

The Impact of Chaos, Complexity, and Luck on Coaching Success

By

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Abstract

Many coaches trust that competitive success can be assured through a combination of hard work and the employment of Newtonian-based models of instruction and training. But in the real world working harder does not guarantee success. Further, the use of the best training and coaching techniques cannot assure victory. Chaos theory and complexity science dictate that as complex social systems, sports teams are prone to the impact of chaotic factors making success in specific competitive events beyond the direct control of the coach. Moral luck, simple luck, and various environmental factors also impact a coach's probability of achieving competitive success. Effective coaches do utilize scientifically based theories and models of instruction to enhance the probability of achieving competitive success but they cannot control competitive outcomes. Administrators who understand the impact of chaos and luck may avoid unfairly terminating the employment of coaches who experience losses due to no fault of their own. Coaches who understand and appreciate the impact of chaos, complexity and luck upon the probability of achieving competitive success can experience higher levels of satisfaction gained from coaching activity, reduce the likelihood of experiencing burnout, and increase the length of their coaching careers.

Keywords: *Chaos, Complexity, Coaching, Winning, Luck*

1. Introduction

Newtonian Science has created within Western society the image of a world that is reliable (Smith & Higgins, 2003). It is based upon physics and mathematics and suggests that the world is intelligible, predictable, and controllable (Tetenbaum, 1998). The Newtonian cause and effect view of looking at the world is predicated upon the belief that systems can be manipulated, quantified, and controlled with a high degree of predictability (Iannone, 1995). It is one in which the impact of randomness or ambiguity are not permitted (Ferre, 1976). Understandably, many coaches believe they can control their competitive fate through the employment of Newtonian-based scientific models of instruction, physiological training, psychological training, hard work, and dedication.

The stronger team, it is assumed, cannot be beaten. As a team becomes stronger than its opponent, the probability of achieving success begins to approach 100% (Sire & Redner, 2009). Often, however, coaches find that expected outcomes are not the observed reality (Morrison, 1991). Upsets happen. Statistically, there is always at least a small probability of any team winning a contest. Further, in the complex world of athletics, environmental factors and real life circumstances confronting coaches and members of their teams impede progress on the road to the Final Four, a conference championship, or a win against an important conference rival.

The purpose of the current paper is to make it clear that coaches cannot control the outcome of any of the *individual contests* in which they will take part over their careers. Coaches who are successful over the long term are good teachers and good leaders; these coaches promote good team discipline, understand motivation, effectively train their athletes physically and psychologically, and adeptly choose appropriate strategies during game play (Carter & Bloom, 2009; Cote & Gilbert, 2009; Gallimore & Tharp, 2004; Knudson, 2007; Laios, Theodorakis, & Gargalianos, 2003; Martens, 2004; Starosta, 2006; Vella, Oades,

& Crowe, 2010). Indeed, coaches can do much to enhance their probability of achieving success. However, even good coaches cannot control the influence of randomness and its impact upon competitive outcomes. In the current paper, chaos, complexity, and luck will be shown to have a significant impact upon a coach's chances of achieving competitive success in individual contests.

Chaos Theory

Western scientists have used rationalism and linear thought processes as key components in the scientific process as they struggled to understand and explain phenomena within the physical world (Bussolari & Goodell, 2009). Living organisms, including human beings, have become viewed as matter that is subject to rules of cause and effect. As such, it is commonly believed that through the application of theories, rules, and processes, even human behavior can be understood, predicted, and controlled. But disorder and chaos are often found within the natural world.

Henri Poincare illustrated through his work on celestial mechanics that a simple system could still be so complex that its future behavior could not be accurately predicted. His work later led to the development of chaos theory (Butz, 1997). Edward Lorenz (1963) advanced chaos theory as a consequence of his study of weather. He found that complex mathematical models given deviations in starting data sets as small as .000001 yielded wildly diverse outcomes in predicted weather. Because observed weather patterns are the end result of the interaction of complex factors, Lorenz declared that accurate long-term prediction is impossible.

Chaos theory does not have a single universally accepted definition though it has application in the biological, physical, and social sciences (Yao, Yu, Essex & Davison, 2006). Simply stated, chaos is disorder in the absence of expected order. Chaos results in disequilibrium within biological, physical, and social systems.

