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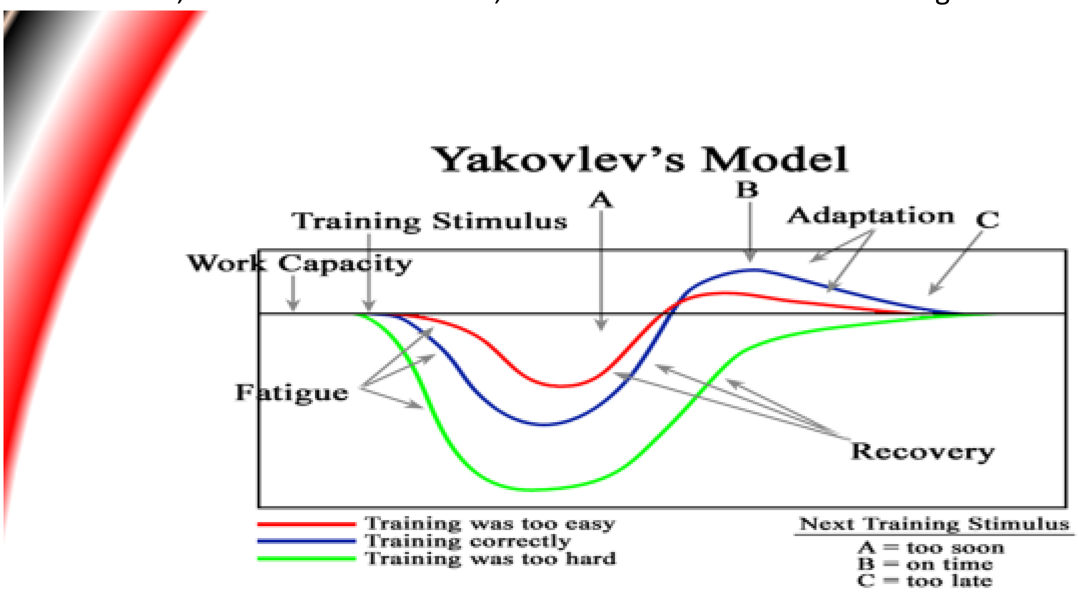
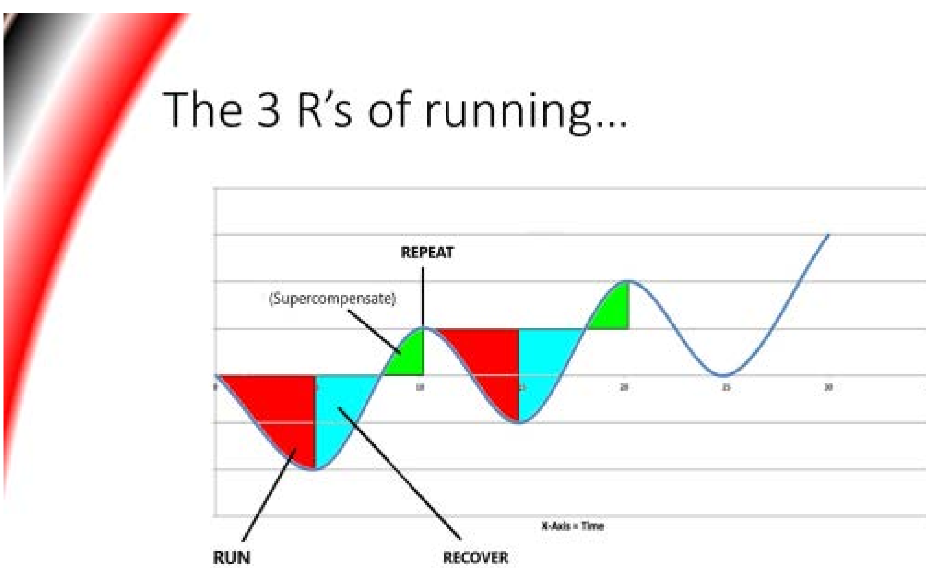
A Simple Approach to Distance Running.

