

COMPARISON OF SUCCESSFUL OKLAHOMA
HIGH SCHOOL CROSS COUNTRY
PROGRAMS

By

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CHAPTER I

INTRODUCTION

Many high school cross-country programs have had one exceptional season or an occasional outstanding individual runner, but only a few have been able to consistently excel year after year as a team. Describing the factors that allow the best programs within the state of Oklahoma to maintain a high level of performance is the aim of this study. If there are consistent patterns in the training methodology or common practices among this group, then these themes should be pointed out.

Coaches may develop the basics of their program through many processes, which include reading training manuals, trial and error, or collaboration with other coaches (Newton, 1998). College course work and coaching education programs also impact this process. Successful programs may have many of the same influences and incorporate many of the same methods, but trying to emulate another program exactly rarely has been effective. Differences in location of the school, characteristics of the athletes or personality differences among coaches lead to some variation.

Some of the many factors that contribute to success in high school athletic competition include the training methodology, coaching techniques, popularity of the sport in the local area, the support system available to the team, ability of the coach to recruit young athletes to the program and occasionally even luck (Newton, 1998). Additionally, talent plays an important role in this. Genetic potential is the first ingredient for success in any athletic competition (Daniels, 1998).

Issues that affect the athlete's mental state can make or break a program as well. Schools with a tradition of excellence at a particular sport often have advantages over those without past accomplishment. Athletes come into the program expecting success and can easily see how the hard work involved with the sport will pay off. The team may also gain numbers, as other students want to be a part of something prosperous. Team dynamics are also a key issue, with interaction between teammates during practice and at competitions helping to shape the overall experience. A positive environment with coaches and athletes supporting each other can improve the chances of success (Martins, 1990).

The characteristics of the area in which the school is located can affect a program's success as well. Support from the local community, parents and students within the school can make participation more desirable, resulting in a greater number of athletes and increasing the chances of success. Factors also exist that can't truly be quantified, as some coaches are just simply able to take their teams to higher levels of performance with methods that appear similar to other programs.

The sport of cross-country running can be viewed in several different ways. Some programs consider it a separate competitive season to aim for peak performance (Newton, 1998). Others view cross-country competition as part of a yearlong buildup for the track season (Arbogast, 2002), while others train similarly year round and never really reach a true peak (Farrell, 2002). Training mileage can vary widely as well. Previous research found a range of 30-130 miles per week among the best high school programs in the United States (Harter, 1976). Despite seemingly very different organizations of the

training year and drastically different volumes of training, programs have reached national prominence using all of the previously expressed methods.

Problem Statement

This study was designed to describe the commonalities and differences among successful Oklahoma high school cross-country programs.

Research Questions

1. What are the similarities and differences among successful Oklahoma high school distance running programs in the areas of:
 - A. Program demographics?
 - B. Training methodology?
 - C. Techniques incorporated for motivational and team cohesion?
 - D. Support system available to the program?
 - E. Reasons why coaches feel their programs have been successful?

Delimitations

1. The study involved only high-school distance running programs from the state of Oklahoma.
2. Results of the Oklahoma high school state cross-country meet were used to select the participants, with consistent top-five team placing over the preceding ten years the decisive factor for selection.
3. Programs must have had the same coach for a minimum of three years to be considered for the study.

4. The study focused on male athletes, as many schools have different coaches for each gender and financial restraints prevent conducting enough interviews to get a clear picture of both groups.
5. Description of the training programs focused on the months of May through November.

Limitations

1. Coaches may inherit a program that is already successful and their methods may not necessarily be responsible for the success of the program.
2. The study size is small and this may lead to problems extrapolating the data to larger populations.
3. Programs in other geographical areas have in the past produced more national class distance runners than Oklahoma and these programs may incorporate different methods.
4. Many programs have runners that are very successful in high school competition, but have no further improvement at the collegiate level.
5. The sample is non-random so this could limit the ability to generalize to the remainder of the population.
6. Programs may use different methods with female athletes, so caution should be used in generalizing to females.

Assumptions

The basic assumptions for the study include:

1. Coaches honestly discussed their programs in detail.

2. Athletes followed their coach's instruction regarding the training program and other advice that was given.
3. Methods used by successful coaches to motivate athletes and develop team cohesion are not sport-specific.

Significance of the Study

There are many factors that could be the difference between a successful distance running program and a mediocre one. The goal of this study was to point out some of the similarities and the differences that exist in programs that have consistently performed well. The results are of benefit to both future and current cross-country coaches as they design or modify different elements within their programs. This information could also benefit high school athletes who are self-coached, parents of athletes who wish to help their children excel, or those who are simply interested in the methods of elite cross-country programs.

Definition of Terms:

Anaerobic Threshold-running at a perceived effort of "comfortably hard", roughly 15km race pace, or 88% of Vo_2 max (Daniels, 1998).

Cross Training-training that is not specific to the sport that the athlete competes in (Bompa, 1999).

Depth Jumping-a type of plyometric exercise that involves jumping off of a raised object resulting in a stretch reflex that is used to produce an explosive reaction (Bomba, 1999).

Double Periodization-the incorporation of two peaks per annual plan (Gambetta et al, 1996).

Fartlek-uniform training with the inclusion of short bursts of high intensity included (Bompa, 1999).

Hard/Easy Training-a method of training where days of lighter training follows days involving longer or more intense workloads (Bowerman and Freeman, 1991).

Interval Training-training method that alternates intense periods of work with periods of recovery (Bompa, 1999).

Long Run-a steady run that encompasses 25-30% of the weekly volume (Daniels, 1998)

Macrocycle-a training phase of two to six weeks in duration (Bompa, 1999).

Mesocycle-a short training phase, generally lasting between two and six weeks (Bompa, 1999).

Microcycle-a training cycle of approximately one week (Bompa, 1999)

Period-a different training load or emphasis during a mesocycle (Bowerman and Freeman, 1991)

Plyometrics-drills or exercises linking sheer strength and scope of movement to produce an explosive-reactive type of movement (Bompa, 1999).

Periodization-a process of structuring training into phases (Bompa, 1999)

Peaking-attempting to achieve maximum performance on a set date or at a specific competition, achieved by carefully modifying the training plan (Gambetta et al, 1996).

Phases-subdivisions of macrocycles, usually lasting between two and six weeks (Bowerman and Freeman, 1991)

Pick Ups- similar to fartlek, a surge or increase in speed inserted in the middle of a uniform training run (Bowerman, Freeman, 1991)

Repetition-a short run at roughly mile pace with full recovery (Daniels, 1998).

Single Periodization-the incorporation of one peak per annual plan (Gambetta et al, 1996)

Strides-short bursts of speed, usually done to prepare for a faster workout or after a run of moderate intensity (Daniels, 1998).

Team Cohesion-the degree of harmony, effectiveness of communication and commitment to team goals among athletes on a team (Sandburg and Newton, 1999).

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

This literature review focuses on several areas related to the research questions. It first describes the methodology of a few elite high school programs that have reached national prominence and highlight some of the variances within these programs. The focus then shifts to training plans published by exercise physiologist and well-known coaches, pointing out some of the similarities and differences in these plans. Adapting the training program to the needs of young athletes in a way that allows them to reach their athletic peak post-high school is covered next, although some programs may only be concerned with getting short-term results.

The review concluded with a few ideas on coaching methodology. There are many issues that go into the making of a successful coach. Numerous coaches have described their ideas on building a winning team and what points that they stress in their programs and although not all the factors that make a great coach can be quantified, a few examples from distance running and other sports have been highlighted from the literature.

Descriptions of Elite High School Training Programs

The training of several very successful high school programs has been described in the literature. The training methodology of these teams has illustrated that there are many different paths to reach an elite performance level. Despite very different methods, all the following programs have had success on the national level.

Coach Joe Newton's York High School teams were voted national high school champion in cross-country on 17 occasions. Newton (1998) incorporated double periodization with his teams. Two buildups were completed per year, one for the cross-country season and one for outdoor track competition. Newton's organization of the training year was similar to many programs, but his methods often have been criticized for being too severe for high school athletes.

