

2013 (6th) Edition

Strategy & Tactics for Cyclists

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Arnie Baker
C·Y·C·L·I·N·G

Arnie Baker, MD

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“There are three kinds of riders at the end of a race.
Those who say: ‘What happened?’
Those who let it happen.
And those who make it happen.”

—John M. Richardson, Jr., professor and Tommy Lasorda,
former manager for the Los Angeles Dodgers, paraphrased.

*“I don’t understand this sport. Why is the 200-meter sprint
1,000 meters long? What’s the other 800 meters for? And
why can’t someone in the Tour de France make up five
seconds in a stage that is ninety-seven miles long?”*

—John Scherwa, sportswriter, quoted by Bill Strickland in
The Quotable Cyclist.

**“Use jungle skills:
Watch your back.
Build loyalty.
Keep quiet until you are ready to move.”**

—Retired Army General Hugh Shelton, quoted by Susan Stamberg,
National Public Radio interview, October 14, 2003.

Also by Arnie Baker, MD

- [Altitude-Climbing-Endurance \(ACE\) Training for Cyclists](#)
- [Bicycling Medicine—Cycling Nutrition, Physiology and Injury Prevention and Treatment](#)
- [Bike Fit](#)
- [High-Intensity Training \(HIT\) for Cyclists](#)
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- [Skills Training for Cyclists](#)
- [Smart Cycling—Successful Training & Racing](#)
- [Smart Coaching](#)
- [The Essential Cyclist \(out of print\)](#)
- [USCF: Essentials of Bicycle Training & Racing \(out of print\)](#)

Coach and Author

Arnie Baker, MD

Dr. Arnie Baker has been coaching since 1987. A professional, licensed Level 1 USCF coach, he has coached racers to several Olympic Games, more than 120 U.S. National Championships, and 30 U.S. records. He is the National Cycling Coach for Team in Training. This endurance-training program of more than 800 coaches and 30,000 participants raises more than \$80,000,000 each year for the Leukemia & Lymphoma Society.



Arnie has a Category 1 USCF racing license. He has held eight U.S. 40-K time trial records, has won six national championships, and has won more than 200 races. An all-round racer, he was the first to medal in every championship event in his district in a single year.

Dr. Baker is a licensed physician in San Diego, California. He obtained his M.D. as well as a master's degree in surgery from McGill University, Montreal. He is a board-certified family practitioner. Before retiring to ride, coach, and write, he devoted approximately half of his medical practice to bicyclists. He has served on the fitness board of *Bicycling* magazine as a bicycling-physician consultant. He has been a medical consultant to *USA Cycling* and the *International Olympic Committee*.

Arnie has authored or co-authored 16 books and more than 1,000 articles on bicycling and bicycling-related subjects.

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Feedback Please

Arnie Baker Cycling is not a large company. Apart from Gero, my partner, who helps out when she can, I, Arnie, am the sole employee of all the ABC departments: the coach, the author, and the webmaster. If you notice that there is anything missing that you would like added, typos, other errors, or if you just want to say hello, send me an e-mail: arnie@arniebakercycling.com. Thank you.

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Foreword

The strongest does not always win.

Just like it is not automatic that the person with the highest salary ends up with the most money. It is how you use your abilities. How and when you conserve your energy. How and when you spend your reserves.

Strategy and tactics are about doing more with less as well as doing more with more. Allowing what you have to show through. Not being frustrated. Getting the results, or better results, than your fitness alone deserves.

This book is not only for racers: Spectators will learn to better appreciate the sport.

Although the principles discussed in this book apply to all forms of bicycle racing, the emphasis and examples deal mostly with road racing.

This book will help you learn about strategy and tactics more quickly than you can acquire this knowledge through racing. Nevertheless, there is no substitute for race experience.

Whether you have the opportunity to race frequently or not, you can learn by watching races. Watch professional races on TV or buy racing videos. If you have a local velodrome, go and watch. In just one evening, you can generally observe more than a dozen short races.

Take time to consider strategy and tactics before and after races. What did you learn?

Read this book. Watch races. Read this book again. Watch more races. It will all become a lot clearer.

