

# **Cross Country: Mental Preparation**

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## **Yogi Berra:**

“50 percent of the game is 90 percent mental.”

- Arms, legs, posture are controlled by the brain.
- What you think about before races is controlled by the brain.
- The effort you do workouts and races at is controlled by the brain.
- How you manage your daily life, which creates the environment in which your body builds in response to runs and workouts and gets stronger, is controlled by your brain.

These are all choices, though it may appear pre-determined by genes or some other sources. What isn't controlled by the brain is your response to training. That's in your genes. Some people are more fortunate and build faster and stronger in response to training than others. That's a gift.

But many who have that gift have wasted careers; ones with slightly less of a gift can go farther by making better choices. Many of the stars of professional distance running weren't the biggest stars in high school or even in college.

All were people who persisted in the sport, made good choices, and made mental adjustments, along the way.

Yogi is underestimating how much is mental.

In this documents, we're going to go over:

- How the brain works and how this affects running performance.
- How the muscles make and use energy, to establish basis for what to focus on.
- The affects of adrenalin, establishing basis for race prep.
- Some things to focus on in race prep and while racing.
- The season training and racing plan and how to approach it.
- How what you do away from practice affect your development and performance.

## **Our mental equipment**

Besides my own experiences and reflections, my main literary sources for this section are:

- *Thinking, Fast and Slow* by Daniel Kahneman
- *The Power of Habit* by Charles Duhigg
- *The Will Power Instinct* by Kelly McGonigal
- *The Competitive Edge: Mental Preparation for Distance Running* by Richard Elliott

## **Kahneman's Thinking, Fast and Slow**

Daniel Kahneman is a behavioral psychologist who has worked on judgment and decision making. He received the Nobel Prize for Economics in 2002 for the work that was publicized in his book *Thinking, Fast and Slow*.

I have read psychology books on how to improve habits, will-power, and many other things, but Kahneman's model for how the brain works explains to me what I find in those books, and elsewhere, and what I see in my own behavior and that of others. Explains why myself and people around me can get stuck doing things that are not the best possible. And gives clues of the direction for being more effective. So while things in the other sources are woven through this discussion of mental function, I'll put Mr. Kahneman a central place.

Kahneman's theory is that it is as if the brain makes choices subconsciously with two systems:

- System 1 operates automatically and quickly. Sees a few cues and makes a decision. It is reactive.
- System 2 uses energy to pay attention to a lot more information. Analyzes it and then makes a decision.

For most of what you do, say, and think, the brain has built a reactions to a cues that you see or hear (or smell) and System 1 quickly makes you act, say, or think some way.

If there is no stored reaction to what is seen or heard, then the brain has to analyze things to come up with what to do or say or think, so System 2 is engaged to figure things out.

The running form you have now, is run by system 1. You want to run somewhere, that's the cue, and it executes a complex pattern of posture, leg and arm motions that are stored in a pattern.

Building that running form pattern was done in the past, using System 2. Largely subconsciously. You wanted to get places fast and the brain worked by trial-and-error using System 2 to build a pattern of posture and leg and arm movement that was acceptable, and stored it. If you think it's ideal, just look at the arm motion of any runner. It's slightly different on each side.

If you want to change running form, you have to focus, which is engaging System 2, to make the change and establish a new pattern. That arm motion, if you want to make the same on both sides, or just better than it was, you'll need to focus on what your arms are doing, until a new pattern is established.

You might think it would be better if System 2 made more of the decisions and choices, but there are a couple reasons why it doesn't:

- Most of the quick reactions that System 1 does lead to good results, or at least acceptable results, and you can get a lot more done than if you were using System 2 to analyze and come with a solution to situations that look very similar the situations before. Such as getting up in the morning, getting to

school, and so on. Also, there are some life threatening things that can come up that you need to react to quickly. A quick reaction is needed to get out of danger. This was more true in our ancient past, and to some extent is a carry-over from then.

- System 2 uses energy and the body in all things tends to conserve energy so it is available in emergencies. Kahnemen actually found in tests that when people were doing things that required focus, there was a measurable drop in blood glucose.

But there are situations where the System 1 decisions aren't the best, and you would get a better result if you could engage System 2 to make the decision.

And possibly get the brain to store away a better reaction for System 1 to use when the cue occurs in the future. Some of this retraining happens naturally, but in some cases the brain needs help in getting itself to react differently.

Kahneman's book, after it explains the System 1/System2 theory, has many, many chapters of examples how System 1 makes decisions which can be inappropriate. Some of them are:

Confirmation bias – you've made a decision and only see the facts that support it.

Trusting people based on appearance or how confident they appear, or dress/grooming, or similarity to you.