York's program began with a summer of easy distance running, where each runner attempted to run 1000 miles during the summer. Once school started, the intensity of the workouts increased. The older runners in Newton's program reached 65-80 miles per week or more, with 3-4 days per week to intervals or fartlek, 1-2 races per week included and a long run of around 15 miles completed each Sunday. Intensity increased and the volume dropped until a peak was reached for the state meet in early November. While the younger runners completed the same pattern of training, they ran less volume of mileage or number of intervals compared to the older runners. During the cross-country season, weight training was conducted three times per week and calisthenics were completed daily before each practice.

The month of November was used as a transition period, with active rest in the form of pool work and strength training the main types of training. December and January were used to rebuild the aerobic base with track competition starting soon after this time. Following a period of active rest, the base period for the cross-country season began (Newton, 1998).

Another program that was successful with a very different training system than York was Thousand Oaks High School in California. This team won two California state

championships and was ranked in the top six cross-country teams in the nation three times under Coach Jack Farrell, in addition to having a national record holder in the girls 3200 meter run. Farrell was not a proponent of periodization, arguing that the benefits of base training were lost within two days of cutting back training mileage. Farrell did not use the hard/easy approach, believing a medium tempo every day was ideal (Farrell, 2001).

This team's training remained roughly the same year round, with the emphasis on distance runs at one minute per mile slower than 5,000 meter race pace. Once the competitive seasons started, intervals at race pace or pickups on the road were incorporated once per week as well as a race each Saturday. The older runner's mileage peaked at between 49 and 56 miles per week and stayed at that level most of the year. They did not taper the volume of running for important meets, but did drop the intensity slightly. The mileage was dropped two miles per day in the weeks following the state cross-country and track meets for recovery purposes. They included little as far as multilateral development was concerned, and did not do any one run significantly longer than the others (Farrell, 2001).

Bingham High School under Coach Jeff Arbogast (2002) won five state championships, two national titles and had 63 runners compete at the college level from 1990-2002. This program took a year round approach to training, dividing their training program into four macrocycles per year. These included the summer preparation, cross-country, indoor track and outdoor track macrocycles.

This team's summer training consisted mainly of aerobic mileage to provide a strength and endurance foundation for the rest of the year. Cross-country and indoor

track brought less mileage and an increased intensity in their training. True speed and strength endurance began during the outdoor track season. Arbogast (2002) described their training as a “building” rather than the traditional pyramid, as they tried to apply the gains in speed from the previous track season to the summer base, and so on for the entire year.

To avoid burnout, the team only worked on two of the three goals (improving speed, strength and endurance) that the team set at any one time in the year. They sought variety in their training location, included games and workouts greatly different than usual in their training mix and constantly worked on each runner’s psyche (Arbogast, 2002).

Belmont High School in California also had an impressive tradition in distance running under Coach Robin Paulson (1990). Fourteen runners achieved a time of under 4:30 for the mile during Paulson’s tenure, with the school record of 4:07 being set during this time. This program began the training year with a summer of easy distance running, including some road races to break up the monotony. They did not incorporate high mileage, as runners completed 40 miles a week or less. There was an emphasis on year round condition and high expectations for success.

Following the cross-country season and a short break the team began interval training in January. They gradually increased the number of 400-meter repeats until they reached 24, incorporating this workout every other Monday. The alternate weeks incorporated 1200-meter repeats, and as the season progressed they reduced the number of intervals each week and increased the speed. They ran shorter speed workouts on

Wednesdays and raced each Friday. The days in which they did not run on the track consisted of moderate paced distance runs (Paulson, 1990).

There have been few surveys of the training methods of elite high school teams. One of these was Harter's (1976) survey of 37 of the top high school cross-country teams in the nation. He discovered that the average training mileage was 60-70 miles per week, with a range of 30-130. The teams competed an average of 12 times during the season. Their training consisted of about 45-50% over-distance running, 25% fartlek, 15% strength interval, and 15-20% refined spade work. As important meets approached the training dropped to around 30 miles per week.

Since the time period of the Harter survey, training mileage has been gradually decreasing among high school runners. Miles (1992) reported that freshman runners joining the St. John's University cross-country team have been running progressively less during the summer during his coaching career. Their summer mileage dropped from an average of 355 miles for the years of 1979-1983 to 278 miles for the years of 1983-1986. Miles also found that the runners who ran at least 400 miles during the summer were more likely to stay in the program through their senior year. Seventy nine percent of those who ran more than 400 miles stayed in the program compared to 55 % of those running less than 400 miles.

Principles of Periodization

Periodization is a method of structuring a training program into periods or cycles, using different types of training loads in a phasic fashion to elicit improvement in fitness and performance (Karp, 2001). Each period prepares the athlete for a more intense period that follows, until a peak is reached at the most important competition of the year

(Bowerman, Freeman, 1991). Virtually all training programs incorporate periodization to some extent (Freeman, 1994).

The use of periodization offers several advantages for coaches. First, it allows the coach to better control the volume and intensity of training by making the training objectively measurable. Periodization also allows coaches to monitor year to year increases in training that allows the runner to develop while minimizing injury and burnout. It also reduces overtraining and prevents injury potential and allows the optimization of fitness gains (Karp, 2001). It helps insure athletes develop multilaterally by focusing on different aspects of training at different points in the year. Additionally, it helps in timing the athlete's peak at the right moment (Bowerman, Freeman, 1991). It also leads to easier evaluation of the effectiveness of the training program.

The training plan is broken into units of time, which include macrocycles, periods, phases, mesocycles, microcycles, sessions and units, from largest to smallest. A unit consists of one session of exercise and recovery, while a microcycle consists of 10-14 days of training. A Mesocycle is 4-5 weeks long, with 3-4 of these making up a macrocycles (Vigil, 1995). The annual plan is generally made up of between 1-3 macrocycles per year, with an attempt to peak during each macrocycle. More than two peaks per year is not recommended, as proper preparation for competition takes too much time to effectively peak more than two times a year (Bowerman, Freeman, 1991).

One reason for the use of cycles in periodization is the concept of the law of overload (Vigil, 1995). Cycles involve periods of stress and rest. The body is stressed through a challenging but manageable load. A period of lighter training follows that allows the body to recover from the training load. The body supercompensates during

this recovery time and the athlete reaches a higher level of fitness (Gambetta, Berg & Freeman, 1996).

Related to this are the concepts of reversibility and specificity. The law of reversibility states that if there is no training stimulus and no need to adapt, the state returns to its previous level. If training loads remains the same, the rate of adaptation stays the same. The law of specificity states that the body responds to an exercise in specific ways, and that the training load must be specific to the event for which the athlete is training. This required focusing training on the biomotor abilities that the event utilized. The amount of specific training included depends on the athlete's experience. (Gambetta et al. 1996)

An important element of periodization is adapting the training load to the individual. Christiansen (1998) advises evaluating the athlete when designing the training program, looking at the athlete's strengths and weaknesses, as well as background. Periodization must be flexible or it will not be effective (Freeman 1994). The system should evolve as the athlete improves. Horwill (1991) argues that each athlete is an experiment of one and that no system has worked exactly for every athlete. The coach should look back at the end of each season and see how the training plan worked and what changes were needed. Horwill asserts that ultimately the results of the competition are what count.

Another important factor in periodization is training at the correct intensity level. Christiansen (1998) encourages the use of performance charts to specify at exactly what pace the athletes should complete their workouts. A recent performance is used to determine the pace used for intervals, threshold runs or recovery runs. Another option is

the use of a heart rate monitor. Shaffer (1991) recommends this approach, which involves the athlete training at a certain percentage of their maximum heart rate.

Mayetnev's Model of Periodization

In the traditional Mayetnev model of periodization, an athlete trains for a single peak each year. The annual plan or macrocycle is divided into the preparation, competition and transitional periods. The first two periods are also sub-divided into phases. The preparation period is divided into the general and specific preparation phases, while the competition period is divided into the pre-competitive phase and the main competitive phase (Gambetta et al. 1996).

The general preparation phase is the longest phase, accounting for 30 % of the annual cycle. This phase generally lasts around four months in single periodization and 2.5 months in double periodization. It lasts roughly twice as long as the competitive period (Bompa, 1999). Volume is emphasized, with the intensity gradually increased throughout the phase. Foundational biomechanical abilities of strength and endurance are emphasized, but elements of all types of training are utilized (Gambetta et al. 1996). This phase is called "training to train," as the athlete is preparing for the demands of the more intense training that follows later in the year. Training is primarily focused on the aerobic and anaerobic threshold levels (Nurmekivi, 2002). This phase is longer in younger athletes as they have less overall development (McGinnis, 1981).

