

4-23-2015

The Benefit of Quiet Eye Training as a Tool to Assist Free Throw Shooters Out of a Slump

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The Benefit of Quiet Eye Training as a Tool to Assist Free Throw Shooters Out of a Slump

Abstract

This research project focuses on the benefits of Quiet Eye (QE) to help free throw shooters out of slumps. The purpose of this thesis is to investigate what slumps are, why they occur, what QE is, why it is a useful tool in athletics, and why it can be used to help an athlete improve free throw shooting. Literature review is the main source of information collecting, and builds off research that Joan Vickers has completed on QE. As a future coach, this research is very important to me. QE has usefulness beyond free throw shooting/sports and delves into more serious areas such as law enforcement. The goal of this project is to highlight an unfamiliar, yet useful, skill in athletics.

Document Type

Thesis

Distinguished Thesis

Yes

Degree Name

Bachelor of Arts (BA)

Department or Program

Self-Designed Major

First Advisor

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Third Advisor

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Keywords

quiet eye training, basketball players

Subject Categories

Kinesiology | Psychology

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Thesis Title: The Benefit of Quiet Eye Training as a Tool to Assist Free Throw Shooters Out of a Slump

LAKE FOREST COLLEGE

Senior Thesis

The Benefit of Quiet Eye Training as a Tool to Assist
Free Throw Shooters Out of a Slump

by

Jonah Herscu

April 23, 2015

The report of the investigation undertaken as a
Senior Thesis, to carry two courses of credit in
Self Designed Major Program: Coaching: Personal Identity, Leadership, and Sports
Psychology

Michael T. Orr
Krebs Provost and Dean of the Faculty

Janet McCracken, Chairperson

Jackie Slaats

Naomi Wentworth

Abstract

This research project focuses on the benefits of Quiet Eye (QE) to help free throw shooters out of slumps. The purpose of this thesis is to investigate what slumps are, why they occur, what QE is, why it is a useful tool in athletics, and why it can be used to help an athlete improve free throw shooting. Literature review is the main source of information collecting, and builds off research that Joan Vickers has completed on QE. As a future coach, this research is very important to me. QE has usefulness beyond free throw shooting/sports and delves into more serious areas such as law enforcement. The goal of this project is to highlight an unfamiliar, yet useful, skill in athletics.

Dedication

I would like to dedicate my thesis to my loving parents, Amy Rothenberg and Paul Herscu. I love you both to the moon and back! ADED.

Acknowledgments

I would like to first and foremost thank my family, especially my parents, Amy Rothenberg and Paul Herscu, for giving me the love, support, help, and encouragement in completing this project. I love and appreciate you both, Sophie and Misha! All of your unconditional love gives me strength and inspiration every day. I would like to thank my amazing thesis committee for pushing me to produce a product that I feel proud of. My Chairperson and academic advisor, Professor Janet McCracken has gone above and beyond in helping me at Lake Forest College. She has put up with every one of my crazy ideas since the first day I arrived on campus as a transfer student, supported me, pushed me, and most of all understood me as a student, person, and future coach. Director of Athletics, Jackie Slaats, has overseen a number of independent studies with me, and has given me the opportunities that many college students never have. Professor and Chair of the Psychology Department, Naomi Wentworth has given me insight into the world of psychology and Aikido, and has given me way too much of her time to let me speak my mind during office hours. I feel very fortunate that I had the opportunity to work with these three special individuals. Thank you to all of my friends and family for making me who I am today. Thank you to Lake Forest College for giving me the opportunity to create and complete an independent scholar degree in Sports Coaching and Psychology. Lastly, thank you to all of the players that I have coached and will coach in the future. I have learned and continue to learn from each and every one of you, and work so hard every day to make you a better athlete.

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Introduction

The highlight of my basketball-playing career occurred during my sophomore year of high school. We were facing a rival team, which had the best player in the state, Joe Ragland, on their roster. I did a respectable job guarding him and held him to 26 points, 10 below his season average. We were down two points with 0:52 seconds left when I made a three-point shot to put my team ahead by one point. On the next play, Joe came down the court and made a brilliant shot despite my efforts; the ball never touched the net. On the last play of the game, down by one, my teammate missed a jump shot and I managed to grab the offensive rebound and put up a potential game-winning shot. While the ball did not go in the basket, I was fouled on the play. Since there was no time left on the clock, the referees cleared the foul line; none of the other players were lined up where they normally would be during free throw attempts. I was alone on the court with all eyes on me.

What was going through my head? What was I focusing on? Where was I looking during my pre-shot routine, during this pressure-filled, do-or-die moment? I am unable to recall, because I was not thinking about any of that. I was only thinking about making my free throws, one at a time. I went through my normal free throw routine, bouncing the ball three times, as I took a deep breath; the entire time I kept my eyes fixated on the back of the rim. One more inhale and exhale, as I kept my eyes locked on that exact spot on the back of the rim, before I bent my knees and went into my shooting motion. I was in a purely calm and focused state. I ended up making both shots and we won the game.

I was not aware of it at the time, but now I know I utilized the Quiet Eye (QE) method. An avid athlete my whole life, I had never heard about QE until researching the concept this year. In this paper I will describe the QE technique and argue that among the benefits of QE training is its use and efficacy in pulling athletes out of slumps--specifically, the QE method can help pull basketball players out of free-throw slumps.