Framing – your attitude toward some thing may be based on a few cues, and may not be realistic, and not the most effective way of dealing with it.

And Kahneman has a chapter on how people become experts, where their intuitive reactions are usually successful. It is through focus, persistence and willingness to adjust so that their reactions gradually go from being mostly mistakes to mostly being successes. But some experts think because their intuitive reactions are good in their field of specialty, that their intuitive reactions are good in other things. Leading them to make mistakes in other areas of their lives. It's good to know what you're good at, and what you're not good at.

Implications for running and racing (some of them).

- Running form. It's a pattern of body movement that the mind makes happen when you want to get somewhere faster than walking will take you.
- Your reaction to the external cues in races, such as to other runners, and to being in a competitive environment.
- Wanting to run hard all the time. It feels good and you justify it as good training.
- Running workouts to achieve a certain time, or to stay up with certain people, when that can be counterproductive to achieving the kind of development that is the objective of the workout.

You may recognize some of these things as things as mistakes you made in the past, and have now got control over, and also some of them you may still need to work on.

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What it takes to change.

Focus –Being relaxed but attentive. Not giving in to first reactions to cues around you and in your body and mind.

Self-control – doing something that you didn't do before, but which will get a better result.

Objectives are good. The mind can build new habits to achieve objectives if old habits don't work to get you there. Try to have objectives that are achievable and for which there is a realistic plan for achieving.

Intermediate objectives are good. Simple, achievable things to focus on doing that will lead to better results. What has to happen between the start and finish of a race is to complex and full of distractions. Having intermediate objectives such as being calm at the start, focusing on effort level at the start of a race, focusing on backs of other runners in second half of a race are such internal cues which, when focused on, add up to a better time and place.

Focus on executing these mini-objectives. And if you get distracted, come back to the objectives appropriate for that stage of the race prep, or the warm-up, or the starting area, or the start, or the first part of a race, etc. Second half of this document is about these intermediate objectives, also called internal cues, that will help you have a better season and do better in races.

Reflecting on what happened afterwards and see the situations again and your reactions to them, so you can be more effective in the future. Big emotional investment in a particular outcome will get in the way of this. Not wanting to re-experience a painful thing will get in the way of objectively understanding it and doing better next time.

### **Meditative state is best.**

Richard Elliott's book on Mental Prep for Distance Running spends a whole chapter on meditation. Kelly McGonigal in Willpower Instinct indicates meditation is a good way to improve self-control.

Meditative state means no (or few) verbal thoughts.

Focus on your breathing and how your body feels.

Be relaxed, not excited, and not anxious.

Control of your arms and legs and pacing are non-verbal activities.

Being in a meditative state is good for racing better.

If you have verbal thoughts...positive ones are best.

### **Meditation is good practice for racing better**, or doing anything better.

What is meditation: mental state of no verbal thought and no feelings of excitement or anxiety. Focus on your breathing, and what's around you, but with no verbal thought, and no excitement or anxiety.

When practicing meditation, the main objective to is not to be in a meditative state without verbal thought for a long time. Instead, it is practicing getting yourself back into the meditative state when things such as verbal thoughts or feelings of anxiety

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or excitement come into your mind. This is good practice for running and racing, because there are many things to distract you and causing reactions. If you can get back to focusing on how you feel and what you need to do at that stage of the race, you'll race better.

### **In racing:**

Get back to just being in the race, how you feel, what's going on around you, without verbal thought.

Refocus on internal cues that help, your objectives for the current stage of the race. When you have un-useful thoughts or anxiety or excitement, focus on your breathing, effort level, form, basically, being in a meditative state..

Recall appropriate internal cues for where you currently are in warm-up, starting area, start of race, end of race, etc. And focus on executing these intermediate objectives that will help get you the best time and place.

And not on the un-useful thought, excitement, or anxiety that is getting in the way.

### **Being relaxed is best.**

No strain.

No feeling of being psyched up (we'll talk about adrenaline later).

Pay attention to how you feel (pacing) and posture, legs, arms (economical form).

Also, pay attention to other runners.

First part of race, just look at them and size them up, but don't race.

Latter part of race, compete...race them.

Attach to other runners. Let them pull (or push) you.

But stay relaxed. Pay attention to your form and how you feel.

Staying relaxed is good way not to give in to sudden reactions, and avoid making past mistakes. If you're relaxed, you're more aware of what's happening and more able to control yourself. And more flexible so that you don't get sucked into reacting to things you shouldn't, and able to make adjustments to things that are different than you expected.