The special preparation phase follows and lasts two months in single periodization and 1.5 months in double periodization. This phase features the highest volume of the training year and serves as a transition to the competitive season (Bompa, 1999). Event specific elements are gradually becoming the emphasis as competition nears with

conclusion of this phase. Speed, strength and skill improve together for maximum development (Gambetta et al. 1996).

The pre-competitive phase is next and with it comes an increase in intensity and emphasis on the specific demands of the event. Some competition is included during this phase and as intensity rises, the volume of training begins to be reduced. The key point in training at this time is to develop and stabilize competition performance at the highest possible level. General training is still included at times and basic fitness components such as strength, speed and mobility are maintained (Gambetta et al. 1996).

The main competitive phase follows, with the emphasis being put on performing well in competition. The volume continues to drop and the intensity increases or remains the same during this phase. The demands of competition sometimes lead to elevated stress, so close monitoring was required to avoid this. Prior to the most important competition of the year, a taper period is incorporated where volume is dropped to allow for peak performance (Gambetta et al. 1996). Garvey (1992) stated that the key to the competition phase is regeneration. The athlete must recover enough to peak, while still maintaining or even increasing intensity.

The transition period consists of recovering from the preceding season. The amount of stress involved in the preceding competitions determines the extent of rest needed. A new preparation period begins immediately or 3-6 weeks of active rest follows in the cases of a very intense competitive schedule (Gambetta et al 1996). Removing central nervous system fatigue is the major goal of this phase. Muscular fatigue generally only last a few days, but CNS fatigue could take longer to restore (Bompa, 1999). Ransone (2001) recommended a four-week restoration period for high school runners. This

involved one week of no running, a second week that includes three easy runs of up to one hour and finally two weeks of increasing training volume to begin preparing for the next season. Swimming or biking is recommended to maintain aerobic endurance during this time.

Examples of Single Periodization

An example of the traditional single peak model is the plan designed by Martin and Coe (1997). "*Training Distance Runners*" describes this approach to training and how multi-tier training is incorporated into an annual training plan. The multi-tier approach divides training into seven domains, including aerobic conditioning, anaerobic conditioning, aerobic capacity, anaerobic capacity, general mobility, circuits and weights, and health maintenance. Something from each domain is incorporated to some extent throughout the entire training year.

The annual plan began with a 12-week base phase, with four weeks of primarily aerobic conditioning work that also includes one anaerobic threshold run per week. Aerobic capacity and anaerobic conditioning work is added to the schedule after this four-week period. Following the base phase, 15 weeks of gradually building intensity follow before a six-week consolidation phase that lead to the competition phase. The volume peaks during the 12th-16th weeks and then gradually decreases as the year progresses. A period of 1-2 months away from running was recommended following the last competition.

Benson and Ray (1998) also advocate a single yearly peaking plan and demonstrate how to adapt this to an American racing calendar. The cross country and indoor track seasons serve as building blocks for a peak during the outdoor season in the spring. This

plan divides the year into training blocks consisting of a three-part base phase that lasted 32 weeks which includes the cross country season, an eight week pre-competitive phase that occurred during the winter and early spring and finally an 8-10 week outdoor track racing period in the spring and early summer

The suggested program incorporates easy aerobic running, 12-16 kilometer threshold runs and 100 meter repeats at 400-meter race pace for the first 10 weeks. Fartlek sessions are added during the second 10 week phase, followed by the addition of mile repeats at 10 kilometer race pace and cross county races during the third part of the base phase. The pre-competitive phase focuses on race pace intervals, race simulation workouts, with some anaerobic threshold training and faster than race-pace training included. The competitive period stresses less volume and lighter workouts at race pace, accelerations and a weekly race at the goal distance or a shorter distance. This program divides the yearly volume up with 62.5% done during the base period, 20% during the pre-competitive phase and the final 17.5 % during the competitive phase. Strength training is incorporated three days per week during the base and pre-competitive phases for multi-lateral development. This is reduced to 1-2 days per week during the competitive phase. The final 2-4 weeks of the year are used as a transition phase (Benson and Ray, 1998).

Variations of Periodization

There are many slight variations of periodization that have been put forth by different exercise physiologists and coaches. These include programs that involve two, three or no peaks each year as opposed to the single peak of the Mayetnev model. These models are generally designed for runners who have more than one competitive season

per year, such as a high school runner who peaks for cross-country in the fall and track in the spring.

One example is the plan that was designed by Daniels (1998). He promoted the use of two buildups per year, each lasting 24 weeks. He promoted dividing each macrocycle into four six-week periods. The periods emphasized aerobic training, repetitions, intervals and finally races and anaerobic threshold training in that order.

The first period begins with moderate aerobic running and adds strides at 1500-meter race pace after the first three weeks. A long run consisting of 25% of weekly mileage was also included at this time, and this remains until the final phase in which it was reduced to 20% or less. The second six weeks focuses on repetitions, while also including structured fartlek and anaerobic threshold training. The third and most intense six-week period focuses on aerobic capacity intervals with some racing beginning at this time. The final six weeks consists of races with moderate intensity in the workouts with an emphasis on being recovered to race well (Daniels 1998).

There are fewer proponents of triple periodization. Johnson (1992) incorporated an approach of this type when he coached at Stanford University. For his collegiate athletes, he divided the year into three 10-week periods culminating in a peak at the end of each period. Each period started with aerobic running, 100-meter sprints and mile repeats at a moderate intensity and gradually increased the volume and intensity of these until the key competition. Races were added to the schedule after the 4th week of each cycle. Johnson was not a believer in true peaking, arguing that it is a figment of the imagination.

There are some training systems that incorporate few aspects of periodization and train very similarly year round. An example of this is the Portuguese training system.

This system features year round competition on the road, track or cross-country course with an attempt to perform at a good level year round. The training follows the same pattern all 52 weeks of the year with the same elements included each week. For a 5,000 meter runner, the sessions included each week would be a session of short intervals on the track at 1500/5000 meter race pace, a session of long intervals at 10,000 meter or half marathon race pace, and one fast continuous run on the roads at or around anaerobic threshold. If a race was scheduled, it was substituted for the long interval session. The volume remained high throughout the year (Cabral, 2003).

Another variation of this theme was a program such as the one described by Burt (1995), with an emphasis on interval training and little time spent on traditional base or preparation training. Burt divides his athletes training year into 15-day mesocycles with three days of rest following each cycle. The main ingredients in this plan are intervals completed at 80-100% of VO_2 max and rest days, with one endurance run of 60-90 minutes included during each mesocycle. The cycle's emphasis progresses from maximum velocity, to aerobic power, to anaerobic power and lactate tolerance and finally goal pace as the season progresses.

Concerns for Young Athletes

Young Athletes should train differently than elite athletes. Bompa (1999) states that young athletes training should be more broad, multilateral and moderate. He argues that juniors could better handle more volume at a moderate intensity than a low volume of very high intensity. Bompa suggests that athletes start training for endurance events between the ages of 14-16, and start specializing between the ages of 17-20. This would allow the athlete to reach the top level around age 27.

Coomber (1983) argues that aerobic steady state runs should dominate the training of younger athletes. He concluded that younger athletes respond differently to training than adults and that nervous system stress should be avoided. Young runners may not elicit physical changes such as increases in VO₂ max, and anaerobic threshold as adults do (Greene, 1991). Adams (1981) suggests waiting until the athlete is between the ages of 18-20 to begin high intensity/short recovery interval training.

An important factor in training young athletes is examining both the biological age and the training age of the athlete. Physical maturity must be taken into account so as to not overload the athlete before they are at an appropriate level of maturity. The training background must be taken into account so that the load will not be increased too quickly and increase the chances of injury. An increase of around 10% per year or training cycle is typically recommended (Garvey, 1992).

Vigil (1995) proposes that middle school runners could tolerate a training load of 20 miles per week, with an increase to 30 miles per week in junior high. The high school years increase successively to 40, 45 and 50 miles per week. These numbers represent the peak mileage during the base phase and he recommends lowering these numbers slightly once the competitive season began.

In Soviet Sport Schools, biological maturation was used to determine how the athlete progresses in their training. There were four stages that each athlete completes in this system. The preparatory sport training phase began between the ages 9-12, followed by initial specialization the following two years. Intermediate training took place the next 3-4 years before the sport improvement phase took place between the ages of 16-19 (Nikituskin, 1991).

