

Effectiveness of High School Track and Field Coaches
on the
Athletic Development of College-Bound Student Athletes

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Abstract

Although the importance of effective coaching in the development of athletic ability has been acknowledged, no research has directly tested the impact coaching pedagogy actually has. Therefore, the present study examined the effectiveness of high school track and field coaching methods by means of a survey. This study is based on Cote and Salmela's (1995) coaching model which asserts that the coach's mental model about an athlete's potential influences his or her training choices. Based on this model, this survey tested whether the development of athletes was affected by the level of coaching that was received. The results of the study showed no significance between the experience level of the coach and performance level of the athlete. Research on the impact of effective coaching needs to continue given that the results of the current study are contrary to the findings of the existing literature.

Key words: deliberate practice, expert coaching, coaching model, expertise, athletic performance, talent identification

CHAPTER I

INTRODUCTION

Overview

An athlete's ability to perform is a result of his or her genes and the environment that has influenced his or her development over a lifetime of training. This environment is described by Cote and Salmela, (1995) in their work on the "coaches' model" (p. 10) which describes a mutually dependent relationship between the skills of the expert coach and an athlete's personal characteristics to develop an athlete's potential. Changes in this environment can either enhance or degrade these natural genetic characteristics. This makes the effectiveness of the coach a key piece in determining the future potential of a student-athlete at the collegiate level.

The need to understand all the factors that affect athlete performance is rooted in the high stakes gamble college coaches take every year on trying to determine the potential of student-athletes. Scholarship or nonscholarship, there is a huge amount of resources invested in athletes. In determining an athlete's talent, coaches are able to look at the objective measures such as height, weight, and performance. Too often, though, unseen characteristics, such as the effectiveness of the coach, are overlooked. In personal past experience, the researcher has observed that athletes who have great natural ability but have received ineffective coaching can have problems that take years to fix in order to increase their performance. In order to better understand athletes, coaches need to look at the research on athletic talent selection.

The concept of athletic talent selection focuses on two approaches for measuring future athletic potential, behavioral and psychological. Anshel and Lidor (2012) looked at many definitions for the talent identification , but the one that best summarizes the concept for this

action research project was “the process of recognizing individuals currently involved in sport with the potential to become elite athletes/players” (p. 240). Anshel and Lidor found that psychological measures do not discriminate between athletes of different skill levels. The research suggests measurement of motor ability and motor skill are better predictors of future skills. Gilbin, Oldenziel, Weissensteiner, and Gagne (2010) showed that characteristics of elite athletes were behavioral in nature.

If an athlete’s learned motor skills are the determining factor in his or her success, the coach has the essential role in the development of that talent. Effective coaches show characteristics of superior content and structure of practice, effective use of time, and high level planning, (Anshel & Lidor, 2012). These elements are developed into concept of “deep practice” (p. 65) that was described by Ford, Ward, Hodges, and Williams (2009). The key is knowing whether an athlete is receiving high quality coaching and for how long.

Gilbert, Lichtenwaldt, Gilbert, Zelezny, and Cote (2009) called for future research in this area, saying that “Future studies should included not only team accomplishment outcomes (i.e. winning), but other measures of coaching effectiveness that provide evidence of a coach’s ability to successfully nurture athletes development (i.e., pedagogical content knowledge)” (p. 428). This research project looks to answer this specific question as it relates to high school track and field coaches.

Starting with Title IX legislation in 1972, the expansion of high school sports has increased the demand for talented coaches. As of 2013, over 7.7 million youth under the age of 18 years participated annually in high school sports activities (NFHS, 2013). Since 1972, the number of athletes participating has almost doubled. The NFHS Study shows that track and field is the most popular sport for women and second most popular among men. This significant increase in

participation has created a shortage of qualified coaches. Butterfield and Brown (1991) found that that school officials were forced “to hire people off-the-street (and hope for the best) to staff coaching positions” (p. 123). Stewart (1993) goes on to explain “the situation often results in a coach with limited professional preparation, minimal knowledge outside the particular sport and little understanding of the complexity and demands of the position” (p. 25). The need to be able to evaluate the effectiveness of these coaches becomes of the utmost importance when one considers the impact a coach has on athletic development.

Statement of Problem

The purpose of the project was to examine the effectiveness of high school track and field coaches at developing the athletic ability of possible college-bound student athletes. Previous research has shown there is a gap in the research looking at the impact of a coach’s pedagogy or methods on the athlete’s development. The results of this research will be used to determine whether the survey can be used as a reliable tool for assessing the level of a coach’s pedagogy. Being able to measure a coach’s effectiveness will help with being able to evaluate the quality of training a student athlete had received. Working off the premise of deliberate practice, high quality training over a long term period, coaches can use it as another factor in making choice about how to better identification talent.

Hypothesis

The athletic performance of high school track and field athletes who are being coached by highly effective coaches will not be significantly different than the performance level of those who are coached by ineffective coaches.

Operational Definitions

High school track and field coach: A male or female adult given the responsibility for training athletes ages 14 to 18 years in track and field events

High school track and field athlete: A male or female student-athlete who has been trained in track and field for at least one season.

Nonexpert track and field coach: A coach who scored a 78 or less on the coach effectiveness survey located in Appendix B.

Expert track and field coach: A coach who scored 79 or greater on the coaching effectiveness survey located in Appendix B.

Athletic performance: Criteria for the evaluation of athletic performance in the different track and field events will be based on the chart located in Appendix A.

CHAPTER II

A REVIEW OF THE LITERATURE

This literature review explores the relationship between the qualities of an expert coach and the characteristics needed to develop athletes' performance to an elite level. College athletics have become high stakes businesses with large investments of resources in facilities, personnel, and scholarship. In the last school year, NCAA member institutions provided two billion dollars in athletic scholarships to its student athletes. The recruitment of students has become a make or break it process. To be effective, college coaches need to recognize whether or not recruits come from programs with expert coaching and a history of deliberate practice. The basic premise is that athletes are the sum of their experiences (Ericsson, Krampe, & Tesch-Romer, 1993). The challenge is that there are over 800,000 coaches working with a growing population of children participating in sports (Gilbert & Trudel, 2004). This begs the question: How many of those coaches are really qualified to develop athletes? These coaches may have been involved in the sports, but do they have the knowledge to train athletes? So, the challenge for the college coach is the process of identifying athletes who are ready to perform at next level .