Variations in human physiological systems are low-dimensional consequences of chaos (Kernick, 2005). For example, neural networks are extremely complex. When small deviations from homeostasis occur, severe migraine headaches can result. Similarly the human heart rate is impacted by chaotic factors (Wessel, Ried & Kurths, 2009). Chaos impacts the physical world. For example, the inability of seismologists to predict the occurrence of earthquakes accurately is due to the complex and chaotic nature of the system comprising the earth's crust (Keilis-Borok, 1997). Of greater significance and applicability to an individual's chances at achieving competitive success is the impact of chaos upon the functioning of social systems.

Chaos Theory, Social Sciences, and Coaching

Social scientists, educators, and others not directly involved in research and study within the physical and biological sciences have found application of chaos theory in their fields of study (Farazmand, 2003). Horton (2006) explained why those interested in human interaction, relationships, and performance should be interested in chaos theory:

Just as nuclear physicists, including Einstein, have been forced to accept inherent vagaries in defining subatomic particles, biologists are coming to learn that living systems contain inherent levels of unpredictability and chaos. And the unpredictability seems to become greater as we look at systems involving human behavior and choice. (p. 200)

Chaotic events have a very real and significant impact upon a coach's chances to achieve competitive success, whether they come as a consequence of a careless comment, an injury, or the missed call of a referee.

Complexity Science and the Social System of the Team

Scientific models including those employed by sport psychologists, sport sociologists, and sport pedagogues provide a good framework from which to view the world, and these models can assist the coach in achieving competitive success. However, they are not always sound for predicting behavior or outcomes (Iannone, 1995; Jones & Wallace, 2005). In the world lived by real people, probability is a *qualitative* subject. Too often, social scientists confuse models of the real world with reality (Matthews, White & Long, 1999). There is no real certainty (Taleb, 2005). Life is too complex and human behavior is affected by too great a number of factors.

Complexity science is associated with chaos theory (Larsen-Freeman, 1997). As systems become more complex they are more prone to the impact of and generation of chaotic events. Further, with the more complex a system becomes, the less able one is to predict behavior within it.

Drawing from chaos and complexity science as well as the work of physicists and mathematicians including Abraham (1994), Briggs (1992), Gleick (1987), Kauffman (1991), Waldrop (1992) and others, Larsen-Freeman (1997) posited that complex social systems are nonlinear, complex, chaotic, dynamic, unpredictable, open, sensitive to internal conditions, self organizing, feedback sensitive, and adaptive. Below, each characteristic is discussed in an effort to demonstrate that athletic teams are complex social systems. Each of the characteristics serves to render the performance of a team variable and impossible to control with a high degree of certainty.

Levels of Effort and the Success of Teams are Nonlinear Relationships

Coaches often assume that there is a linear relationship between input (effort) and output (success). It is the essence of the Protestant work ethic (Coakley, 2009; Eitzen and Sage, 1989). Heuristic statements such as, “The harder you work, the more you will win” and, “The harder I work, the luckier I get” are common in sport. Consequently, coaches expect their hard work to translate into victory and sincerely believe that the harder athletes work, the more they will win.

Linear assumptions upon which models of instruction and behavioral control are based are often proven to be false when applied in the real world (Bowes & Jones, 2006). Larsen-Freeman (1997) noted that in complex social systems levels of input do not always result in equal levels of output. Increased levels of effort do not always lead to increased levels of performance or competitive success much to the disappointment and disillusionment of many a coach.

The Social System of the Team is Complex

Complex systems are composed of many components (Davies, 1988). The sports team is a good example of a complex social system as it consists of numerous athletes and coaches. Each coach and each athlete can be affected by one another. Adding to the complexity of the environment are factors such as diverse learning styles, various personality traits, stress, and responses to specific competitive situations. Ultimately, the behavior of the group and a team’s performance are the result of the complex interactions taking place within and between members of the group. Competitive performance is variable as a result.

Chaotic Factors Impact Athletic teams

Change occurs within complex systems as a consequence of chaotic events generated from within or outside of them. The athletic team is often impacted by chaos. Random and unexpected incidents should come to be expected. Examples of chaotic incidents include injuries, bus breakdowns, pregnancies, players quitting a team, and the ball literally taking a bad bounce. A coach never knows when chaotic incidents will take place, nor is it possible to prevent them. Consequently, chaotic events impact the performance of the team.

Athletic Environments are Dynamic

Complex systems are dynamic and ever changing (Larsen-Freeman, 1997). The team and its members do not have the same level of motivation in each game or for each practice. Physically, players are not able to give the same effort from day to day. The challenges offered by opponents differ from contest to contest. Though there may be many similarities, no two practices or competitions are the same. The dynamic nature of the team guarantees variability in performance, and this impacts a coach's chances at achieving competitive success from season to season, day to day, and minute to minute.

