5K and 10K Training

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In memory of Arthur Lydiard (1917-2005).

Contents

Preface

Every runner has a story, and every training program forms another chapter in that story. Some runners train to set a personal record in a goal-race; others simply want to get in better shape than last year. Whatever your personal goal, a successful story should include effective, individualized training.

Unless your training fits your individual needs and goals, it's unlikely your programmatic story will result in the running of a successful goal-race. The programs and discussions in this book will give you the tools to know when you are running too hard, too easy, or just hard enough for injury-free training and improved racing performances.

This book is not a quick-fix compendium of tips for 5K and 10K training. Rather, it's an integrated system for dealing effectively with the complexities of the training process. By learning and using the tenets of the hard–easy system, you can solve the perennial problems inherent to endurance training, including knowing *when* and *how hard* to train.

I've been in the game of competitive running since 1961. I've directed training and educational programs for recreational runners and triathletes since 1979. I learned the hard–easy system from Bill Bowerman—one of the premier track coaches of the 20th century. Over the years I've worked with athletes of all levels, and I know that a variety of runners can benefit from the training programs outlined here. Beginners can use this book as a training primer. Intermediate and advanced athletes will value its solutions to the recurrent training problems.

Chapters 1 through 4 contain the background information you'll need to understand how a training program works by defining the five racing abilities—stamina, power, tempo, speed, and endurance—and providing scales for gauging how hard you are working so you can run optimal workout efforts. They also provide questionnaires to determine your current capacity for exertion so you can adjust new workouts to that capacity without becoming sick or injured at the outset.

Chapters 5 through 9 describe the process of creating a training program, including descriptions of seven new workouts with instructions on establishing and building ability with them. Also included are sample training programs for 5K and 10K races, as well as a unique effort–energy training log for recording your workouts and tracking your progress.

The guidelines set forth in this book will teach you to coordinate your workout effort with your running energy for ability-building purposes. They will also assist you in targeting and monitoring your exertion so you can accomplish your racing goals. By following the programs in *5K and 10K Training* you will be able to train smarter and perform better so you can live a happy running story.

Acknowledgments

Many readers have asked me whether I research my books. I don't research them as much as I think about how to solve various problems. My thinking is inseparable from my writing, and I never research what others have said on a topic while I'm writing.

My first book helped me to define the major constructs of effort and energy. In my second book, *Running by Feeling* (1999), I used previously developed concepts to survey the recurring problems of endurance training. The current book focuses on setting up new ability-building workouts, and how those workouts fit into a training program. In this regard, I'm indebted to my editors at Human Kinetics for encouraging me to think programmatically.

While writing this book, I had several conversations with Nobby Hashizume, a protégé of Arthur Lydiard. I knew Lydiard personally from the early 1960s when he stopped in Honolulu for track meets with his New Zealand athletes. During those visits, he gave clinics on the training process that influenced me to take my first 20-mile training runs. Lydiard also had a major effect on my track coach at the University of Oregon, Bill Bowerman. Hashizume reminded me of Lydiard's enormous contribution to my understanding of endurance training.

My thinking and writing are footnotes to the ideas developed by Bowerman and Lydiard. Bowerman taught me about the hard–easy system, structuring exertion to build ability, and the peaking process. I've taken his ideas and added perspective, but there is nothing fundamentally new here that wasn't already said by Bowerman and Lydiard.

CHAPTER 1

Understanding Effort and Energy

This book describes the role that effort and energy play in training for 5K and 10K races. Effort and energy are the essential aspects of every run. You cannot do a race or a workout without exerting an effort or encountering running energy.

Effort and energy are also the building blocks of adaptation. This chapter introduces you to the idea of effort so you can gauge your training effort for ability-building purposes. It will also help you understand how changes in your running energy determine how much effort you should exert during the training process.

Reading Body Language

5K and 10K Training is based on the premise that you can read your body to tell when you are running too hard, too easy, or just right. Suppose you needed to run a workout at 65 percent of your maximum heart rate. How would you know when you had it right?

If you knew your maximum heart rate and you had a heart rate monitor, it would be easy to get it right. But if you had to rely only on the experience of your beating heart, it would be difficult to tell. This is because your heartbeat is not usually a conspicuous part of your experience.