Other high profile coaches have weighed in on this topic. Daniels (1998) believed that younger runners should work on technique and speed throughout the high school and college years and then add mileage when the athlete is older and mature. They would focus on repetition and threshold training as opposed to intervals and race at shorter distance races. Lydiard (1995) argued that young athletes should focus on aerobic mileage and possibly some short sprint races and begin distance competition when the athlete is physically mature. Lydiard believed that excessive anaerobic training is dangerous for young athletes and is what most often ruins young runners' development.

Moore (2000) stresses the need for athletes to have a long-term relationship with one coach during their developmental years. Good record keeping allows the training load to be gradually increased at suitable levels. Also stressed is the need for multilateral development, which included general speed drills, regular stretching, and general muscular strength and endurance exercises.

Greene (1991) suggests that the emphasis should be placed on the development of motor skills and tactical awareness as opposed to developing the energy systems in younger athletes. He argues that distance running is a skill that is fundamentally based on strength-endurance, which involves control, technique and tactics. He recommended focusing on developing running economy, a sense of pace, learning a variety of race tactics, participating in other sports, sessions focused on strength, speed endurance and fast but controlled running.

Korikosk (1980) described East German theories about the training of young athletes. After experimenting with early specialization, the East Germans determined that a different approach was better. They found that early specialization led to good

performances at a young age, but not world-class performances at maturity. They recommended that young athletes avoid group training and focus on aerobic development. They determined that children adapted slower to anaerobic work, took longer to recover from maximum workloads, but reacted similarly to aerobic training when compared to adults.

Pate and Greene (1997) made similar recommendation for training young runners. They advised waiting until after puberty to begin regular distance running. Early training promoted general fitness and athletic skills, while avoiding early specialization. They also advised increasing training loads gradually and using elite adult runners as developmental role models.

Coaching Methods

There are many elements that contribute to the success of a coach. Many coaches have expressed their ideas on developing a winning team and have identified themes that they emphasize with their teams. While not all the factors that make a successful coach can be clearly identified, a few examples from distance running and other sports have been described from the literature.

Distance Running Coaches

Lydiard (1996) stated that the most important factor between the coach and the athlete was motivation, and that hope or a belief that they could be successful was the key to this. He stressed setting realistic goals that the athlete would be able to achieve. He believed that the athlete should understand the specifics of training from both the psychological and physical standpoint. He encouraged coaches to be sensitive to emotional factors and to help the athlete develop a positive attitude. He demanded

sincerity from his athletes and stressed the fact that all athletes are different. He pointed out that some athletes may respond better to a pat on the back and some a kick in the butt.

Newton (1998) describes a list of twelve factors essential to coaching success. The first of these was making the sport of cross-country important so the athlete could gain status among their peers. He argues for taking a positive approach to everything, setting realistic goals, concentrating on overcoming disappointment, and developing a winning attitude by repeating satisfying experiences. He supports taking a sincere interest in every athlete and dealt with each as a whole person, not just as an athlete. He wants to develop thinkers who would have suggestions for their own improvement. Promoting group dynamics and the magic of their team, letting the athletes know it is their program and they were responsible for its success is a key point in his program. He also believes in being a role model for the team by staying in shape.

Newton (1998) also incorporates several other factors to motivate his athletes. These included rewards, rules, empowerment and respect. He issues t-shirts for runners who completed 1000-mile summers and also to the top 12 runners on the team. Other rewards included school letters and also the awards assembly at the end of the year.

For empowerment, Newton (1998) makes several athletes team captains to motivate the team from within. He has six training groups and each group had a captain. This role was often alternated throughout the year, so many different members of the team were able to fulfill this role.

Coaches From Other Sports

UCLA basketball coach John Wooden (1997) described some of the factors that he felt were important in his coaching success. Among these were analyzing players,

getting them to fit into the team, paying attention to details and fundamentals, working well with others, and hard work. He also emphasized fairness, and both respecting and gaining respect from the athletes. He promoted leading by example, and avoided embarrassing his athletes in public. He used pride as a motivator, and considered not allowing participation to be the greatest punishment. He also rewarded hard work and things done right. Wooden tried to concentrate on what his team could do, not the opponent. He encouraged focusing on preparation not emotion. He focused on making small steps each day, as opposed to large jumps all of a sudden. He developed a pyramid of success, which focused on what he felt was success and what factors made up that area.

Duke Basketball Coach Mike Krzyzewski (2000) also described some of the factors that what felt were important in coaching. These included setting up a support system for athletes, developing bonds among the team, developing trust and mutual respect, focusing on personal responsibility, and being positive and confident. He also stressed having a plan but being flexible to make adjustments when they were needed. He tried to find weaknesses in his teams and concentrated on fixing them. He also stressed not becoming complacent and never let his athletes give up.

Martens (1990) argued that a coach's success would depend on their coaching philosophy more than anything else. He stated that coaches should have knowledge of all parts of sport science including sport psychology, pedagogy and physiology. He stated that an effective coach must have knowledge of their sport, the ability to motivate athletes and the ability to empathize with them. Martins also described three styles of coaching, which included the command style, the submissive style and the cooperative

style. He deemed the cooperative style the most effective, emphasizing sharing the designs of the program with the athlete, but providing leadership and guiding young people toward achievement.

Pate and Greene (1997) described ways to develop proper thinking in young athletes. They stated that to reach their potential athletes must develop a high level of mental fitness, which involves self-confidence, a flexible attention style, strong pacing skills, strategic skills, and optimal levels of mental energy and motivation. They encouraged coaches to organize the training so that improvement could be seen throughout the season so that confidence could snowball. They supported learning to relax and mental rehearsal to deal with the anxieties of competition. To increase motivation, they argued for goal setting, intrinsic sources of motivation, and having a plan for competition, which could involve running for either time or place.

Summary

Cross-country programs have reached national prominence with seemingly very different training methods. However, there are a few key issues that are generally acknowledged in effective training programs. A gradual increase in intensity and volume both from year to year and as the season progresses, workouts that are specific to the event being trained for, and a slight reduction in volume to allow for a peak prior to the goal competition are generally included. Broad, multilateral training with less intensity is also almost universally recommended for young athletes, although post high school improvement is not a concern in some programs.

Coaching methodologies have been described from several sports. These methods for motivating athletes and creating team cohesion are similar for most sports. Included

among the high points derived from the literature are the need for a positive environment with high expectations for success, strong team cohesion and respect between the athletes and coaches. Status derived from the sport, setting achievable goals, and an extensive reward system to motivate the athletes to work hard was shown to be essential as well.

CHAPTER III

METHODOLOGY

The intent of this study was to describe the similarities and differences that exist among Oklahoma high school distance running teams that have been consistently successful. Ten coaches were interviewed using a structured personal interview regarding the organization of their program. In regards to training, the study focused on the months of May through November. In a program that incorporates double periodization, this time period would include the transition period following the track season and continue to the peak of the cross-country season.

Setting

The location of the interviews was determined in conjunction with the coaches taking part in the study. Coaches were contacted through the school that employed them. Attempts were made to conduct interviews in a quiet environment that allowed for maximum concentration. During the pilot study, interviews that were conducted during practices or at meets were found to be less detailed as the coaches were often distracted and other tasks drew their attention away from the interview.

Subjects

The participants (n=10) in the study were successful Oklahoma high school cross-country coaches. The success of the program was based on past state meet results, with an emphasis on top five finishes as a team over the previous ten years. Coaches must have been at their current school for a minimum of three years to qualify. This study focused on male distance running programs.

High Schools from Classes 3A-5A were included in the study. The smaller schools in class 3A had around 300 students, while the larger 5A schools had more than 2,000. This is a fairly large range and there were differences among these groups. In the pilot study, it was determined that the smaller schools had a larger percentage of athletes that participate in other sports in addition to cross-country and track. This affected their cross-country training in that they spent more of their total yearly training time practicing or competing in other sports and less time on distance running. This had the potential to eliminate most of the aerobic base period, as some athletes may leave another sport and almost immediately begin competing in cross-country races. For this reason the two smallest classes, Classes A and 2A, were excluded from the study.

Research Design

This study was descriptive and qualitative in nature and incorporated a personal interview to obtain the desired data. Each coach was interviewed using a list of open-ended questions. If coaches selected for the study declined to participate, the coach of the next best team willing to participate was interviewed.