- In US Olympic Trials 10,000 this year, Bernard Lagat made the mistake of staying glued to the lead runner (Galen Rupp), and the pace turned out to be too fast and he dropped out after 7000 meters knowing he was going to not be able to come in 3<sup>rd</sup> and would take too much out himself to place in the 5000 later in the trials.
- In the 5000 prelim and final, he focus on being relaxed and not on being in a certain place in the early part of the race...and he won both his prelim and the final. Particularly in the final, there were a lot of crazy things like two young runners surging to open big gap in early part of the race, and a lot of anxious surging and positioning among the runners in second half. Lagat didn't get sucked in and though he was in 6<sup>th</sup> position with one lap to go he felt as he wanted to feel at that point in the race and had enough for a great kick to charge past everyone in last 150 meters.

Part of getting better at racing is learning not to react to the things that will get you in trouble. Learning control. Over the course of a season and even several seasons, you want to learn from mistakes so you have better reactions, or can suppress reactions that are not good. Remember how people become experts. They learn, from their experiences and mistakes, to have better reactions.

Mo Farrah (2012 Olympic gold medalist in both 5000 and 10,000). This is what Mo has been exceptional at. He's a very relaxed, low-tension guy. And in races, he doesn't get 'sucked in' to doing things that will hurt his chances of being with the leaders when he needs to be, and having a kick at the end of races.

### **How the Body's Energy Production Systems Affects Performance**

So that was about how the mind works in relationship to the body.

Now I'd like to talk about how the body works, particularly about how the body produces and uses energy when you run (and race) and about adrenaline which is key for overcoming the effects of the muscles getting into states of fatigue. This is to explain some ways to think about racing, and to think in races, to use the body to get the best time and place, and how some of the untrained reactions to racing (such as starting too fast, charging up hills, and reacting to other runners' surges), can lead to poorer results at the end of the race. Basically, what you do early in a race and how you react to situations in a race have effects on the chemistry in your muscles and in your body, which will effect how fast you're able to go later in the race. Some good intermediate objectives or mental cues are a helpful way to get the mind to use the body to get the best time and place.

Main literary source for this section are:

- Physiology of Sport and Exercise (textbook) by Jack Wilmore, David Costill, and Larry Kenney

### **Lactic acid (and other things that get in the way)**

I'm covering this, because getting the best time and best place means using your body, as it is on the day and time of a race, wisely. It's largely about creating the most energy over the course of the race (pacing), and using it efficiently (running form). What you do in a race can be evaluated against these criteria.

You may be absolutely exhausted at the end of a race, and no one could say you didn't give your all, but could you have gotten a better place or time if you have raced more wisely?

Such strategies as marking a specific runner, charging up hills, getting to the front and holding on should be evaluated against this. So should any actions you do during the race. We'll cover some guidelines that are usually good, but over time you just want to get wiser about racing and more in control of yourself so you can have an overall approach that works well, and also react (or stifle reactions) to situations that come up during a race.

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Clearly if you start way too fast, you will have to go very slow later and not do well. That's obvious. Waste products and acid (lactic acid) once they build up in the muscles get in the way of going fast.

But the consequences of going out just a little too fast, surging to get a position, and charging up hills, are not as obvious as starting way too fast. Since the consequences are not so immediate, it's more likely you'll give in to impulses that lead to poor results later.

Most of the guidelines for race strategy and tactics are about dealing with situations in a race so that you get the most out of your body, using it wisely, to get the best place possible.

### What are the energy sources that we have.

ATP is what the muscles use to do work. To actually contract. But very little ATP is stored at any instant. ATP is produced in the muscle from carbohydrates, fat, or oxygen. The 3 systems the muscle has for producing energy are:

Alactic – lasts 5 seconds. The start of a race or kick at the end. (Creatine phosphate is the source).

Anaerobic – starts in after alactic. Uses glucose (carbohydrates). Produces waste products and acid that get in the way of going fast. The muscles can tolerate a bit of those waste products and can put some in the blood to get processed elsewhere in the body...that's one of things we work on with faster tempos (lactic threshold).

Aerobic. – takes waste product from anaerobic process, mixes it with oxygen, and produces a lot of ATP. We work year round, and year-to-year, to make it able produce more energy aerobically. Miles/week, long runs, tempos at a steady pace (at aerobic threshold). To create more mitochondria in the muscles (which produce the ATP aerobically), improve better blood circulation in the muscles to bring in oxygen, more glucose, and carry waste products out of the muscles, and increase the concentration of red blood cells (RBCs) in the blood for transporting oxygen from the lungs to the muscles.