Fortunately, we don't have to rely exclusively on heartbeat to measure exertion, because exercise exertion consists of five components, including heart rate, breathing, power, tempo, and intensity (see table 1.1).

TABLE 1.1 Five Components of Perceived Exertion

Heart rate	Breathing	Power	Tempo	Intensity
95-100%	Hyper	Strained	Very fast	Very uncomfortable
90-94%	Labored	Forced	Fast	Uncomfortable
80-89%	Heavy	Pressed	Rapid	Tolerable
70-79%	Huffing	Relaxed	Quick	Comfortable
60-69%	Conversational	Held back	Slow	Very comfortable
50-59%	Normal	Gentle	Very slow	Soothing

Separately, these components of perceived exertion are useful for recognizing how exertion changes from moment to moment during a run. Each component is a distinct and recognizable experience: Heart rate is the per-minute rate at which your heart is beating; breathing is the rate at which you inhale and exhale; power is the sense of muscle strength you are applying to a run; tempo is the rate at which your arms and legs are moving; and intensity is your relative sense of comfort or discomfort.

Each component of exertion is scaled into six levels. Most of the time, the experience of one component is related to the experience of the others at the same level. Thus we can talk about six general levels that I call mild, light, steady state, threshold, ragged edge, and maximum.

Defining the Six Levels of Exertion

Everyone is capable of a wide range of exertion, from the slowest jog to the fastest run. In this sense, exertion is the physical effort necessary to sustain a pace from moment to moment during a run. Exertion is also the essential adaptive stimulus. You can't build your racing ability without exerting an effort.

To get the most out of your training, you must learn to distinguish between the various levels of exertion, using each level purposefully to train and race effectively. The following material will describe the six exertion levels in more detail.

> **Mild**. Mild exertion can be defined as your slowest jogging pace. Your heart rate at that pace will be 10 to 15 beats per minute faster than your heart rate at a brisk walk, even though both paces are the same in minutes per mile. This increase in heart rate reflects the additional effort required to get airborne between jogging steps–effort you don't exert while walking.

Some athletes are unwilling to run at their slowest pace. They overlook the value of a very slow glide, which is useful in a variety of circumstances. When

you're injured, for example, gentle jogging may allow you to continue exercising without causing further injury. Very slow jogging also conserves energy while warming up before a race or workout or when you are recovering from a particularly tiring run.

Fast runners are often uncomfortable running at mild exertion because they feel awkward and inefficient at their slowest pace. They lumber along, overstriding to the point of walking instead of jogging. If you want to be efficient at your slowest jog, take short, quick steps, and repeat the following mantra, "Short and quick; short and quick," matching the tempo of your feet to the tempo of the mantra.

Taking little steps feels strange at first, but learning to be efficient at your slowest pace can broaden your training range by giving you a valuable extra level of exertion.

> **Light.** Although light exertion feels slow, it represents a relatively high level of metabolic activity: roughly 60 to 69 percent of your maximum heart rate, which is approximately double your resting heart rate.

Most trained endurance athletes who are running at 60 to 69 percent of maximum experience exertion as conversational breathing at a very comfortable, slow tempo that feels "held back" in the sense that they would have to consciously prevent themselves from moving at a faster pace.

Like the mild level, light exertion enables you to run for a long time. As you'll see, long duration runs are the base upon which faster running is built.

> **Steady State.** Steady state is the level between 70 and 79 percent of maximum heart rate. At that level your tempo feels quick and relaxed, with deep, slow, inaudible breathing and a discernable "huff" between phrases of conversation.

Huffing is not necessarily an indication of being out of shape. Even the best athletes huff when exerting themselves at steady state. With proper training, all athletes eventually get in shape and move at a relatively faster pace when they are running at steady state.

> **Threshold.** The threshold level is characterized by audible, heavy breathing at a rapid, pressed tempo. Most runners encounter audible breathing between 80 and 89 percent of maximum heart rate. At that level they are no longer merely huffing between sentences of more-or-less normal conversation, but breathing loud enough for someone running next to them to hear each exhalation. Threshold exertion precludes "normal" conversation because it requires focused concentration to maintain the pace.

> **Ragged Edge.** The ragged-edge level is a fast, forced tempo, with labored breathing and intense discomfort at 90 to 94 percent of maximum heart rate. Only the most courageous athletes push themselves hard enough to explore exertion between 90 and 100 percent of maximum. Even at the lower half of this range, ragged-edge exertion is downright uncomfortable. While some athletes can sustain ragged-edge exertion without apparent distress, it's almost impossible to conceal some enabling emotion.

