

## **Beat the Heat.**

It's hot in South Florida!

Yeah, I know I don't get any points that obvious statement, but it's getting hotter everywhere (thank you Global Warming) and more and more people are doing races in high heat and humidity. Increasingly, athletes are looking for an edge in competition and this article will discuss some of the aspects of training and competing in the heat that will give you a much better shot at beating the heat and your competition. While I will review the benefits of heat acclimation training, the main focus is going to be on mental training for improved performance in the heat.

Participation in endurance events such as marathons, triathlons and long distance cycling events has grown by some estimates as much as 67% in the United States alone since 1990. The USA Triathlon organization estimates that between 550,000 and 746,000 people participate in triathlons per year, and the estimated number of marathon participants grew from 260,000 to 435,000 between 1990 and 1999 alone. Most of the events, triathlon especially, take place in the height of summer with temperatures most often between 80 to 90 degree Fahrenheit and humidity above 70%. When you consider that the 55° F is the optimal temperature for running, and that temperatures higher than that lead to a decrement in performance what can we do to combat this environmental condition?

Aoyagi and Noakes, among many others, have done many studies on physical training and heat acclimation with similar results: heat acclimation will improve your performance. But I am constantly surprised by athletes who live in the northern climes who fail to take into account that an early season race in the South is going to require heat acclimation training. Just to review: it takes about 10 days to 2 weeks to become fully heat acclimated, and if one is training in a hot climate one should begin training with both reduced intensity and volume and gradually increase both of these until one is back at optimal training levels. If the athlete is not living in the hot climate, then s/he has to get a bit more creative! I have clients in Michigan preparing to do St. Anthony's triathlon in St. Pete Florida by wearing full sweat suits for indoor run and bike sessions- heaters next to the treadmill, etc.

Physiologic changes induced with heat acclimation:

1. decreased energy cost of a given intensity of exercise .
2. an enhanced sweating response at a given percentage of maximal effort: we sweat sooner and lose less electrolytes in that sweat
3. slower increase in body temperature owing to a reduced cardiovascular stress because of changes in the autonomic nervous system, the sweat response, and decreased blood flow to the skin.

4. expansion of blood volume (3-27%)
5. improved subjective tolerance reflecting a decrease in the relative intensity of a given activity.

Factors that affect an athlete's ability to acclimate to heat:

- 1) initial fitness,
- 2) hydration status,
- 3) use of illegal ergogenic aids such blood doping,
- 4) the mode of exercise, the severity of environmental heat stress and the type of clothing worn,
- 5) treatment conditions such as the intensity, duration and frequency of exercise and/or heat exposure, the length of any rest intervals and cumulative depletion of body water and minerals.

That concludes my brief review of the traditional methods for heat acclimation. ☺

Now onto the mental aspects of the "training/racing in the heat" beast.

I frequently meet with some resistance from athletes who train with me when it comes to the mental training that I ask them to do. I could give these athletes the roughest, most muscle soreness inducing, lung burning, and face contorting intervals and they would do it without a second thought. Ask these athletes to do some mental training and tell me what they noticed and what do I get? Nada. Nothin. Zip. This, despite oodles of research showing that with as little as 5 minutes a day of mental training they could take their training to the next level and see truly impressive results.

An abridged version of the research background on mental training.

And my favorite quote from Scott Jurek: *"[Ultra Endurance events] are 90% mental. That other 10%? That's mental too."*

Ungerleider and Golding (1988) conducted a survey of 1200 track and field athletes who qualified for the Olympic trials in 1988 and found that 83% of them reported using some sort of mental training in the form of visualization in training and racing. Interestingly only 50% of non-professional athletes did. When the results were broken down, they found that those athletes that did actually end up qualifying for the Seoul Olympics were doing more mental training in the final stages of preparation. When winning or losing a 2 plus hour race may come down to a one second time difference, I feel that every advantage possible should be utilized!

Isaac (1992) and Thelwell (2003) also worked to show that mental training packages improved competition/race day performance. Jones and Stuth's (1998) review of literature also held up that mental training for performance enhancement, arousal regulation, affective and cognitive modification and rehabilitation was an effective tool in all areas. They found that the more specific the mental training and visualization the better. The more "in control" of the situation the individual feels, the better the outcome.

Now comes the part that pertains to our training and racing IN THE HEAT. Barwood, Thelwell, and Tipton (2008) showed that with psychological skills training, time to fatigue was increased when training and racing in the heat, because the temptation to reduce intensity was reduced. Perhaps that is not surprising when you consider the work done by Ross, Rauch, Yolande, and Noakes in 2003. They found that there is an anticipatory slowdown, or self regulation, of exertion in the heat *before* any of the physiological markers of thermal stress actually reach critical level. If this is the case, then there is a mental/psychological component to training and racing in the heat- it is not just central or physiological fatigue that causes athletes' performance to degrade in hot and humid conditions.

### So what are these mental training packages?

Common features of most of the cited studies are mental training techniques that focus on the following: Goal setting, arousal regulation, mental imagery, and positive self talk. I would have to concur that in ten years of coaching these are the aspects that my clients have reported have had the greatest effect on their performance also.

### **Goal-setting**

When athletes set goals, their motivation, sense of control, effort, and concentration are all increased. You get to keep your eyes on the prize when you set the right goals. There are two main types of goals: outcome (placing in the top 3 for example) and performance (keeping your effort consistent or drinking every 10 minutes). The performance goals get you to the outcome goals and both types keep you motivated and focused.