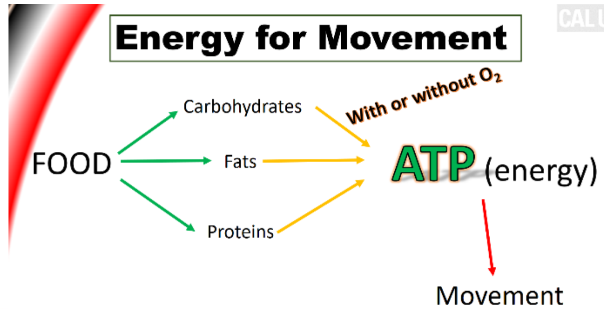
It is a widely held belief that an individual who consistently trains will improve some aspect of his or her physiology. Therefore, providing your athletes do some form of moderate activity on a consistent basis, improvements should occur. Be aware that in order to keep them doing things consistently you may need to motivate them, give them challenges they can successfully accomplish (small victories), add variety to the workouts, make the workouts fun, or some amount of all those things.

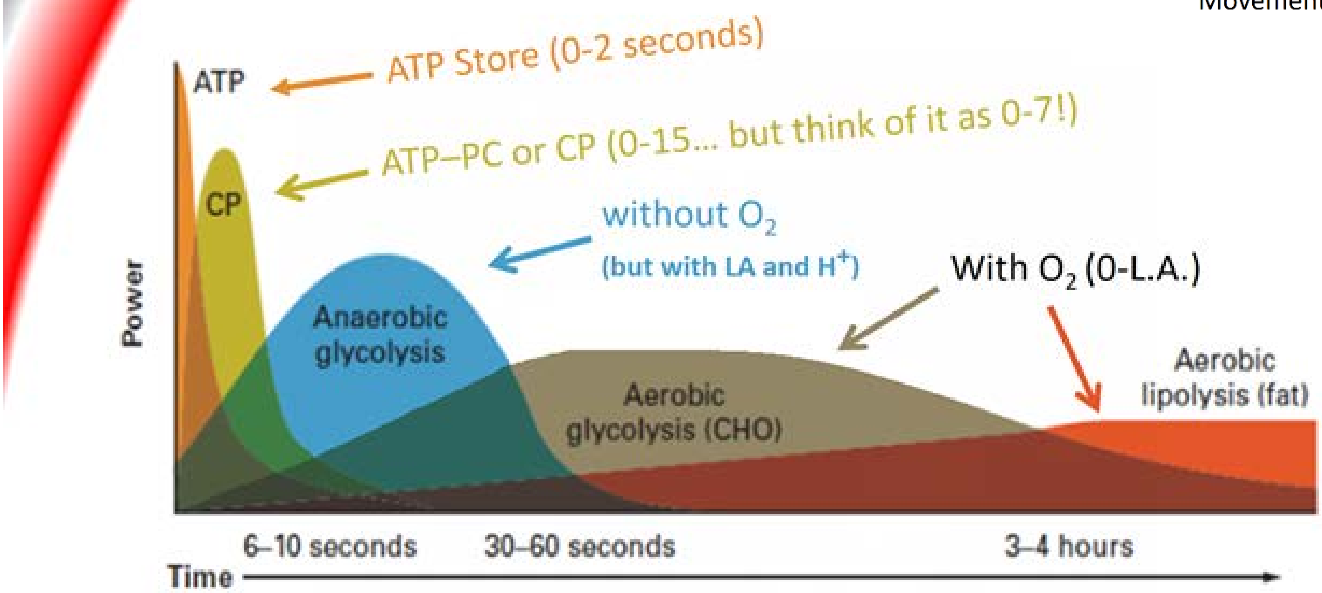




All human movement, needs ATP (Adenosine Triphosphate) for muscle contraction. ATP could be considered our gasoline, and it is created through various methods in our body. Racing and training for the distance events contested in high school necessitates utilizing the following energy systems:

1. Anaerobic Alactic (ATP-PC and ATP Store)
2. Anaerobic Glycolysis (Lactic Acid)
3. Aerobic Glycolysis





The ATP-PC system is powerful but only lasts for a few seconds. It is the system you use when running at full speed (maximum velocity). You use it at the start of many races, and sometimes throughout.