Energy Systems Contributions in Track and Field Performance

Event	Duration	Alactic	Anaerobic	Aerobic
100	10 sec	53%	44%	3%
200	20 sec	26%	45%	29%
400	45 sec	12%	50%	38%
800	1:45	6%	33%	61%
1500 (mile)	3:40	-	20%	80%
5000 (xc)	13:00	-	12.5%	87.5%
10,000	27:00	-	3%	97%

Source: K A von Someren, 2006. The physiology of anaerobic endurance training.

After you go from alactic to anaerobic at the start of a race, it takes a few seconds for the aerobic system to gear up and start producing. During that period, anaerobic

waste products (lactate and acid) are building up in the muscle. If you're going faster during that period, more will have built up before aerobic starts producing. But those waste products get in the way of ATP production and muscle contraction, and the higher the level of these waste products as the aerobic system gets into production, the lower the speed you will be able to hold for the remainder of the race.

Think of it this way:

The speed you're running at in a race requires certain number of ATP per minute. Some of that is from aerobic capabilities you've built up in training which are spinning out ATP at the maximum rate they can. But that only accounts for a percentage of your current speed. The rest is accounted for by anaerobic ATP production that is also happening, but which is also creating waste products and acid which, you can support only a gradually increasing level of to the finish of the race. If you go faster than that, the additional speed can only come from the anaerobic production since aerobic production is already at its limit. So if you suddenly go faster, or charge up a hill, that extra speed or lift has to be done with additional anaerobic production, which will mean a higher level of waste products which WILL reduce the speed you can hold later in the race, or your kick. This is the concept you want to be mindful of when deciding on the pace at the start and what you do in situations that occur during the race. Mo Farrah has been particularly expert at making good decisions with this concept in mind.

System 1 reactions to the start of a race or situations during the race might make you go faster than you should. It takes some System 2 focus to restrain yourself. And over time, if you can make adjustments, you will build up better System 1 reactions to the different situations that come up in a race and use the energy production systems more wisely.

In track races of 1600 or more, usually even splitting most of the distance is best. What we usually see with most runners in track races in high school, is a slow down between the first and second 200 meters of the distance races. They're going too fast in the first 200 while the anaerobic system is building up waste products until the aerobic system has geared up production and the amount of waste products is too much to allow holding the speed they started at. If you run the first and second 200 evenly, you can hold a slightly faster pace for the remainder of the race, and beat people who are just as fit as you, but don't race as wisely.

In a XC race, with the varying terrain and hills, and wanting to get in a good position in the field in the crowded start, even-splitting the race distance is not an objective. Finding the effort level of an intensity you can hold for the duration of the race is. Over the first races of the season, you want to find the feeling of the fastest pace you can hold. What it feels like at different stages of the race. Particular during the start of the race, because it will be hard to make yourself slow down once you're in a rhythm. That's called **calibration**. And then once you've found it, you want to back off to that effort level after your short burst of speed of 10-15 seconds at the start.



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I thought our boys varsity did this beautifully in the CIF prelims and finals last season. And what it looks like is that after the first 400 meters, they started rolling past a lot of other runners who ran that first 400 at a pace faster than they could hold. First half of a race, they got by many. In second half, things had thinned out, but they were still catching people.

Given that's how the energy systems operate, what are some guidelines for racing:

### **The first part of a race – calibration**

You want to focus on the feeling of that optimal pace, not on other runners. There may be a desire to stay as close to the leaders and hope you can hang on for the entire race, or to race a particular runner from another team or your own team mate right from the gun. You don't want to do that. You want to focus on your effort level and getting that right so you're at a pace you can hold for the whole race distance. That is the thing to do in the start of a race that will have you beating more people by the finish than any other thing.

With crowded start of XC races, in the first 20 seconds, you just want to go fast enough to get among runners who are at about the pace you want to be at during that most crowded part. After first half mile, the field will string out and you can easily weave your way forward.

Find a rhythm. You want to find a 'rhythm' of how you feel during stages of a race. Over the first few races, suggest you get a feeling of an internal 'map' or 'schedule' for how you feel at different stages of the race. A 'rhythm' of how you feel that you can feel confident in. As you're developing it, reflect after the race how you did. Did you go too hard for first part of the race and lose places in the second half or have no kick? Did you have too much at the end, and could have run first part a little harder? Again, this is called calibration.

### **Latter part of a race - Callousing**

Stay relaxed. Don't get anxious and don't complain about the pain.

The pain (or discomfort) is actually in the brain. Pain is a regulating mechanism of the brain to keep you from using something that is injured so it can recover, or discouraging you from using up energy resources that could be needed in a real emergency. Get used to running with it.

Holding your form and being as efficient as possible so you get as much speed as you can out of the level of pain you're able to tolerate. This is called callousing.

And in second half of a race, you can focus on other runners...competing against them.