Section one of this literature review will delve into what 'expert coaching' entails, including discussions of becoming an expert coach, characteristics of an expert coach, and deliberate practice. Section two examines athletic performance and includes information about genetic influences as well as sports psychology. Lastly, the review of the literature draws conclusions about expert coaching.

Expert Coaching

Research recognizes that coaching is a process that is dynamic and systemic and that needs to be

learned. Cote and Salmela (1995) developed a model of coaching that looks at the different components of coaching in order to develop a mental model of an athlete's potential. When a coach is recruiting athletes, he or she isn't recruiting where the athlete's athletic ability is currently, but is instead gauging what this athlete can achieve in the future. The coaching model is centered on the coaching process, which is a systematic approach to controlling the variables of organization, training, and competition in order to attain the goal. Dynamic components that are added to this equation such as the "coach's characteristics, athlete's characteristics, and athlete's level of development" (Cote & Salmela, 1995, p. 11) can raise or lower the coach's mental model of the athlete's potential. A deeper examination of the coaching process can be gained by looking at the characteristics of expert coaching.

Developing an Expert Coach

Expert coaches are not born with their skills but are developed through the process of reflective practice. Irwin, Hanton, and Kerwin (2004) describe reflective practices occurring in "four sequential stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation" (p. 426). This process is universal, but the information gained is domain-specific, so it is necessary for the process to be applied to real professional experiences in order to be meaningful (Irwin et al., 2004).

Irwin et al. (2004) describe the professional knowledge we have gained from reflective practice as coming in different ways. Reflective practice allows us to cycle through different methods to improve our observation, generalization, and testing skills. Novice coaches seek out information from external sources such as coaching courses, mentor coaches, and trial and error. There is a shift with expert coaches to problem solving, consulting colleagues, and experimentation through which the coaches look internally for answers. In the end, expert coaches use reflective practice to learn to become good decision makers about the interdependent

elements of their sport.

Characteristics of Expert Coaching

There are four main characteristics of expert coaches that were laid out by Nash, Sproule, and Horton (2011) in their paper the “Excellence in Coaching: The Art and Skill of Elite Practitioners.” Based on interviews conducted with expert coaches, expert coaches demonstrate the following characteristic: “long- term approach, authentic coaching environment, creating a learning environment, and quality versus quantity” (Nash et al., 2011, p. 231). These four characteristics are seen as necessary to best manage the coaching process and the variables included in the model.

Expert coaches look at training from a long-term approach that can be as short as a season and as long as a four-year cycle ending in high school and/or college graduation or Olympic competition. For example, one of the respondents in the study sees the planning process as a massive jigsaw puzzle working on different chunks of the puzzle at all times (Nash et al., 2011). The long-term approach starts with assessment of the current athlete’s skills level, which allows the expert coach to select the necessary underlining skills needed to accelerate athlete’s individual performance. The coach works on these skills in a general to specific manor, moving through the training progress toward the athlete’s short- and long-term goals. Each athlete’s season plan needs to work into the long-term goals. This is extremely important if the athlete plans on progressing to the next level (Nash et al., 2011).

The authentic coaching environment has several qualities, but the dominant one is “integrating aspects of competition into their practice” (Nash et al., 2011, p. 233). This environment forces the athletes to work harder and focus on activities. Competition-based practice exposes errors and allows for correction to be practiced at the highest levels.

Additionally, the coach needs to manage the needs of the athletes and work to build athletes' confidence. The right mixture will provide a relaxed but focused environment that adds to an athlete's ability to grow within the long-term plan (Nash et al., 2011).

Another characteristic of expert coaches is creating a practice environment that focuses on learning. This can be done by coaching in the form of the reflective practice method or, more importantly, by the athletes themselves. Wilson and Stephens (2005) showed that athletes who perceived higher level of internal locus of control had higher expectations for success.

Experienced coaches shift the focus on learning in practice to the athletes through acting as facilitators or partners in problem solving with the athletes in order to create the feeling of an internal locus of control (Nash et al., 2011). For less experienced athletes, this sense of internal control is missing because they are doing as they are told in practice. Even expert coaches can get novice athletes to internalize control by giving them the opportunity to explain what they are doing in practice and show how they fit into the game plan. An example of the collaborator approach is the development of a competition plan between coach and athlete. A competition plan is made of four components: action plan to deal with competition situations, evaluation of emotional state during competition, positive self-talk, and personal coping mechanisms (Balague, Cecchini, & Brustad, 2009). Balague et al. (2009) found a positive correlation between creation of a competition plan and satisfaction with performance results.

The final characteristic of elite coaches is the concept of quality of effort over the sheer amount of work. Coaches need to focus on quality because there needs to be high intensity in order to attain competition level in training. The expert coach needs to optimize an athlete's training time by following the concept of deliberate practice. Another issue that falls under this area is selecting training that is appropriate for the time of year. Next, a coach must provide

opportunities for development and time for recovery. Striking a balance in training is the key in continuing long-term progress.

Deliberate Practice

Deliberate practice has been mentioned previously in the literature review as being connected to the coaching model and characteristics of expert coaching. So what is deliberate practice? Hyllegard, Radlo, and Early (2001) define the practice as engaging in specific activities designed to improve performance over an extended time. The concept proposes that activities that require high effort over ten years or about 10,000 hours of practice allow a person to become an expert. Hyllegard et al.'s research showed evidence of deliberate practice being present in sports/activities such as soccer, badminton, chess, music, basketball, and others. In addition to high effort, Johnson, Tenenbaum, and Edmonds (2006) suggest that deliberate practice activities will include qualities of high effort, a well-defined task, repetition and error correction, and quality vs. quantity. These last three qualities overlap the discussion on expert coaching. As for athletes, they need to give their full attention and concentration as they take part in practice. During the execution of deliberate practice, the challenge for athletes is that they push themselves to near failure in order to engage in the learning and modification needed to reach the next level of performance (Johnson et al., 2006).