Review the material in this book periodically. Although some of the information will make sense immediately, after gaining race experience, you will find you have missed many points that are now helpful to you in upcoming races.

The book is divided into six parts.

- Part 1 deals with the concept of energy: Saving your own energy and using up the energy of rivals. How well you do has to do with how much energy you have and need relative to your rivals.
- Part 2 discusses racing psychology and style. How to read the energy levels of your rivals, how riders bluff (misrepresent their energy levels), and how to benefit from this information.
- Part 3 is all about the important specific tactics of attacking and blocking, the building blocks of most race strategies. Part 3 also provides detailed information about establishing and working in breakaways.
- Part 4 elaborates on how teams function well, both theoretically and tactically in races.
- Part 5 is about tactics and strategies for intermediate sprints (primes) and finishes.
- Part 6 deals with the special tactics of time trialing and stage races.

Throughout this book, references are made to additional published sources of information. For example, read about cycling fitness and interval training in the *ABC (Arnie Baker Cycling)* book *HIT (High-Intensity Training) for Cyclists*.

ABC handouts, books, and slide shows referred to in this book are available where you purchased this electronic book or at <http://arniebakercycling.com>.

Context

Racing Recipe

Many riders simplistically think that all you need is to be strong. There is a lot more to it. The following information places the strategic and tactical elements in perspective.

The major elements of successful riding and racing can be dissected. Consider each ingredient. Train each one—the right amount at the right time. Put the ingredients together. You will go a long way toward optimizing your potential.

In addition to strategy and tactics, including pacing and energy conservation, some of these elements are:

- Fitness, including
 - Aerobic fitness
 - Muscle-strength fitness
 - Endurance fitness
 - Metabolic fitness
 - Anaerobic fitness
 - Power
 - Neuromuscular (leg-speed) fitness
 - Neurohormonal fitness
- Nutrition, including
 - Diet
 - Body composition
 - Ergogenics
- Equipment
 - Bicycle fit
 - Bicycle geometry, aerodynamics, weight, and other specifications
 - Bicycle maintenance

- Skills
 - Bike handling, including proximity, descending, and cornering
- Mental attitude, goal setting, and sport psychology
- Physical health
- Rest-recovery-sleep

Strategy & Tactics for Cyclists is about achieving results on event day with the fitness you already have. Other *ABC (Arnie Baker Cycling)* publications provide more information about other elements of successful riding and racing:

- Fitness is discussed in *High-Intensity Training for Cyclists*.
- Diet, body composition, and ergogenics are discussed in *Nutrition for Cyclists*.
- Equipment, in terms of aerodynamics and weight, is discussed on page 52. Equipment, in terms of bicycle positioning, is discussed in *Bike Fit*.
- Bike handling and other skills are discussed in *Skills Training for Cyclists*.
- Mental attitude, goal setting, sport psychology, and goal setting are discussed in *Psychling Psychology*.
- Physical health issues are discussed in *Bicycling Medicine*.
- Rest, recovery, sleep, and overtraining are discussed in *Smart Cycling, High-Intensity Training for Cyclists, Bicycling Medicine*.

Introduction

Goals, Strategy, Tactics, Moves, and Skills

GOAL: A desired state of affairs, vision, or objective.

STRATEGY: A plan or method for achieving a goal.

TACTIC; TACTICS. Action taken to further an overall strategy; the building blocks of strategy; the maneuvers.

Within the context of your overall long-term cycling goals, short-term goals may include specific events or races.

A strategy is a plan or method for achieving a goal. Tactics are actions taken to further a strategy. Tactics are the building blocks of strategy, the maneuvers.

Those goals lead to strategies, which can be broken down to tactics.

Carrying out those tactics involve moves or skills.

Overview

Consider the overall strategy and tactics of Freddie Rodriguez for an upcoming US Professional Championships, an event he has won three times, more than any other racer:¹

“I follow a plan... I have to play my card, and that's it.

If another card comes out, and I pull out my ace, then I could lose the whole event, so I have to play the ace when... I'm supposed to play it, and hope all the other guys play their cards first.

There's a lot of strategy, and the race could be lost in just a moment like that, so it's a gamble.