Events in Athletics are Unpredictable

Because the complex social system of the team and the competitive environment is chaotic, a coach's chance of achieving competitive success is *necessarily* unpredictable. One of the reasons that the NCAA men's basketball tournament holds so much appeal to spectators is the possibility that a little, under-budgeted school can make its way toward the Final Four.

In the 2012 NCAA basketball tournament, relatively unknown Lehigh (15th seed) and Norfolk State (15th seed) defeated second-seeded Duke and Missouri in the first round of regional competition. Relative nobodies with small budgets bested well-known teams with vast resources. Both upsets happened on the same day. Who could have predicted such an occurrence?

No one can predict when team cohesion issues will present themselves rendering a player or team ineffective. No one can predict when an illness or injury will be suffered. No one can predict when an athlete will play poorly or exceptionally well with a high degree of certainty. Upsets in sports are not uncommon. Uncertainty and unpredictability characterize the performance of athletes and sports teams.

Athletic Teams as Open Systems are Subject to Disruption

Open systems include those, "open to new matter and energy infusions" (Larsen-Freeman, 1997, p. 144). For example, the human body, as an open complex biological system, is subject to infections caused by viruses and bacteria (Topolski, 2009). Social groups are open systems for they are also subject to disequilibrium and change due to the influence of external factors.

Athletic teams are impacted by factors external to its member components. Examples of external factors and incidents impacting a team might include the death of a player's family member or the divorce of a player's parents. During competition, the crowd may impact a team's performance. Officials' calls can change mood states, decision-making ability, and performance. Because the complex system that is the sports team is an open system, external factors can create a state of disruption or disequilibrium within it, thus influencing competitive outcomes.

Athletic Teams are Sensitive to Internal Conditions

The impact of small changes in internal conditions is illustrative of the "butterfly effect." Hypothetically, the flapping of a butterfly's wings can have an impact upon the weather observed in an area far from where the motion of the butterfly's wings moves the air around them (Gleick, 1987).

Even slight differences in internal conditions can have a profound impact upon the performance of a team. For example, on any two dates of competition the physical condition or psychological state of specific individuals on a team can vary. Resultant sub-par performances can negatively impact overall team performance. Likewise, in advance of a competitive event an athlete's careless comment may cause disunity between team members resulting in poor team performance. Though differences in internal conditions may be slight, they can ultimately be responsible for a team winning or losing a specific contest especially when the competition is closely contested.

Athletic Teams are Self-Organizing

Teams are self-organizing in that, given a group of individuals, interactions result in some form of stability over time. In other words, expectations of behavior develop for members of the group, including the coach. Once established, members of the group generally adhere to expected behaviors. Expectations would include those comprising each individual's personality, practice behaviors, leader and follower behaviors, and typical performance during competitions.

Chaos impacts the behavior of individuals within the group, disrupting the stability of the system. Given time, the group again becomes internally stable through self-organization. Order gives way to chaos and chaos leads to order (Farazmand, 2003).

Athletic Teams are Feedback Sensitive

Complex social groups such as athletic teams are feedback sensitive. Disruption and temporary instability periodically confronts teams as a consequence of chaos. When the group adapts and changes as a consequence, positive feedback sensitivity is exhibited (Larsen-Freeman, 1997). It is also possible that disequilibrium may strengthen the group's resistance to change. This is reflective of negative feedback sensitivity.

Athletic Teams are Adaptive

Adaptation is characteristic of all complex systems. Farazmand (2003) explained why adaptation is vital for the continuance and evolution of systems, "Without turbulence and change stagnation and decay prevail, causing a halt in system survival and continuity" (p. 344).

The coach and team who have been defeated by a conference rival may illustrate the process of adaptation. The effective coach will determine how to alter a game plan to increase the probability of success in the next meeting. The members of the team, having suffered defeat, may be highly motivated to avenge the loss making it more likely that they will be receptive to change and approach the next contest differently. Adaptations are called for, are observed, and consequently the team experiences an enhanced probability for success.

Up to this point in this paper, it has been demonstrated that the athletic team is a complex social system. As complex social systems, teams are impacted by chaotic events that contribute to unexpected changes in training effectiveness and competitive performance. Complexity and the impact of chaotic factors impact the probability of a coach achieving success or failure in specific competitive events.