As you get tired, the brain will try to save energy by working less on controlling form. But at the finish, you still want to be running as efficiently as possible. It takes focus to hold your form together.

Other runners. Once you get into discomfort, hopefully it's not until second half of a race, connecting with other runners will give you a focus that can counteract some

of the pain that is asking you to slow down. But in first part of a race, you don't want to connect yourself to a runner that is running at a pace that is wrong for you. First part of a race, primary focus is on being on the right effort level, then looking around for runners that you can 'draft' with.

'Don't get isolated' has it's place, but it's not all the time. There's a small percentage energy saving from running with a competitor versus on your own. This is the reason for the 'don't get isolated' guideline. But if you're going to use other runners for this purpose, do it wisely. Running with someone too fast in the first part of a race and you'll have to go slower later. So don't pick a specific runner before you start. Find the right pace and then use runners around you.

And if all the runners near you started too fast (and will have to slow), then forget this guideline, and use the thrill of catching other runners to pull you along.

Manage your effort up hills. Even intensity is the best strategy, so that means minding your intensity going up the hill and letting yourself go slower, rather than charging up the hill or trying to maintain speed up the hill. If you charge up a hill, aerobic system is at its limit and you're already at the right pace for the amount of anaerobic waste products and acidity that won't get you in trouble, then maintaining speed uphill will require additional anaerobic energy to lift you higher with each step up the hill, and you'll building up waste products and acidity that could get in the way later, or require you to lower your effort level later to recover. And could affect your kick. So best to go up a hill with same intensity as the pace that works on the flat. In a hill in early stages of a race, you might find other runners getting ahead of you on the hill, because they're making the mistake of trying to maintain speed or staying with other runners up the hill. If you ARE going to increase you're effort a little going uphill, do it in a managed manner, planning on how your going to recover down hill or on the next flat.

Rolling hills (as opposed to big hills like at Mt SAC). Treat them with respect. Just because their small doesn't mean you can maintain speed over them without effecting how you'll do later.

Cresting hills. There is a mental tendency of relief (and starting recovery) right as you get to the top of a hill. You can pick up on some runners who give into this by forcing yourself to maintain effort over the top of the hill. 'Ten fast steps' is a guideline. As you get to the top of the hill, take 10 fast steps to make sure you maintain speed over the crest.

### **Adrenaline (actually, epinephrine)**

My sources for this section are:

- Physiology of Sport and Exercise
- Endocrinology of Sport Competition by Jay Hoffman
- Endocrinology of Overtraining by Andrew Fry, Juergen Steinacker, and Romain Meeusen

But I also have reflected on a lot of personal and coaching experience with adrenal fatigue in major and minor stages.

There are many hormones of the endocrine system that effect performance in racing. Overall, different hormones are at different levels in different situations throughout the day. Some help you get better performance while working and racing, and others help with recovery. The levels of different hormones are drastically different between when you workout/race and when you sleep. Several come from the adrenal glands, which have two sections, one controlled by a direct nerve from the brain, and another which responds to hormones secreted by other endocrine glands. I'm going to focus on epinephrine (the fight or flight hormone) that is secreted by the section controlled directly from the brain by your reactions and attitude towards situations and how important they are too you, whether because there is real danger, or because you consciously or subconsciously think something is important. Epinephrine is the hormone most synonymous with the term 'adrenaline.'

When someone has done the training to be at a performance level to achieve a certain time or place in a race, but falls far short, and it isn't because of a pacing mistake, the usual explanation I can find is that they couldn't get their adrenaline to the level needed to support the performance that they were otherwise prepared. There was either a short term or a long term cause of adrenal fatigue. Short term causes are a lack of sleep, and also anxiety and excitement before the race, which will be hopefully be different before the next race if the runners prepare more carefully. Long-term causes are overtraining and racing, in which case possibly a week or two of less stressful workouts and racing might be the answer, but in extreme cases it may require reducing the workout and racing stress for a longer time and waiting for the next competitive season to do well again.

Jay Hoffman (Endocrinology of Sport Competition) checked adrenaline levels of athletes right before competition and also near the end of intensive exercise.

- At the starting line, 3x normal.
- At late stages of the race, 10-15x normal.

Why? Adrenaline is what makes the muscles still work at a high level when all those waste products and acid are there. There are limits. The waste products can reach levels at the end of the race that the amount of adrenalin you're subconsciously willing to supply won't overcome them.

If you think something is important, the mind causes adrenaline to increase. It is higher in races than in workouts, explaining why we design race-pace workouts as repetitions of distances that are shorter than the race the pace is for. You need adrenaline stores to be at top levels when you start a race so that you'll be able to hold the pace you've trained your body to hold.