There's certain risk involved in the way I race the event, but on the other hand, it's the only way I can assure myself the possibility of winning, more than playing for just a result.

It's a race of attrition. I let the attrition take place, and then I play my cards at the end.

The day that doesn't happen is the day I'll lose. It might happen this time - an early breakaway, or an attack that I don't cover, but if I cover all those moves?

I have one game plan... I stick to it.”

Assume Success

Goal setting and planning help.

Game theory often holds that if it will take a specific set of circumstances to achieve your goals, assume those circumstances will take place.

If you need to make an attack, cover a breakaway, have teammates control the tempo, or be first to that corner—visualizing those circumstances and assuming they will take place, helps.

That is not to say you are rigid to changing conditions, adopt false confidence, or are overly disappointed if events do not play out.

“If you need to find a specific lie of the cards to make or defeat a contract, play as if that is indeed the position.”

Goren Bridge by Omar Sharif and Tannah Hirsch

Read more about motivation, confidence, and other sport psychology topics in the *ABC* book *Psychling Psychology*.

¹ Daily Peloton. Jaime Nichols interview, June 6, 2004.
<http://www.dailypeloton.com/displayarticle.asp?pk=6350>. Accessed 12/24/2005.

Goals

For each event, your goals for that event may be individual or team related.

Events may be single or multi-day.

The initial goal of most beginning racers is survival: participation, not crashing, and finishing all or part of an event.

Long-time professionals may be event beginners entering what is for them a new event, for example, an Olympics, World Cup, or major Tour. Process familiarization is often a short-term goal, part of a long-term plan. A new relatively young pro may enter her first Olympics for the experience, planning to medal 4 years later.

Many riders enter events to hone fitness or skills, in preparation for more important events later in the season. Fitness building may be for endurance, aerobic, or anaerobic fitness. Examples of skills building include proximity and cornering for criteriums; descending for mountainous road races; and dirt, root, or mud riding for cross-country mountain bikers.

Finally, the traditional result-based goals: Winning prizes and capturing medals, for self or teammates.

Strategies

Using energy wisely—conserving, pacing, and wasting rivals' energy—should be a key strategy for almost every rider in every race.

Plans for achieving event goals may be simple or complex.

If the goal is survival, the only strategies may be to use energy-saving tactics to finish.

If the goal is winning, the strategy may be to establish an early breakaway, force a chase and selection of riders to reduce the field, and then a small group sprint.

In a team event, one domestique's strategy may be to ride tempo early to discourage early breakaways, set up a teammate in a breakaway halfway through the race who will go on to help the team leader, when on the last climb, there are only a few riders left, and proffer a leadout.

Tactics

ATTACK: An aggressive high-speed jump away from other riders. A sudden acceleration to move ahead of another rider or group of riders.

BLOCK: Physically or psychologically impede or slow down an individual or group of riders. Most commonly, when a teammate is in a breakaway.

GAPPING: Letting some space open up between you and the rider in front of you.

DRAFT, DRAFTING: Riding behind one or more riders; saving energy in the slipstream. Drafting is illegal in individual time trials.

LEADOUT: A rider, often a teammate, provides the benefit of a draft to better position another rider, generally before a sprint.

The basic tactics are attacking and blocking. Gapping is an important type of blocking. Drafting, in its many forms (large group, small group, paceline, echelon, marking a rider, and leadout) is a key tactic in mass-start races.

Moves

Carrying out a tactic may require a move, or series of moves.

For example:

- Attacking requires an acceleration, perhaps by shifting to an easier gear and placing ones hands in the drops
- Blocking may require sitting in the front of the pack
- Gapping may require easing off the pedals, not matching an acceleration, or pulling off wide in a corner
- Drafting requires getting on a wheel
- Leading out a teammate may require finding that teammate and getting ahead of him

Skills

Skills may be determinant in many events. For example:

- Proximity skills (riding close to others) are required for track events and criteriums.
- Cornering skills are required for criteriums.
- Descending skills are required for many road races.
- Balance and technical skills are required for almost all mountain bike events.