Player Control as an Effort to Limit the Frequency of Chaos

In an effort to minimize the potential for chaos and in effort to maximize the potential for success, coaches often initiate controls on the behavior of athletes (Steinberg, Singer & Murphey, 1999). For example, coaches may do any or all of the following:¹

- Require study halls and conduct periodic grade checks to prevent academic eligibility issues;
- Require curfews and conduct bed checks in an attempt to prevent fatigue;
- Sequester players in hotels the night before a contest to enhance focus on an upcoming competition;
- Control diet in an effort to prevent weight gain/loss and subsequent decreases in performance;
- Prohibit the use of alcohol and drugs that may detract from performance or render an athlete ineligible;
- Require fitness training outside of scheduled practice time to maximize performance and to prevent injury;
- Recruit "good kids" of "character" who will fit into the coach's system and not serve as a source of disruption, division, or performance catastrophe.

In spite of these and other actions, coaches still lose the services of players as a consequence of injury, failed drug tests, arrests due to illegal behavior, transfers to be with boyfriends or girlfriends, poor grades and a host of other reasons. Regardless of making the best effort to know what a recruit will be like upon arriving to campus (phone calls, visits and observation in competitive situations), a coach can never know what athletes will be like until they have joined a team. Further, individuals change physically, socially, and psychologically over time (Haywood & Getchell, 2009). The athlete recruited today may not be the same a year from now. Coaches may anticipate positive development of recruits only to experience disappointment when negative development or regression in performance is noted over time.

Efforts taken by coaches toward controlling behavior may limit the frequency and impact of chaos. However, because coaches cannot stop individuals from engaging in behavior that results in chaos for the team, negative competitive outcomes will result from time to time. It seems unlucky and unjust when a coach has done all that could be done to control behavior only to find that chaos has negatively impacted competitive outcomes.

Luck and Coaching Success

Most coaches and athletes would state in honesty that factors beyond their direct control often have a significant impact upon their success or failure (Eitzen & Sage, 1989). Luck is often the determining factor in many of the successes and failures coaches experience in a season and throughout their careers.²

A lack of control in situations of uncertainty leads to the development of magico-religious behaviors (Malinowski, 1948). Through the use of rituals, fetishes and other magico-religious behaviors, coaches, athletes and fans attempt to control the impact of luck. Sport is rife with such superstitious behavior (McCallum, 1988). The ubiquitous nature of superstitious behavior in sport is illustrative of the commonly held understanding of luck's impact upon competitive success.

In this paper luck shall be defined as something random over which an individual has no direct control. Two types of luck are discussed below. Moral luck concerns factors that impact a coach's development. Moral luck can influence behavior and decisions throughout an individual's personal and professional life. Simple luck is associated with a coach's day-to-day and season-to-season success.

Moral Luck and the Winning Coach

Moral luck is important in any individual's life successes (Nagel, 1979).³ Moral luck refers to the aspects of an individual's life over which they have no real control. Individuals do not select their place of birth, genetic makeup, IQ, schools attended as a youth, or their parents' parenting styles, yet each factor influences personality, abilities, and skills. Nagel suggested that moral luck affects not only the actions of individuals but also every intention formed and every exertion of one's will (Nelkin, 2008). Moral luck impacts both personal and professional decisions and ultimately what one may accomplish in life (Dixon, 1999). Indeed it remains unclear as to how much of an individual's success in life is attributable to their efforts and how much is due to the luck of the draw (Simon, 2007).

Several factors associated with successful coaches attributable to moral luck are listed below. Some coaches, due to no fault of their own, are assisted along the path to careers in coaching and the achievement of competitive success by moral luck:

- The coach was born male or female limiting or expanding sport opportunities as prescribed by socially appropriate gender models.
- The coach was born in or moved to a place in the world where sport was played.
- The coach's parents encouraged and financially supported participation in sport.
- The playing experience, interests, and perceived abilities of the coach made coaching appear to be a reasonable career choice.

- The coach had the cognitive skills to earn a college degree and the ability to either reproduce what was learned through study and/or had the creativity to utilize new approaches to training and competition.
- The coaching environment provided the opportunity for the coach to effectively utilize abilities in the pursuit of victory.
- The coach benefitted by having effective coaches while a player and effective mentors as a young professional.
- Someone gambled that the individual would be a good assistant coach.
- Someone gambled that the individual would be a successful head coach.