- If you do things that emotionally have you worked up, you could have increased adrenaline for hours, and the adrenal gland will have less in reserve to use during the race. Affects the pace you can hold.
- Or have several nights of little sleep, because adrenal glands really recharge a lot while you're sleeping. If you have poor or little sleep for several nights before a race, the adrenal system won't deliver 15x...and the pace you can hold will be slower than you're used to.

### So it's best not to get psyched up.

Richard Elliott in preparing to write his book on mental preparation for distance running, interviewed elite runners and asked how they prepared for a race, none of them mentioned getting psyched up. All had a business-like approach to preparing for competition.

- Be determined. Be focus.
  - But not excited. Or anxious.
- Be relaxed. Loose.
  - Business-like without being tense.
- And best to get a good nights sleep every night, but particularly for the 2 nights before a race.
- And it's good to be familiar with the race venue, where you'll warm-up, and how they do check-in, and what it's like to be at big meets so that there won't be any strangeness to the environment which could make you feel anxious and use up adrenaline before the race.

### Adrenaline and the season plan

In terms of pacing out hard races and the combination of hard races and workouts, one needs to consider how much adrenaline is needed to hold the pace of the race distance. And allow the time between workouts and races for the adrenal glands to recover enough to support another all-out effort at that distance.

- For 800, the recovery time is 2-3 days.
- For the 1500/mile, about 4 days.
- For the 3000/3200/2-mile, about 8 days.
- For the 5000/3-mile about 15 days.
- For the 10,000, about 30 days.
- And for the marathon, about 6-months.

This explains

- elite runners only compete in 2 marathons a year, in spring and fall.
- the US marathon trials were in February with the Olympics in August.
- elite marathoners skip major spring marathons if they are going to run in the Olympics that summer.
- the frequency with which elite runners race 5000 meters in Diamond League meets, it's usually no more than once every two weeks, and 3000 meters races are included in DL meets so runners can race, and get paid, more frequently.
- the 10,000 meters is rarely contested in top level professional meets: the runners couldn't compete often enough to make good money.

- college runners carefully space out the 10,000s and 5000s they run to get marks to qualify for those distances at NCAA prelims.
- college cross country seasons typically have fewer races than high school seasons,
- many college runners skip less important meets in the early part of the schedule, or do them with a workout mindset.

With the high school cross country race distance of 3M/5K, I'm careful not to emphasize any early season race, and don't include the hard workouts that get us into peak mode until mid-season. And back off the stress of workouts in the part of the season with the target races. Hoping that people won't burn out from the amount of racing we do in the early season, and hoping they can race well week-to-week at the end when the races are most important.

Also, since high level of adrenaline is needed to get the muscles to still work when waste products and acid build up, how you pace out a race effects how much adrenaline is used, and how long it will take the adrenal glands to recover enough to support another all-out effort. Positive splitting means that you will be using a lot of adrenaline for more of the distance. Negative splitting will take less. And when there are rounds, such as League 3, Prelims, etc., if you have the luxury, it's best to race just hard enough to make sure you advance. I've seen some really strong teams hold out one or two top runners from invitationals, league races, and early CIF rounds. And if the team is really strong, to tell its members in league finals or prelims, to just run hard enough to make sure they are in a good enough places to get a score that will advance the team to the next round. And for coaches to insist their runners race in trainers in non-important meets to emphasize the point and reduce likelihood of injury.

### **Preparing for races.**

I'll update my one page check list for race prep and make it available both in print and at our website.

Get familiar with the travel, the warm-up area, and the course beforehand if you can. Clovis and Mt SAC are exciting meets, but our primary purpose for going to them is so that the runners who could run in CIF prelims, finals and State will be familiar with the travel, the venue and the course, and the feel of a big meet. So there won't be any strangeness about the situation when we're trying to do well in the championship rounds. Only varsity are going to Clovis this year, and the rest are competing at Lake Casitas the Wednesday before. But we want the varsity to go to the Lake Casitas meet to run on the course, because that course will be used for League 2 this year...which is the following week. The Thursday after Clovis.

The course. Get familiar with it beforehand. Either on a preview trip, or pre-meet the day before the meet, or before or during your warm-up. I've said that even

intensity gets best result, if you can get a feel for a rhythm of effort level at different stages of a particular course, that is good.

The finish. To time your surge and kick, it's a good idea to know the distances back from the finish line to remembered landmarks such as a tree, or a hill, or a turn, or a sign, so you can time surge into the finish and your final kick. Things like landmarks near 800 meters to the finish. 400 meters. 200 meters. 100 meters.