As mentioned previously, the deliberate practice process requires ten years of focus to develop necessary skills. This process occurs through three identifiable periods: sampling years, specializing years, and investment years (Ford et al., 2009). The sampling years are defined as the time period from 6-12 years of age. During this time period, activities can fall under the heading of deliberate play, which involves activities for the purpose of fun and which mimic a real game with small changes. Johnson et al. (2006) showed that future elite and non-elite

swimmers put in the same number of hours of deliberate practice at this age. There are two unique pathways that kids can take at this age. In sports where expert levels are reached at older ages (18+), kids benefit from experimenting with a diverse array of sports that develop similar skills. In contrast, research shows that athletes in sports such as gymnastics benefits from specializing earlier, because they are commonly reaching an expert level before the age of 18 (Johnson et al., 2006).

The next two age periods start to narrow down the training toward the athlete's field of expertise. This specializing training period is defined as the time period from 13-15 years old (Ford et al., 2009). The number of sports decreases to one or two sports, with one of them being the primary sport. The number of hours spent in deliberate practice differs based on research. As for swimmers, the number of hours spent in deliberate practice started to show a difference between the future elite and non-elite groups (Johnson et al., 2006), whereas the research on soccer players saw that elite and non-elite athletes had a similar number of hours (Ford et al., 2009).

The final stage, the investment years, is defined as participation in a single sport after the age of 16 (Ford et al., 2009). During the investment years, "changes in performance become increasingly difficult to achieve until a point where focused training on specific areas of weakness become the only means of advancement" (Davids & Baker, 2007, p. 966). This is the point where the athlete's dedication to deliberate practice is the most critical. Johnson et al. (2006) show that the number of hours for both groups decreased, but deliberate practice continues to grow for the elite swimmers. The difference in number of hours being accumulated is based on the swimmers' commitment to reach the elite level. This commitment affects the quality of practice by the athletes' levels of engaging in higher levels of attention, concentration,

and effort (Johnson et al., 2006). Little doubt remains that attention to high quality training is critical for promoting the development of expert performance.

There are weaknesses in the concept of deliberate practice because of the athlete and training environment. Practice is only beneficial if the learner is motivated to invest in sufficient mental and physical effort (Hyllegard et al., 2001). Johnson et al. (2006) determined that athlete motivation and effort were an underlying weakness of deliberate practice. The other area of weakness is in training resources, such as facilities and expert coaching. Differences among athletes in these areas would require them to put in different levels of deliberate practice to reach the same level. Deliberate practice implies that nurture accounts for almost all of the variability in the development of expert performances. The literature review now turns its attention to characteristics that are more associated with the individual athlete.

Athletic Performance

Coaches will emphasize that the goal for any athlete is to maximize his or her athletic potential. The idea of potential as a natural genetic gift given to a person may be too limited. Instead, a look how those natural gifts have been developed throughout an athlete's life is warranted. Being able to identify these natural and environmental factors is important when evaluating athletes in the recruiting process. Johnson et al. (2006) identify four factors of elite performance. Two of the four factors, expert coaching and deliberate practice, have already been discussed in relationship to the coaching process. The other two factors, genetics and psychology, are unique to each athlete and will be examined further in the following sections of the literature review.

Genetic Influences

Genetics are an expanding field of study in sport performance. Commonly when people

speak of talent, they think about the genetics that makes each of us special (Hyllegard et al., 2001). In the past few years, scientists have identified over 200 variations in the DNA sequence that can impact athletic performance (Ostrander, Hudson, & Ostrander, 2009). For example, “The gene encoding enzyme angiotensin-converting enzyme (ACE) has two alleles commonly associated with human performance” (Ostrander et al., 2009, p. 423). The I allele is connected to increased endurance performance, and the D allele is connected to improved power and strengthening gains from training (Ostrander et al., 2009). Another genetic difference is absence of Myostatin (MSTN), which allows for the growth of fast-twitch fibers and results in heavy muscular body types (Ostrander et al., 2009). Also, the X-actinin-3m protein is responsible for how fast muscle fibers contract at high speeds, which impacts force production of sprinters at high speeds. Davids and Baker (2007) report that genes work in combination in order to influence biological function. Because of the complexities of the genetic combinations, however, “there is still little understanding of the role that such genes might play in individual differences in health-related fitness and physical performance” (Davids & Baker, 2007, p. 973).

These genetic traits impact an athlete’s ability to do deliberate practice (Johnson et al., 2006). So Davids and Baker (2009) argue that if athletic ability isn’t attributable to just nature or nurture, than it needs to be a combination that they call “complementary nature” (p. 975). Davids and Baker’s research showed that more work needs to be done to understand how genes and the environment can affect athletic performance. For example, researchers have identified the obesity gene, but the effect that gene has is influenced by a person’s environment. In environments with abundant food, humans who have this genetic quality tend to gain more weight than those who don’t. As for athletic performance, inherited traits’ effects were reported as being low during the earliest stages of learning, but those traits become increasingly

influential later in practice (Davids & Baker, 2007).

Sports Psychology

Sports psychology begins and ends with the athlete, and outsiders can only hope to influence it. Psychological skills are important to athletic performance because they allow the athlete to deal with the stress of training and competition. For example, Gould, Guinan, Greenleaf, and Chung (2002) reported athletes indicating that a wide variety of skills, such as developing a competition plan, motivation/commitment, coping skills, self-confidence, and arousal control, helped them to achieve Olympic caliber performances. Gould et al. also reported that in a previous study elite track and field athletes would incorporate psychology skills such as maintaining concentration, positive social support, and persistence and confidence (Gould et al., 2002). The literature shows that skills used by athletes vary greatly. As such, some of the skills most commonly cited in the literature are the purview of this next section of the literature review.

