. and 8 p.m. time slots
- Share cooking or get take-out food
- Share dog walking
- Schedule exercise in advance
- Leave work on time
- Get up on time in the morning
- Vary exercise activity (decrease strain)
- Vary time of day (add variety/use down time better)
- Run errands during lunch hour instead of evening
- Start walking for exercise

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ly busy or long day coming up. Another aspect of pre-scheduling was planning exercise times earlier in the day, especially on weekends. Previously I felt I had to get all of my errands and chores and schoolwork done before I could afford to take the time to exercise. I was treating exercise as a luxury, which is sort of bizarre when you think of how critical it is to your overall health and longevity! I began exercising in the late morning or early afternoon on weekends. I actually had fun during my exercise, and I have finally stopped feeling guilty about that. I also found that everything else that has to get done *does* get done by the end of the day. The other things can wait.

One of the easiest parts of the plan, starting to WALK for exercise, made the quickest difference in my total exercise time. I think one of the reasons is that it is so convenient. I did not have to get in the car and go somewhere to exercise. I did not always even have to change clothes to do it. I could just step out my front door, at any time of day or night, and walk a half-hour loop through the neighborhood. This also gave me time to think and time to enjoy the outdoors. Even in the winter and the summer when weather is extreme, you can always go for a walk. And if you think that just walking would not make much of a difference, walking accounted for the majority of my exercise time early on, when I lost the most weight.

Changing my own routines also affected others, and for example, I had to negotiate and compromise about cooking and dog walking. Sometimes I cannot go out and do the kind of exercise I would choose that day, because I only have enough time for a quick 30-minute walk or the rowing machine. I have to coordinate dog coverage for my rowing class nights, but I also agree to be home for the dog on nights that my housemate has class. The point I am making is that my plan took some time and modification to implement; I did not do it all in one swoop. It took some tweaking, to build on what was working and to discard the rest. Most of my obvious changes happened during the evening, but I still believe that the combination of all of the changes utilized together is what worked. Adding in the walking made an immediate and significant impact because it was convenient, quick, and easy to do any time during the day, even after meals. You will read later about some other adjustments I made along the way. I continue to learn about the whole process, and I am still making changes nine months later, building on what I know now.

I Measured My Progress

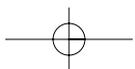
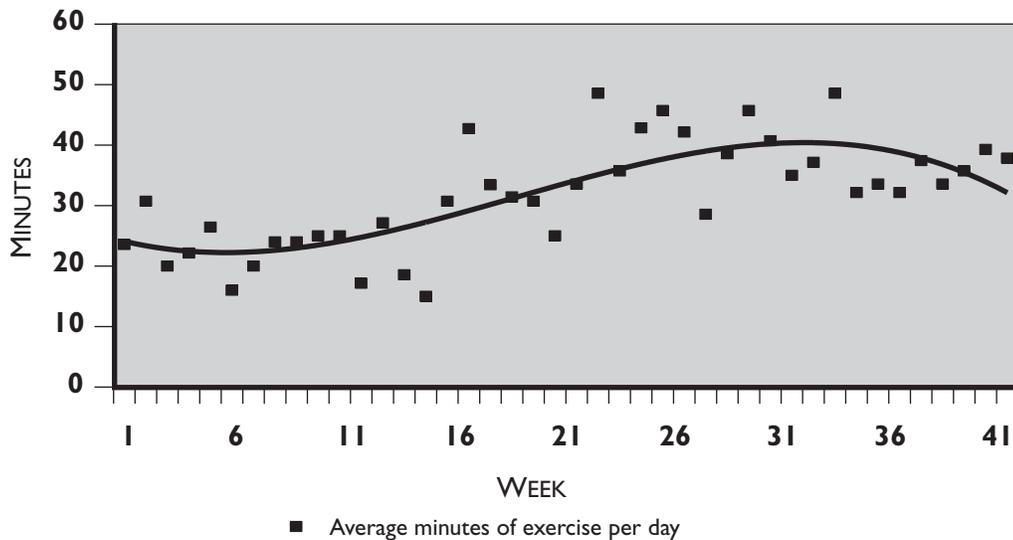
Before I was ready to implement my plan, I had been exercising an average of 13 minutes a day. This represented my two or three days per week for 20–30 minutes per session, averaged out over the seven-day week. I did not

set a specific goal for improvement, but I very much wanted to observe my progress for improvement over time. So I continued to keep my log daily. The chart below shows you how I did over the first 42 weeks.

You can see that in the first few weeks I made some improvement in my exercise time by increasing from a low of about 13 (not shown) to 20-some minutes per day. Something about my plan was working. However, then you will see that in weeks 6–15, my average time dropped at times, even almost back to the 13 min./day, where I’d started. One reason was that I got the flu one of those weeks (week 12). I can see this in my notes when I look back, so while it looks “bad” on the graph, I know it was not a process failure. Another thing I see in my notes is that weeks 14 and 15 were around Christmas, when a lot of additional activities and tasks disrupted my routine schedule.

Another really interesting observation relates to the increase in average exercise time between weeks 16 and 34. Although I had lost 10 pounds during the first 10 weeks with less exercise, I did not lose significant weight during this period of significant increase in exercise time. You will see my weight loss chart later in the results section. In fact, my weight loss hit a downward trend after the first six weeks. This baffled me, and I began to wonder again whether this process was really going to work in the long run. It seemed that I had maximized my benefits and hit a plateau. Even though I was putting in more time and continuing to increase my exercise time, which met my overall goal, the weight issue was bothering me. I had already dropped a clothing

Average Minutes of Exercise per Day



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size with the first 10 pounds, but I wanted and needed to lose more weight.

Some of you may already know or be able to guess what happened during this time. Even though I was not losing weight, my clothes continued to get looser, and I felt really good. Later on you will see data showing that I was decreasing body fat and building muscle during this seemingly long period. I even bordered on dropping another clothing size, even though I was not losing weight. I want you to listen to this part carefully, so pay attention. If I had given up then because I could not see all of the results I wanted, I would not be where I am now. It is extremely important not to believe all of your perceptions. This is why writing things down and studying all of the different pieces of information can help you see the process more clearly. It was critical for me to see that my exercise time was showing good improvement. While I was not seeing weight loss, I *was* seeing better stress management, good health through the winter, and improvements in my athletic performance. Logically this told me that improvement was happening, and subjectively I felt it.