Good to think in advance of about a race and have in mind the things you'll do when you get there, in warm-up, the start, and so on so that it's easier to recall what you want to execute when you get to the meet, to the starting area, and in the race.

Thinking about an actual time or place won't really help much. Think about the things you want to do that will add up to the best time and place.

Don't get psyched up. Don't get anxious or excited. Just be business like about finding out about the meet, and reminding yourself of the things you want to do at the meet.

Can do visualization, or just thinking about what you'll do when you get there. If you do, be relaxed. And be realistic. Visualize yourself executing the little things that add up to success. Don't get emotional when you visualize, creating a state of high adrenaline.

Don't want to have surprises during the warm-up.

Want to be mentally prepared for the environment of the start and the start of the race, so you can execute the start you want, and the race won't be a bunch of surprises that you are continually reacting to without any self-control.

I think the hours or even a whole day before your race you should be focused, but relaxed on the race. And what you're going to do.

I have found with the best runners are open or eager to talk about an upcoming important race several weeks before, but that in the last day before, they have a vision of all the pieces put together in their head and are focused on executing it and are not real open to suggestion. Trying to give a lot instructions to a runner right before a race is not good. Either it's annoying them. Or, if they're receptive it is usually too many things to be able to process. If the coach can help right before a race, it is usually only with a reminder to focus one or two few good things that have been hard to get yourself to focus on in the past. And by being calm, to help you be calm and relaxed, and better able to execute the things that will help you do better.

Warm-up and going to the start.

As your standing at the start of a race, you want to be:

- 1) warmed-up, and warm, and recovered from the warm-up.
  - a. Usually the body will stay warm for up to 10 minutes.
  - b. A few run-outs while waiting for the start are ok, but not a lot and not really fast.
- 2) Adrenaline fully available.

- a. Don't want there to be much to be anxious or excited about in getting to the meet and to the starting line. And if there is, be relaxed and flexible so you don't waste adrenaline over-reacting to issues that come up.
- 3) Able to execute what you need to do at each stage of the race.
- a. Particularly in the first 60 seconds as you get off the line, into a good early position in the field, and get to the effort level of the pace that will work best for the whole distance of the race.
  - b. So it's good to be focused, but relaxed, not tense, as you're waiting to start. So you'll have self-control in the crowded start. But also able to be flexible in case something in the start of the race isn't as you expected. I like to be in a meditative state as I wait for the start. Still able to talk to people, but mostly focused on how I feel, my arms and legs, and being calm, not excited or anxious.

### **Training and racing plan – the season plan.**

The plan is built around some principles that seem to be in line with how the body gets stronger for distance racing, and my experiences over many years.

It is designed to build things gradually and mostly work on build the fundamental pieces of endurance and leg strength for most of the time in the summer and early season, and to postpone the work that gets you into peak mode because that work and the peak mode itself can only be done for a limited number of weeks without burning out and going flat.

It is not designed to get you ready for first races (Seaside) and hold that level for the rest of the season. The target races are in late October and November and the work to be in peak mode for them doesn't start until late September. The early races, Clovis, and Mt SAC are just where they are along the way. We're doing a typical HS XC racing schedule, but if you look at college meet schedules, there are not as many races and some runners might only race 4-5 times. The early season meets are treated just race experiences. The focus is on the conference championships, NCAA Prelims, and NCAA championships.

Our plan thinks along those lines and factors in the training effect of the races we typically are running every week from early September forward.

Last year our boys were in four races with Buena. Our record against them was 3 losses and 1 win. But that win was in the CIF Prelim. We got the last qualifying spot to get into the Final. We advanced. Buena didn't. It came when it most counted. So be patient with the plan and execute it as we ask. Running easy on easy days. Doing workouts the way we describe them.

Also, the plan is designed to help you get faster each succeeding season and each succeeding year, and not max you out to get fast times in the current season, or even when you're a senior, so that you have no room to grow if you want to continue in

distance running in college or beyond. If we asked for more mileage or a lot harder workouts, might see great results this year, but not much improvement in the years to come or in college and beyond. Also that 2-week planned break and taking 3 weeks to get back up to your previous miles/week is part of allowing the body to respond to the entire amount of work and stress of the season just completed so that it will be stronger and faster as a result of the work of the season we're currently in.

The body gets stronger while it's not working, and getting stronger within you can only be done at a certain rate. It's governed by the laws of chemistry. Those reactions can't happen any faster than they do. Sleep and nutrition that are important for getting stronger, but also allowing enough easy days in a week to allow the time for getting stronger. And we factor in the training effect of the races since they are as hard on the body as a hard interval workout.