Expectancy is a concept that refers to another concept: self-fulfilling prophecy (Wilson & Stephens, 2005). Wilson and Stephens (2005) show that the coach's expectancy for his or her athlete did not make a difference in how that athlete performed. In the research, athletes with high expectancy had a greater internal locus of causality. High expectancy athletes who have poor performances saw those performances as temporary. Low expectancy athletes believe that their performances were due to outside factors and may not be within their control. "Ideally, athletes should believe that the cause of their performance comes from within themselves..." (Wilson & Stephens, 2005, p. 401).

Taylor (1987) looked at the issue of self-confidence and anxiety in relationship to athletic performance. As a point of reference, self-confidence and self-efficacy are considered

synonymous for his research. Taylor's research describes self-efficacy as the strength of the expectations individual's possess about their ability to perform successfully. Self-efficacy determines whether or not a person will participate in an activity and how long he or she will persist. On the other hand, Taylor reports that a certain amount of psychological arousal is essential for peak athletic performance. But like most things, extreme arousal inhibits motor coordination and efficient use of the cardiovascular system, which is commonly known as stage fright.

Taylor's (1987) results showed self-confidence and anxiety were significant predictors of performance. He showed that sports with gross motor and aerobic basic activities saw that higher levels of self-confidence and anxiety produced better results. Sports with fine motor movement and anaerobic characteristics showed that athletes need moderate levels of self-confidence and anxiety to perform at optimal levels. The research also showed differences between male and female athletes. Males tended to perform better with moderate levels of self-confidence and anxiety, but females did with better with higher levels of both.

Finally, "coping with stress of sport competition is recognized as a pivotal self-regulatory factor to promote optimal levels of sport achievement" (Nicolas, Gaudreau, & Franche, 2011, p. 460). Athletes approach coping in one of two ways. First is task-oriented coping, which directly manages the problems encountered in competition and the associated emotional reaction (Nicolas et al., 2011). Specific task-oriented coping activities are effort expenditure, thought control, relaxation, logical analysis, mental imagery, and support seeking. These skills are positively correlated with both objective and subjective indicators of achievement. In addition, a coach who is deemed to be supportive can assist in the development of these athletic and mental skills.

Nicolas et al. (2011) define a supportive coaching style as exhibiting emotional/relational and structural/instrumental components of effective coaching. This style stands in contrast to the other strategy of disengagement-oriented coping which enables the person to withdraw from the process. This type of behavior exhibits itself as behavioral disengagement and venting of unpleasant feelings. In disengagement-oriented coping, the coaching can be seen as an added source of stress. Nicolas et al. suggest that coaching support can impact the coping skills of an athlete, which, in turn, impacts athletic performance.

Conclusion

The literature shows that coaching athletes is a complex undertaking that takes a skilled person to get the most out of the athlete's potential. Skills of advanced athletes come from a mixture of internal and external factors. The coach controls the coaching process that shapes the long-term development of athletes. Coaches must work with the genetic and psychological characteristics of the athlete in order to develop the athlete's potential. Introduction and refinement of these factors must take place when athletes are young in order to set up later elite performance. College coaches must find athletes who have followed the correct process of development so that those athletes are prepared for the deliberate practice needed to train at the next level.

CHAPTER III

METHODS

This study examines the impact of coaching effectiveness on athletes' performances.

Design

This action research project utilized a causal-comparative methodology. The study included two comparison groups of high school track and field coaches. The groupings were determined by the coaching effectiveness rating each coach received on the Coaching Effectiveness Survey (Appendix B). Based on the survey results, coaches were assigned to an 'expert' or 'nonexpert' group based on the definitions described in the operational definitions in Chapter I.

Demographic data was collected on the group of coaches in the following areas: gender, age, coaching responsibilities, and career path. Athletes' performance data were obtained from the coaches' self reporting and confirmed by a web-based database.

Participants

The participants for this research included eight coaches in Baltimore County's 2013–14 Indoor Track and Field season. Each coach listed as assistant or head track and field coach for Baltimore County high school was emailed a link and directions for taking the survey. The respondents for this survey included seven male coaches and one female coach. Participants varied in age from 24 to 59.

Instrument

The instrument used for this study was a survey created by the researcher. The survey was designed to obtain information in four major areas: (1) demographic information of the participants, (2) career paths the coaches took in their development of coaching knowledge, (3) application of coaching knowledge in their training program and (4) athletic performance data

for athletes coached by the participant.

The survey consisted of three sections. The first section was made up of demographic information and coaching career path. The demographic information consisted of five questions that focused on the following areas: gender, age, and coaching responsibilities. The coaching career path section was comprised of five questions focusing on the areas of athletic participation and coaching experience.

The second section consisted of 20 questions related to the coaching pedagogy used in the coaches' training programs. The questions were grouped so that the first fifteen questions focused on the methods taught for training, organization, and competition. The next five questions attempted to gain insight into a coach's personal factors that impact an athletes' development in the areas of passion, communication, flexibility, and learned knowledge.

The third section of the survey focused on collecting athletic performance data on three current or past athletes who the coach deemed to be prospects for collegiate track and field programs. The performance data centered on collecting publicly available information to verify an athlete's top performance for his or her primary event.

For this survey, coaches' responses were measured using the Likert scale and a rating scale. The Likert scale was used to assess agreement to statements about coaching pedagogy. The rating scales measured the frequency of use of pedagogy in practice. A Likert scale was used to determine area of importance of the coach's pedagogy and frequency of its use in his or her training program. Validity and reliability statistics are not available for this instrument because it was created by the author.

The coaches self reported the athlete performance data which was then verified by

Runners' Space.com (2013) and runningmaryland.com (2013). Athletes' performance data were evaluated using national and state performance standards developed for each event by Dyestat Elite 100 (Runners' Space.com, 2013).