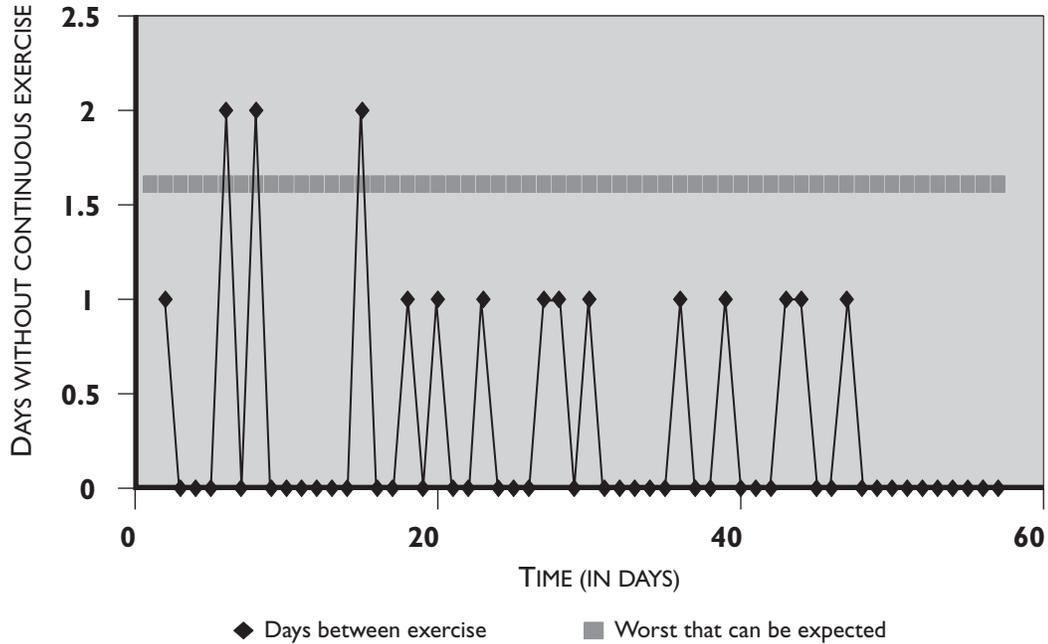
Relapses Are Opportunities for Problem Solving

During the time when I seemed to stop losing weight, I wondered if I had somehow fallen into old habits. My exercise times, though, as I mentioned, were showing and sustaining noticeable improvement. Earlier in my process, when I was first implementing my plan, I did run into some problems. I was not so concerned about exercising every day, but sometimes I was not exercising for more than one day in a row. I was still showing overall improvement and some weight loss, so I could have shrugged this off. But these lapses told me that the system changes I had planned were not always working. If I had not noticed and paid attention to this trend, the problems would have interfered with my long-term success. What I will call “sometimes solutions” were not much better than relying on motivation.

One tool I used to look at the lapses is a chart you can see below. It shows the number of days between exercise.

You can see the times when I skipped a day, and the times when I skipped two days. The solid line shows a statistical calculation of the worst that can be expected based on my own historical patterns. For me, based on my exercise log, more than 1.6 days was a relapse. You can see that I had some relapses early on. Mostly these had to do with not pre-scheduling my exercise during really busy times. Or in some cases, I pre-scheduled, but it didn't work. As you know all too well, things do not always go as planned. It

Relapse Chart



was just as good to see, though, that skipping one day of exercise was not a relapse into old habits. This was such a relief, to know that there was room in the process for variation. It meant that the process should work most of the time if I had made the right changes, but it did not have to be perfect all the time. This goes with most everyone’s reality, where nothing goes as planned 100 percent of the time.

As I have said before, it is not important that you use the same tools or measurements. It is just nice to know that they exist. What is more important is that you write down and look at *your* data to measure *your* progress. Do not jump to conclusions or think that you know what everything means for sure.

I Kept Learning and Making Adjustments

In reviewing my log, I was able to see that I was continuing to exercise longer on Saturdays and Sundays than on weekdays, but I was usually doing a couple of different activities instead of just one for a long time. In looking at this I realized that there was no reason I needed to limit myself to one activity on a

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weekday, or even one episode of exercise. Funny thing—I had just figured that if I did one activity every day, that was enough. And it *was* enough, but there was no reason to limit myself to one if I happened to have time for more.

I could also see patterns of zeros on days I had school in the evening, or any other type of social commitment. Although some zeros were OK, I did start to plan better for those occasions. Now I actually will plan to walk in the morning on days with busy evenings. I have found that walking in the morning is actually pleasant, so now I do it sometimes even if I still plan to exercise in the evening. It especially helps me relax if I am anticipating a particularly stressful day at work.

Over time I got a bit bored with swimming and rowing and walking. Although I really do enjoy these three things, when you are doing them all of the time, constantly, they lose some of their luster. One of the things I did to counter this effect was to start swimming at different community centers. I now have a new favorite. I also found some new places to walk. I found a park close by, for example, that had a 4.5-mile trail around a lake in the woods, and I started walking there once a week. Pretty quickly I could walk the whole trail in 70 minutes without being sore afterward. That 70 minutes is a satisfying recording in my log, and the walk itself is really beautiful—an additional benefit.

It was also at the park that I saw a flyer for a biking class. I had a bicycle that I only rode once a year at the beach. It was in my basement all along and it never occurred to me to get it out and ride it. I signed up for the class—called “Biking for Fitness”—to get back into cycling, and to learn bike maintenance for safety reasons. It turned out to be a mountain biking class, and I loved learning skills like jumping curbs and riding off trails on rough terrain. Believe me, I would have never predicted this for myself! Now I am buying a mountain bike and I will probably join a local cycling group.

When my indoor rowing teacher offered a new course rowing on the water, I made a decision to try it. I hated giving up the indoor rowing class, but with school and my dog, I could not be out every evening of the week, so something had to give. I also had a rowing machine at home, which I could use more often. This would actually save time driving to class and back. So I started rowing in a two-person scull on a local river. Rowing (on equipment or on the water) is a great exercise because you use all of your major muscle groups, but there is no weight bearing on your joints. You can also see your progress by measuring your times as they improve. Rowing and biking are both activities that you can do at any age. I will tell you, though, that I am 43 years old as I take up mountain biking and sculling, and some people in my life are convinced that I have lost my mind! I simply tell them

that I have found new challenges, new skills, and new fun.

