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THE WINNER WITHIN

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#23: The Coach Who Will Put You in The Zone

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Photograph by Tom Schierlitz

A sprinter crouches in the starting blocks, body and mind quiet, thoughts focused: 100 meters of dash for an Olympic gold medal ahead. Two lanes away, legs twitching, eyes darting, vagrant notions race through the mind of another competitor: a sore ankle, potential fame, bad breakfast; relax, says his inner voice, growing desperate, come on, come on, come on. For an elite athlete, trying to concentrate in the moment of greatest stress, finding the focus and groove known as the zone can mean the difference between first place and fourth, a smiling face on a Wheaties box and abiding regret.

The United States Olympic Committee headquarters in Colorado Springs is populated by folks dedicated to finding any and all manner of perfecting performance. In an aerie set apart from the rest of the sports sciences department, Tim Conrad and Tom Westenburg, principal engineers, explained that the greatest challenge of the future is not so much improving the mechanics of sport as helping athletes understand and master their minds. Unlike the fit and trim jocks that abound on campus, both men are slope-shouldered and pasty-faced -- Conrad whippet-thin and talkative, Westenburg with a paunch and a gentle manner. They have spent nearly a decade daydreaming of ways of translating the mantra of sport -- higher, faster, stronger -- into technological breakthroughs. They have used tiny remote sensors to measure the force applied in vehicular sports like rowing and bobsled; they have constructed a pulley system able to drag a swimmer faster than she can swim -- a second or two faster than the world record, for example -- allowing her to adjust breathing and mechanics to match the pace and giving her the chance to feel what it takes to win.

These days, however, their thoughts tend toward the interior life of competitors. There isn't much physical difference between the best athletes, Conrad said, but there can be a good deal of difference in their states of mind. Measurement is the key to all advances in sport, Westenburg said, including measuring the intangibles like thought and feeling. So the future of athletic progress lies in trying to take the measure of the mind. The vital question is, Can the zone be quantified? Can an athlete be taught to get into the zone, and regain it if he gets distracted?

In a laboratory on the U.S.O.C. campus, Sean McCann, a sports psychologist, showed me the contraptions used over the years to try to teach athletes to create a concentrated mind for competition. The newest system, McCann said, was a device called the Peak Achievement Trainer (PAT) EEG, designed to trace electrical activity in the brain, especially the frontal lobes, and provide biofeedback. Asking if I'd like to try it out, he applied the EEG's sensors with conducting jelly, one to my forehead, the other two behind my ears, the wires transmitting signals to a computer screen sitting in front of me.

The screen showed the brain activity of commonplace distraction -- jagged valleys and peaks of synapses firing wildly in all directions. I tried to relax and then sat perfectly still, and suddenly, for a moment, there it was: a flat line, the zone, or at least as close as can yet be approximated. The PAT EEG is an

adaptation of a device used to treat kids with attention deficit disorder, letting them watch, and learn to control, the fidget and wander of their thoughts. For Olympians, the hope is that by seeing neural biofeedback in the lab, they will be able to find methods -- focusing on one point, visualizing peaceful images -- to achieve a quiet and still mind when it is most required.

Dan Landers, an exercise-and-sports scientist at Arizona State University in Tempe, has set out to measure the thought processes right before performance. He has collected EEG data of athletes in the moments before a basketball free throw is tossed, an arrow let fly by an archer, a trigger pulled by a marksman. By analyzing this data, he has been able to determine the brain state most conducive to successful athletic achievement, and by training athletes to manipulate their EEG patterns, he can teach them to improve their performances.

Nonetheless, it is still primitive stuff, Landers acknowledged; the PAT and similar devices can measure only overall activity in the brain; they can't isolate particular areas, and only inferences can be drawn about the workings of the mind. It is probable that the zone involves several parts of the brain. The nether regions of the mind -- the basal ganglia, which contain the fight-or-flight instinct; the cerebellum, with our motor skills programs -- may also be where the zone resides. In order to measure those deeper parts of the brain, though, a time-consuming and expensive CAT scan or M.R.I. would be needed. More important, the CAT scan or M.R.I. requires almost complete immobility. Even the less sophisticated EEG requires that a person remain still for at least a few seconds.

The uncharted territory, Conrad and Westenburg explained, lies in mapping -- and recreating -- a different kind of zone, the zone of an athlete in motion. The sprinter on the starting block trains for and tries to summon a zone that ends with the blast of the starter's gun. From that moment the state of mind of a runner is a blur of action. Standing in the batter's box awaiting a pitch with steady thoughts, to use another example, is altogether different from the half-conscious act of swinging at a fastball. When the body engages in action, millions of neurons are fired in the brain, and right now we have no way of differentiating that neuron activity from the neuron activity of thought. In order to try to capture the zone of a person in motion, Conrad and Westenburg said, unobtrusive wireless sensors would have to be devised that could take in the vast brain information of a person competing in an activity. To get useful biofeedback, computer technology will have to advance so that a machine will

be able to filter out the "noise" in the brain caused by muscle contraction. Computers have become so fast and so small so quickly, Conrad said, there was every reason to believe that such a machine would become a reality within a decade. Westenburg suggested that digital signal processing systems, superfast computers used to analyze the infinite impulses circulating in outer space, might someday be applied to decoding neural signals.

Until now, reaching and maintaining the zone has been an art -- part zen, part willpower, part mystery. In 10 years, though, Conrad said we will know whether or not the zone can be quantified and trained for; whether it is a matter of science, not spirit. One day, he said, we might all wear headbands attached to Walkman-size devices that are our own personal zone monitors. Or, it occurred to me, the next generation of EEG readouts will become another fixture on sports broadcasts, the wave patterns of the basal ganglia as familiar to TV viewers as any stats graphic. Landers told me that determining the workings of the mind could someday lead to drug therapy to improve performance -- introducing the prospect, in the dawning age of psychotropic medication, of pills taken not to build muscle mass but to create the dreamscape of the zone. Inevitably, fear, hope, fortitude and moments of transcendence will be rendered as data collected and digested by computers. The final frontier, then, reaches outward but also inward: athletes crossing the divide between the physical and metaphysical. Perfect machines.