Quiet Eye is, "...the final fixation that occurs prior to a critical movement" (Vine, Moore, & Wilson, 2012, p. 235). More specifically, "...QE is...the final fixation or tracking gaze directed to a single location or object in the visuomotor work-space within 3 degrees of visual angle (or less) for a minimum of 100 ms. The onset of the QE occurs before the critical phase of the motor task and the offset occurs when the final fixation deviates off the target by more than 3 degrees of visual angle for more than 100 ms" (Vine et al., 2012, p. 235). What is the significance of all of these minute details in understanding this phenomenon?

In basketball terms, Vine et al. (2012) would say that QE officially begins when the shooter is about to begin the free throw, and is over when he releases the ball. In other words, the QE process is finished when the individual looks away from the target, the basket. The main reason why QE is valuable is because if an athlete can focus exactly on where he is trying to aim, he will have a better chance of success. The tiny increments used by Vine et al. (2012) are needed to describe the very miniscule portions of the visual field employed when one tries to focus on a singular object.

As Vine et al. (2012) explain, QE is measured in degrees of visual angles. Visual angles are used in vision instead of the size of the object being viewed, to accommodate different sized objects at different distances. When a person sees an object, the light reflecting off that entity goes through the pupil and lens, the most forefront parts of the eye, and is then projected, inverted, on the back of the eye at the retina. This is done for both horizontal and vertical properties of the object. As the light from the [object] is being "passed through" the eye, to be projected onto the back of the eye, the two outer limits of the object cross each other (Wolfe, J., Kluender, K., & Levi, D., 2011). This angle that is created by the crossing is the measurement of the visual angle (Appendix A). A simplified representation of this measurement is the object size divided by the distance (Wolfe et al., 2011). An accepted guideline to understand degrees of visual angles is that an average person's outstretched thumb is about two [visual angle] degrees

across laterally (Groot, Ortega & Beltran, 1994). The visual angle required to encompass an object increases when the eye is closer, whereas, if an object becomes further away, the visual angle needed to see it decreases. Applying this understanding of visual angle to free throw shooting can show how closely eyes must focus in order to make a free throw. The free throw line is 15 feet away from the back of the basket, which is 10 feet high. For a six-foot tall basketball player, this distance from his eyes to the back of the basket is a little more than 15 feet and seven inches (187 inches) in distance. Thus, since the average width of a basketball rim is 18 inches, the necessary visual angle for a free throw shooter is about 5.5 degrees (Wolfe et al., 2011).

QE calls for a duration of at least .001 seconds, according to the current research, in order to yield benefits. This is because .001 seconds is how much time the brain needs in order to become aware of something, when an individual has a steady gaze (Vickers, 2004, p. 99). However, the duration of QE should in fact be closer to two to three seconds, and should last through and after the action. The brain needs .180 seconds in order to see something and make a movement or correction. From this we can gather that the stability of the gaze is essential during QE. As Vickers states, “It may be that the stability in the gaze that is The Quiet Eye is even more important, as this is the source of the information you need to make a putt. If your gaze is moving when you hit the ball, the commands that set your gaze in motion were sent through your brain about 180 milliseconds before contact—sometime during your stroke” (Vickers, 2004, pp. 100-101). The point of QE is to keep the eyes focused through the action, so that the brain is not confused, and only has to focus on one main target. Beyond basketball free throw shooting, QE affects numerous other sport skills. In golf, for example, a good duration of QE is evident in Vickers’ description of a successful putter in golf. “The good putter maintains fixation on the same location at the back of the ball through the backswing, forward swing, contact and for almost half a second after the ball is struck. The gaze stays in exactly the same location relative

to the position of the feet, indicating the gaze does not move” (Vickers, 2004, p. 99). By combining the two most important aspects of QE, gaze location (where the person is looking) and duration (for how long) “[the good putter] achieves a ‘harmonic’ state in the brain whereas the poor putter shows chaotic activity, particularly in the area of the brain that controls vision” (Vickers, 2004, p. 100). The best advantage to QE, therefore, is the absolute focus and tranquility that it brings to the athlete.

There is a place for QE in every sport, because of how imperative detailed vision is. All sports rely on vision in some capacity. In order to accomplish a task successfully in athletics, an individual must know where to look, how to look, and then be able to transfer this information into action. This takes coordination, the skill of being able to match visual information with kinesthetic movement of the body. It does not matter if QE is related to a pitcher in softball focusing on the catcher’s mitt, or an archer zeroing in on her target; all athletes need exact focus to perform at least some parts of their sports-related actions and skills.

Slumps are a common challenge in sports and although QE may not seem to have any direct association, I feel it can be an important component of teaching and coaching sport skills. At the very least, while an athlete is in a slump, learning about the QE technique can get an athlete’s mind to focus on a new process and function. As a future coach, I have to be prepared to help both my athletes and team when either enters into a slump. This is a part of athletics, as much as strategy or strength training. When an athlete is in a slump, she is unable to reach this state of peak performance. Slumps are unavoidable. No athlete in her respective sport can always play at the very top of her game. Every athlete knows the feeling of having an “off day” and not being able to accomplish what she is normally capable of. Slumps occur for different reasons and they happen at different times for individual athletes.