The Lactic Acid system is next in terms of power production. It can last over a minute, but has a byproduct of lactic acid, and more importantly, hydrogen ions (H^+). The accumulation of H^+ leads to a reduction of power output and as a result, reduction of speed.

Finally, the last, and *most important* energy system involved with all high school distance running is the Aerobic glycolytic system. This system, which can last a few hours depending on the intensity, accounts for no less than 70-90% of the energy provided in both races. As a result, the vast majority of your athletes training should be aerobically based. However, this does not mean that you should spend 6 months only doing distance runs. At no point in the year should you ever be far away from race pace or doing some anaerobic alactic work. A simple way of achieving this is by doing some form of sprints (90-98% effort) at least 2-3 times per week. The distance of these sprints can vary from 60m to 150m with the total volume being as much as 1km. Our normal variation of this is 8x100m ‘strides’. We do them after an easy run. The first 4-5 may be building in intensity, whereas 6-8 are between 95-98% effort. I never say to run at 100% or go all out since the chance for injury is so much higher. Also, in general, most distance runners do not know how to run at 100% without losing form or straining. Therefore, my athletes are instructed to focus on good form while doing their strides.

Energy system contribution during 200- to 1500-m running in highly trained athletes (2000) - MATT R. SPENCER and PAUL B. GASTIN Human Performance Laboratory, Department of Human Movement and Sport Sciences, University of Ballarat, Ballarat, Victoria, AUSTRALIA; and Victorian Institute of Sport, Melbourne, Victoria, AUSTRALIA

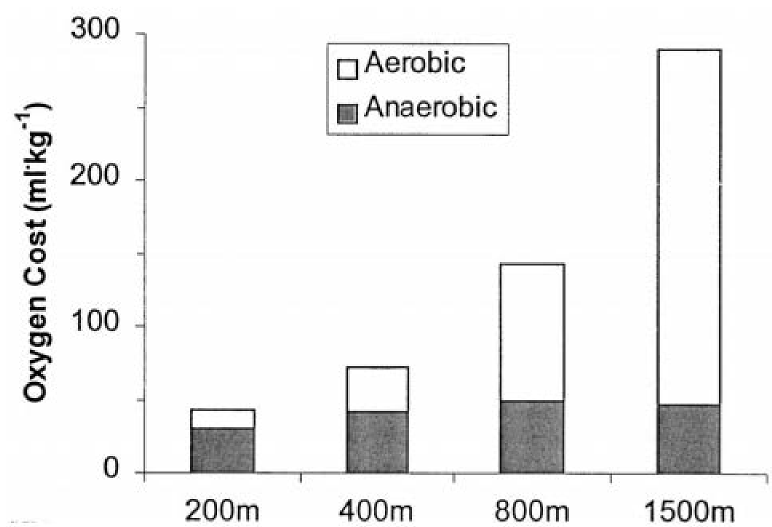


FIGURE 3—Aerobic and anaerobic contribution to the total oxygen cost of the 200-, 400-, 800-, and 1500-m runs. Data are mean values.