> **Maximum.** Maximum exertion running is at the opposite end of the scale from very slow jogging. Most runners can reach maximum exertion at the finish of a highly competitive 5K race. At maximum exertion–95 to 100 percent of maximum heart rate–breathing is hyper fast and you strain to maintain the pace against the onslaught of extreme discomfort and inexorable fatigue.

TARGETING EXERTION ON THE EDGE

Sometimes when I'm running intervals at the border between steady state and threshold, I find myself pressing instead of relaxing. Even though my heart rate is technically still within my steady-state level, I grip my stopwatch tightly, grimace slightly, and, of course, I press the pace instead of being relaxed in spite of it.

At times like those, I have to remind myself to stay relaxed. After all, the target zone is still ostensibly steady state, even though I'm aiming for the upper edge of it. This example points out the problem of exertion levels blending with one another at their borders. This is an unavoidable aspect of measuring perceived exertion. Nonetheless, a cogent scheme for measuring exertion should delineate reasonable, yet clearly differentiated, levels—even though the characteristics of one level tend to blend at the border with the characteristics of the adjacent level.

As long as an exertion level is delimited by characteristics that make it distinct from adjoining levels, there is still reason to use the measuring scheme because it squares with our experience. After all, we are only talking about a conceptual measuring tool, and the true value of such a tool is its utility.

Calculating Maximum Heart Rate

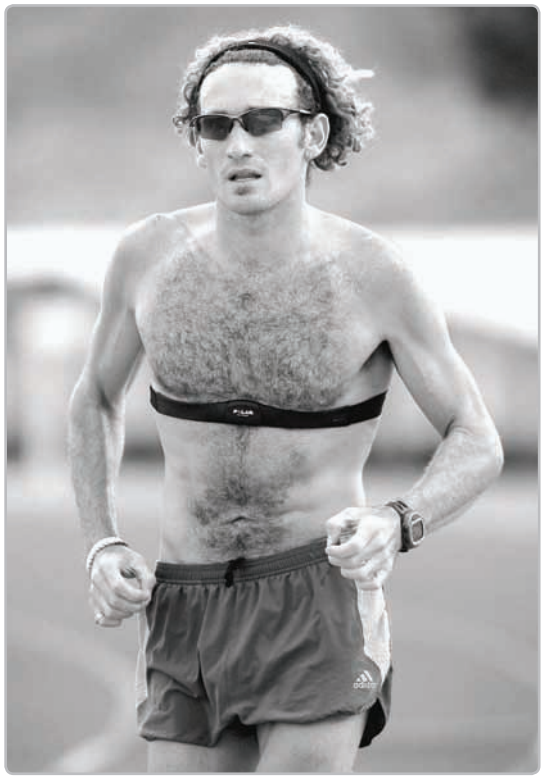
According to this scheme, exertion is cut into increments of 5 or 10 percent. I could have made the exertion levels wider or narrower, but these particular levels are wide enough that the perception of exertion at each level changes in regular, distinct, and noticeable fashion as exertion increases in intensity.

I recommend memorizing each exertion level so you can recognize how hard you are working at any moment of a run. This is an introspective, subjective process. But once you know your maximum heart rate, you can use a heart rate monitor to measure your exertion more objectively. Before you can use this method, however, you need an accurate measure of your maximum heart rate.

The most reliable way to accurately determine your maximum heart rate is to take a reading while running at maximum exertion. You could record your heart rate near the end of a highly competitive 5K race. Or you could test yourself using the following protocol.

You'll need a heart rate monitor for this test. If your monitor doesn't store data for later retrieval, you can station a couple of friends with clipboards and stopwatches at 200-meter intervals on a 400-meter track. Hold the monitor in your hand so you can easily see the readout and, as you pass your friends, yell out your heart rate so that they can record it along with your split times.

You should have abundant energy for this test. It's difficult to run all-out when you are tired from recent training. So give yourself enough rest that you can raise your heart rate to its true maximum. Please refer to the box on page 6 for the HR protocol test.



The band on the runner's chest transmits data to the heart rate monitor on his wrist.