Putting it Together

Here are a few possible goals-strategies-tactics-moves-skills situations:

Goals	Strategies	Tactics	Moves	Skills
Individual				
Survive Finish 5 laps Finish	Energy conservation	Draft Arrive at obstacles near front	Get on wheels Move up in anticipation of obstacles	Draft Proximity
Fitness, aerobic	Fit rider: Time trial off front Less-fit rider: Enter race	Attack in lull after prime Survive	Jump and TT	Draft Shift and accelerate Ride low
Prizes/points	Go for primes	Mark riders Follow teammates Attack early	Get on wheels Jump	Draft Proximity Shift and accelerate
Win or place	Breakaway Field sprint	Attack Mark riders	Jump and work breakaway	Shift, accelerate, TT Proximity
Team				
Domestique	Shelter leader Tempo ride Defend attacks Leadout Feed leader Mechanical support Breakaway early for later role	Mark rivals	Wheelsuck	Draft

Table 1. Examples of goals, strategies, tactics, moves, and skills.

This book focuses on two columns of Table 1: Strategy and tactics.

Race selection is discussed in detail on page 143.

Goals setting for more than one race is discussed in detail in *Psychling Psychology*.

Moves and skills, including bike handling, are discussed in *Skills Training for Cyclists*.

Summary

Strategy and tactics, along with fitness, nutrition, equipment, physical and psychological health determines race-day success.

Goals lead to plans (strategies), and actions (tactics and moves) to achieve those plans.

At first, this process is conscious, and sometimes overwhelming. With practice, it becomes more automatic and reflexive, giving thoughtful and experienced racers an advantage.

Part 1

Energy

“Cycling is such a long endurance sport in terms of hours but it’s also such a tactical sport that there are times when you could be just strolling along. But it can also be very intense, like a 3,000-meter run.”

—Greg LeMond, three-time Tour de France winner (1986, 1989-90), two-time world champion (1983, 1989).

Energy: The Currency of Racing

Racers want to race, and beginning racers are often eager to go hard from the gun.

However, that is not necessarily the best strategy, and generally is a hard way to win a bike race.

You start out a race with a certain level of fitness. Other riders have their levels of fitness. You can do more with less if you are thrifty, and spend your fitness wisely. You can also do more with less if you can induce your rivals to waste their fitness. Moreover, if you have more to start with and play it smart—you are unstoppable.

Consider this analogy². Every rider that rolls up to the start line has a “little pocket of change” to use as spending money during the race. Based on ability, preparation, and training a thrifty rider’s “little pocket of change” holds \$4.00. The strongest (wealthiest) rider has 25 percent more, \$5.00.

Neither rider has teammates. An hour criterium has just started and the thrifty \$4.00 rider maintains a position in the top quarter of the field. The \$5.00 rider immediately goes to the front, trading pulls and making jumps.

The thrifty \$4.00 rider is spending the equivalent of 3 cents a minute. The stronger profligate \$5.00 rider is spending 5 cents a minute when pulling and 10 cents a minute when attacking. After about 40 minutes, the thrifty rider has \$2.80 left. The initially stronger, but more profligate rider now has \$2.20 left.

Now a prime is called and a big acceleration occurs as riders ante up 20 cents in a dash for the line.

After the prime, a split occurs and it has the potential to be a strong breakaway.

² Adapted from Team X Strategy by Steve Rouff and Jim Whittaker.

Now the thrifty rider has more money left and has a better chance of getting into the breakaway, sticking with it, and winning.

A racer on a well-organized team? Well, it is like having several like-minded investors pooling their money together for a purchase.

Don't Just Slug Away

Home run hitters get noticed, and bring fans to the ballpark. However, the top sluggers are rare, expensive, and do not necessarily win games that often.

Billy Beane's small-budget baseball success as general manager with the Oakland A's³ was principally due to the realization that winning ball games came not from slugging at the ball, but by getting on base. Moreover, getting on base had to do with patience: tiring out pitchers, swinging at good pitches, not slugging away at poor pitches, and getting a fair share of walks.