Procedure

The survey was given to head and assistant track and field coaches involved in Baltimore County's indoor track and field 2013–2014 season. A presentation was given at the coaches' organization preseason meeting held November 12, 2013. During the presentation, coaches were told about the purpose of this study and how to access the online survey. Major sections of the survey along with how the results were going to be used were reviewed and explained. Coaches were informed that their individual results would be kept confidential. Results were reported out in a group format only. Coaches were given a written set of instructions on how to complete the electronic survey administer through Google forms. The survey for this project can be found in Appendix B, and documents from this presentation can be found in Appendix C.

CHAPTER IV

RESULTS

This study examined the how effective high school track and field coaches are at developing the athletic ability of possible college-bound student athletes. Data were examined using Spearman's Rank Order Correlation for various combinations of variables. All analyses were not significant at the $p < .05$ level.

Spearman's Rank Order Correlation is an appropriate analysis when data are ordinal, interval, or ratio or any combination of these. In this case, data on the coaches' survey was totaled and, for the eight responding coaches, scores were ranked from high (1) to low (8). This data was then compared to the number of students the coaches had who made national elite status, then state status, and, finally, non-qualifier status. There were no significant findings for any of these. See Tables 1, 2, and 3.

Table 1

Correlation of Coach Rank to Number of Students Ranking as National Elite

		Coach Rank	National Elite
Spearman's rho	Correlation Coefficient	1.000	-.540
	Coach Rank		
	Sig. (2-tailed)	.	.167
	N	8	8
	Correlation Coefficient	-.540	1.000
	National Elite		
	Sig. (2-tailed)	.167	.
	N	8	8

Table 2

Correlation of Coach Rank to Number of Students Ranking as State Elite

			Coach Rank	State Elite
Spearman's rho	Correlation Coefficient		1.000	-.315
	Coach Rank	Sig. (2-tailed)	.	.447
	N		8	8
	Correlation Coefficient		-.315	1.000
	State Elite	Sig. (2-tailed)	.447	.
	N		8	8

Table 3

Correlation of Coach Rank to Non-qualifiers

			Coach Rank	Non-qualifiers
Spearman's rho	Correlation Coefficient		1.000	.655
	Coach Rank	Sig. (2-tailed)	.	.078
	N		8	8
	Correlation Coefficient		.655	1.000
	Non-qualifier	Sig. (2-tailed)	.078	.
	N		8	8

Next, a new variable was computed as National Elite Adjusted, which was 100 times the number of students the coach had who reached national elite status. This statistic was computed because National Elite Status is 100 times more difficult to attain than State Elite. Again, no significant findings occurred. See Table 4.

Table 4

Correlation of Coach Rank with National Elite Adjusted

			Coach Rank	National Elite Adjusted
Spearman's rho		Correlation Coefficient	1.000	-.540
	Coach Rank	Sig. (2-tailed)	.	.167
		N	8	8
	National &	Correlation Coefficient	-.540	1.000
	Elite	Sig. (2-tailed)	.167	.
	Adjusted	N	8	8

Finally, an adjusted Total National State Elite was computed by adding the Adjusted National Elite to State Elite and Non-qualifiers. Again, no significant findings occurred.

Table 5

Correlation of Coach Rank to Total National, State, and Non-qualifier Numbers of Students

			Coach Rank	Total National & State Adjusted
Spearman's rho		Correlation Coefficient	1.000	-.540
	Coach	Sig. (2-tailed)	.	.167
	Rank	N	8	8
	Total	Correlation Coefficient	-.540	1.000
	National &	Sig. (2-tailed)	.167	.
	State Adjusted	N	8	8

CHAPTER V

DISCUSSION

This study examined the impact of highly effective coaching on the athletic performance of high school track and field athletes. The performance of these athletes was compared to the performance of athletes who are coached by ineffective coaches. The null hypothesis of no significant difference in achievement between the two groups of high school coaches was retained. The results of the study showed no significance between the experience level of the coach and performance level of the athlete.

Threats to the validity

The outcomes of the research present several different threats to validity. First, the survey didn't have enough participants to adequately use statistical analysis. There was a possibility of fifty participants for this study, but only eight responded. Also, participants in the survey were overwhelmingly male, with a 7 to 1 ratio. Second, the survey assumed that the coach was solely responsible for the development of the athlete's potential. The deliberate practice model developed in the literature review expresses the idea that one needs up to 10,000 hours of deep practice to reach the expert level (Ford et al., 2009). So the athletic development of student-athletes in the study would have had outside influences that weren't the result of the surveyed coach. These influences might come in the form of expert training and knowledge from outside coaches or resources, participation in complimentary sports, and overall athletic environment.

Connections to Previous Studies/Existing Literature.

Anshel and Lidor's (2012) research on talent detection programs noted that an "athlete's coach is almost always the most important external source that influences the development of

physical and mental skills” (p. 246). This is contradictory to the results of this survey, because data didn’t find significance between the expert of level of coaching and the athlete’s development. Anshel and Lidor recognized that coaching expertise is a mediating factor that can’t be controlled when looking at talent selection. Results in this study found that controlling the level of experience of the coach wasn’t possible.

The questions in the survey were developed to focus on key concepts found in the literature and used in this research. First, the coaching model worked to rationalize the variables high level coaches must manage in order to develop athletes (Cote & Salmela, 1995). Second, expert coaches exhibit characteristics of “long- term approach, authentic coaching environment, creating a learning environment and quality versus quantity” (Nash et al., 2011, p. 231). This rooted the results of the survey on a strong base of research.

Implications of Results

Within the literature, there had been two gaps in the research to which this study focused on trying to respond. This search wanted to survey the coaching pedagogy used in training programs instead of the traditional manner of cataloging steps in the development of coaches’ experience. The research procedures and survey used in this project enabled the researcher to collect data on coaches’ methods. The results of the survey showed that the eight coaches’ training effectiveness ratings ranged from 68 to 95 on the survey. The results of the survey classified four coaches as being expert and four as non-expert. The survey was a good first step; however, future research should be conducted to address validity issues with the sample size and question construction for non-experts.