Types of Workouts for Distance Races

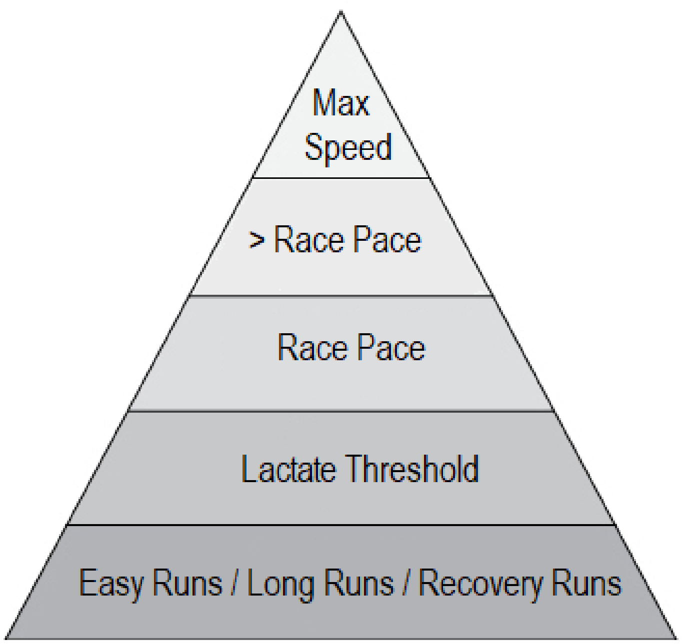


Figure 1.

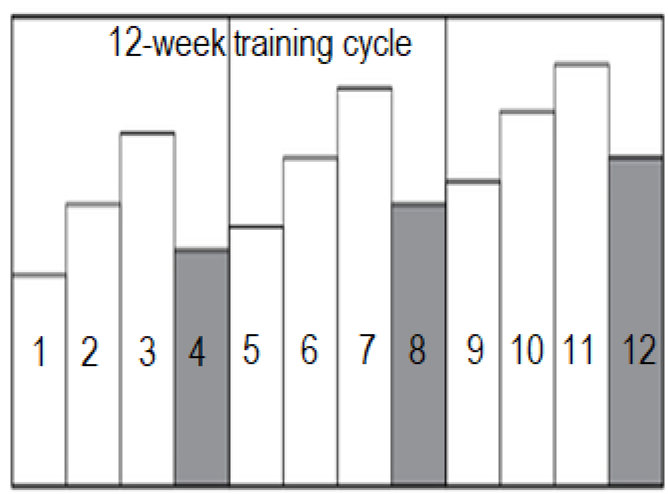


Figure 2.

As you'll notice in Figure 1., the aerobic runs (Easy/Long/Recovery/LT) should make up the vast majority of your athletes' training volume. We know that aerobic distance running done on a consistent basis causes an increase of red blood cells, increased capillarization, and an increased number and size of mitochondria. Since those improvements greatly benefit the production of ATP, it's important that we do a lot of aerobic running at an effort that the athlete can engage in a conversation. I personally believe that this effort should be harder rather than easier, providing again that the athlete is capable of maintaining a conversation. However, recovery runs are necessary after harder efforts, and on these runs I simply tell my athletes to run however they feel. Although, if I'm talking to an athlete who is extremely competitive, I usually tell her/him to run with a slower teammate that day. And depending on an athlete's injury background, these are days that I may have him/her cross train (bike, pool, elliptical, etc…).

In addition to these basic easy aerobic runs, there seem to be benefits to doing a long run once every 7-14 days. Most coaches make this run 20% of the athlete's weekly volume. Due to our academic schedule, we usually do ours every 7 days. I feel as though this is one of the most important runs of the week, and so we take it very seriously. These should be done throughout the year providing the athlete is healthy. Be aware that your athlete's stride frequency may have to dictate how far you let them run at one time.

The fastest and most intense of the aerobic runs is called a variety of names such as a Lactate Threshold run, an Anaerobic Threshold run, a Steady State run, and many more things! After years of using a specific pace or heart rate to guide the intensity of this workout, nowadays I simply call this a medium-hard run and allow the athletes to gauge their efforts. [I'll explain more about this at the clinic] Some other coaches have success using a breath to stride ratio, and some even take blood lactate readings throughout the workout. We may do this workout 1-2 times per week depending on the time of year, or if we have a competition that week. They can be broken up into to short runs with very little rest (e.g. 5x4 minutes with 1 minute rest), to one longer run (e.g. 20 minutes). There is currently a shift in the belief of how beneficial these runs are, but if you are a beginning coach, I feel that there are still lots of benefits to doing this sort of work, even if it doesn't elicit the response that many people think it does.