I mention all this because I never would have believed I would be tackling these activities. But looking at my routines, setting goals for more exercise, and learning as I went along opened my eyes to my community and all of the possibilities out there. Especially the rowing and mountain biking came from turning to local resources (through the county and park service to see what was available, and just picking some things that sounded interesting to me). In the past I have taken yoga, deep-water aerobics, and weight room orientation classes this way as well. There are many resources available that do not cost as much as joining a health club. Mirroring my engagement in other activities, I did each of these things for a while, and then moved on to something else to keep things fresh and exciting.

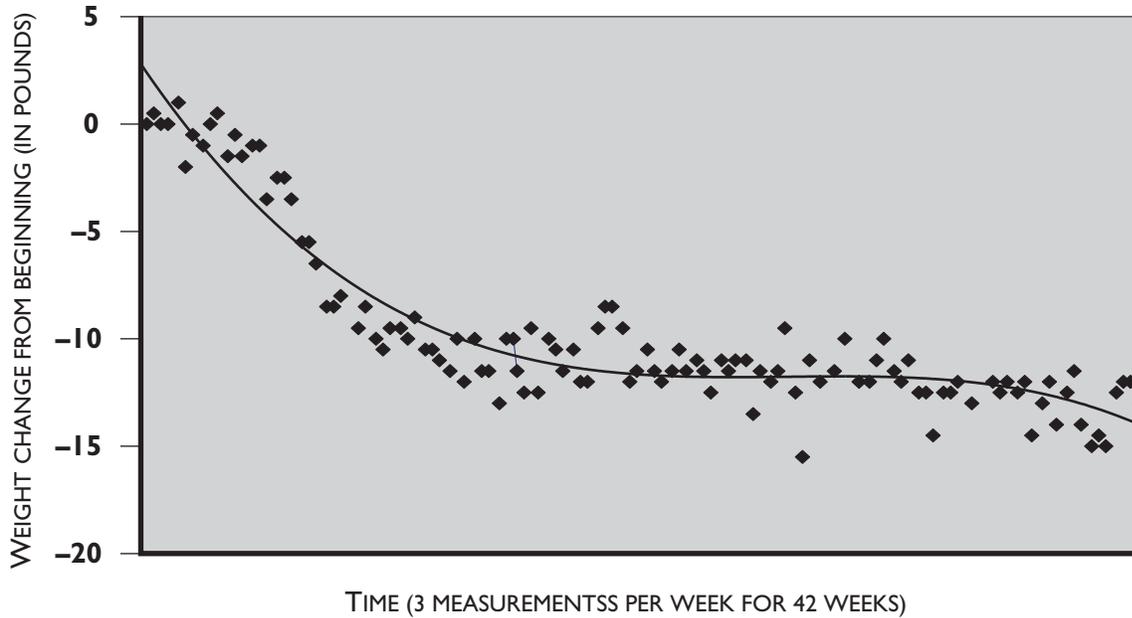
Activity also has to be broadened if you want to sustain it over time. The more I varied my exercise, the more I looked forward to each individual activity because I couldn't do them all as often as I wanted. I also had more to choose from on any given day based on my schedule, the weather, and how I was feeling. Besides more types of exercise, the recreational components of each exercise have become important. There are days I hike around the lake because I just need to get away from everybody and everything. Other days I bike by the river so I can see other bikers, rollerbladers, boaters, soccer players, and so on. Adding other kinds of exercise has changed my overall environment for the better.

It Worked—I Got Results

Now we have come to the part that I cannot wait to tell you! Some of this information I have only just learned myself in preparing it for you, the reader. I have known all along, from the beginning nine months ago, that I was making improvements. I could see in my log that my exercise times were increasing, that I had fewer days between exercise, that I was losing weight, and that I was varying my exercise more. These were all things I wanted to accomplish. It was really, really important to be able to see them come true as I went along. Also during this time I dropped two clothing sizes, one in the first 10 weeks, and the other since then, when my weight did not drop as dramatically. My bathing suit even became too big, an experience I can't remember ever having in my whole life.

Below you can see a chart that shows you my weight over time, as I recorded it in my log three times a week. You can see that I have lost up to 15 pounds over the past 42 weeks (or about 10 months). The solid line shows you the trends in the dots, how I lost quickly at first and then leveled off.

Weight Loss During Exercise Program



Recently I have started to lose weight again. When I see my weight recordings graphed like this, even I am amazed at how dramatic it looks! In my log I could see the changes, but this is the bigger picture of what I have accomplished. And now it is great to see the plateau end and the weight decrease start again, because I want to lose a total of 23 pounds to put me into the average weight range for my height.

I had honestly expected to lose more weight by now doing all this exercise, but I will keep going. I cannot complain about dropping two clothing sizes and feeling great! And you have to remember, I am not a dieter. If I could have dieted with the exercise, you can only imagine where I might be with my weight, and it would have happened faster. Now I would tell you, however, that I probably don't need to diet since I have found another way that works for me.

You will remember that losing weight was only one part of my plan, albeit an important part. Next I have charted for you some other measurements that I took along the way, so that you can see more of my results.

You can see how I started at 2.5 days of exercise per week and ended at almost 6 days per week. Along the same lines I went from an average of 13 min./day to 32 min./day. You will recall that I did not set a specific goal for increasing my exercise time, but it has more than doubled. I am pointing this

RESULTS: Measurable Changes over Time

	BEGINNING	10 WEEKS	10 MONTHS
Average # of days per week of exercise	2.5 days/week	5 days/week	5.8 days/week
Average minutes of exercise per day	13 min./day	23 min./day	32 min./day
Weight loss	0 lbs.	10 lbs.	12 lbs.
Body Mass Index (BMI)	26.5	25.1	24.9
Percentage of body fat	34%	N/A	28%
Pounds of body fat	66.6 lbs.	N/A	51.5 lbs.
Rowing performance (2,000-meter test)	8:53 (in minutes)	8:34 (in minutes)	8:26 (in minutes)

out because you will also recall that my biggest problem, I thought, was not having enough time to exercise! You should also see that the biggest increase came in the first 10 weeks of my exercise program. This points to the system and process changes I made. Making some changes in my routines yielded results pretty quickly, which means they were some of the right changes. And the fact that I was able to sustain these changes over time has made exercise easier for me. Exercise is a regular part of my day now, not something I am trying to fit in.