Measuring Workout Effort

As you'll soon see, adaptation depends on how you coordinate measured workout efforts with your variable sense of energy. The first concept you'll need to grasp in order to build your racing ability is workout effort. Two simple words, but do you have a clear understanding of their meaning? Since many runners confuse workout effort and exercise exertion, our first task is to make a clear distinction between these important concepts.

Exertion, as you have already seen, tells you how hard you are working from moment-to-moment within a race or workout. Workout effort, by contrast, is a measure of the difficulty of a whole run, including all its exertion moments. The longer you run at any given heart rate, the harder the overall workout becomes. With workout effort, it's the overall effect of exertion that counts. Thus, a long-duration workout can be a hard workout even though the pace felt "easy" (light) the whole way.

TESTING FOR MAXIMUM HEART RATE

Warm-up

Begin at your slowest jogging pace. After 15 minutes of very slow jogging, do several 50-meter pickups, building to a quick, relaxed pace.

Test

When you are completely warmed up, begin a six-lap, nonstop test, recording your heart rate and split times every 200 meters.

1. Run laps one and two at a quick, relaxed pace (steady state). Your breathing should be inaudible to someone running beside you.
2. Run laps three and four at a rapid tempo, pressing the pace (threshold). You should begin to hear your breathing after a lap at this level, but it should not be labored—merely noticeable to someone running beside you.
3. Run lap five and the first half of lap six at your fastest sustainable pace—fast enough to cause ragged, labored breathing (ragged edge), but not so fast that you cannot accelerate during the last half lap.
4. Run the last 100 to 200 meters as fast as you can (maximum). Be sure to check your heart rate monitor at the finish, as that will be your maximum.

Cool-down

Jog a lap or two at your slowest jogging pace and notice how quickly your heart rate drops from its highest level. Jogging very slowly after a race or workout helps to dissipate lactic acid and speed recovery.

Here's a thought problem for you: Suppose you were scheduled to run a hard workout. How would you know when you've run a hard workout, rather than a moderate or a very hard one? This is an important question because effective training requires that you gauge your effort exactly for ability-building purposes.

If you were scheduled to run a hard workout, you should be able to end the workout without over- or undertraining. And having just completed the workout, you should be able to say exactly how hard it was, whether relatively hard or easy. Gauging your workout effort is an intuitive skill that's necessary as a check on momentary whim. Running by feeling is not the same as running by caprice.

A defining characteristic of any effort is the fatigue that sets in as you exert it. All workouts—even the easiest—cause some fatigue, but noticeable fatigue is one of the delimiting marks of a hard workout (see table 1.2). Table 1.2 describes the fatigue generated by five different levels of workout effort. The harder a workout, the more fatigue it generates. This fatigue is distinct from your fatigue going into the workout. Thus, a very easy workout generates imperceptible fatigue, but you may have been already fatigued from other recent workouts. Noticeable fatigue usually comes on gradually as your efficiency disintegrates, your energy flags, your joints become achy, and your legs become heavier and less responsive.

TABLE 1.2 The Fatigue Generated by Five Workout Efforts

Effort	Level of fatigue
Very Easy	Imperceptible and insignificant
Easy	Perceptible, but negligible
Moderate	Appreciable, but minor
Hard	Noticeable and significant
Very Hard	Obvious and major
All-Out	Strikingly evident, overwhelming

So the question is, how would you know when you've run a hard workout? First, you can simply intuit the difficulty of the effort based on your experience of its intensity and duration. By this method, when you finish a hard workout you'd say, "Whew, that was a *hard* workout." By contrast, a moderate workout would feel only moderately difficult, and a *very* hard workout would be a killer.

Second, even if you weren't sure how difficult a workout was when you finished, you'd know by seeing how long it takes to recover from it. If your recovery takes 24 to 36 hours, it was a moderate workout. If it takes between 48 and 60 hours, it was a hard workout; if it takes longer than 60 hours it was at least a very hard workout.

At this point you should have a conceptual grasp of workout effort and, in that context, the following workout effort scale should make some sense to you.

Workout Effort Scale

Very Easy: A very easy workout is very short and very slow. You recover from a very easy workout in less than 12 hours.

Easy: An easy workout is short and slow. You recover in about 12 hours.