Further, Billy's success came principally in the second half of each season. The first halves of most of the A's seasons were modest. It was during the second half of the season that they played like a new team—because they often were a new team. As the mid-season trade deadlines loomed, other teams would allow Billy to acquire players for modest amounts of money.

Similarly, although there are some exceptionally strong riders who can slug/attack from the gun and win, most success in bicycle racing requires patience and thoughtfulness: waiting for riders to tire, swinging at moves likely to work, not slugging away at poor pitches, and letting others give you an occasional free ride.

Moreover, as long as you can stay in contention in the first half of the bicycle race, the first half does not matter much—it is the second half of the bike race that is decisive.

You do not win the race in the first half of a race, although you may lose it; you win it in the second half.

Riders often tell me they were every break except the one that ultimately mattered. Play the odds. The early breaks without the strong riders or the strong teams do not matter.

Racing is not about machismo; it is about winning the race.

³ Moneyball—The Art of Winning an Unfair Game, Michael Lewis, Norton, 2003.

Work for a Reason

Many athletes train and race, working hard, without considering when and why they are working. It is not necessary to train hard all the time, indeed it is counterproductive. Recovery is an important part of training.

Similarly, it is not necessary to race hard all the time—it is also often counterproductive. Pacing and tactics generally play a crucial role in racing success.

A breakaway group makes an escape and gains 30 seconds on the pack. Should you chase to catch up? Beginning racers often do, towing everyone in the rest of the field back up to the breakaway. Unless you have a good reason for chasing, this is usually a mistake, and you should not. Bridge maybe; chase rarely⁴.

Here are some reasons to work:

1. Before racing: Test equipment or bicycle position
2. For training
3. To keep up
4. Warm-up for later efforts
5. To win, place, or gain a time bonus at the finish of a race, or intermediate point, e.g. prime
6. Break away or create strategic gap
7. Bridge to a break
8. To contribute to a break
9. Chase down a break
10. Test others
11. Force others to work, weakening them
12. Reduce the number of opponents; split the field
13. Capitalize on the weaknesses of others
14. Gain a time or positional advantage before an obstacle, such as a climb, intermediate point, or finish.
15. When you have the element of surprise, with the right timing
16. When you can carry it through
17. Misdirection; to establish a pattern of behavior that you will later break.
18. To bluff; to appear stronger than you are
19. When there is no other choice to preserve your chances
20. When there is no other option
21. When you are just about done, for one last hurrah
22. When there is TV coverage
23. Help teammates
 - Chase down a break
 - Prevent attacks
 - Get teammate to an obstacle (hill, crosswind section) protected or relatively fresh compared with rivals
 - Prevent a teammate's rivals from winning, placing, or gaining a time bonus at the finish of a race or intermediate point
24. For the sheer joy

Before Racing: Test Equipment or Bicycle Position

Riders need to work hard to test equipment or bicycle position.

Riders frequently unpack their gear just before a race and test equipment during warm-up. Occasional racers commonly use their race wheels for the first time in several weeks only minutes before a race.

⁴ Bridge, Bridge a gap: To join a rider or group of riders ahead. Bridging usually implies a tactical effort in which only a rider or small group reaches the group ahead. If the whole pack rejoins it is not a bridge; it is a chase or the group ahead was merely caught.

Testing during race warm-up is better than during the race, but is a little late. Better to use race equipment occasionally during training and test the day before racing.

A new chain may skip on worn cogs, but only under heavy pressure. After testing a new chain at low power outputs, test the chain cogs at controlled, progressively higher outputs before using a new combination in a race.

Bicycle position may seem right at low power outputs, but at high power, position changes. For example, riders commonly move forward on their saddles as effort increases toward time-trial power output. Without hard riding, what initially may seem to be a satisfactory seat height in casual riding may prove to be too low in competition.

Again, hard-work testing during training is best.

Training

As stated above, it is not necessary to train hard all the time, indeed it is counterproductive.

Riders without the time to train properly for a given race, or with broader goals, may enter a race without any plans for finishing well.

They may race to increase fitness either by entering harder races than they are ready for, working harder than they otherwise tactically should, or as part of block training⁵.

At the finish line, riders who enter races with the expectation of not doing well need to remember why they entered the race when they do not do well.