While I lost about 12 pounds in *weight* between body composition analyses, I lost 15.1 pounds in *body fat*. This was definitely a surprise result. The nutritionist who performed my test said that I had a 3.5 pound increase in muscle mass, as measured by body water content. This was not part of my plan, but it turned out to be a really cool outcome! In fact, probably even more dramatic than my weight change was my change in body fat, from 34 to 28 percent! That is HUGE. It also put me into the upper end of the normal range for my age and height and weight.

Body Mass Index (BMI) is another way to look at weight. The 1998

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Federal guidelines describe a BMI of 20–24 as healthy, 25–29.9 as overweight, and over 30 as obese. You can see that I started at 26.5 and progressed downward to 24.9, which is still a little high. This measurement does not show as dramatic a change as the change in body fat, but it is a very easy measure to obtain. You can even go on the Internet, put in your height and weight, and it will be calculated for you.

My rowing times may not mean a lot to you, but they are just as important to me as everything else you see on the chart. A decrease in rowing time is obviously good—my 10-month rowing time above is a personal best, and I have been rowing for almost three years now! That means I have almost three years of results for comparison. My times have fluctuated up and down, especially because of injury. Although you may say that there are only a few seconds of improvement, the better you get, the harder it is to improve your performance, even by seconds. Reaching a personal best time now, without increasing my rowing activity, tells me that I am in better condition with regard to strength and endurance. My overall fitness level has improved. I would attribute this to losing weight, more cross-training, and more time spent exercising. I have also not had an injury that has kept me from exercise since I started this program. There are days when I might be sore from exercise the previous day, or my feet hurt from walking, but I just do a different type of exercise those days. I believe this is another indication of my overall fitness. In the beginning I said I wanted to avoid strain and injury, and to improve my athletic performance. My results make me very happy in these areas. I cannot tell you how amazed I am to see all of these results for myself!

I Kept It Going

Even more than the results, I am most surprised that I could keep the exercise program going through this entire period. I was skeptical that little things like when I ran errands or how often I cooked dinner could permanently impact my ability to exercise. Remember, I was the person who barely had time to exercise for 20–30 minutes a couple times each week. It was always a struggle to fit it in, often it got skipped, and I could not lose weight even when I did exercise. You will also recall that despite these things, others thought I had my exercise under control, and that I was not overweight.

Now that I am doing more than double the exercise, it's not harder than before, it's easier! In fact, my other daily routines fit around my exercise and support it rather than getting in the way. This is the key to keeping it going. You have to really, really, look at all of your systems and routines to discover the important relationships between them. That is where you gain control.

Motivation is a good thing and it helps, but it is never enough to get you everything you want. In order to make and keep a permanent change, you have to find the right changes to make. The right changes for you will be different from those that are right for the next person.

My changes have kept coming. Even as I write these words, I have had to think about this process again, looking at the data and the results. Now I am working on establishing some regular schedules for varying my exercise. I am still rowing on the water, but it has been really hard work and much more challenging than I had expected. I have thought about quitting at times. That would be OK, as outdoor rowing isn't for everyone, but I think the challenge might also be what keeps me doing it. I feel more able to take on challenges and master new skills now that I have been able to improve my exercise and fitness so much.

In fact, I feel great. People around me have watched my progress and asked a lot of questions about how I got such good results. It is hard to explain this process verbally, especially in terms of how writing things down and looking at them from all different angles help you see them in a different light. That is why I wanted to write my story and share it with you. I am not all that unlike you, and I believe that you can do it if I've been able to!

Review and Summary

CHAPTER 8

This book has laid out a seven-step process for personal improvement targeting exercise, dieting, and weight loss, as shown in Table 1.

This approach is systematic, evidence based, goal driven, shared, and tested. It uses the scientific method applied to changing the way we live. Similar methods have been used for decades in industry to improve product and service quality. This process uses the power of group support, process understanding, measurement, and sequential experimentation.

One of the most important axioms in industrial quality improvement is that a higher quality often costs less. In industry, doing it right the first time is cheaper than doing it wrong and having to do it all over again. Could

TABLE 1 / Seven Steps in Personal Improvement

1. Put together a team of process owners
2. Define your goals
3. Define your relevant life processes
4. Implement changes
5. Gather data
6. Engage in cycles of improvement
7. Tell your story

weight control follow this example and save you money? Yes, and Table 2 shows how.

As illustrated by Table 2, David saves money, exercises, and controls his weight. Over 20 years the savings can really add up. For him, it is too expen-

TABLE 2 / Cost Savings Associated with Weight Control Efforts

ACTIVITY	COMMENT	ESTIMATED SAVINGS (20 YEARS)
Keep the thermostat at 53°	Spot heat, targeting some rooms only; set the temperature to a higher setting for mornings and evenings if you like; your body will use more calories to stay warm	\$35,000
Mow lawn with push lawnmower, rake leaves instead of using a leaf blower	A yard-care company does this for your neighbors—see cost at right	\$50,000
Split logs and use a Franklin stove for heat	Additional exercise by gathering firewood—trees and branches on the property	\$2,500
Walk to work (at least part-way, combining this with public transit if necessary)	No expenditure on parking place at work	\$25,000
Shovel snow	Someone with a snowplow does this for your neighbors—see cost at right	\$12,500
Climb stairs frequently	Keep your computer in the basement, office on the second floor, and files in the attic	N/A
Clean own house	The alternative is hiring a cleaning service—see cost at right	\$25,000
Total savings over 20 years		\$120,000
Invested \$6,000 a year, earning 4% for 20 years—accumulated savings		\$178,000

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sive not to exercise. Some of his neighbors pay for all of these services and they use the extra time to watch TV, play computer games, go to their fitness center, and worry about being overweight. David saves about \$6,000 a year this way, which he invests at 4% interest. This results in savings of \$178,000 at the end of that period.