Effort, commitment, and dedication to an activity are not attributable to moral luck (Bailey, 2007). Coaches must consistently act decisively and effectively if success is to be achieved in the long run. Coaches can develop and improve their knowledge and coaching behaviors through study and experimentation. Consequently one cannot attribute a given level of coaching success solely to moral luck. However, successful coaches should have a proper modesty concerning their achievements for none of them are due entirely to their own efforts (Carr, 1999). Uncontrollable circumstances have a role in an individual's coaching successes and failures.

Simple Luck

In discussing the results of their statistical analysis of baseball standings and streaks from 1901 through 2005, Sire and Redner (2009) noted that the strongest teams did not necessarily have the best records, "By luck, a strong team can have a poor record or vice versa" (p. 475). Similarly, economists Kuper and Szymanski (2012) noted that the results of a soccer match or a single season's worth of matches is not an effective measure of a coach's ability because, "in such a short period, luck plays a big role" (p. 104). The strongest team may win most of the time, but due to the influence of simple luck, it does not *always* win. Because of this fact, the belief that "any team can win on any given day" is commonly held.

Simple luck consists of events over which the coach has no direct control that impact the outcome of a contest or success over the course of a season. Each lucky or unlucky event can serve to benefit or to harm a coach's chances to achieve competitive success. Several examples of simple luck are identified and discussed below.

Injuries

Injuries are a form of simple luck that negatively impacts a team's performance. Injuries to key personnel can have a significant and negative impact upon a coach's probability of winning. Coaches can condition athletes optimally, structure practices with safety in mind, and remind athletes that safety should be kept in mind during competition. Yet, injuries can still detrimentally impact a team's record. When a star player is lost to a team lacking in depth, injuries can have a catastrophic impact upon a team's success over an entire season.

The Conference is Stacked with Superior Opponents

On occasion, a conference may be strong from top to bottom. In most years there may be only a few teams that are traditionally strong and perennially favored to secure the top spots in the final standings. There are also seasons in which for no particular reason the conference schedule is uncharacteristically full of very good teams. In such a year, it is more difficult to win a championship or achieve a winning conference record. Simple luck impacts the strength of conference schedules from year to year. The uncharacteristic and unlikely addition of one or two great players, for example, can help a mediocre team quickly become a very strong one team in sports such as basketball or volleyball.

The Coach has Great Players

While speaking at a coaching clinic, Jud Heathcote, Head Men's Basketball Coach at Michigan State, was asked what he felt to be the key to winning a national collegiate basketball championship the

previous year.⁴ He responded, “Have Magic Johnson on your team.” Laughter echoed throughout the facility.

But Coach Heathcote was serious. Players such as NBA Hall of Fame member Magic Johnson come along infrequently, and Coach Heathcote understood that he was fortunate to have Johnson on his team. Understandably, collegiate coaches feel a bit lucky when they have a great athlete on their roster. Similarly, high school coaches rejoice when a great athlete moves into their school district. A great player does not ensure success; however, conventional wisdom dictates that, “You can’t win the Kentucky Derby riding a mule no matter how hard you train it.”⁵

When a coach has an especially talented player on the roster or has an exceptionally good recruiting class, it may result in a higher than normal number of victories. How do schools suddenly vault to prominence when they typically do not have good recruiting classes and do not have a history of having star players? Lady Fortuna smiles on them.

Kyle O’Quinn, the 6’10 player key in the aforementioned Norfolk State victory over Missouri, accepted the only scholarship offer he received after completing his junior college eligibility (Kussoy, 2012). He managed to score 26 points and grab 14 rebounds in the upset win. How could a player such as O’Quinn have had only one scholarship offer in April of his sophomore year of junior college? How could the Norfolk State coach have been so fortunate to be the only one to offer him a scholarship?⁶

Caro (2012) demonstrated the importance of recruiting on success in college football. Sixty-three to eighty percent of a college football team’s success was attributable to success in recruiting. Given the importance of recruiting, most successful college coaches work hard at recruiting each year and do the best they can to develop the players they have on the roster. In spite of consistent recruiting actions and effort from year to year, some recruiting periods prove to be more successful than others. This may be attributable to simple luck.