⁵ Block training: Consecutive days of interval work or stage racing. Incomplete recovery between sessions may raise overall fitness as long as commensurate recovery is postponed, not omitted.

Keep Up

Most riders ride defensively, using energy when it is necessary to keep up, chase down others, or during the final sprint.

Attack

Proactive riders use energy at opportune times—when it improves their chances for success by reducing the field size or otherwise weakens their opponents. Opportune times generally are when there is an element of surprise, when others are weak or otherwise vulnerable, and when the energy reserves of the rider are sufficient for the time remaining in the race.

Misdirection

By consciously establishing a pattern of working with a race, or series of races, you may fool your rivals into expecting the same behavior again—only to change it.

Bluffing

Riders may try to appear stronger than they really are in order to avoid being attacked. For a fully discussion of bluffing tactics, see page 61.

Limited Options

Riders may also use energy when there are no viable options for success.

For example:

A good, but not great climber might try an early breakaway in order to get over a climb before or with the best climbers in a race.

A good time trialist may try to solo away early knowing that otherwise the sprinters or climbers will win.

A weak sprinter may attack a three-person breakaway early if that is the only way in which victory is possible.

Limelight

Some professional riders commonly ride for personal and sponsor exposure when television cameras are present.

Exhausted riders sometimes make a last-ditch effort for exposure, one last hurrah, before sitting up, their race over.

Teamwork

Teammates often work hard to protect their team leader, whether it is to set up a breakaway, toughen a climb, leadout a sprint, or protect him in a stage race.

Hard steady riding discourages other teams from attacking; near the end of a race, hard team riding also helps to lead out the team sprinter.

Pull

Leading the peloton in a non-team situation is rarely a useful tactic. Pulling to toughen the race, making it harder for everyone, is discussed on page 50.

Drafting

Drafting is the elemental component of energy conservation.

Factors to be considered in the benefit of drafting include:

- Number of riders
- Gap between riders
- Size and position of riders
- Wind, including headwinds, tailwinds, and crosswinds
- Speed of the group
- Steadiness of the person being drafted

The bigger the group, the closer the rider drafts, the greater the surface area of the person being drafted, and the greater the speed, the more the benefit from drafting.

The effect of group size and gap distance is detailed below.

Crosswinds affect drafting tactics; knowledge of echelons is important.

Big riders (those with more surface area) provide a better draft than smaller riders do. A wider rider generally provides a better draft than a tall, thin rider does.

In a group that will likely stay together, energy is conserved riding behind a steady rider rather than a rider who accelerates and decelerates within the paceline.

Number of Riders

Here is one estimate of how power is saved, dependent upon speed, drafting a single rider at 3 feet:

- 6 mph 2%
- 12 mph 7%
- 18 mph 18%

- 25 mph 25%
- 30 mph 28%

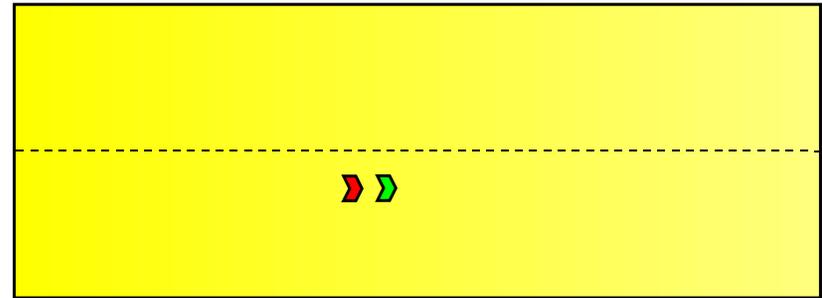


Figure 1. Drafting a single rider. Moving from left to right, RED drafts GREEN.

Drafting two or three riders at 25 mph at 3 feet saves about 30% energy.