I will investigate slumps, why they occur, and what are the best ways to both prevent and work out of slumps. Studying the subject of slumps and working out of slumps dovetails with

related topics such as self-confidence, imagery, positive self-talk, encouraging coaching or leadership, and understanding the past experiences of specific athletes.

At a basic level, basketball, like any other sport, requires fixation of vision. In order to shoot accurately and properly, a player must have clear vision of the basket, if he wants to have any chance of success. Because QE technique improves visual focus, and in turn accuracy, this technique can be employed to improve many aspects of basketball. QE has a place in basketball, but not in all aspects of the sport. If a player is dribbling down the court with players moving all around, it is not the time to use QE, because the individual needs to be cognizant of what is happening all around him; for example, which players are where, and what is about to develop as the play continues. Everything during a free throw, however, is constant and consistent, no matter what level or league I investigated. Thus, I believe that QE can have the biggest positive influence in free throw shooting. The shooter is standing at the free-throw line and not moving, the shooter is always 15 feet away from the basket, the basket is always 10 feet high, and there is never defense. This is why I believe that free throws are a perfect application for the QE technique.

My goal in this paper is to show why slumps occur and how to both prevent them and work an athlete or team out of one using the QE method. In Chapter One, I will describe slumps, why they occur, and how to prevent them. In the Chapter Two Preface, I will touch briefly on relaxed vision and will give a brief overview of several other athletic performance-enhancing techniques. In Chapter Two, I will give an in-depth examination of QE, and provide studies from a few different sports to show its usefulness and effectiveness. Lastly, in Chapter Three, I will explain how to teach and apply QE to free throw shooting in basketball. My conclusion will bring together my findings on slumps and QE, to show how and why QE is not only a useful tool in life, but also how it can be used to get a basketball player out of a free throw slump.

Chapter I: Slumps

Over the last 20 years, there have been numerous studies done on the topic of QE. Many researchers have examined the benefit of using the QE technique as it relates to the sport of basketball. However, all the research to date focuses strictly upon trying to improve a skill, such as free throw shooting. Improvement is similar to working out of a slump, but there is a considerable difference. Improvement does not have to be preceded by failure or subpar performance. Of course, no one wants to stay the same, and most every athlete wants to continue to improve ability and execution. Even average players try to improve, and the same is certainly true for successful players. However, when one is in a slump, it is *imperative* that change occurs and athletes often search for additional tools that might assist them in moving past slumps. This is what makes my approach to the QE subject unique; this key difference between basic improvement (for the sake of getting better), and using QE intentionally to encourage an evolution out of that dark place that athletes know as a slump.

Every athlete has to deal with slumps at various points of a season or a career. Human minds are capable of wonderful work and are often used to enhance athletic performance. However, the mind can also get in the way and drag an athlete down. Psychological aspects of slumps occur regardless of whether or not an athlete has done all of the on-court training required, all the work in the weight room needed, and memorized all the team's strategies or specific plays. In a slump, an athlete's body language will literally express "slump": the shoulders droop, the gaze is fixed downward. The athlete's confidence is diminished. Of course, being in a slump can become a downward spiral. The worse the athlete feels, the poorer he performs. The poorer he plays, the worse he feels, both physically and psychologically. Either physical or mental triggers can cause slumps. Coaches and athletes should be trained in how to identify which type of slump an athlete or team is in, because it dictates the strategies that they should implement in order to get the athlete or team out of it.

In poker, trying to make up for a mistake in a previous hand by overbetting a bad hand is referred to as “being on a tilt.” This means that a participant tries to make all of her money back on one hand, even when she does not have good enough cards to win. This poker player “on a tilt” is much like an athlete in a slump. In sports, we see this picture all too many times, an athlete struggling, going quickly from bad to worse. A slump is like quicksand. The harder an athlete tries to get herself out of the slump, the deeper she falls in. The experience becomes dreadful and while playing used to come easy to the athlete, now it is extremely difficult. The athlete can seem like she is trying too hard. This maximum and ineffective effort leads to paltry and minimal results (Palomäki, Laakasuo, & Salmela, 2014).

Throughout this first chapter on slumps, and the rest of this paper, I will reference *Sports Slump Busting: 10 Steps to Mental Toughness and Peak Performance (2011)*, by Dr. Alan Goldberg. Dr. Goldberg is a sports psychologist who works on the ‘head game’ with novice through professional and Olympic athletes. He writes about topics such as how to get an athlete ‘in the zone,’ how to create buy-in on a team, and how to increase confidence in athletes. This specific book describes a 10-step process directed at an athlete in a slump. He aims to help an athlete get out of a slump and develop effective and useful strategies to build mental toughness while doing so.

Slumps in sports are analogous to depression and can certainly be intertwined. (Begel, 2012). The present looks bad and the future looks even worse. During a slump, players perform below par and their game becomes tight and tentative (Lucks, 2014). As Dr. Daniel Begel, a sports psychologist who works with professional baseball players (and who founded the International Institute of Sports Psychiatry) states about slumps in baseball, “There are two things to understand about a slump ... The first is that it is unconscious. It is something that is out of your control. The second thing is that the closest thing to a slump outside of athletics, is depression. A slump, like depression, changes your perception. The world becomes condensed,

flat. If you are in a bad slump you may not even see the ball because of this flatness” (Begel, 2012). Just like in a depression, an athlete will often dread the next at-bat in baseball, or the next putt in golf, and might rather slip under a rock and stay there than suffer the fear and anxiety of coming up short once again.