Reviewing the Seven Steps

Let us now review the seven steps of personal improvement whose benefits are summed up above.

1. Tapping into Group Power

Engagement of processes owners can make a big difference. If John comes home from work and plans to eat three stalks of celery (zero calories) rather than his usual big bag of chips (don't ask), it helps to get the whole family involved. Mary buys the celery and makes sure it is on the table when John comes in. The children come into the kitchen to greet their daddy and watch him eat. The calendar page where a plus is recorded for each celery day is on prominent display in the kitchen. At the dinner table later, there is a family discussion. Has daddy done well enough to be able to switch to carrots instead? Mary tells John he is looking more fit and handsome. In our terminology, the family is both a process owner and a buddy for John, changing his environment and encouraging him.

Note that most medical treatment does not use the power of group support, opting instead for one-on-one treatment and counseling. There are examples of patients with diabetes and hypertension drawing on this power by meeting in groups and creating a process for helping one another out. We think that treatment of chronic conditions would be more effective if patients involved their process owners in the changes they made.

2. Defining your goal

Priorities matter. You may want to lose weight, but if your business has gone bankrupt, your husband wants a divorce, the mortgage is being foreclosed, and your brother is about to be sentenced to jail, this is not the time to focus on losing 10 pounds successfully. If there are more pressing problems in your life, focusing on those makes good sense. If your life is constantly filled with such crises, and more than a few people lead such lives, you may never get around to losing weight (unless stress causes weight loss for you). Losing weight has to be a priority.

This is a problem for physicians who tell patients that the patients have high blood pressure, for example. The doctor asks the patient to take expensive medicine with side effects to lower it. Blood pressure control may not be on this patient's priority list and the result is noncompliance—and of course, the doctor is frustrated. A better place to start might be with the patient's priorities even though they may not be the same as the doctor's. Other problems may have to be resolved first.

3. Understanding the Process of Your Life

The way you now lead your life is perfectly designed to give you exactly the weight you have now. Change that process and your weight will change. More time at the computer and in front of the TV, junk food constantly at hand, and no exercise—and you too can gain weight like a lot of other Americans. Compare this to the Norwegian man who grew up in a rural farming family and walked three miles to school and three miles back. Only when the temperature was below 25°F was a ride allowed on the bus. This created habits that keep him thin 60 years later, even though he immigrated to the United States a while back.

If you want to change your weight radically, you need to change radically the process of your life. Move out of your apartment with its elevator and into a fifth-floor apartment with no elevator (the rent will be cheaper as well), get a young dog that must be walked five times a day, change nothing else, and you will lose weight. Your dog could give you all the motivation you need; you would have no choice. Another good example of a fitness environment is the U.S. military. If you are an officer and do not maintain your (age-adjusted) level of weight and fitness, you will lose your job. It is easier to be fit when everyone you work with is exercising daily. The military has a very high, documented success rate in keeping its officers and enlisted men and women fit. Fitness is seen as not just a hobby but central to the mission of the military, so the goal is widely accepted.

4. Implementing Change and Holding on to the Gain

“Stopping smoking is easy. I have done it dozens of times.” Motivation often goes just so far before relapse occurs. In process improvement in industry, “holding the gain” beyond the first burst of enthusiasm is often the hardest part. For this reason, system and environment change can have lasting results. We observe that it takes a real effort to start exercising, but for some

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people, after a while, exercising becomes a habit and failing to exercise hurts. Skipping exercise becomes uncomfortable. "I can't stand sitting any longer. I just have to walk four miles to town and back." When a person is at that point, holding on to the gain is easy.

5. Measuring Progress

Measure your progress toward your goal. Measure it daily. *Rapid feedback* is much better if you want rapid change. Measuring means you are *paying attention*. Many people find that measurement by itself changes behavior. For example, buy a pedometer (basic ones are not very expensive) and keep track of the number of miles you walk every day. Learn about your causes of variation. Plot the number of miles walked on a graph and create a run chart. Put this chart in a place where your roommates, family, or co-workers can see it—and talk to them about it. Measurement brings accuracy and better understanding. This is why measurement is at the heart of the scientific method. Pedometers are better than your guess but their *accuracy* is not perfect. One of the things you learn is that your measuring tools have their own built-in error. For example, blood pressure monitors have measurement error.

Change your diet and exercise and it takes a while to see a change in your weight. Because you want rapid feedback, you may wish to measure your diet and exercise every day as your primary measures. These are the things you are trying to change. You can see your success quickly with these process measures. This is just a broad statement—you should eventually know what the specific link is between these processes and your weight.

6. Following the Scientific Method: Cycles of Improvement

Cycles of change are called Plan-Do-Study-Act (PDSA) cycles. Plan the change, do it, study the results, and if successful, act to hold the gains. Keep repeating this approach. Many small changes can add up to a large gain. You need to know what works and what is not helping. Does putting a water bottle in your knapsack reduce the number of soft drinks you buy from the vending machine? Design a study that would show whether this is true. Try it and inspect the results. Perhaps you will find that it does work when you remember to take the water bottle. Perhaps it makes no difference on Thursday because you work at another location that day. In short, you will gain systematic insight into your environment and how it influences your life and weight.

7. Telling Your Story

This is your way of keeping your process owners and buddies informed of your progress and your lapses. One way this is done is by using storyboards, which are described in Chapter 1. For a lot of people, the requirement to tell the story of their progress puts additional pressure on them to carry out their promises. Ideally, you should update your storyboard daily so others can follow your progress.

The Evidence: Does the Seven-Step Process Work?

In Chapter 2, the results of a large number of personal improvement projects are summarized. Most of these projects relate to exercise and diet changes. These people are health-professions students taking a class. They did their projects as part of their class work. Their grade did not depend on whether they made an improvement. They just had to use the methods and try to improve their behavior. Most of them were successful. This way they learned that it is possible, but not easy, to change behavior. This knowledge will help them as they help their patients and clients to manage their hypertension, asthma, diabetes, weight, smoking, and stress.

When you are at the bookstore shopping for a new diet or exercise plan, ask yourself this question: Do they tell me, of the last 100 people who implemented this, how many succeeded? How many made a real lasting improvement? Be scientific. Demand proof—ask to see the evidence in support of claims.