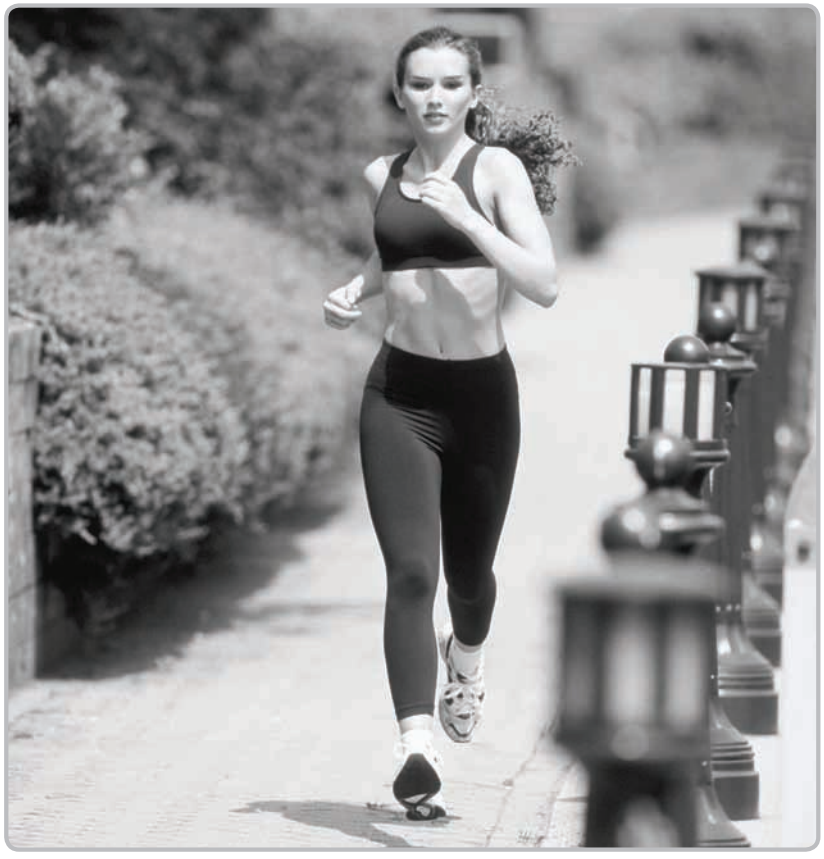
Moderate: A moderate workout can be short and quick or somewhat longer and slower. You need 24 to 36 hours to recover from a moderate workout.

Hard: A difficult, noticeably fatiguing workout that can be relatively long and slow, or short and fast. It takes 48 to 60 hours to recover from a hard workout.

Very Hard: A very difficult race or workout. It can be very long and slow, or shorter and faster, but the key factor is major fatigue. Most conditioned athletes need at least 72 to 84 hours to recover from a very hard workout.

All-Out: You've run all-out when you couldn't have run faster for the distance, or longer without slowing down. Most all-out efforts take more than 84 hours for recovery, but some all-out races can take one day of recovery for every racing mile.

I have used the ideas of fatigue and recovery to delimit different levels of workout effort. Technically speaking, however, fatigue and recovery belong to another conceptual construct–namely energy. To better understand workout effort you should also understand running energy, which is the subject of the next section.



You should be ready for your hard workouts; your level of energy should be sufficient for the difficulty of the effort.

Measuring Running Energy

Whenever you exert a running effort you push against your internal, metabolic resistance to effort, that is, energy. If you happen to have a lot of energy, your effort encounters little resistance and you feel like you're flying. But when you are out of energy even an easy run can be tough to do.

Fortunately, you don't need a special monitor to measure your running energy. All you have to do is take a run and feel it on the following scale: no energy, little energy, some energy, ample energy, and abundant energy. This scale measures your running energy as you feel it *in the moment*.

The interesting thing about running energy is the way it can change from moment to moment during a run. Most runners have noticed, for example, how they can start off with only some energy, but after awhile they develop ample energy—even enough for a hard workout. This changeability of energy is a quality of its cyclic nature.

Left to follow the metabolic forces that govern it, your energy always moves through several phases from the start of one workout to the start of the next. Each phase changes the amount of energy you experience, first by contracting your energy, then by expanding it. These fluctuations in the amount of energy you experience form an energy cycle that's common to most workouts (see figure 1.1).

There are two ways you can understand your energy: as running energy and as workout energy. Because running energy typically changes during a run, workout energy is actually a measure of the *pattern* of running energy that develops during a whole workout.