Anxiety is another major component of being in a slump and may manifest as choking while performing in high stress situations. We have all seen athletes choke, at key points in a competition, being unable to come through with needed skills (Moore, Vine, Cooke, Ring, & Wilson, 2012, p. 1005). This is not because the athlete is unable to perform the task, it is because the brain gets in the way and makes the athlete unable to be successful at that moment. “The choking phenomenon...is a complex process involving the interplay of several cognitive, attentional, emotional, and situational factors” (Murphy, 2012, p. 174). During key moments of a game, there are combinations of factors that can hinder a choking athlete’s performance. “...While choking, the athlete is able to make rational decisions and select the correct ‘plan of action’ under pressure, but cannot *execute* it because of intervening psychological factors. Several theories have emerged [to explain this]...however, self-focus and distraction theories have received the most attention” (Murphy, 2012, p. 174). The brain becomes distracted with unnecessary information that it focuses on, instead of the task at hand, which makes the athlete unable to perform basic actions that have been practiced and in some cases mastered.

It is important to appreciate, however, that slumps are not strictly psychological, they can also be neurobiological. Kim et al. conducted a subjective questionnaire with both athletes in a slump and those not in a slump and recorded data on four regions of the brain: the left prefrontal, right prefrontal, left frontal, and right frontal. The brain activity was notably different for the two groups of athletes (Kim et al., 2014, p. 139). As Kim et al. state, “The findings of this study demonstrated that participants in the non-slumped group showed higher frontal theta activity than their counterparts in the slumped group. The study suggested that mental fatigue may cause

low frontal theta activity in athletes who experience a slump” (Kim et al., 2014, p. 140). It has been previously proven that frontal theta activity is negatively related to levels of anxiety and stress (Suetsug et al., 2000), arousal and concentration (Kubota, 2001), attention (Missonnier, 2006), and emotional states (Aftanas & Golocheikine, 2001) (Kim et al., 2014, p. 140). Though athletes may not be aware of it, and surely would not want to admit it if they are, a slump is more than just being in a bad mood and playing poorly. Kim et al. make the point that there are actual changes going on in the brain when an athlete is in a slump. Kim et al. conclude,

Significantly low frontal theta power in the slumped group during a task requiring attention indicates that these participants may experience deficits in attention. By contrast, higher frontal theta power in the non-slumped group indicates superior concentration...[These frontal theta activity differences] are associated with the fact that athletes in a slump are characterized by certain negative psychological states such as the loss of concentration, increased stress, anxiety, and frustration. (Kim et al., 2014, p. 140)

The cause of a slump may seem ambiguous in terms of these brain patterns. Does the experience cause the brain patterns, or do the brain patterns cause the slumping experience? This is one of the intriguing questions about the relationship between behavior and brain states: which is the “chicken” and which is the “egg”? It is difficult to tell which comes first without conducting an experiment and changing one of them to record the effect it had on the other. Yet, I believe that the negative brain states feed the slumping experience, not the other way around.

Physical factors

A slump caused by physical variables can occur for different reasons. Three common causes include when an athlete changes his form, when he returns to play after an injury or overtraining, on which I will concentrate here.

An example of a physical slump due to change of form would be when a basketball player changes her shooting form to get more distance on her jump shot, or when a golfer changes her putting mechanisms to increase accuracy. The adage, “sometimes you have to get

worse in order to get better” is pertinent in physical slumps. Patience is the most useful trait that an athlete can have during this often-frustrating process (Edger, 2010).

Coming back from an injury is often a testing process because an athlete is unable to do what he is used to doing before the time of the injury. This can sometimes seep into an athlete’s mind, in which case a significant slump can ensue. However, at the very basic level, even when an athlete comes back from an injury, it will take the athlete time in order to get back to normal playing form and feeling like his old self again. A perfect example of this kind of slump can be seen in Derrick Rose, who missed the best part of two seasons on account of a torn left ACL followed by a torn right meniscus. Returning this season, he has had good games and bad games, but for the first few months, he seemed a little bit “off.” This makes sense: anyone who took a break from anything and then tried to compete at the highest level possible would experience these inconsistencies at the beginning of a comeback.

Though changing form and returning from an injury can be the cause of a slump, these methods are not relevant for my discussion of slumps and QE. I only included them to introduce slumps and to illustrate a more complete picture of slumps.

One more relevant and well-studied type of physical slump can be produced by overtraining. Training works by breaking down muscles, so that, upon healing fully, the athlete is stronger than before he started. This is why lifting weights is useful, as muscles are broken down, and recover stronger.

Simply put the body goes through adaptive reconstruction which in the case of strength training is a temporary decrease in strength and speed followed by a subsequent increase in strength and speed after the intensity has lessened (adaptation) therefore the effectiveness of strength training is not immediate, but will come with time. (Diaz-Johnson, 2010, p. 12)

When there is no rest, the body never has time to heal stronger, so the body continues to break itself down (Fry, 2010, pp. 2-3). A common mistake for athletes to make is to believe that, “more is always better.” This is not the case, and trainers, coaches, and athletes must be wary of

overtraining syndrome. It is essential to prepare and train hard, but as my high school ultimate Frisbee coach used to say to my team every week, “Rest is part of training.”