Many diet and exercise programs tell you they have the answer. They tell you to drop other programs and buy their answer and product because theirs is the only right one. Not us. We think our approach can be used in conjunction with other popular diet or exercise programs. People have used our approach while participating in Weight Watchers® or following their fitness center's program and found the benefits of group support, measurement, experimenting, and understanding the process of daily life useful. People have used our method to make sure they get to the fitness center regularly so they can follow their prescribed fitness routine. We ask you to be scientific. Measure your results and test your changes. If the "XYZ" diet works for you, keep it up. If not, try something else. Measure, experiment, measure again. Daily measurement helps you pay attention to and understand your situation, and accelerates the cycle of experiments. Table 3 lists the steps of our methodology, key concepts behind these steps, useful tools, and the chapters that covered these topics.

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Each of the steps has some underlying concepts. Understand what you plan to do (2), understand and control your environment (1 and 3), take frequent measurements for rapid feedback (5), experiment many times (4 and 6), and keep your friends and process owners informed of your progress (7). Useful tools have been developed to help you tackle these stages. They are not all required but in industry they have been found to be helpful for quality improvement.

TABLE 3 / The Seven Steps of Process Improvement

STEPS	CONCEPTS	USEFUL TOOLS	EXAMPLE
1. Put together a team of process owners	Others help control your experiment	Understanding how groups work	The person who buys and cooks your food impacts your diet. See Chapters 1 and 4
2. Define goals	How will you measure this every day?	Writing a goal statement and making it public	"To lose 10 pounds." See Chapter 1
3. Define life processes	Changes in your environment have long-run effects	Process diagnosis	See Chapter 5
4. Implement changes	Small experiments	PDSA cycles	See Chapter 3
5. Gather data	Did your change make a difference?	Run and control charts	"Minutes or distance run every day." See Chapter 6
6. Engage in improvement cycles	Many small changes can add up to a big difference	Rapid feedback, evidence-based experiments	See Chapters 1 and 3
7. Tell your story	Your buddies and process team can encourage you	Storyboards	Post your daily exercise list on the fridge door where the family will see it—see Chapter 1

By understanding the process of your life, measuring your progress, drawing on support of people who share your environment, using the scientific method, carrying out a series of small experiments and evaluating the results, relying on rapid feedback, and paying attention to the results, you too can lose weight.

APPENDIX I

The Ethics of Self-Improvement

FARROKH ALEMI

Anyone who seriously thinks that it is possible to improve people's willpower, must ask: "What if we succeed?" What if people achieve their resolutions, get their wish, but come to regret it. Helping people get to their resolutions begs the question of what if they resolve to do what is not in their best interest.

Sure, many obese and sedentary people would use this book to lose weight and become more active. They would choose to change their environment to encourage a healthy set of habits. Some, frustrated by years of attempting to lose weight, would rejoice upon success. A morbidly obese person would find that he can keep to his exercise regimen. He would find himself and revise his sense of self-worth. A sedentary soccer mom, coming out of years of child rearing, would find confidence in losing weight and becoming active again. But there is another group of people who are in marked contrast to those who stand to benefit: a group of people who succeed in their resolutions but continue to overindulge to the point of harming themselves. I am referring to a teenager who wants to lose weight despite the fact that she is already thin. I am referring to a runner who wants to exercise more despite the fact that he already does plenty. This book can help both groups of people. It can help those who have resolved to have healthier habits as well as those who ignore health, in order to look good, to feel wanted, or to fulfill some other externally imposed resolution. They may succeed in accomplishing their resolutions but fail in having a better, happier life. This book shows how we can revise our environments to achieve our objectives. The question is—to what end? If we can redo ourselves, who is it that we want to be?

We can falsely claim that the techniques presented in this book are devoid of any value judgment. After all, we don't tell the reader what to

wish for. As scientists, we are not the one making the resolutions. Individuals make their own choices; we only help them remain committed to their choices. In fact, in order to avoid the typical debates and value judgments, we have painstakingly avoided discussion of any particular diet or exercise program. We have not made recommendations because others, better informed individuals, are doing so. We are also not suggesting a course of action because we truly believe that the best course of action is a personal one. The best advice is to engage in problem solving and not to rely on what has worked for others. But, despite claims of neutrality of science, despite claims of uniqueness of each person's resolutions, a set of tools that improves our willpower is inherently dangerous for the individual as well as for all of us collectively. At the individual level, the tools can be used to lose more weight than needed. Collectively, the book may be used to create a new social mindset, where the power to lose weight is taken to extremes.

The problem is not unique to us and this book. In the report of the Presidential Council on Bioethics in the Fall of 2001, in a book entitled *Beyond Therapy*, commissioners discuss the plethora of pills and therapies directed at getting well people better. The commissioners raise concern about a pharmaceutical industry that manufactures "desire" itself, and reshapes what we want. These include enhancement drugs that help us develop more muscle, medication that makes us feel happier, drugs that remove wrinkles, medications that delay aging, and pills that enhance sexual performance. All of these innovations are working to create a new sense of who we are. *Beyond Therapy* laments what scientists might be doing to the dignity of life, to what it means to be human. Scientists might point to individual freedoms run amok. But, when many individuals make the same choice, a social norm emerges that pressures others to follow. In the end, some people may be forced to lose weight because their friends are doing so.

If everyone improves, is better at sex, happier in day-to-day life, has less anxiety, has no hair loss, no wrinkles, no aging, what becomes of the few of us who do not want to follow? When social norms change, everyone is pressured, even people who did not set out to change. A personal choice of losing weight may, if followed by many, have a rippling effect. It may generate new social norms. These norms may pressure others to lose weight. For example, when social norms change, some options disappear. Many manufacturers may move away from producing and marketing food items that do not fit social norms. For example, the growth of the Atkins diet has led to a drop in demand for bread and a possibility of major manufacturers changing the nature of these products to appeal to the new low-carbohydrate diets. In

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the end, a personal choice is not so personal after all; if it ripples through the society, it affects us all.