Sometimes the Ball takes a Bad Bounce

The outcome of a contest can be determined by a bounce of the ball, a slip, a gust of wind, or a host of other factors. The bad bounce of a ball is not premeditated or prearranged. When a ball hits the net cord and rolls over for a game winning point, it is not something practiced or planned. The winds of fate will cause an occasional field goal attempt to fade left of the upright thanks to a sudden gust. Points in a volleyball match can literally slip through the hands of a setter if the ball has excess perspiration on it.

Over the course of a coaching career, individuals should plan on losing contests as a consequence of the ball taking a bad bounce. If the sport of choice does not allow for a ball taking a bad bounce, some other random act within the physical realm of sport will cause a number of losses. The coach cannot control such incidents.

A Superior Team or Player Has an Off Day

There are times when a superior team will have a bad performance on a day or over a period of days. In such a case, an inferior team may win. If the losing team would have been victorious in the majority of any future contests, one could not argue that the lucky winner of the one event was really the better team (Dixon, 1999).

It is fortunate for the victor when an opponent’s star player who averages twenty points a game goes one for twenty-two and scores only two points. It is lucky for the winning team when it plays the best game of the year on the same date that its overwhelmingly favored opponent has its worst. Teams are weakened when coaches bench their best players for disciplinary reasons. There are periods of time in a long season in which a good team may experience issues related to team cohesion causing it to play poorly. Luck

enters into competitive outcomes and results in one team playing at an inferior level on a given day. In such cases, the inferior team may win.

A Team May Outperform an Opponent and Still Lose

There are competitive events in which a team may outperform its opponent in nearly every statistical category and still lose. Dixon (1999) referred to such events as “failed athletic contests.” Failed athletic contests are found most often in sports that typically have low levels of scoring such as soccer, hockey, or baseball. In the failed athletic contest, the losing coach would seem to have done everything right; yet, bad luck negatively impacts the competitive outcome of the contest.

Officiating Errors

At times, officiating errors are key in a loss. For example, during a 1986 FIFA World Cup match, Diego Maradona intentionally handled the ball as he proceeded to score a goal. The officials missed the call. Argentina was the beneficiary of luck. England was unlucky. Coaches often state that one play or official’s action does not *cause* a contest to be won or a lost. The contention may be true. However, during a contest one lucky or unlucky play or official’s action can *result* in a win or a loss.

Athletic events involve human beings who are fallible and prone to imperfection. Officials miss calls, make mistakes, and fail to detect illegal techniques employed by competitors based upon their position and as a consequence of their perception of the events surrounding a decision or call. The side of the call you are on simply makes you lucky or unlucky.

A poor coach cannot expect to find solace by claiming bad luck is the cause of losses game after game and season after season. Luck does, in fact, impact the result of specific contests and in some seasons bad luck may result in an inordinate number of losses given a coach’s skill and effort (Kuper & Szymanski, 2012). However, luck tends to even out in the long run. Good and bad luck are bestowed upon both the competent and incompetent coach alike.

Environmental Factors and Just Desert

In egalitarian societies one’s achievement and social ranking are assumed to be a function of the individual’s ability to compete on equal terms with others (Arneson, 2008). The belief is illustrative of the concept of “just desert.” Coaches, athletes, and fans view success in sport as just desert and believe victories result from the confluence of skill and effort (Dixon, 1999). Unfortunately, many good coaches toil in environments that serve to rob them of their just desert.

How do good coaches end up in bad environments? Simple luck may be to blame. Perhaps there were no other coaching opportunities available, or maybe the pool of applicants was unusually good at the time the coach was seeking a position. Moral luck comes into play when an equally qualified coach loses out on a good position because another applicant has a more influential network or when the coach is not hired because of age, appearance, ethnicity, race, gender, or religion.

Once hired, environmental variables may enhance or impede a coach’s chances of achieving competitive success and include, for example, the value the community places upon a sport, the physical characteristics of the citizens in the area, scholarship support, facilities, recruiting budgets, equipment budgets, the location of the institution, as well as administrative support and policies. When coaches end up or remain in an impoverished environment it harms their chances at success and possibly the opportunity to obtain a better positions at a later time.

Certainly environmental variables are not solely responsible for the creation of a winning or losing coach. Good coaches can do well in poor environments and poor coaches can fail to take advantage of the benefits provided by their environment. For most coaches, however, the environment that they work in

will impact long-term probabilities of success. The coaching environment may preclude some very good and very poor coaches from receiving their just deserts.