Coaches were questioned regarding the organization of the training year, amount of mileage their teams completed, incorporation of multilateral development, coaching techniques and methods of motivating athletes. Coaches were allowed to give their opinions on why they feel they have been successful.

Pilot Study

A pilot study was conducted during the spring of 2002 to test the data collection instrument and to gain additional ideas for the study. Six Oklahoma high school cross-country coaches were interviewed at this time, including schools from Classes A-5A. All

coaches asked to participate agreed and were willing to discuss their training programs in detail. The questionnaire proved to be sufficient in obtaining the desired data, however some modifications were made to include elements regarding motivation, support systems and program demographics. The average time for completing the interview was 20 minutes, with a range of 10-45 minutes.

External Validity

The ability to generalize from the results of this study was limited by several factors. All programs were located within the same state, so making generalizations about other states, which may have different rules regarding off-season coaching, and may have a differing climate or altitude was not attempted.

A non-probability sampling method was used to select the population, so caution should be taken in making generalizations about the methods of the rest of the population. The remaining schools may have used different methods, and this may have been one of the reasons for their differing levels of success.

Internal Validity

The instrument used to collect data was developed based on the literature review and tested during the pilot study. It was also given to a panel of experts for review to insure it measured what it was intended to. To control response user bias, questions in the survey were worded in the most neutral form possible to avoid eliciting certain responses. The questionnaire is included in Appendix B.

Prior to the interview each coach was given the same simple set of instructions and signed a consent form. They were given a brief description of the goals of the study, and given directions on what to expect in the interview, including the number of questions

and how long it should take to complete. The subjects were guaranteed confidentiality, with their names not included in the results section.

Data Analysis

The data analysis was qualitative and incorporated descriptive statistics. The similarities and differences in the training and coaching techniques among these teams was described including organization of the training year, weekly training mileage, incorporation of multilateral development, athlete characteristics, motivational techniques, and the support system available to the athletes.

CHAPTER IV

MANUSCRIPT

Comparison of Successful Oklahoma High School Cross Country Programs

Many high school cross-country programs have had one exceptional season or an occasional outstanding individual runner, but only a few have been able to consistently excel year after year as a team. The problem of this study was to describe the commonalities and differences that exist among successful Oklahoma high school cross-country programs and determine what issues factor into their consistent achievement. If there are consistent patterns in the training programs or common practices among this group, then these themes should be pointed out.

There are many factors that contribute to success in high school athletic competition. A few of these include the training methodology, coaching methods, popularity of the sport in the local area, the support systems available to the team, ability of the coach to recruit young athletes to the program and occasionally even luck (Newton, 1998). Having talented athletes within the program and the relationship between team members also affects success. Other factors exist that can't truly be quantified, as some coaches are simply able to take their teams to higher levels of performance with methods that appear similar to other programs.

Coaches may develop the basics of their program through many processes, which include reading training manuals, trial and error, or collaboration with other coaches (Newton, 1998). Successful programs may incorporate many of the same methods, but merely copying another team's program generally is not effective. Differences in

location of the school, characteristics of the athletes or personality differences among coaches leads to some variation.

The sport of cross-country running can be viewed in several different ways. Some programs consider it a separate competitive season to aim for peak performance (Newton, 1998). Others view cross-country competition as part of a yearlong buildup for the track season (Arbogast, 2002) and others train similarly year round, never truly reaching a true peak (Farrell, 2002). Training mileage varies widely as well, with past research having shown a range of 30-130 miles per week among elite high school programs (Harter, 1976). Despite very different organizations of the training year and very different training mileages, programs reached national prominence with the previously described methods.

Methods

The participants (n=10) in the study were successful Oklahoma high school cross-country coaches. The programs were selected based on state meet results from the previous ten years, with consistent top-five team placing the main criteria. This study focused on large school male distance running programs. Three programs from both Classes 4A and 5A were included, as well as four from Class 3A.

Experimental Design

This study was descriptive and qualitative in nature, incorporating a structured personal interview to obtain the data. Each coach was interviewed using the same questionnaire, which consisted of nine questions concerning the characteristics of the program's athletes, organization of the training program, methods incorporated for motivating athletes and team cohesion, support systems available to the program and

reasons why the coaches believed their programs had been successful. Ten of the twelve programs contacted about participating in the study were willing to take part in the investigation.

This study was delimited to programs that have had the same coach for a minimum of three years. Interviews were conducted during the months of May and June, with each coach being allowed to select the setting for the interview. Each subject gave his written, informed consent to participate in the study after the purpose, procedures, and known risks of the methods were explained in accordance with the University Institutional Review Board

Results

Specifics of each program are described in Tables 1-6 as well as Appendix D. The results showed substantial differences among the programs in several areas, including training mileage and support systems between the three classifications. The organization of the training year and use of multilateral development were found to be very similar among the ten programs. Similarities were also found in the methods used to motivate athletes and reasons for team success.

The mean enrollments of the high schools involved in the investigation for each classification was 2,226 for Class 5A, 1,021 for Class 4A, 421 for Class 3A. One 5A school had much smaller numbers of athletes participating (22 vs.45-50) compared to the other 5A programs studied. This program differed from the other schools in that the cross-country coach was not involved in the track program, and this could play a role in the lower numbers.

A one-sport athlete refers to an athlete that is only involved in track and cross-country competition and no other sports. The most common secondary sports varied among the schools. In three cases coaches mentioned basketball, with wrestling and soccer being mentioned once. Table 1 lists the demographics of the programs involved.

| Classification | Mean # Athletes | Range, # of Athletes | % 1-Sport Athletes | # of Schools |
|----------------|-----------------|----------------------|--------------------|--------------|
| 3A | 14 | 11-17 | 55 | 4* |
| 4A | 23 | 19-25 | 50 | 3 |
| 5A | 39 | 22-50 | 76 | 3 |
| Overall | 24 | 11-50 | 61 | 10 |

Table 1. Program Demographics

* Two programs have over the past ten years been classified as both Class 3A and 4A, but are currently classified as 3A.

Ninety percent of the teams followed a plan in which they attempted to peak for the state cross-country in the fall and state track meet in the spring. One program did not attempt to peak at any time, but tried to reach higher levels in their training throughout the year without a taper for either of the state meets. The athletes in this program did take a restoration period of approximately two weeks following each of the state meets, although the coach did not require this. The mean amount of training mileage among the teams is described in Table 2.

| Approximate Mean Peak Training Mileage (MPW) for Experienced Athletes | Range | Approximate Mean Team Peak Training Mileage (All Athletes) | Range |
|---|-------|--|-------|
| 55 | 35-70 | 40 | 25-55 |

Table 2: Approximate Training Mileage, Miles Per Week

One program incorporated a microcycle in the middle of each season that included reduced mileage and travel to an important out of state meet at this time. Another

program had athletes involved that viewed cross-country as off-season training for another sport, but these athletes completed the same training as the remainder of the team. Table 3 describes the distribution of the training mileage throughout the Fall Months. See Appendix D for more information on the organization of the training programs including the use of training phases.

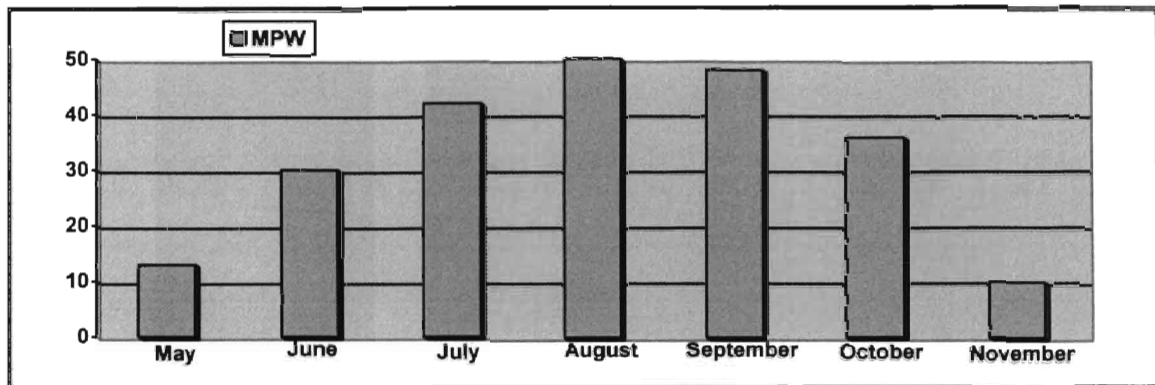


Table 3. Mean Training Mileages Throughout the Fall Months.