### **Arousal regulation**

Athletes who learn how to control their arousal levels are more likely to be less anxious (over-arousal) and more ready to focus on their performance goals. Arousal control allows one to focus on relevant cues of performance versus how nervous they are pre-race or how tired they may be mid-run. I advise my athletes to learn a relaxation strategy such as progressive muscular relaxation (PMR) or centering techniques to help them control nerves. PMR involves progressively tensing and relaxing the muscles from the feet all the way up to head, neck and face and is very good for pre-race nerves. Centering techniques teach the athlete to bring his/her attention to their centre of gravity (just above the umbilicus) with each exhalation and can be used when the body is in motion and provides a sense of relaxation but still allows one to focus on the goals.

### **Mental imagery**

One of my faves! I ask my clients to create a mental "movie" of themselves wherein they swim, bike and or run to the best of their abilities. In these movies, they experience themselves overcoming all obstacles (heat, hills, waves, whatever the world can throw at them). These movies can come from experience (the best races or training sessions) or can be made up and area always seen from the first person. Wherever the movies come from they utilize all the senses: the feel of the water, the sound of the crowd, the taste of the sweat, etc. Then, when

times get tough and the athlete is tempted to slow down in competition, they can watch the movie and resist the temptation.

### **Positive self-talk**

Self-talk can be used to control negative statements that may occur before and during competition or training sessions. Generally, negative thoughts are replaced with a short, positive, believable statement or mantra, such as "I am strong enough, fit enough, fast enough", but whatever is said must ring true with each individual and with practice the athlete can come up with his or her own favorite. Sometimes positive self talk takes the form of restructuring negative words into positive phrases. For example "the heat is overwhelming, I'll have to slow down," can be turned into "this is a challenge I'm going to meet, as I have the physical and mental tools to cope". This gives the athlete more sense of control over their running and the situation. They can also give themselves verbal cues to augment that feeling of control and take the focus of any negative feelings: "head up, shoulders back, and keep my stride length" (performance goals)

### Some other things to consider.

What other some ways can you improve performance in the heat? Lee and Haymes (1995) and Booth & Ward, (1997) both researched how pre-cooling the body prior to competition improves performance and rating of perceived exertion. Of course, this is kind of tricky on race day (where will you keep cool before the race start), but maybe keeping an ice pack around or being sure to get in the water before your tri will help. I had a client suggest visualizing walking into one of those industrial size freezers and I have to say I have tried this one and it helps! Really give it some thought- hear the sound of the cooler, feel the cold air on your face and at the very least it takes your mind off where you are in South Florida's 90 degree days. 😊

I have included a list of works cited as well as a bibliography which I hope you will use to work on your mental game. I promise you, you will not be wasting your time. Give yourself time to perfect each technique listed above and maybe try out some of the others in the books I have listed. You have to work on these in training and make it a part of every session so that on race day you can call on each technique at will and beat the heat and the competition. Train smart and race happy. Stay cool!

## References


Aoyagi Y; McLellan T M; Shephard R J Interactions of physical training and heat acclimation. The thermophysiology of exercising in a hot climate. (Auckland, N.Z.) Sports Medicine. 1997;23(3):173-210.

Barwood, M., J., Thelwell, R., C., and Tipton, M., J., (2008). Psychological Skills Training Improves Exercise Performance in the Heat. *Medicine & Science in Sports & Exercise*. 40(2):387-396.

Booth, J. M. Merino, Ward, J. J & Jeffrey. (1997). Improved running performance in hot humid conditions following whole body precooling. . *Medicine & Science in Sports & Exercise*. 29(7) , 943-949.

Issac, A. (Jun 1992). Mental practice: Does it work in the field?. *The Sport Psychologist*. Vol 6(2) , 192-198.

Lee, D.T., and Haymes, E.M. Exercise duration and thermoregulatory responses after whole body precooling. (1995) *J Appl Physiol* 79: 1971-1976.

Lesley Jones  and Gretchen Stuth (1998) The uses of mental imagery in athletics: An overview. Southwest Texas State University, San Marcos, Texas, Available online 2 March 2005., *The Sports Psychologist*.

Patrick, T, D., Hrycaiko, D. (1998) Effects of a Mental Training Package on an Endurance Performance, *The Sports Psychologist*, Vol 12(3).

Pedoe, D. T. Heat Illness in Athletes: The Dangerous Combination of Heat, Humidity and Exercise. *Sports Medicine*. 34(1):9-16, 2004.

Ross, T., Rauch, L., Yolande, X.,R., and Noakes, T., (2003) Impaired exercise performance in the heat is associated with the anticipatory reduction in skeletal muscle recruitment. Published online: 8 May 2004

Thelwell, R. and Greenless, I. (2003) Developing Competitive Endurance Performance Using Mental Skills Training. *The Sports Psychologist*, 17(3).

Ungerlieder, S. (1996). *Mental Training for Peak Performance*. Emmaes, Pennsylvania: Rodale Press.

## **Bibliography.**

The Mental Edge by Kenneth Baum

Mind Gym : An Athlete's Guide to Inner Excellence (Jun 3, 2002) by Gary Mack and David Casstevens

The Mental Athlete Kay Porter

Mental Training for Peak Performance. Stephen Ungerlieder (1996).

The Sport Psych Handbook by Shane M. Murphy (2004)

Magical Running by Bobby McGee.

What I Talk About When I Talk About Running by Haruki Murakami

Championship Sports Psychology by Keith F Bell.