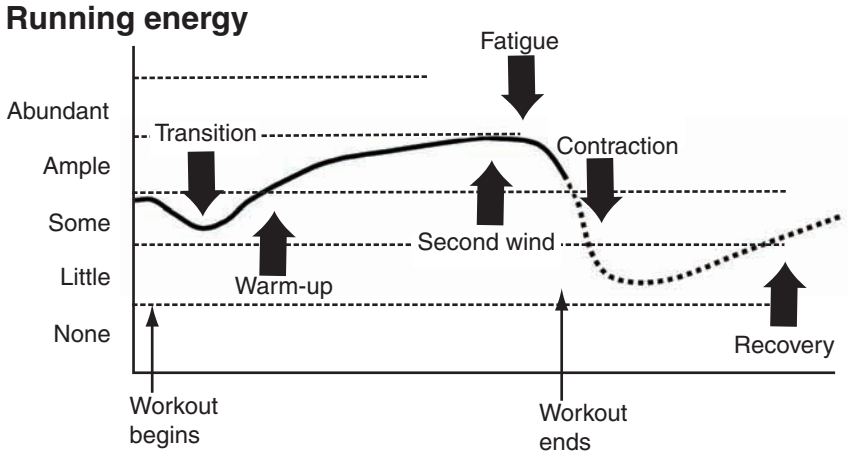


Figure 1.1 The arrows (representing metabolic forces) cause running energy to fluctuate during a run. Given enough time between workouts, the recovery force will return running energy to the original level. This is the basic energy cycle for all runs.

The specific energy pattern illustrated in figure 1.1 is ready-to-run-hard. It is characterized by some energy at the start of a workout, which develops into ample energy after a 10- or 15-minute warm-up. Ample energy is usually sufficient to accommodate a hard workout, meaning a difficult, noticeably fatiguing workout that requires 48 to 60 hours of recovery time.

Experienced runners can say which pattern of energy will develop during a run based on how their running energy develops during the first few minutes. The ability to make this distinction is one of the most important skills in running, for being successful in the competitive game depends on coordinating your training effort with your fluctuating sense of energy.

Understanding the Five Workout Energy Patterns

Ready-to-run-hard is one of five workout energy patterns called sluggish, tired, lazy, ready, and eager. Each pattern is distinct from the others, as described in the following definitions and seen in figure 1.2.

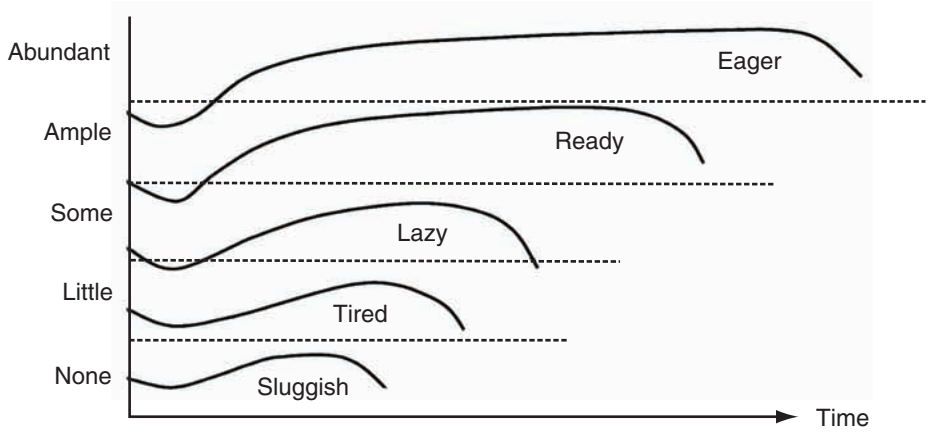


Figure 1.2 Running energy fluctuates within a workout as shown in this figure illustrating five different workout energy patterns. Each pattern represents the typical flow of energy during a single workout, depending on how much energy you had to start. The patterns range from sluggish (no energy and it never gets better) to eager (abundant energy develops early and lasts a relatively long time).

Workout Energy Scale

Eager-to-Race: Abundant energy and an aggressive attitude are sustainable at a racing pace.

Ready-to-Run-Hard: Ample energy develops after a short warm-up, and it lasts long enough for a hard workout.