Practical Implications for Coaches and Administrators

Chaos, complexity, and luck have been shown to have a significant impact upon coaching success. Athletic teams are complex and consequently, they are subject to the impact of chaotic factors that negatively impact competitive outcomes. Moral luck, simple luck, and the environments within which coaches work also contribute to their achieved level of success. All factors serve to make the possibility of a coach controlling the outcome of specific athletic contests impossible. Presented below are recommendations for administrators to consider when performing evaluations of coaching performance as well as suggestions that may help coaches deal effectively with the inability to control competitive outcomes.

Administrators Should Take Chaos, Complexity, and Luck into Account During a Coach's Evaluation

A proper appreciation and understanding of the impact of chaos, complexity, and luck upon competitive outcomes can help administrators place a coach's disappointing losses and poor season records into proper perspective. Coaching performance is often judged upon win-loss records and coaches are held directly responsible for a team's performance. This performance-based evaluation is flawed for coaches cannot control some external factors including player inexperience, injury, and illness (Mallett & Côté, 2006).

Administrators capable of recognizing chaos and poor luck as the cause of periodic competitive failure may be better able to realistically judge a coach's performance after a close loss or unusually poor season record. Further, where environmental factors serve as impediments to a coach's success, the administrator should be able to recognize the shortcomings and along with the coach, work to remedy them.

It seems unreasonable for an administrator to release a coach for a poor win-loss record when environmental variables are so poor that the unlucky coach has little probability of succeeding. If administrators were able to accurately assess the impact of an impoverished environment upon a coach's chances for success, good coaches would not be unjustly relieved of their positions.

Lessen Stress and Burnout by Recognizing You Cannot Control Everything

Coaches experience stress as they go about their duties. Some of the stress is caused internally, primarily because they wish to be successful (Lackey, 1986). In fact, Kelley and Baghurst (2009) found that the pressure coaches placed upon themselves to win was the greatest source of experienced stress. Over time most coaches realize that they have little control over competitive outcomes. The realization adds to the stress coaches may experience (Steinberg, Singer & Murphey, 1999).

When coaches experience stress over a long period of time, they are prone to acquire symptoms of burnout characterized by feelings of emotional exhaustion, and a lack of personal accomplishment. Burnout negatively impacts coaching productivity and longevity, and it is mediated by personal, situational, and environmental factors such as recruiting challenges, budgets, and facilities (Kelley & Baghurst, 2009; Raedeke, Gransyk, & Warren, 2000).

Coaches should understand and accept that losses will come from time to time even when they have ideally prepared the team for competition and made good decisions during competitions. Many of the losses experienced over one's career will be due to the unfortunate impact of bad luck. If the losses do not come as a consequence of poor effort on the part of the coach or the athletes there should exist neither anger nor frustration (Steinberg, Singer & Murphey, 1999).

When environmental variables make success unlikely, the coach should identify environmental shortcomings that limit the probability of competitive success and share them with the administration.

Then the coach should slowly and resolutely take measures to improve the conditions, while remaining positive, optimistic, and as effective as possible in the performance of all coaching duties. Time, the assistance of the administration, and assistance from supporters within the community are needed to produce change in the environment.

Competitive Outcomes Cannot Be Controlled By Outworking Opponents

Coaches who believe the outcome of athletic contests can be controlled through their efforts alone deceive themselves. Chaos and the complexity of the social group that is a team make its performance nonlinear by nature. At some point, the amount of effort may continue to increase, but returns experienced in the form of victory will not. Hard work can certainly increase a coach's probability of achieving competitive success, but it cannot guarantee it. All of the preparation in the world will not prevent chaos from striking or the ball from taking an unlucky bounce, nor guarantee that the coach will have all-conference level players on the roster.

Coaches who believe that outworking opposing coaches is a means to controlling competitive outcomes will work themselves into a state of poor health, poor relationships with family and friends, and undesirable mental states. Coaches who embody the belief that outworking opponents is the means to success may disengage from the profession due to poor physical health, burnout, or an untimely demise.

In order to avoid burnout and to stay motivated, coaches should spend a reasonable amount of time in the performance of their coaching duties. Then they should allocate time for recreation, performance of non-coaching related tasks, and exercise. These activities will lessen stress levels and keep the challenges offered through competition exciting and fresh (Malikow, 2007).

It takes Courage to Accept One's Limitations: Effort is Required to Lessen Them

It takes exceptional courage to examine one's beliefs, to accept one's limitations, and to acknowledge that acts of randomness and luck are vital to success (Taleb, 2005, p. x). It takes a modicum of humility to acknowledge that individuals cannot control their destiny.