These are not just academic and detached musings. There was a time when obesity and fat bellies were considered signs of people who were well off. Artists and painters would depict women with large bellies as symbols of beauty. Men of stature would seek to have large fat stomachs. Obesity was sought after. There was a time when going to the beach was for the sick. People would consider a pallid face attractive; a suntan pointed to peasant origins, not a vacation. These are just a few examples of how individual choices are helping rewrite the options available to others. Once again, personal improvement is not that personal after all.

The myth of benign scientific progress is not true. Technologies enable new social norms and, inevitably, they prefer some norms to others. The value-free technology is a farce. In the end, technologies serve to inherently reinforce some—not all—social norms. They are not value-free; only disguised to appear that way.

What we have proposed in this book will make many people succeed at losing weight and exercising more. Even though we do not say so overtly, the nature of prevailing social norms is to use this book to diet and exercise. For some, this course of action would be beneficial; but for others it may be disastrous—perhaps even life-threatening.

So what are we to do? We see the devastation of obesity and the repeated frustration of people trying to lose weight. Naturally, as scientists we would like to help. We do not ask whether it is good to lose weight and exercise—it is, for many. We see people trying and we would like to help. We see a functional problem of getting from A to B and we would like to find an optimal solution. This is the nature of science. The larger questions of what life is, what dignity is, who we are, are questions scientists do not typically answer. Yet, obviously, we are concerned if tools and techniques we propose are used to poor ends. We are concerned if an ecological approach to behavior change leads to clashes between people who share the same environment. We are concerned, if our approach leads to social norms that force many to change against their own desire.

We are concerned but not to the point of abandoning access to our proposed methods. Contrary to Bill McKibben, who in his 2003 book entitled, *Enough: Staying Human in an Engineered Age* seems to worry that progress might end our society, we seek a road in between. We want our tools in the public domain and accessible to all but we also want them to be used for good. Gary Greenberg, in his 2004 essay on “After Nature,” criticizes the Presidential Council for defining the problem yet, like us, shrinking from its

responsible solutions. He argues that the Council's recommendation to cajole people to think more about these issues misses the point for collective action. He calls for regulation. It is difficult to understand what shape and focus such regulation will take without restricting self-improvement—which seems to be part of the American experience and, perhaps, the very definition of humanity.

So, where does this leave us? How can we orient our tools for good? We define “good” as better health. We claim that weight loss and exercise are worthy resolutions if they improve the individual's health. This is a simplification, however. At the extreme, among the obese and the anorexics, appropriate exercise and weight maintenance do not necessarily produce better health. Some run to feel good. Others diet to change their self-image. Are we condoning such practices that are not purely for physical health? Is losing weight to feel good a legitimate reason—and what message does this send to an anorexic teenager who wants to lose more? When do we reach the point where, as McKibben said, “enough is enough”?

We have very little to offer to help safeguard these tools from people who want to harm themselves. Our only hope that our methods would be used for worthwhile causes is based on the fact that this is an approach that connects the individual to his or her environment. Contrary to most technologies, here is a tool that reconnects us to the nature of things and to people around us. It is a tool that highlights our dependencies and our links to one another. In essence, then, the tools in this book have built-in qualities that should prevent people from misusing them. An anorexic person who becomes aware of how her or his environment is coloring body/food perceptions may change his or her resolution. Being aware of the environment may help people understand the value of their resolutions. In the end, the technology of reconnecting with our environment will make us more natural and less technological.

We end this book with the hope and desire that the reader has gained better understanding of willpower and would resolve to improve his or her health and not just lose weight. We are reassured that this is the most likely outcome because our tool is one that raises awareness. In the end, in the choice between good and evil, our methods are likely to lead to more good because these tools are built on increasing knowledge and linkages. Of course, we can be wrong and we may have added to the perplexities of modern life. We may see a surge of anorexics modifying their environment in order to lose more weight. We worry about this possibility but think that chances are this will not happen because “A Thinking Person's Weight Loss and Exercise Program” starts and ends with thinking. And only good can come out of thinking—out of honest assessment.

APPENDIX 2

Online Coaching for Personal Improvement

FARROKH ALEMI

George Mason University has put together a Web page focusing on personal improvement. An expert in Continuous Self-Improvement can help you stay the course toward your goals by maintaining e-mail contact with you. At the time of publication, this resource was free and available on the Web at <http://improvement.gmu.edu>.

If you wish to have an online coach, you can go to this Web page and enroll in the program. The first step is to sign a consent form.

Consent

The Web site collects data on your progress. You need to be aware of the information collected and how it is processed. The consent form provides details of the risks and benefits you face by signing up at the Web site. You can print out this consent form by visiting <http://gunston.doit.gmu.edu/healthscience/708/consent.asp>.

Before signing the form, please check to see that you are eligible for this free service. At the time of publication of this book, the site was limited to students at George Mason University. If you are eligible, please sign the consent form electronically online *and* fax a paper copy to 703-993-1953.

Did It Work for You?

We ask that you report your success or failure in achieving your resolutions at <http://gunston.doit.gmu.edu/healthscience/708/exitPersonal.asp> on the Web. The information you report will be added to the reports of others and

averaged and presented back to the readers. (No individually identifiable data will be collected or revealed.)

Workbook for Lifestyle Management

This book already includes the workbook. The workbook has been around for a while now; as a consequence many different versions are on the Web. The version in this book focuses on diet and exercise. If this is not helpful, check the **original workbook** at http://gunston.doit.gmu.edu/healthscience/708/pers_cont_qual_work.pdf.

See the version for patients with **cardiovascular problems** at <http://gunston.doit.gmu.edu/healthscience/708/frimp.htm>.

You can read the workbook in **Arabic** at <http://gunston.doit.gmu.edu/healthscience/708/arabic.doc>, in **Norwegian** at <http://gunston.doit.gmu.edu/healthscience/708/norway.doc>, and in **Chinese** at <http://www.p-i.cc/rxn20/work/scans/chinese.pdf>.

You can also access the original paper that described the approach—for the **abstract** see http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10672505&dopt=Abstract or for **full text** see <http://gunston.doit.gmu.edu/healthscience/708/csi6.rtf>.

Examples of Personal Improvements

Before you set out to make your own journey, the site <http://improvement.gmu.edu> provides many examples of how others have gone through the same process. You can see examples in weight loss, exercise, stress reduction, smoking cessation, and many other resolutions.