Overtraining may make athletes perform far below their potential. This is because overtraining can cause symptoms such as burnout, fatigue, or overuse injuries (Kreher, Schwartz, 2012, p. 128). Researchers in the past have referred to overtraining as, “unexplained underperformance syndrome,” because, while overtraining can be demonstrated to be responsible for underperformance, it has been very much understudied (Budgett, 2000, p. 67). The perfect amount of training is tricky to measure and maneuver for both coaches and athletes, because, if an athlete does not prepare enough, she will not be competitive enough to be a champion. However, too much training can cause overtraining syndrome, which is now the clinical diagnosis (Kreher, Schwartz, 2012, p. 128). Overtraining syndrome occurs when an athlete exercises excessively, without quality rest (Kreher, Schwartz, 2012, p. 128). Not only does overtraining syndrome have a negative effect on performance, it also usually has other consequences, such as depression, mood swings, fatigue, weight loss, or constant muscle soreness (Budgett, 1990, pp. 231-234).

The most important factor in preventing overtraining syndrome is healthy training (Jenkins, 1998). Most athletes work well with about 5% increase each week in their workouts (Budgett, 1990, p. 233). Doctors and trainers also believe in periodization training. This type of training varies in both weight and exercises. “Over a longer training period or cycle, the training variables can be altered to provide the individual with the necessary variability for long-term improvement. Such variety in the long-term program is called periodization, and helps to ensure that the body is continually being presented with a stress that permits both progress and adequate recovery” (Fry, 2010). In addition, periodization ensures that athletes do not become bored or lazy with the monotony of the same workout, week after week (Fry, 2010). Certain external factors that influence the body can also lead to physical slumps. The saying “your body is a

temple” is particularly apt in the case of athletes. This is the reason that NFL head coach Chip Kelly monitors his players’ nightly sleeping patterns (Wickersham, 2014). A culmination of healthy habits, such as sleeping patterns, nutrition, hydration, and avoidance of substance abuse, can increase the likelihood of success for an athlete or team.

Other physical factors can also create slumps. For instance, not training smartly before a competition can cause a slump, as can simple body development, especially during puberty (Kimball, 2010). I had a teammate on my 8th grade basketball team who grew six inches that year. Understandably, he did not have a great season. However, he ended up being a solid college basketball player, once he adapted to his growth spurt. When an athlete like my former teammate is not comfortable in his body, one should expect some of the symptoms and frustration of a slump occurring. To navigate through these tough times, parents, coaches, and the athlete himself must be cognizant of normal bodily changes, and continue to do everything to help this normal development, including proper stretching and training.

One last type of physical slump is when an individual is not realistic about her talent level. “You also have to be realistic about your talent level. Some swimmers think they are better than they actually are, and others might be better than they give themselves credit for” (Kimball, 2010). The best way to prevent slumps caused by self-deception is by asking for and receiving brutally honest feedback from coaches and peers (Kimball, 2010). Though this can be difficult for sensitive athletes, this will set the individual up for better outcome expectations. When an athlete has an accurate perception of her ability level and what to expect during competition, it makes for a healthier athletic environment, and results come as less of a surprise (Kimball, 2010).

A physical slump is generally believed to be easier to overcome than a psychological slump, because it is easier to figure out the cause (Edger, 2010). In addition, though there are serious types of physical slumps, these are generally more “superficial,” because the psyche of

the athlete is not damaged, meaning that once the cause of the physical slump is identified, it is easier to prescribe a process to get the athlete back to playing well (Edger, 2010).

Dr. Goldberg's first step in his book is: "Ruling out Nonmental Causes." As I have described, not all slumps are in an athlete's head, so before Goldberg investigates the mental side of slumps, he must rule out other factors. According to Dr. Goldberg, there are three key issues which an athlete should investigate before he turns the focus to his psyche, which are: is the problem physical (example: strength), technical (example: form) or tactical (example: preparedness) (Goldberg, 2011, pp. 10-11). As Goldberg writes at the end of the chapter, "Are you stuck in a slump because of your head, or is your mental game completely out of whack because you're stuck in a slump?" (Goldberg, 2011, p. 13). Only after ruling out these first three factors, can one investigate his mental game.

Psychological factors

Slumps of the other category occur because of a psychological issue with an athlete. Mental slumps can happen for a number of reasons. Some examples are: ego or low self-confidence (Edger, 2010), anxiety and stress, dwelling on negative thoughts instead one's current circumstance (Tseng, 2013), and obsessing over winning (Edger, 2010). Psychological slumps are *internal*: they do not occur as a reaction to observable events, such as an opponent's move. Though others may play a role in a slump, if an athlete can control *her own* mind, she will limit slumps caused by psychological factors.