One program was found to incorporate no strength training, aerobic cross training or plyometrics. This program had only 25% one-sport athletes however, and their athletes may include these types of training through their other sport involvements. The reasons given for the lack of aerobic cross training included the lack of exercise equipment and a lack of specificity to the sport. Fifty percent of the programs incorporated this type of training only when athletes were injured, while 10% of the programs made this type of training a key point in their summer base training. The program that incorporated plyometrics and aerobic cross training but did not conduct any type of strength training cited a lack of time as the main reason for this exclusion. Swimming, pool running and cycling were included in 50% of the programs, with a Nordic ski machine utilized in 10%. Table 4 describes the use of multilateral development among the programs.

| Method | Aerobic Cross-Training | Strength Training | Plyometrics /Drills |
|------------------------|------------------------|-------------------|---------------------|
| Programs Incorporating | 70% | 80% | 80% |

Table 4. Multilateral Development

Strength training involved circuit training and upper body exercises. Two programs included interval or repetition training between circuits. Another program incorporated hand weights, going through the running motion with the arms before and after each practice. Only one program specifically mentioned training the lower body during circuit training. Plyometrics involved skipping, bounding and form drills. None of the programs in this study incorporated depth jumping or any type of plyometric exercise involving raised platforms or boxes.

Each program incorporated an average of 4.6 techniques in their programs for team cohesion and motivation. Two programs incorporated only one of these methods, while one of the programs incorporated eight. One of the coaches of the programs that incorporated only one of these methods spoke about the difficulty of recruiting athletes to his program. Neglect in this area could play a role in difficulty in recruiting or keeping athletes in the program, although the number of athletes involved in this case was similar to other schools in the same classification.

Table 5 lists the results found regarding team cohesion and motivation. “Team meals” involved the athletes eating a meal together the day before a competition. This included elements of both team cohesion and motivational aspects, as in some cases there were discussions about the upcoming competitions and goal setting for the remainder of the season. “Family meals” included get-togethers where the athletes were allowed to invite their parents and siblings to the meeting. “Formal Meals” entailed the team renting tuxedos and being served at a meal by their coaches at a meal following the conclusion of

the season. “Team recreation” involved team outings such as trips to the lake or camping that were used to develop cohesion. One team also included water balloon fights followed by eating ice cream as team recreation during the summer months.

| Program # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|-----------------------------------|---|---|---|---|---|---|---|---|---|----|-------|
| Team Meals | X | X | | X | X | | X | X | | | 6 |
| Family Meal | | X | | | | | X | | | | 2 |
| Formal Meal | X | | | | | | | | | | 1 |
| Team Recreation | X | | X | | | | X | | | | 3 |
| Summer Running Camp | | X | | X | | | | | | | 2 |
| Awards Banquet | X | X | X | | X | | X | | | | 5 |
| Fundraisers | X | X | | | | | | | | X | 3 |
| Bulletin Board | | X | X | | | X | | | | X | 4 |
| Newsletter | | | X | | | | X | | | | 2 |
| Web Page | | | X | | | | | | | | 1 |
| Weekly Award | | | | | X | X | X | | | | 3 |
| Positive Daily Encouragement | | | X | | | | | | | | 1 |
| Picture Posted for All State | | | X | | | | | | | | 1 |
| Visualization Exercises | | | | | X | | | | | | 1 |
| Competition/Trip for Varsity Only | | | | X | X | X | | | | | 3 |
| T-Shirt as Reward | X | | | | X | X | X | | X | X | 6 |
| Training Challenge | | | | | | | X | | | X | 2 |
| Total | 6 | 6 | 7 | 3 | 6 | 4 | 8 | 1 | 1 | 4 | 46 |

Table 5. Methods used to motivate athletes and develop team cohesion.

“Bulletin boards” involved the posting of best times, records or achievement of certain standards in the teams meeting area. “Newsletters” involved information being sent to the athlete during the summer months to keep them motivated and give them training information and times for group meetings. “T-shirts as rewards” involved

awards being given to athletes that met desired achievements, such as running a certain amount of miles for the summer, running consecutive days, or in one cases for their place among the top 14 runners at their school. “Weekly Awards” were given to an athlete who had made a big improvement at a recent race or had been working hard in practice, with the athlete typically receiving a t-shirt for this honor. One program arranged for the winner of this award to be interviewed on the radio or television each week.

“Trips for varsity only” involved overnight trips to out of state competitions that rewarded runners for making the varsity and provided incentives for those not among the top seven runners to improve. “Fundraisers” involved both raising money for the program and elements of team cohesion. These included a 12-hour relay with athletes alternating all-out miles on the local track with pledges taken for each mile run in one program and dances for middle school students in the other. “Training challenges” referred to a one time difficult training event that involved rewards if the challenge was accomplished. One program included a run up Mt. Scott as a training challenge, rewarding those who completed the run with t-shirts. Another program held a team only eight mile race around a lake each year, with medals being awarded and the all-time best times for the race being placed on the team’s bulletin board.

Seventy percent of the programs had some type of paid support, either an assistant coach or athletic trainer. In regards to dealing with injuries, two programs had support systems other than those listed in Table 6. One program was found to have access to free care at a local health clinic, while another had a medical doctor that traveled with the teams and served as a volunteer assistant coach. Student trainers involved either a

student teacher from a local college or high school students that volunteered. One program was found to have no outside support in dealing with injuries.

| Classification | Athletic Trainer | Student Trainer | Paid Assistant | Volunteer Assistant | Booster Club |
|----------------|------------------|-----------------|----------------|---------------------|--------------|
| 3A | 0% | 20% | 10% | 10% | 20% |
| 4A | 30% | 0% | 10% | 0% | 0% |
| 5A | 30% | 10% | 30% | 0% | 0% |
| Total | 60% | 30% | 50% | 30% | 10% |

Table 6. Support Systems Available to the Program

Most coaches did not directly take credit for the success of their program. The most common reasons given for success were related to characteristics of the athletes, including willingness to hard work, dedication and talent. The value of running in the local community and the support it provided to the program and school traditions of success in cross-country were also common answers. The only factors given relating directly to the coach included the athlete/coach relationship and the example of the coach being a runner, both of which were mentioned in 20% of the programs.

Table 7 lists the reasons that were given for team success. “Spiritual” reasons included God’s blessing on the program in one case and God giving the coach success early in his career so that he could be in a position of service later on in another program. The “coach is a runner” reason involved the example that the coach of the team provided by being a runner, which motivated the athletes to work harder. Most programs undoubtedly provide encouragement to their athletes, but “Encouragement” listed in Table 6 refers to stressing positive encouragement daily in the program and this given as a reason in 10% of the programs.

| Reason for Success | Programs |
|------------------------------------|-----------------|
| Athlete's Willingness to Work Hard | 60% |
| Tradition | 60% |
| Talent/ Right Athletes | 50% |
| Community/Parents | 30% |
| Coach is a Runner | 20% |
| Spiritual | 20% |
| Athlete/Coach Relationship | 20% |
| Team Cohesion | 10% |
| Encouragement | 10% |

Table 7: Reasons for Team Success

Discussion

The intent of this study was to describe the methods of successful high school cross-country programs. Regarding organization of the training year, there are definite similarities among the top programs. Double periodization was incorporated 90% of the time, as the best teams attempted to peak for the state cross-country meet in the fall and the state track meet in the spring.

In terms of training volume, there was no exact mileage level that could be determined to be the most effective among the top teams. The most common amount found for the peak mileage among the 10 programs was 45 miles per week, which occurred in 30 % of the programs. However, the two most successful programs had peak training mileages of 35 and 65, near the opposing extremes found in this study. One commonality among the programs in terms of training volume was that seventy percent of the programs incorporated a gradual buildup of training mileage over the high school years with lighter training for the younger athletes, so this would have to be considered important.

In terms of program demographics, percentage of one-sport athletes played was shown to play an important role in consistent success. Ninety percent of the most successful programs had the majority of their athletes participating in only distance running. School enrollment did not affect the success of the program, when comparing schools within the same classification. The most successful programs in all three classes were not the largest in terms of enrollment. In terms of number of athletes, this appeared to be an important factor in Class 5A, but not 3A or 4A. The smallest school in terms of both enrollment and number of athletes was the most successful in Class 3A in terms of top five finishes over the previous 10 years.