Slides and Narrated Slides

If you are tired of reading about it, you can listen to lectures on personal improvement, including the following:

1. Introduction to personal improvement (**listen to narration** at <http://gunston.doit.gmu.edu/healthscience/708/PersonalImprovementVoice.swf>).
2. How to analyze and display your data (**listen to narration** at <http://gunston.doit.gmu.edu/healthscience/708/TimeToExerciseVoice.swf>).

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Narrations require free **Flash** software available at: http://www.macromedia.com/shockwave/download/download.cgi?P1_Prod_Version=ShockwaveFlash&P5_Language=English .

More Resources

There are numerous other Web resources available besides the site created by George Mason University at <http://improvement.gmu.edu>. Some of these include:

1. H. V. Roberts and B. F. Sergesketter's book, titled **Quality is Personal**, presents an extraordinarily useful approach to improving everyday work (and life). Roberts is on the faculty of the University of Chicago School of Business, where for years he has used CQI to improve education. This book is a straightforward guide to using CQI to clear off your desk, keep your family happier, and make your life easier.
2. For abstracts of recent papers on continuous personal improvement see [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=PureSearch&db=PubMed&details_term=\(%22Total%20Quality%20Management/methods%22%5bMajor%5d%20AND%20%22Health%20Behavior%22%5bMajor%5d](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=PureSearch&db=PubMed&details_term=(%22Total%20Quality%20Management/methods%22%5bMajor%5d%20AND%20%22Health%20Behavior%22%5bMajor%5d).
3. If you are a health care provider, read how to **help patients change** by visiting <http://gunston.doit.gmu.edu/healthscience/708/book2/Outline.htm>.

Other resources, including numerous commercial sites, can be found through a Web search engine.

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Extra Forms

A P P E N D I X

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Who Is a Process Owner?

A buddy is a person who can participate in your diet or exercise plan. A process owner is a person who shares a common environment with you and can influence your diet and exercise plan, *even when he or she is not dieting or exercising with you*. This exercise helps you decide whether the person you have in mind is a buddy or a process owner.

PLEASE WRITE THE NAME OF THE PERSON YOU ARE CONSIDERING:

	YES	NO
1. Do you share food with this person on a regular basis?	_____	_____
2. Do you have joint responsibility for maintaining a household?	_____	_____
3. Do you need to consider this person's timetable when you are deciding on the best time to exercise or eat food?	_____	_____
4. Does this person help you in carrying out daily living activities (bathing, eating, cleaning, washing clothes, commuting, etc.)?	_____	_____
5. Can this person's decisions affect time, equipment, sports clothes, or other resources needed for your exercise?	_____	_____
6. Does this person's decision affect what options are available to you for food or exercise?	_____	_____
7. Do you see each other on a daily basis?	_____	_____
8. Does this person affect how and when you socialize with others?	_____	_____

The person with the highest number of positive responses is the most ideal person as a process owner for you.

TOTAL NUMBER OF YES RESPONSES _____

Please note that the following are not important considerations and should not influence your decision:

- *Whether you like the person or not.* Process owners may not be on your list of favorite people; nevertheless they must be included if they are good candidates as determined by the questions above.
- *Whether the person participates in your diet or exercise plans or not.* A process owner participates in your system, but not necessarily in your diet or exercise activities.

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A Form for Entering Cycles of Routines

Enter a routine/habit in each box.

The diagram features a central circular path with two large arrows forming a continuous loop. Eight rectangular boxes are arranged around the circle, with lines connecting each box to the circular path. The boxes are intended for users to enter specific routines or habits.

Evaluating Possible Changes

STEP 1 COLLECT IDEAS ON HOW TO CHANGE YOUR ENVIRONMENT AND LIST THEM BELOW.

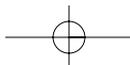
IDEA FOR CHANGE	IDEA FOR CHANGE
A	G
B	H
C	I
D	J
E	K
F	L

STEP 2 CHECK ANY RESPONSE THAT APPLIES TO THE IDEA.

	A	B	C	D	E	F	G	H	I	J	K	L
1. Focuses on events that happen prior to eating or exercising.												
2. Does not primarily rely on personal motivation or commitment.												
3. Changes the person indirectly by changing the environment.												
4. Once done, stays done. No need to make the change again.												
5. If it fails to affect exercise or diet, it is no one's fault.												
6. If it fails to affect plans, no point in trying to do it again and harder.												
7. The activity is initiated by others and not me.												
8. It does not rely on a person's memory.												
9. Indirectly affects food and exercise.												
10. It is a change in a recurring life routine.												
11. Requires more than one person to bring it about.												
12. If done today, it will affect exercise and food in the future, not today.												
13. Leads to diet or exercise as part of another task.												
14. Involves a physical change.												
15. Provides resources (time, equipment, etc.) for diet and exercise.												
16. Changes whom I spend time with.												
17. Affects others who live with me.												
18. Changes what I do for fun and social gatherings.												
19. Forces one to exercise or diet.												
20. Changes a group activity.												
21. If it fails to work, it gives me new insights about what to do next.												
22. Rearranges the sequence of my daily living activities.												

STEP 3 LIST TOTAL CHECKS AND SELECT THE IDEA WITH HIGHEST VALUES.

For each idea, check which criteria are met. Then select the top two or three ideas, set a date, come up with a ritual to mark the start, and make several of the changes simultaneously.



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Exercise and Diet Data Collection Tool

DAY OF THE WEEK	DID YOU KEEP TO YOUR EXERCISE PLAN?		TOTAL MINUTES OF EXERCISE	DID YOU KEEP TO YOUR DIET PLAN?		WEIGHT IN POUNDS
	Yes	No		Yes	No	
Monday	Yes	No		Yes	No	
Tuesday	Yes	No		Yes	No	
Wednesday	Yes	No		Yes	No	
Thursday	Yes	No		Yes	No	
Friday	Yes	No		Yes	No	
Saturday	Yes	No		Yes	No	
Sunday	Yes	No		Yes	No	

Note: The table shows the set-up for one week of several weeks of data collection. If exercise is not planned for certain days, shade out the area. Weight is to be measured once a week, on the same day and under the same circumstances.