In addition to examining levels of coaching, there were problems involving how to measure the success of coaches. This research used methods that focused on athlete performance

against performance standards which weren't influenced by the traditional methods of wins and losses. The athlete data was provided by the coaches and classified into three categories: national elite, state elite, and non-qualifier based on performance standards created by the website runnerspace.com. The information provided by the coach was confirmed by using databases at runningmaryland.com and runnerspace.com. The athlete data was classified as six national elite athletes, eight state elite athletes, and ten non-qualifiers. This was a reliable method for measuring individual athletic performance under the specific track and field coach.

Theoretical Consequences

The model used in this research and this entire field stems from the coaching model which looks at the relationship between the athlete's personal characteristics and a skilled coach's ability to influence the development of an athlete's athletic potential (Cote & Salmela, 1995). According to the results from this research project, the hypothesis doesn't support the coaching model. This would have major consequences if the sample size had been larger and significance could have been found for the data. For example, data from the survey showed that both Coach 1 and Coach 8 developed national elite athletes, but there was a 21-point difference in their ratings on the coaching survey. The results of survey found that defining expertise by a single factor—pedagogy—is difficult; there may need to be a more comprehensive approach taken to defining the level of coaching knowledge and execution.

Implications for Future Research

The premises of this research were based on the need to study the coach's ability to successfully nurture athletes' development. In the study, the result found non-expert coaches producing state and elite athletes. In future studies, researchers need to control for an athlete's prior athletic ability and any outside support influences. First, this study doesn't account for

athletes who had advanced athletic performance that were not the result of the surveyed coach. In high school, athletes participate in multiple sports, which will have residual effect on their performance. To account for these validity issues, measurement of athlete development needs to move away from overall event performance to focus on growth on pre- and post speed and power performance tests to eliminate this influence.

This project followed a traditional model of a single coach serving as the source of training information. Future research should examine the influences of outside forces on athletes' development, which included three evolving areas. The explosion of instructional videos and books has made expert information available to athletes in ways that weren't accounted for in Cote and Salmela's (1995) original coaching model. Also, the introduction of video analysis technology has allowed less experienced coaches and athletes to experience more detailed feedback. Finally, it is more common for athletes to use private coaches in specialty events to supplement training by the high school coach. Future research in this area should account for new sources of information that don't come directly from the traditional coach.

The survey developed for this project attempted to construct the instrument for the purpose of measuring a coach's ability to "nurture athlete development" (Gilbert et al., 2009, p. 428). The survey was designed to have coaches reflect on past training practices to answer the questions. Future research might benefit from changing the research procedures to focus on analysis of written workout plans or direct observation of practices as a method of measuring the coach's pedagogy.

Conclusions/Summary

The findings of this research support the position that athletic development is a multidimensional process. The hypothesis tried to isolate how the quality of coaching impacts

athletic performance. The data collected from a limited sample size showed there is not a significant correlation between the quality of coaching and an athlete's performance as a single variable. If true, this would indicate that college coaches need to look at other areas to determine future potential of college bound student athletes. These findings force consideration of whether Cote and Salmela's (1995) coaching model used as a framework to determine an athlete's future potential might need updating. Several questions need to be considered: Does an evaluation model account for outside influences (i.e. video analysis technology, access to expert knowledge, and private coaching) that weren't widely available during its original development? Is it possible for athlete's mental and physical characteristics to overcome ineffective training? Can athletes create an environment of deliberate practice without the assistance of expert coaching? College recruiters need to consider these questions and others to determine the affect the corresponding answers may have on their individual talent identification model.

In order to accomplish a multiperspective talent identification, the coach faces the huge task of sorting through a mountain of data. The challenge lies in determining which data is most important and in recognizing the subjective nature most of the data in the talent identification process. The complex nature of the identification process will continue to challenge every coach to make the difficult choice of selecting student athletes who can handle the opportunities and responsibilities of being a college student athlete.

References

- Anshel, M. H., & Lidor, R. (2012) Talent detection programs in sport: The questionable use of psychological measures. *Journal of Sport Behavior*, 35(3), 239-266.
- Balague, G., Cecchini, J., & Brustad, R. (2009). Understanding the relationship between perceived development of the competition plan and sport performance: Mediating effects of self-efficacy and state depression. *Perceptual and Motor Skills*, 109, 304-314 DOI 10.2466/PMS.109.1.304-14
- Butterfield, S., & Brown Jr., B. (1991). Student-athletes' perceptions of high school sports participation. *Physical Educator*, 48, 123-129.
- Cote, J., & Salmela, J. (1995). The coaching model: A grounded assessment of expert gymnastic coaches' knowledge. *Journal of Sport & Exercise Psychology*, 17(1), 1-17.
- Davids, K., & Baker, J. (2007). Genes, environment and sport performance. *Sports Medicine*, 37(11), 961-980.
- Ericsson, K., Krampe, R., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychology Review*, 100, 363-406
- Ford, P., Ward, P., Hodges, N., & Williams, M. (2009). The role of deliberate practice and play in career progression in sport: The early engagement hypothesis. *High Ability Studies*, 20(1), 65-75 DOI: 10.1080/13598130902860721
- Gilbin, J., Oldenziel, K., Weissensteiner, J., & Gagne, F. (2010). A look through the rear view mirror: Developmental experiences and insights of high performance athletes. *Talent development & Excellence*, 2, 149-164