Running hard and racing frequently are exciting, but they not only use a lot of adrenaline, they also cause the body to go into a high drive mode with adrenaline levels a little higher all the time. But the adrenal system can only support the work to build this level for a few weeks and can only hold that level for a few weeks after. So the plan is based on being in that peaked mode for a few important races at the end of the season, and being in the high-work/racing mode to get there for 4-5 weeks before.

So for the summer and even into late September, we're in Base Phase, sometime called Strength or Pre-Season phase. Working on things that develop the basic components we exploit at the end. For getting the best results at the end of the season, and to get better from one season to the next and from one year to the next, it's best to be mostly in this base or strength building mode. There's a saying, 'A good cross country season in the fall depends on a good summer of consistent, sensible work.'

Aerobic resources can be built up over time from season-to-season, year-to-year by just basic running, helped by long runs, and some tempo running. Leg strength can be built by short and medium hills, core, and drills. Not a lot of racing is needed, and can get in the way of long-term results.

In the base/strength phase, don't want to overdo things. If race too hard, whether it's in actual races or against each other in practice, the adrenal system goes into that high-energy mode that can be held for only a limited time (a couple months). We want to get the adrenal system in that mode in October in November. Not in August and September.

The base/strength pieces that build the fundamentals under a better race pace are:

- Miles/week and long runs (up to 25% of week's mileage).



- Steady tempo running at aerobic and lactic threshold one or twice a week in moderate amounts. 2-3 miles for lactic threshold. 4-8 miles for aerobic threshold.
- We'll do tempo-pace repeats with 5-to-1 ratio of work to rest.
  - 1200-mile repeats with 1 minute RI.
  - Starting next week (August 15-21).
- Short, fast hills (80 meters). Strides, Drills.
- Some longer hills taking 30-seconds (150s) and 60-seconds (300s).
- Core strength work.
- Sleep. Nutrition.

Transition phase –4-5 weeks long - late September and most October. Also called Pace Phase. We get the body into the peak mode with a combination of hard interval workouts and races. This is sometimes called Early-Competitive phase since it takes place during the racing season. But because it's best to be only 4-5 weeks long, we wait until late September, so actually our first few races in early September are still in the base/strength phase.

For track, we did 800s/1000s/1200s, but for any running sport, the hard training should be done on same type of surface and terrain you race on. So our hard interval workouts for cross country 4:00 hard/3:00 jog repetitions that we do in late September and early to mid-October on our own course loop in the back half. Typically during this phase there will be a hard interval workout AND a race each week. And long runs about every other week.

### 'Competition phase'

The period of the important races. 2-4 weeks. Also called Peak Phase.

For JV, we're targeting County Championships and League 3 at end of October/early November. For varsity, it will be League 3 through State.

Lighter workouts to give the body room to fully respond to all the work before, and also to allow recovery between the fast, hard target races themselves.

The main work driving the body to the higher performance level during this period is the races themselves, run faster and harder than the ones earlier in the season.

### **Managing yourself when you're not with us.**

Getting stronger happens when you're not running.

Creating an environment inside your body so that the recovery and building happen optimally is what will get the most out of your training.

Sleep. Nutrition. Amount of stress are what set this environment.

The professional runners (out of college) focus as much on this as they do on training.

Most books on training (Meb for Mortals, Daniels Running Formula, Magness's Science of Running) mention training plans, types of workouts, sleep, nutrition.

Alan Culpepper in his book Run Like a Champion covers all these things, but he also covers a thing he calls FLOW. If you have a feeling of flow in your life, the environment inside you is best for getting faster. Over the course of a season, or multiple years. Most elite runners live simple lives of just working out, eating, sleeping, resting. Alan Culpepper and his wife Shayne, who was also an elite runner were their own coaches. They had a busy life with three children. But they figured out how to get everything in for their family and their training and racing. So they felt good about what they were doing and it contributed to them getting better and being among top American runners for many years. Alan Culpepper made the US Olympic team in the 10,000 in 2000 and in the marathon in 2004. And I saw him win US Cross Championships in 2007. The long running success of Meb Keflezighi who just made his 4<sup>th</sup> US Olympic team and Bernard Lagat who just made his 5<sup>th</sup> and are over 40 and have a couple children can also be attributed to not only good training, nutrition, sleep, but also life management and feeling good about what they're doing. Possibly more amazing is Jo Pavey, a 42-year old British mother who just qualified for her 5<sup>th</sup> Olympics in the 10,000. While placing the children first and racing second, she and her husband have still been able to manage a life that got Jo to a performance level of an elite distance runner.

Two people could follow the same training plan, but the one who has better sleep, nutrition, less stress, and better flow will come out of it faster. If one of them doesn't manage the time away from practice to create the environment for growth, there actually may be no improvement.