Every athlete has an ego. Especially in professional sports, having an ego has a negative connotation. I do not always agree with this. Athletes, coaches, teachers, and parents all have an ego, and need to have one to a certain extent, in order to be successful. An ego gives an individual his confidence. However, an ego gets in the way and becomes a problem when it escalates into a false bravado. This happens when an athlete has an ego without putting in the

work and preparation to back it up. As my old basketball coach used to tell our team, “It is okay to have confidence as individuals and a team, if we ‘put the money in the bank’ during practice!” Having false bravado can be another source of a slump, because expectations can be too high. There is a difference between having confidence and a positive-outlook, and always expecting to win. In a way, winning is ‘an uncontrollable.’ Athletes should focus on what they are doing, and not the overall desired outcome. “Many performance-disrupting uncontrollables (for example, winning or losing, getting or not getting a hit, and so on) are related to the outcome and therefore violate this important principle” (Goldberg, 2011, p. 33). Inside an ego-protecting athletes’ mind, he may have a strong fear of failure. “What happens when I try my best, but do not succeed?” An excuse, such as, “I should not have lost that race, I still have so much energy” protects the athlete’s ego because he makes it seem like he did not perform at his best. This is a very dangerous position to take because competition really is not about winning but about performing to the best of one’s ability. This does not mean that an athlete will always win when performing well, but in the end, this is all that an athlete has control over, his effort. During competition, an ego-protected athlete will have thoughts such as believing he is doing his best, focusing too much on his opponent, not giving his opponent respect until the end of the competition, worrying about losing, or knowing that he is not performing well and essentially giving up (Kimball, 2010). The key to helping the ego-protecting athlete is to shift his focus so that he still competes for pride, while putting his unhealthy type of ego to the side (Kimball, 2010). As the USA swim team’s sports psychologist said, “The negative emotions resulting from ‘I coulda, shoulda, woulda’ last a lot longer than the disappointment of ‘I did, I just fell short’ (Kimball, 2010).

For an athlete, stress and anxiety, like ego, are not always negative qualities. In fact, an optimal level of stress is required for an athlete to reach “the zone.” This ‘flow state’ has been proven to be a universal phenomenon across all sports, including contact or non-contact as well as team or individual sports (Young & Pain, 1999, p. 21). The “Inverted-U Hypothesis” explains

the relationship of an athlete's arousal state and his performance. "...at low arousal levels, performance will be below par; the exerciser or athlete is not psyched up. As arousal increases, so too does performance—up to an optimal point where best performance results. Further increases in arousal, however, cause performance to decline" (Appendix B) (Weinberg & Gould, 2011, pp. 86-88).

Mihaly Csikszentmihalyi is responsible for developing work on this subject of flow. Csikszentmihalyi examined athletes, in addition to other individuals, such as dancers, chess players, and musicians to determine what factors make a task intrinsically motivating (Weinberg & Gould, 2011, p. 148). The elements of reaching a flow state, according to Csikszentmihalyi are: "Balance of challenge and skills, complete absorption in the activity, clear goals, merging of action and awareness, total concentration on the task at hand, loss of self-consciousness, a sense of control, no goals or rewards external to the activity, transformation of time and effortless movement" (Weinberg & Gould, 2011, pp. 148-150). Csikszentmihalyi states that the flow experience happens when: an individual's skill equals the current challenge, intrinsic motivation is at its highest, and maximum performance is achieved (Weinberg & Gould, 2011, p. 150). Being in "the zone" does not just happen randomly, there are factors about the individual and activity at hand that can make reaching this state more likely.

Goldberg makes it clear that an athlete needs to take more responsibility for her failures than most athletes normally do. This will give her the ability to have more control over her performances. Often, an athlete will play the blame game, when instead she should look internally. "Most attempts at slump busting fail because athletes look outside themselves for the culprit when they should be looking in the mirror for both the problem and the solution" (Goldberg, 2011, p. 24). Just as an athlete can have poor athletic fundamentals, such as an unorthodox shot in basketball, an athlete can also have bad mental strategies, which can negatively impact performance. "To bust that slump, you must first recognize your slump-

feeding mental strategies and replace them with performance-enhancing ones” (Goldberg, 2011, p. 27). Slumps do not cause negativity, rather, negativity causes slumps. This distinction is essential to appreciate for any athlete in a slump, and is a key step to emergence from a slump.

Stress can affect an athlete physiologically, with relation to vision. Optimal arousal makes an athlete have the perfect attentional focus (Appendix C) (Weinberg & Gould, 2011, p. 94). When an athlete is not aroused enough, his vision will be too broad. An athlete who is overly aroused will have hyper focused vision, and miss what is going around him during competition (Weinberg & Gould, 2011, pp. 93-94). It is clear that an athlete needs to possess a certain amount of arousal to perform well. This is clear for anyone who has ever had “nervous butterflies” before a test. This is healthy; it helps make sure the student’s focus is where it needs to be. Often, however, anxious athletes believe that they are performing worse than they actually are. Athletes need to focus more on what they *are* doing, compared to what they are *not* doing (Kimball, 2010). For example, if a baseball player has made three errors in a game, he would probably be scared of the ball coming his way again. However, if he has also hit a homerun and a double in the game, it is clear that his hitting skills are still productive. The baseball player, in this case, should focus on his superb hitting skills, and less on his fielding. He should continue to practice and try to improve his fielding, but he should not let his mistakes affect the parts of his game, which he is executing well (Kimball, 2010).