Regarding support systems available to the programs, no definite conclusions can be drawn other than the systems were very similar within each classification. Class 3A schools had almost no outside support, with only one school having a paid assistant and no athletic trainers. All Class 4A schools had athletic trainers, but there were no paid assistants, with all Class 5A schools having both paid assistants and athletic trainers.

In terms of methods used for team cohesion and motivation, there were some similarities found among the top programs. Team meals, bulletin boards, awards banquets and t-shirts as rewards were incorporated in the majority of the programs. Each coach mentioned an average of 4.6 methods that they used for this purpose. It can be concluded that these types of activities and methods are important to the consistent success of the program.

Regarding the reasons given for team success, the most common reasons related to the athlete. Their willingness to work hard and talent were given as primary reasons in the majority of the programs. Tradition also was given as a reason in the majority of the

programs. The coaches in the study may have understated their role in the program's success, as there were only four instances of a coach making any mention of their role in the development of the program.

Regarding the training volume, a previous study found an average training mileage of 60-70 miles per week among 37 top American high school cross-country programs (Harter, 1976). This study found a slightly lower amount, around 55 miles per week. The trend among high school running programs has been less emphasis on training mileage in comparison to the time the Harter study took place (Miles, 1992), so this was to be expected.

Recommendations for younger athletes previously have been made to increase from 30 miles per week to 50 during the high school years (Vigil, 1995). Seventy percent of the programs in this study were found to incorporate a much lighter workout for younger athletes and gradually increased their mileage over their high school years. The majority of the programs in this study (60%) also echoed Daniels (1998) and others suggestions that talent is a major factor in athletic success.

Bompa (1999) recommended younger athletes incorporate broad, multilateral training with a moderate amount of intensity. The majority (70-80%) of the programs followed this recommendation, incorporating strength training, plyometrics and aerobic cross training, as well as devoting a large portion of the year to base training. Bowerman and Freeman (1991) recommended incorporating either single or double periodization into the training program. Ninety percent of the programs involved in the study incorporated double periodization, attempting to peak for the state cross-country meet in the fall and the state track meet in the spring.

Newton (1998) stressed the need for an extensive rewards system to motivate athletes. In the York high school program, that involved awards ceremonies, t-shirts being rewarded for running 1000 miles in the summer and for the top 12 runners on the team, and varsity letters. Most of these methods were incorporated in a majority of the programs in this study. The varsity letter was not however mentioned in any case and this apparently has less significance in this population.

Compared to York and Bingham High Schools, two nationally prominent high school programs, the teams in this study appeared to have less extensive support systems on the whole. No student assistants or managers were reported, which were important in Newton's program. Newton (1998) used 5-6 student managers to monitor workouts and assist him. York also went as far to bring the high school band and cheerleaders to the state meet, and this level of support does not occur within this population.

Bingham High School had three assistant coaches in addition to the head coach involved in their program. They had a booster club that supported the program as well as extensive parental involvement. Parents volunteered to bring food to meets and events, as well as take pictures of meets and host meals prior to important meets (Arbgobast, 2002). The programs in this study got much less support from the school and surrounding community than these two elite programs. Only two programs in this study mentioned having a booster club, and parental involvement was not mentioned frequently in terms of support.

CHAPTER V

CONCLUSIONS, APPLICATIONS, RECOMMENDATIONS

Many high school cross-country programs have had one exceptional season or an occasional outstanding individual runner, but only a few have been able to consistently excel year after year as a team. The problem of this study was to describe the similarities and the differences that exist among successful Oklahoma high school cross-country programs and determine what issues factor into their consistent success. If consistent patterns in the training programs or common practices among this group exist, then these should be pointed out.

The research questions were in the areas of athlete demographics, training methodology, methods incorporated to motivate athletes and develop team cohesion, support systems available to the program and reasons why coaches feel their programs have been successful. It was found that many programs use similar methods in regards to organization of the training year, methods to motivate athletes and multilateral development. The programs were found to differ in many areas as well, such as training mileage and support systems available to the programs. The reasons given for the programs success also had many commonalities.

Several other areas related to this study could be used for future research. Female distance running programs as well as college programs could be studied in a similar manner. Additionally, the methods of programs that have not been as successful or have had only occasionally good teams could be compared to the most successful programs. Different geographical regions could be studied to see if methods differ between locations.

Additionally, the entire training year could be described as opposed to just the training during the fall months. Smaller Class 2A and A schools could also be studied. These programs would probably have a very different organization of the training year, as a greater percentage of the athletes would take part in other sports.

The progression of training from the high school to college level including how college programs transition their athletes to the higher level of training and competition, as well as their expectations of athletes new to the program are areas that need to be researched as well. The same could be done for the junior high/high school transition.

The following recommendations for future research are made: 1) Female distance running programs, 2) Small schools, 3) College programs, 4) Winter and Spring track training, 5) Transition between levels, 6) Different geographical regions, 7) Comparing less successful programs with successful ones and 8) The number of athletes from successful high school programs that compete at the collegiate level and their rates of improvement.

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APPENDIX A

IRB APPROVAL

Oklahoma State University Institutional Review Board

Protocol Expires: 5/11/2004

Date: Monday, May 12, 2003

IRB Application No ED03128

Proposal Title: COMPARISON OF SUCCESSFUL OKLAHOMA HIGH SCHOOL CROSS COUNTRY PROGRAMS

Principal Investigator(s):

Zac Johnson
700 W. Scott #317
Stillwater, OK 74075

Jack Ransone
429 Willard
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

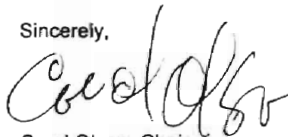
Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 415 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,



Carol Olson, Chair
Institutional Review Board

APPENDIX B
QUESTIONNAIRE

1. How many male athletes typically are involved in your cross-country program each year?
2. What percentage of your athletes participate only in cross-country & track and field?
3. Do you view the cross-country season as an independent season in itself with a focus on performing well and peaking for the state meet, as part of a long build-up for a larger peak for the outdoor track season or some other variation?
4. How much mileage do your athletes run per week and could you describe how this fluctuates throughout the summer and fall?
5. Do you divide the cross-country season into training phases, and if so could you describe the phases including what types of training are emphasized during each time period?
6. Do you incorporate any type of cross-training or strength training in your program and if so could you describe what types you include?
7. Do you incorporate any methods to motivate your athletes or foster team cohesion, such as team meetings or rewards for certain achievements?
8. What support systems are available to your program, such as assistant coaches, tutors, sports psychologists, or athletic trainers?
9. Why do you feel that your program has been successful?

APPENDIX C
OSU INSTITUTIONAL REVIEW BOARD
CONSENT FORM GUIDELINE

Comparison of Successful Oklahoma High School Cross-Country Programs

I, _____ voluntarily agree to participate in this investigation directed by Jack Ransone, PhD. ATC, FACSM, and Zac Johnson at Oklahoma State University. I understand that the purpose of this study is to investigate the similarities and differences that exist in the organization of successful Oklahoma high school cross-country programs.

Procedures

The procedures that I voluntarily agree to take part in include:

1. A personal interview including questions concerning issues such as number of athletes involved in the program, percentage of one sport athletes, organization of the training year, mileage, use of training phases, multilateral development, motivational techniques and the support system available to the athletes. This interview will last approximately 30 minutes.

Confidentiality

I understand that complete confidentiality of records identifying the subject will be maintained throughout this investigation. Subjects will be identified by number only and these assigned numbers will be kept confidential and secure. Materials relating myself to my identification number will be kept in a locked cabinet and will be destroyed immediately after the study is completed. I am aware that the results of this study may be published but my confidentiality will not be compromised.

Risks

I understand that there are no known risks to the subjects involved in this type of research. I will not encounter stress greater than those ordinarily encountered in daily life or during the performance of routine examinations or tests.

Benefits of Participation

I will receive no direct benefits from taking part in this study. Cross-country coaches in general will benefit from the survey in that information will be collected that could be used in designing or modify the methodologies that they incorporate in their program. The information will also benefit parents of cross-country runners who wish for their children to excel, and also athletes who are self-coached.