Too-*Lazy*-to-Run-Hard: Little energy at the start. Some energy develops slowly—perhaps even to ample energy—but it runs out early.

Too-*Tired*-to-Run-Moderate: A little energy can develop, but you cannot run harder than a short, slow workout without being burdened by the effort.

Too-*Sluggish*-to-Run-Easy: You have no energy from start to finish of a run. You feel terrible for the whole workout.

You can never predict exactly what energy pattern will develop during a run. It depends on the difficulty of recent workouts, the length of your last recovery period, the amount of sleep you've had recently, the quality of the food you've eaten, and your mental preparation for the effort.

Similarly, you can have slightly more or less starting energy than any of the five energy patterns described in the workout energy scale. You can also expect the five patterns to develop in slightly different ways, depending on your starting energy. With practice, as you experience different levels of energy and you become skilled at measuring them, you should be able to distinguish gradations between workout energy patterns.

When it comes to energy, the goal is to have enough of it to do a scheduled workout. Since you cannot produce energy on demand, you've got to know how to control it indirectly, with effort. In other words, to control your energy you have to control your effort. And, conversely, the only way you can optimize training effort is to give absolute priority to your energy.

It follows that energy is not an arbitrary factor that sometimes hinders performance and sometimes enables it. Rather, energy should be the central focus of the training process. It doesn't matter how many miles you plan to run during a certain workout. The only thing that matters is whether you have the energy to run those miles.

Optimizing Workout Effort

Every thoughtful runner has dealt with the question of how to optimize workout effort. With six levels to choose from, the answer isn't necessarily apparent. For instance, which of the following levels of workout effort do you suppose is optimal: very easy, easy, moderate, hard, very hard, or all-out?

Let's say, for the sake of discussion, that the optimal effort is the one that feels neither too hard nor too easy, but just right. Which level would be the right effort? Is there, in fact, a single level of workout effort that's optimal for every run? The answer to this question is no, because it's always a mistake to consider the effort of a workout without considering your energy.

It follows that the best answer to the right-effort question is, *it depends on your level of energy.* You are either running too hard, too easy, or just right for the energy of any workout. In order to get workout effort right, you must gauge it to accommodate your workout energy, including both your energy in the moment and the pattern of running energy that develops during the run as a whole.

This means that the apparently simple matter of choosing–the one "right" effort level out of six has been complicated by a factor of five. For six levels of effort and five patterns of energy make a total of thirty effort/energy combinations (see figure 1.3).

Figure 1.3 is a graphic way of illustrating the gamut of effort/energy combinations. The figure is a matrix with 30 cubby-holes, covering the array of combinations from very easy/sluggish (at the bottom left) to all-out/eager (at the top right). This matrix also features five *optimal* workout combinations (those shaded blocks), each of which depends on how much energy you have. For example, when you feel sluggish, the optimal workout effort is very easy. Or when you feel ready-to-run-hard, the optimal workout effort is hard.

All-Out	All-Out/ Sluggish	All-Out/ Tired	All-Out/ Lazy	All-Out/ Ready	All-Out/ Eager
Very Hard	Very Hard/ Sluggish	Very Hard/ Tired	Very Hard/ Lazy	Very Hard/ Ready	Very Hard/ Eager
Hard	Hard/ Sluggish	Hard/ Tired	Hard/ Lazy	Hard/ Ready	Hard/ Eager
Moderate	Moderate/ Sluggish	Moderate/ Tired	Moderate/ Lazy	Moderate/ Ready	Moderate/ Eager
Easy	Easy/ Sluggish	Easy/ Tired	Easy/ Lazy	Easy/ Ready	Easy/ Eager
Very Easy	Very Easy/ Sluggish	Very Easy/ Tired	Very Easy/ Lazy	Very Easy/ Ready	Very Easy/ Eager
	Sluggish	**Tired**	**Lazy**	**Ready**	**Eager**

Figure 1.3 This matrix represents the gamut of effort/energy combinations. Each cube represents a separate workout, consisting of distinct and measurable amounts of effort and energy as defined in this chapter. The optimal combinations are the five shaded ones.

Although effort and energy must both be considered in the adaptive process, energy should be given the primary focus. In practice, you must know how to coordinate your workout efforts with the specific patterns of energy that develop from day to day as you train. Otherwise, your training loses its adaptive focus and you are apt to blunder into over- or undertraining.