It is not suggested here that luck or moral luck are the definitive reason for any coach's long-term success. In fact, once an individual believes success is the result of luck, it takes away the power to create success because it comes to be viewed as something that is out of one's control (Goldsmith, 2005). Often, individuals who are successful position themselves and prepare to take advantage of luck through planning, hard work, and correct actions (Anderson, 2007). Gallimore and Tharp (2004) provided an example in how legendary basketball coach John Wooden maximized the probability of his teams' successes through the employment of effective instructional and motivational practices. But even Coach Wooden lost 162 collegiate basketball games as a head coach (UCLA, 2012).

Coaches who aspire to have successful careers should read, study, and seek new theories and techniques to improve their both their effectiveness and chances for achieving success. Though no theory of teaching or coaching is perfect, each may point a way toward improvement. As Belot (2000) noted,

Perhaps if we had The Final Theory we would know what to believe. Such a theory would tell us Truth, and from its millennial perspective the pronouncements of other theories could be read as hints – some helpful, some misleading. (p. S454)

Wise Coaches Understand That Chaos, Complexity, and Luck Will Impact Them

Coaches who understand the impact of chaos, complexity, and luck upon their probability of achieving competitive success may be better able to avoid overreacting to the problems, unexpected challenges, and undeserved losses that are certain to confront them. A loss resulting from a bad bounce of the ball can be understood and accepted for the unlucky and undeserved thing that is. When an official makes a bad call, perhaps the coach can believe that a good call will come at a later time. When a valued player quits the

team for personal reasons, the coach can anticipate that at some point, another excellent player will come along. Life and the profession of coaching are messy and chaotic. The realization need not make a coach angry, bitter, or disillusioned. However, denial of the fact will certainly lead to anger, bitterness, and disillusionment.

Wise coaches accept that chaos and bad luck will impact them throughout their careers. Chaos is a part of life. Athletes are not machines and they will not always perform as hoped or expected. With such an understanding, setbacks can be placed in perspective and unnecessary stress will not lead coaches to burnout and early withdrawal from the coaching profession. Coaches may be better able to exhibit wisdom through their behavior, deal with others in an upright manner, and go through life with courage and a sense of continued optimism. For you see, the only aspect of one's life Lady Fortuna has no impact upon is an individual's chosen behavior (Taleb, 2005).

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Author's Notes

1. Coaches may also employ chaos-avoiding policies and procedures because they have a genuine concern and care for their athletes. Even those who claim to employ such strategies for the “good of the kid” acknowledge that they also do so to enhance their probability of coaching success.
2. Many associate good or bad luck with the actions of God, Devine Providence, predestination, Karma, or fate. The term used to describe actions beyond our ability to control in this paper is luck, but it could be used interchangeably with such terms. It is beyond the scope of this paper to address the impact of God or other supernatural factors upon athletic successes or failures. To me, the mind of God is incomprehensible. It is not worth my time trying to explain the random things (both good and bad) that happen in my career and life. They just do. I accept that and move on with a sense of gratitude or optimism.
3. Nagel coined the term moral luck in conjunction with moral judgments.
4. I serve my university as a head volleyball coach and athletic director. I have coached professionally for over 30 years and have experienced a modest level of success as a youth, junior high, high school, and collegiate coach as reflected by winning career records at each level. Teams I have had the pleasure of coaching have won championships in each setting. Coach of the year awards have been bestowed upon me in volleyball and basketball. I am in the midst of an eighteen-year tenure as a head coach at my university and my teams have won over 300 matches.
5. I have often heard different versions of this bit of folk wisdom but was not able to identify an original source.
6. Three of the best players I have had in my program came to me as follows:
 - “Jane” did not play competitive volleyball outside of high school and was not recruited by other colleges. She was undersized. I saw potential in her, but I had never seen her play in a match against good competition. She was the most valuable player in the conference tournament of her senior year of college.
 - “Jo Ann” did not play high school volleyball as a senior. She was not impressive in the middle hitter role on her club team. She was moved to an outside hitting position for me and was an all-region player. I honestly had no idea how good of a player she would prove to be.
 - “Joan” was a setter in high school. I believed she would make a good defensive specialist based upon my assessment of her, but her high school coach stated that Joan “hated” playing defense. Joan became an all-region defensive player.The *luckiest* thing for me was that all three players were a part of the same recruiting class. As seniors, they won a conference championship, the institution's first as a NCAA Division II member.