Subject Assurances

I understand that 1) my participation in this study is voluntary; 2) I may withdraw from this study at any time without penalty or loss of benefits to which I am otherwise entitled

3) I have not given up any of my legal rights or released any individual or institution from liability for negligence.

I understand that I (or my legally authorized representative) may ask questions and request information about this research project at any time. By signing this consent I acknowledge that I have been afforded the necessary opportunities to pose any questions which I may have and that they have been answered to my satisfaction. Dr. Ransone may be reached in his office by calling 405-744-9439, and Zac Johnson at 405-377-4668. I may also contact Sharon Bacher, IRB Executive Secretary, 305 Whitehurst, Oklahoma State University, Stillwater, OK 74078; telephone (405) 744-5700.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: _____ Time _____ (a.m./pm.)

Signed: _____

(Signature of Subject)

I certify that I have personally explained all elements of this form to the subject or his/her representative be requesting the subject or his/her representative to sign it.

Signed: _____

(project director or his/her authorized representative)

APPENDIX D

USE OF TRAINING PHASES.

Program 1

Phase I. Summer: Steady distance runs are stressed, with an occasional road race or fartlek included. Strength training and drills/plyometrics are completed, which are also incorporated year round.

Phase II. August-Late September: Steady/fast distance runs and fartlek are emphasized, with a weekly cross-country competition added in mid August.

Phase III. Late September-October: Mileage is reduced at this time, with the training focus shifting to getting in 5-6 hard speed workouts during this period as a peak is reached for the state cross country meet.

Phase IV. Restoration: Two weeks of rest are incorporated before beginning a buildup for the spring track season.

Program 2

Phase I. Summer: The emphasis is on aerobic distance running during this time with occasional untimed 1000 meter repeats included as well as strength training.

Phase II. August-Mid September: Intensity builds as training focuses on tempo runs, hills, timed intervals, and weekly cross country races. Weight training focusing on the upper body is included.

Phase III. Late September-October: Training intensity increases and mileage is reduced with the emphasis put on interval training, as the team prepares to peak for the state cross country meet.

Phase IV. Restoration: A two-week break from running is incorporated before beginning a build up for the spring track season.

Program 3

Phase I. This team follows the PAAVO training plan, which begins with a 6-8 week phase focusing on aerobic development including two tempo runs per week, one all out run of 1-2 miles, and long easy to steady distance runs.

Phase II. Intensity builds with two interval sessions per week added (9x400, 4x400) at approximately two-mile race pace, along with one tempo run, and a cross-country race each week. There is a gradual increase in training mileage through this time period.

Phase III. This phase includes the same organization as phase two, but track fartlek involving sprinting 100 meters and jogging 100 meters is now included. There is no reduction in mileage for the state meet, but a specific order of workouts is used in the final weeks.

Phase IV. The runners either continue attempting to reach higher levels within PAAVO Program or take time off before building up for the track season. The majority incorporates the restoration phase.

Program 4

Phase I. Summer: Training involves alternating days of running with days of cross training. A session of 400 meter intervals at slightly faster than race pace is included each week, starting at four and building to 13 at the end of the summer. A fartlek run and a long easy run are also included each week as well as daily strength training.

Phase II. Mid-August-Late-September: This time period emphasizes base training, focusing on mileage, with some tempo runs and fartlek included as well as a weekly cross country race starting in late August.

Phase III. Late September-October: As mileage decreases at this time, the focus of training shifts to intervals, including 800 and 1600 repeats, until a peak is reached for the state meet.

Phase IV. Restoration: A short break from running is included until a buildup for track starts.

Program 5

Phase I. Summer: The team begins running on their own around June 15. They start out at 3-4 miles per day and building to 5-6 miles per day by July.

Phase II. This phase lasts 4-6 weeks and coincides with the beginning of the school year. The emphasis is on aerobic distance running, with some hill training, strides and weekly cross-country races included beginning in late August.

Phase III. Late September-October: Training intensity increases with the focus on interval training, which is included every other day. The team reduces their mileage to allow for a peak during the final weeks of the season, which include the Conference, Regional, and State meets.

Phase IV. Restoration: A short break from running is taken before a buildup for the track season begins.

Program 6

Phase I. Summer: Training is casual and focuses on aerobic distance runs and weight training, with the team meeting several times a week for runs.

Phase II. This phase begins in September and is a transition to faster running: Training intensity builds focusing on long intervals with short recovery, some hill training, and weekly cross-country races. A microcycle of reduced mileage is included in this time period as the team travels to an important invitational in Kansas.

Phase III. Sharpening: Intensity increases and mileage is reduced. The recoveries and the speed on interval workouts (800-1000) increase, with some hill workouts also included at this time. The team peaks for the state meet.

Phase IV. Restoration: The team takes a two-week break from running. Some athletes may choose to run 1-2 cross-country races with a club team and this extends their season several weeks.

Program 7

Phase I. Summer: Training focuses on easy distance running.

Phase II. A six-week phase follows focusing on circuit training exercises alternated with nearly all out runs of 400-1000 meters. Some easy distance runs and weekly cross-country races are included at this time.

Phase III. October: training mileage is reduced, with a focus on interval training. The team peaks for the state cross-country meet.

Phase IV. Restoration: The team rests from running for one week, and then includes games and one day per week of running until track training begins in January.

Program 8

Each phase lasts 3-6 weeks, with other types of training occasionally included in addition to the training emphasis.

Phase I. The training cycle begins with a period emphasizing long steady distance runs and building mileage, with an occasional low-key road race included.

Phase II. Tempo runs are added to the training, with cross-country racing beginning around this time.

Phase III. Interval Training is added to the schedule.

Phase V. Tapering: The team incorporates a two-week taper to peak for the state meet.

Phase VI. Restoration: The team takes a recovery period from training, followed by a build up for track season.

Program 9

Phase I. Summer: The training focus is on aerobic distance running, with some anaerobic threshold sessions included in the second half of this time period. Heart monitors are used to insure the training is completed at the proper intensity.

Phase II. Early Season: Interval training is introduced just above anaerobic threshold and threshold workouts are continued. Cross-country competition is also introduced around this time. Mileage is reduced 3-5% per week for the remainder of the season.

Phase III. Late September/October: Intensity continues to build with training still including anaerobic threshold runs, and intervals. Varied fartlek is added at this time, which involves 15-60 second sprints.

Phase IV. Tapering: A two-week taper is incorporated in preparation for a peak at the state cross-country meet.

Phase V. Restoration: A two weeks break from training is planned, with some relaxed running occasionally completed during the second week of this phase if desired, followed by a build up to the outdoor track season.

Program 10

Phase I. Summer: The training focus is on easy distance running, and strength training with cross training included. The athletes are encouraged to train six days per week.

Phase II. Early Season: Intensity begins to build with long intervals, speed play, hills, and cross-country competition introduced at this time.

Phase III. Late season: More emphasis is placed on shorter intervals and mileage is reduced on long Sunday runs as the team tapers to peak for the state cross-country meet.

Phase IV. Restoration: A break from running is included before beginning a build up for the track season.



VITA

Zachary Neal Johnson

Candidate for the Degree of

Master of Science

Thesis: COMPARISON OF SUCCESSFUL OKLAHOMA HIGH SCHOOL
CROSS COUNTRY PROGRAMS

Major Field: Heath, Physical Education and Leisure

Biographical:

Personal Data: Born in Cape Girardeau, Missouri on December 20, 1976, the son of Robert and Barbara Johnson.

Education: Graduated from Velma-Alma High School, Velma, Oklahoma in May 1995. Received Bachelor of Science degree in Heath, Physical Education and Recreation from Oklahoma Baptist University in December 1999. Completed the requirements for the Master of Science degree with a major in Health, Physical Education, and Leisure at Oklahoma State University in August, 2003.

Experience:

Served as assistant cross-country coach, Oklahoma Baptist University, 1999. Spoke at the OBU Winter Track Camp, 1997,1998. Worked at the Oklahoma cross-country state meet in 2001-2002. Was the Oklahoma Class 2A state cross-country champion in 1994. Was the Oklahoma Class A state champion in the 1600 and 3200 meters runs in 1995. Earned NAIA All-American honors by placing second in the Marathon at the outdoor track national meet in 1998. Earned NAIA All-American honors and was NAIA national champion in the Marathon in 1999.

Professional Memberships: Member of USA Track and Field.