Depending on the race, the next increase in training effort brings us to Race Pace training and greater than race pace training. These are both anaerobic efforts – in other words, lactic acid and hydrogen ions will be accumulating at a rate faster than our bodies can tolerate them. For our middle distance runners, this usually involves doing lots of intervals between 100m-400m, with a total volume between 800m-5000m. The harder the effort, the less the volume, and the more the rest unless extremely high levels of acidosis are desired. High levels of acidosis would be of most benefit to an 800m runner who needs to be able to tolerate high amounts in a race.

Finally, maximum velocity work is usually only done with sprinters/jumpers, but we know that if you improve a runner's flying 30m time, based on the Anaerobic Speed Reserve model, it can benefit his/her 800m time. However, this work must be done carefully. [I'll explain more at the clinic]

But when should a runner do these runs? First of all, you may try to have your athletes do one of each of these runs every week, or more in the case of the easy aerobic running. In Figure 2. the bars are representing weekly mileage volume over 12 weeks. Every 4th week there is a reduction of volume in order to help the athlete recover and allow for complete physiological adaptation to the previous 3 weeks stress. The volume then continues to climb over the following 3 weeks. This is a good method for the start of training. Once the athlete has reached a maximum volume then this 3 weeks hard/1 week easier is a good method to use. As far as planning your whole year – a very popular method for decades has been Periodization as seen in Figure 4 and Figure 5. However, more and more research is bringing those methods into question as alluded to by Figure 6. That being the case, if you are a novice coach, I bring your attention back to the beginning of this paper which states that "providing your athletes do some form of moderate activity on a consistent basis, improvements should occur."

For coaches with more experience, I will explain the implications of this more at the clinic.

Sample Training Plan, One Peak/Macrocycle, 16 Total Weeks																
Month	February				March					April				May		
Dates (Mondays)	1	8	15	22	1	8	15	22	29	5	12	19	26	3	10	17
Competitions									X	X	X	X	X	XC		XC
Annual Plan	Annual Plan															
Macrocycles	Macrocycle															
Phases	Preparatory								Competition							
Periods	General Preparation				Specific Preparation				Precompetition				Competition			
Mesocycles	1				2				3				4			
Mesocycle Themes	Technique & Work Capacity				Speed & Strength				Synthesis				Peaking			
Microcycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Schexnayder, 2015 Figure 4.