This concept ties into Goldberg’s third chapter, titled: “Developing a Championship Focus.” Focus is an essential part of competition, and can either enhance or undermine performance (Goldberg, 2011, p. 46). When an athlete is in a slump, she focuses on exactly the *wrong* things, at the perfectly *wrong* times. Effective concentration is important, because it enables an athlete to have fun, relax, and fulfill his full potential (Goldberg, 2011, p. 47). Important factors of focus are concentrating on the here (not thinking about a test or family matter) and now (not thinking about the past or future, such as mistakes made earlier or the

outcome of a competition). An athlete must have control over her ears and eyes, in order to focus on the correct aspects, both before and during a competition. An athlete should not judge herself against other athletes. “Stop making comparisons to other players and your opponent. This is a distraction that can undermine an athlete’s confidence, especially when in a slump” (Edger, 2010). Keeping the focus on herself will eliminate distractions and focus points that do not improve performance. Rituals and pregame routines are good strategies to keep an athlete locked-in mentally before and during competition (Goldberg, 2011, p. 61). Effective concentration is the key component that lets an athlete reach peak performance, and unlocks other mental skill challenges, such as overcoming fears and using imagery (Goldberg, 2011, p. 73). This type of focus is directly related to having a good Quiet Eye. Knowing where and when to look at a target, for how long, can be practiced and mastered, and will enhance athletic performance.

All people, including athletes, have fears. The fourth step in becoming mentally tough, according to Dr. Goldberg, is “Dealing With Your Fears.” Fears do not go away; even the best performers still get anxious over going ‘on stage’, but learning how to manage fears and turn them into positive influences can help an athlete overcome slumps, according to Goldberg. “Whether it’s a fear of failure, making a mistake, getting hurt, or something else, *fear is probably the single biggest cause of choking in sports*” (Goldberg, 2011, p. 78). Playing not to lose is another factor that Goldberg highlights, because it can make an athlete too careful, and play tentatively, which will keep an athlete stuck (Goldberg, 2011, p. 78). In order to defeat fear, an athlete must be able to recognize it, understand where it comes from, and at least neutralize it (Goldberg, 2011, p. 81). In reality, according to Goldberg, F.E.A.R. is really “False Education that Appears Real;” once it is looked at closely, fear is often outdated and not accurate (Goldberg, 2011, p. 85). Ironically enough, in order to defeat their fears, athletes must go *towards* their fears. By getting close instead of far away from fears, “...they begin to change

right before your eyes. They get smaller and lose their power” (Goldberg, 2011, p. 89). This is the way an athlete can neutralize a fear, because fears can only negatively impact an athlete if she continuously avoids confronting it (Goldberg, 2011, p. 89). Another useful tip when dealing with fears is to break them down into smaller and less intimidating fears (Goldberg, 2011, p. 90). Challenging the logic of one’s fear is another useful tip to make it less frightening, because oftentimes, fears are illogical and do not make sense. “Confront the childlike logic and catastrophizing that forms the foundation of fear” (Goldberg, 2011, p. 95). This is evident when looking at irrational expectations that an athlete thinks his coach has for him. Standing up to his fears can enable an athlete to get out of a slump (Goldberg, 2011, pp. 94-95). Lastly, an athlete who has persistent fear from a past mishap or error, must, “. . .dissociate or separate your feelings from the visual images in your memory. Once you do this, your fear will lose power over you” (Goldberg, 2011, p. 96). Even the best athlete often has fears, but he does not give any power to this ‘deceitful liar’ (Goldberg, 2011, p. 98). Instead, the athlete runs the show in order to keep complete control of her performance.

Worrying about past performance can also lead to a slump. Just because an athlete has not had success yet does not mean that she will not have success in the future. As Goldberg states, “If that inner voice is scaring you, don’t sit back and listen. Yes, you struck out your last six at-bats, but this is a *new* one and anything can happen *now* so keep your focus. Besides, didn’t you go 8 for 10 four weeks ago?” (Goldberg, 2011, pp. 94-95). Part of getting out of a slump has to do with the athlete being able to “let go” of his recent struggles (Kimball, 2010). Another way to think about this is to think less, and just play. When an athlete worries, she begins to over think every detail of her game, and thereby surely stay in a slump, because she is not playing freely. “. . .try to implement a strategy to change technique, thinking, re-frame, or analyze it won’t work, because that makes them think more. The goal is less thinking. The fastest way to break out of a slump is to do absolutely nothing to try to break out of a slump. The

philosopher, Yogi Berra once said, ‘You can’t think and hit at the same time. A full mind is an empty bat’” (Tseng, 2013). A coach, therefore, must pick the right time to speak to an athlete about a troublesome skill. Certainly, the middle of a game is not the right time to do this. Mental toughness, Dr. Goldberg vouches, is the single most important asset an athlete has (Goldberg, 2011, p. 220). The most significant part of mental toughness is accepting and dealing with failure. All athletes fail at some point during a competition or career. Accepting that fact and dismissing it from her mind is what allows an athlete to truly play freely, and have future success (Goldberg, 2011, p. 223). Bumps along the road, adversity, plateaus, and failure bring an athlete closer to her goals and success, even though this does not always appear to be the case (Goldberg, 2011, p. 225).