- Gilbert, W., Lichtenwalddt, L., Gilbert, J., Zelezny, L., & Côté, J. (2009). Developmental profiles of successful high school coaches. *International Journal of Sports Science & Coaching*, 4(3), 415-431.
- Gilbert, W., & Trudel, P. (2004). Analysis of coaching science research published from 1970-2001. *Research Quarterly for Exercise and Sport*, 75(4), 388-399 228-238.
- Gould, D., Guinan, D., Greenleaf, C., & Chung Y. (2002). A survey of U.S. Olympic coaches: variables perceived to have influenced athlete performances and coach effectiveness. *The Sport Psychologist*, 16, 229-250.
- Hyllegard, R., Radlo, S., & Early, D. (2001). Attribution of athletic expertise by college coaches. *Perceptual and Motor Skills*, 92, 193-207.
- Johnson, M., Tenebaum, G., & Edmonds, W. (2006). Adaptation to physically and emotionally demanding conditions: The role of deliberate practice. *High Ability Studies*, 17(1), 117-136. DOI: 10.1080/13598130600947184
- Irwin, G., Hanton, S. & Kerwin, D. (2004). Reflective practice and the origins of elite coaching knowledge. *Reflective Practice*, 5(3), 425-442 DOI: 10.1080/1462394042000270718
- Nicolas, M., Gaudreau, P., & Franche, V. (2011). Perception of coaching behaviors, coping, and achievement in a sport competition. *Journal of Sport & Exercise Psychology*, 33, 460-468.
- Nash, C., Sproule, J., & Horton, P. (2011). Excellence in coaching: The art and skill of elite practitioners. *Research Quarterly for Exercise and Sport*, 82(2), 228-238.
- National Federation of State High School Associations, 2012-13 High School Athletics Survey, Indianapolis, 2013.
- Ostrander, E., Hudson, H., & Ostrander, G. (2009). Genetics of athletic performance. *Review of*

Genomics & Human Genetics, 10(1), 407-429. DOI: 10.1146/annurevgenom-082908-150058

Runners' Space.com. (2013, November). DYESTAT Elite 100. *DYESTAT TFX Rankings*.

Running Maryland. (2013, November). Performance Database. *Running Maryland Top 25*

Stewart, C. (1993) Coaching behaviors: The way you were, or the way you wished you were. *Physical Educator*, 50(1), 23-30.

Taylor, J. (1987). Predicting athletic performance with self confidence and somatic and cognitive anxiety as a function of motor and physiological requirements in six sports. *Journal of Personality*, 55(1), 139-153.

Wilson, M., & Stephens, D. (2005). Great expectations: how do athletes of different expectancies attribute their perception of personal athletic performance? *Journal of Sport Behavior*, 28(4), 392-406.

Appendix A

Athletic Performance

Table 1

Female Standards			
Event	National Elite	State Elite	Non- Qualifier
100	<12.0 sec.	12.1 to 12.5 sec.	>12.5 sec.
200	<24.7 sec.	24.8 to 26.0 sec.	>26.0 sec.
300	< 41.14 sec.	41.14 to 43 sec.	>43 sec.
400	<56.2 sec.	56.3 to 60.0 sec.	>60.1 sec.
800	<2:18 min	2:18 to 2:24 min	> 2:24 min.
1600	<5:01.3 min	5:01.3 to 5:12.0 min	>5:12.0 min
3200	<11:00 min	11:00 to 11:25 min	>11:25 min
100 H	<14.5 sec.	14.6 to 15.25 sec.	>15.26 sec.
300 H	<44.6 sec.	44.7 to 48.0 sec.	>48.1 sec.
400 H	<63.0 sec.	63.1 to 65.0 sec.	> 65.1 sec.
Long Jump	>18'-08"	18'-07.75' to 17'-00"	< 16'-11.75"
Triple Jump	>38'-08"	37'-07.75" to 35'-00"	<34'-11.75"
Pole Vault	>110-01"	11-01 to 10-09"	< 10-09"
High Jump	>5-05"	5-05 to 5-01"	<5-01
Shot Put	>40-00	40-00" to 33-00	<33-00
Discus	>175-00"	175-00" to 160-00"	<160-00"

Table 2

Male Standards			
Event	National Elite	State Elite	Non- Qualifier
100	<10.6 sec.	10.7 to 11.0 sec.	>11.1 sec.
200	<21.5 sec.	21.6 to 22.5 sec.	>22.6 sec.
300	<36.0 sec.	36.0 to 38.0 sec.	> 38.0 sec.
400	<48.2 sec.	48.3 to 50.0 sec.	>50.1 sec.
800	< 1:59 min.	1:59 to 2:05 min.	> 2:05 min.
1600	<4:16.5 min	4:16.5 to 4:25 min	>4:25 min.
3200	<9:19.8 min.	9:19.8 to 9:40 min	>9:40 min.
110 H	<14.3 sec.	14.4 to 15.0 sec.	>15.1 sec.
300 H	<38.4 sec.	38.5 to 42.0 sec.	>42.1 sec.
400 H	<54.74 sec.	54.75 to 57.0 sec.	> 57.1 sec.
Long Jump	>23'-03"	23'-02.75" to 22'-00"	< 21'-11.75"
Pole Vault	>14-08"	14-08" to 13-09"	<13-09"
High Jump	>6-06"	6-06" to 6-02"	<6-02
Triple Jump	>47'-00"	36'-11.75" to 43'-00"	<42'-11.75"
Shot Put	>54-04"	54-04" to 47-00"	<47-00
Discus	>135-00"	135-00" to 120-00"	<120-00"

Appendix B
Coaching Effectiveness Survey

Demographic info

Gender ☐ Male ☐ Female

Age _____

Coaching is which portion of your job responsibility

☐ Primary ☐ Secondary

Current primary coaching responsibility

☐ Males ☐ Females ☐ Mixed

Primary Event Area

☐ Long Distance (800-3200) ☐ Sprints and Relays ☐ Hurdles

☐ Jumps ☐ Throws

Coaching Care Path

Athlete participation level in Track and Field

Mark the highest level of participation

Club ☐ High school ☐ College ☐ Professional ☐ None ☐

Years of Experience Coaching ☐ 0-5 ☐ 6 to 15 ☐ 16 to 25 ☐ 26 +

No of season Coached ☐ Indoor Track ☐ Outdoor Track

Do you coach only track and Field / Cross Country Yes ☐ No ☐

If yes, what age did you specialize in a single sport _____

Highest level of Coaching

☐ Assistant Coach HS ☐ Head Coach HS ☐ Assistant Coach Collegiate ☐ Head Coach

Collegiate

Coaching Knowledge

1. In a ideal situation, , are you more likely to focus training goals on a single year instead of a multi-year training cycle?