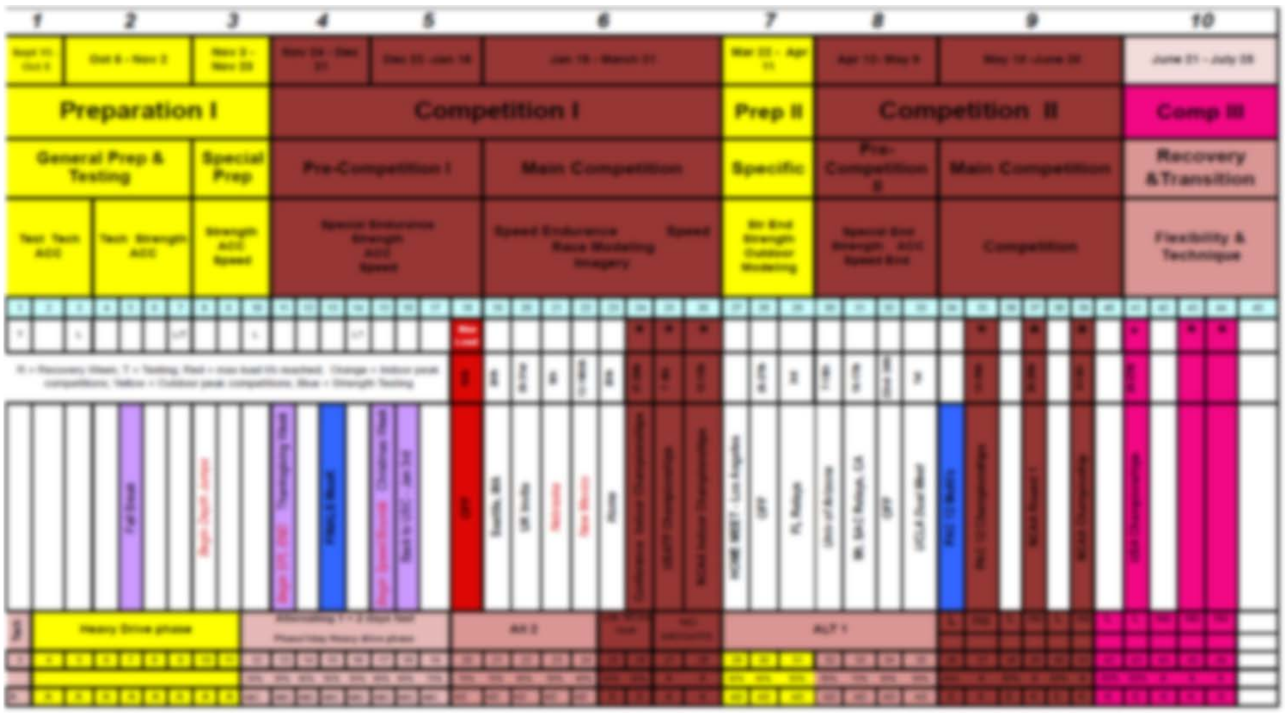
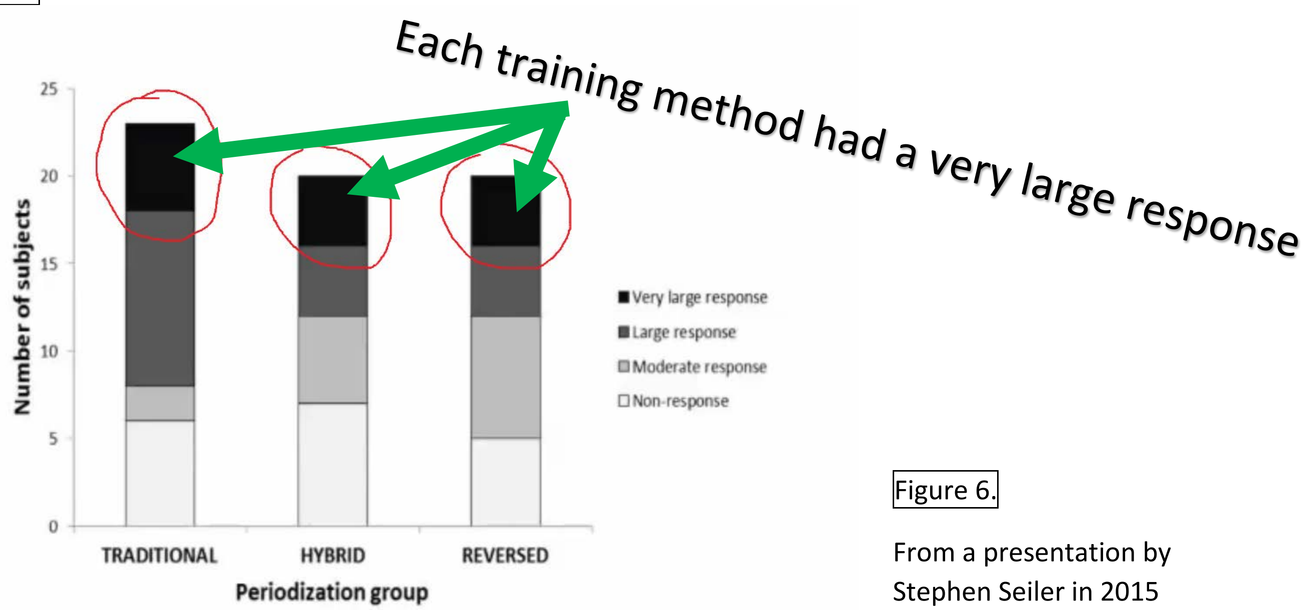


Figure 5.



Chi-square test for independence indicated no significant association between periodization groups and response status. There were however a medium effect size, 0.21, calculated by Cramer's V with three categories (Cohen's, 1988)

Figure 6.

From a presentation by Stephen Seiler in 2015