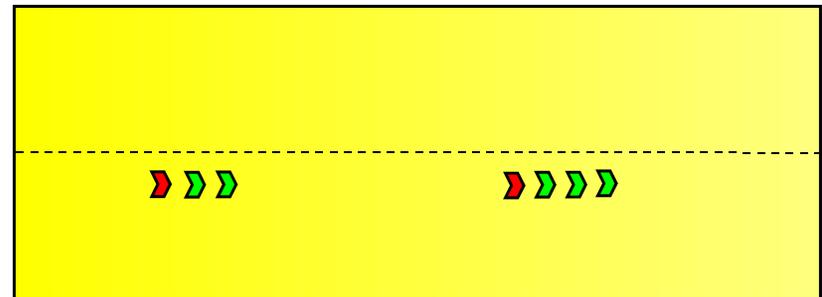


Figure 2. Drafting two or three riders. Moving from left to right, RED drafts GREENS.

Drafting within a small group at 25 mph at 3 feet saves about 40% energy.

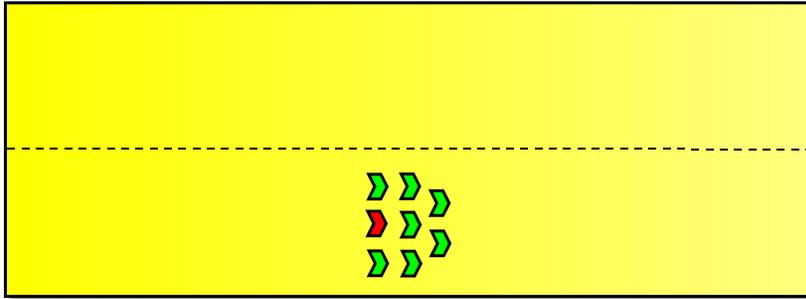


Figure 3. Drafting with a small group of riders. Moving from left to right, RED drafts GREENS.

Gap Distance

The closer the drafter follows the rider in front of him, the more energy is saved.

Here is one estimate of how power is saved, dependent upon gap distance, drafting a single rider at 25 mph:

- 6 inches 35%
- 12 inches 30%
- 18 inches 30%
- 3 feet 25%
- 4.5 feet 22%
- 6 feet 20%

Drafting Technique

Although a smaller gap provides more energy conservation, drafting so closely that you are uncomfortable wastes mental energy.

Just as tailgating in a motor vehicle may require sudden braking, drafting too closely increases the need for braking, which causes a yo-yo effect, wastes energy, and increases the risk of crashing.

Riding slightly to one side, rather than directly behind a rider, allows you to see hazards ahead and gives you an out if the rider ahead of you slows.

Learning to follow another rider closely and safely requires practice. For more information about this skill, see the *ABC* book *Skills Training for Cyclists*.

Overall Benefit

Domestique (team worker) riders commonly use twice as much energy, put out twice as much power, as their protected teammates in stage races.

When the crunch comes, riders who have saved energy have the crucial reserves for attacks, climbs, or sprints.

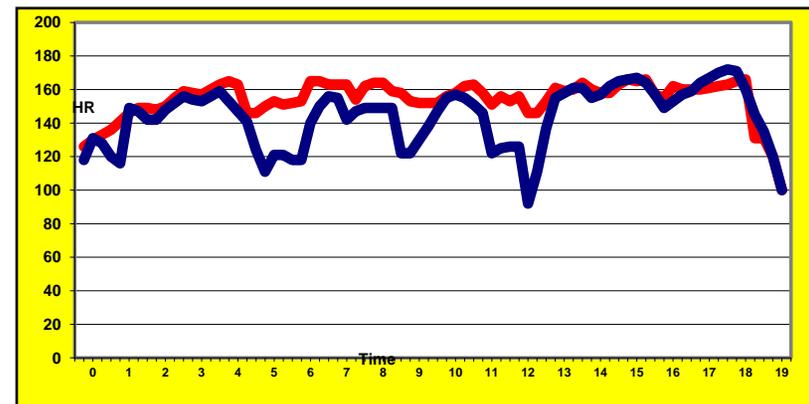


Figure 4. Drafting benefit. Less work, lower heart rate. BLACK, drafting, saves energy on flatter course sections.

Figure 4 shows the superimposed heart rate recordings of two riders over a 10-mile rolling road ride. Both riders have about the same max heart rates. The RED rider is a fitter and faster rider.