1. Almost Always True 2. Usually True 3. Occasionally True 4. Usually Not True 5. Almost Never True

2. As an event coach, do you test your athletes to determine their individual training needs?

1. No, and not considered 2. No, but considered 3. Yes, once a season 4. Yes, multiple times a year

3. I evaluate my athletes and program against the best competitors and programs in the state.

1. Strongly disagree 2. Disagree 3. Neither agree or disagree 4. Agree 5. Strongly agree

4. Reflecting on your coaching practice, how often do you evaluate the effectiveness of your training program?

- 1 Very Frequent (Daily) 2. Frequent (Weekly) 3. Occasionally (Monthly) 4. Rarely (Seasonally) 5. Never

5. New skills need to be introduced in a steady and slow progression.

1. Strongly Agree 2. Agree 3. Undecided 4. Disagree 5. Strongly Disagree

6. How important are recovery activities to developing your training program? (e.g. circuit training, pool workouts, and days off)

1. Very Important 2. Important 3. Moderately Important 4. Of Little Importance 5. Unimportant

7. Once a skill is learned to competition level, how often is a skill revisited in practice? (e.g. starting from blocks)

1 Very Frequently (Dailey) 2. Frequently (Weekly) 3. Occasionally (Monthly) 4. Rarely (Seasonally) 5. Never

8. How often do you create sub training group to isolate an underlying skill that needs to be improved?

1 Very Frequently 2. Frequently 3. Occasionally 4. Rarely 5. Never

9. It's not necessary to practice a skill once an athlete is successful at executing it in a meet.

1. Strongly Agree 2. Agree 3. Undecided 4. Disagree 5. Strongly Disagree

10. During practice, how often is feedback provided to your athlete?

1 Very Frequently 2. Frequently 3. Occasionally 4. Rarely 5. Never

11. After providing feedback, how likely are you to prescribe follow up drills to practice corrections?

1. Almost Always True 2. Usually True 3. Occasionally True 4. Usually Not True 5. Almost Never True

12. How often are your practices designed to create a competitive environment?

1 Very Frequently 2. Frequently 3. Occasionally 4. Rarely 5. Never

13. Simulated competition allows athletes to practice at higher intensities than running against the clock.

1. Strongly Agree 2. Agree 3. Undecided 4. Disagree 5. Strongly Disagree

14. Simulated competition is the best way to assess how well an athlete has incorporate new skills in their event.

1. Strongly Agree 2. Agree 3. Undecided 4. Disagree 5. Strongly Disagree

15. How often do you have athletes practice making competition decision in practice? (e.g cooling down between events, shorten warm-up period or a false start)

1 Very Frequently 2. Frequently 3. Occasionally 4. Rarely 5. Never

Personal Factors

16. What is primary way you gained your coach methods?

1. Athletic Participation 2. Trial and Error 3. Coaching Education 4. Mentorship

17. I'm passionate about being a track and field coach

1. Strongly Agree 2. Agree 3. Undecided 4. Disagree 5. Strongly Disagree

18. Reflecting on your coaching career, how often do you reinvest time and resources into improving in your personal growth as a coaching?

1 Very Frequently (Monthly) 2. Frequently (Seasonally) 3. occasionally (Yearly) 4.

Rarely (Multi-Year) 5. Never

19. How often do you and the athletes discuss their understanding and execution of their training?

1 Very Frequently 2. Frequently 3. Occasionally 4. Rarely 5. Never

20. How likely are you to explain why athletes are doing a drill or executing a training run?

1. Almost Always True 2. Usually True 3. Occasionally True 4. Usually Not True 5.

Almost Never True

21. During practice, how often is feedback provided on your athlete's performances to your athletes?

1 Very Frequently (after each meet) 2. Frequently (Big Meets) 3. Occasionally (No

Schedule) 4. Rarely (Seasonally) 5. Never

22. Rate the frequency that your athletes' participation in making training decision.

1. Never (No, and not considered by the coach) 2. Rarely (No, but considered by the coach) 3. Occasionally (Yes, once a season) 4. Frequently (Yes, multiple times a season) 5 Very Frequent (yes, and daily)

Athlete Performance Data

Athlete Name	Primary Event	Performance

Appendix C

Coaching Effectiveness Survey Letter

Coaches,

My name is Eric McCray and I spoke with you at Baltimore County's indoor track and field meeting. Thank you for allowing me to speak to you because your involvement in my research project is important to legitimizing the hard work and time you put into your coaching profession. Most people's experiences with participating in sports come from their athletic success and relationships they have with coaches and teammates. This survey is will provide valuable information to establish impact you as the coach have on developing the is experience for student-athletes.

In order to make this quick as possible, I have provided a link below that will bring up the survey into a separate window. I would appreciate your completion of the questionnaire by December 1. This will allow for the successful completion of my master's program.

<https://docs.google.com/forms/d/1176zQkWid9a-9d2lII3zlg82yrPH03nzIXUacm9Fqw/viewform>

I realize that your schedule is busy and your time is valuable. However, I hope that the 15 minutes it will take you complete the questionnaire will show the impact high school coaches have on developing student-athlete's. Thank you in advance for your participation. If you have questions about the study, you can contact me at 410-294-7487 or emccray@goucher.edu or emccray@bcps.org.

Yours Truly

Coaching Effectiveness Survey Directions

- Following the link to open the Coaching Effectiveness Survey on Google forms.
 - <https://docs.google.com/forms/d/1l76zQkWid9a-9d2-lll3zlg82yrPH03nzIXUacm9Fqw/viewform>
- At the bottom of page 1-3, select Continue to move onto the next page.

Current Event Area(s) Coaching Responsibilities *
Check all that apply

- ☐ Long Distance (3200-800m)
- ☐ Sprints and Relays
- ☐ Hurdles
- ☐ Jumps
- ☐ Throws

25% completed

- Page 4- This section ask you to provide athlete performance data. Please type the athlete's name, event, and best performance. If you don't have don't remember their best performance, please list the HS name and I will look up their performance on Runningmaryland.com

Never submit passwords through Google Forms.

100%: You made it.

- At the bottom of page 4, select Submit to finish the survey