In sports, I interpret the law of averages to mean that for every high, there is a low, and for every low, there is a high. As the Hall of Fame former baseball player, Cal Ripken Jr., wrote in his book, *Get in the Game: 8 Elements of Perseverance That Make the Difference* (2007), “...when I was mired in a batting slump, the law of averages would eventually catch up to me. I also knew deep down inside that I was not a .200 hitter. So rather than dwelling on the miserable, I remained optimistic. Conversely, I was also realistic when I was on a hitting streak. Just because I was hitting .400 or .500 didn’t mean I was going to stay that way. I knew things were going to drop off again. So I rode the wave while it was up and tried not to get too depressed when I came back to reality” (Ripken Jr., 2007, pp. 122-123). The best athletes are able to realize that they will encounter both success and failure. These athletes do not let their “highs” get too high, or their “lows” get too low. It is important to remember that, “What we think, we feel. That is why smart people sometimes do stupid things. When you focus on the negative, it is impossible to get positive results. Living in the past is like driving while looking through the rear-view mirror” (Tseng, 2013). There are many benefits of an athlete staying in the moment, and focusing on the present, and staying out of slumps is one. As Dr. Goldberg suggests, there

are three time zones that an athlete can be in, “the past, the present, or future. If you’re *in the past*, your mind is *behind* your body [such as worrying about a past mistake]...If you’re *in the present*, you’re concentration and your body are in sync. Your focus is locked onto what you are doing at the moment...If you’re *in the future*, your mind is *ahead* of your body as you perform [such as worrying about an outcome]” (Goldberg, 2011, p. 48). The key for a slumping athlete is to stay in the *now*, and re-focus when one drifts to the past or future. “Choking in sports is all about being in the wrong time zones” (Goldberg, 2011, p. 48).

Every building has a blueprint, and an ideal finished product that the architect expects to create upon completion of the project. It is no different for an athlete. The fifth element to getting out of a slump according to Dr. Goldberg is: “Expecting Success.” Athletes must make their fears work for them, not against them (Goldberg, 2011, p. 99). “If you don’t really believe in yourself, then you’ll enter competition entertaining the what-ifs and expecting failure.

Unfortunately, these worries and negative expectations shape your performance. To bust that slump, you must learn to expect success and to believe in yourself. You must challenge those negative, slump-fueling beliefs that have forced their way into your consciousness” (Goldberg, 2011, pp. 99-100). This reminds me of the adage, “Champions act like champions before they are champions.” In this chapter, Goldberg considers the role beliefs play in slumps. Enabling or disabling beliefs may make or break an athlete (Goldberg, 2011, p. 100). Athletes who have success usually show a simple and positive relationship between their beliefs and expectations. “Because you *believe*, you can, you *do*. Furthermore, the success that you finally earn confirms and strengthens your original positive belief. Thus, a success cycle is set into motion. Because you *believe* you can, you *do*; and because you *do*, you *believe you can*” (Goldberg, 2011, p. 101).

However, there is a similar pattern in slumping athletes. “You see a similar self-fulfilling prophecy at work with slumping athletes, only it operates in reverse...Because struggling athletes do not believe in themselves and expect to fail, their view of setbacks and obstacles

merely reinforces their negativity” (Goldberg, 2011, p. 101). Both positive and negative beliefs become cycles that are repeated. This vicious cycle can only be reversed from negative to positive by believing in oneself (Goldberg, 2011, p. 104). The Structure of Belief has three levels, according to Dr. Goldberg: experience, self-talk, and action. Insidious beliefs can be broken down by mentally “attacking any of these [three] elements” (Goldberg, 2011, p. 108). An example of how to ‘attack’ an experience is by tricking your mind. Goldberg illustrates a high school track runner who could not break the five-minute mile. He had a disabling self-belief that he was unable to do it. The runner’s coach lied to him and celebrated a 4:59 mile at the end of one of the races. The runner’s coach tricked him into believing that he had accomplished this ‘unachievable’ goal. For the remainder of races the rest of the season, the runner broke five-minute miles. (Goldberg, 2011, pp. 108-110). “Sometimes, however, an experience can be so powerful that even your trusted way of distorting it to fit your negative beliefs doesn’t work. That one experience of success completely obliterates the negative beliefs you held, so that your self-talk has no choice but to change to the positive” (Goldberg, 2011, p. 109). How athletes frame their failures has an influence on their future performance. Athletes should not view failure as “a continuation of a never-ending process, but as a temporary deviation from normal good performance” (Goldberg, 2011, p. 116). Expecting success has to do with positive affirmations as well. Positive self-talk, such as “I always come through in the clutch” can stretch the limits of an athlete’s beliefs (Goldberg, 2011, p. 125). An athlete in a slump can look back at his past successes, especially if he faces a similar adverse situation in which he has already overcome a challenge successfully (Goldberg, 2011, p. 129). Dr. Goldberg ends this chapter with a simple, but effective conclusion. Athletic performance is always self-fulfilling; “You will get what you *expect*... With a change in your beliefs, you now begin to see what you *want to happen* instead of what you’re *afraid will happen* (Goldberg, 2011, p. 130).

Yet another potential cause of slumps is when athletes and coaches feel the pressure to “win at all costs.” This can lead to slumps because the athlete’s focus is on the outcome and not the process. This can lead to an unhealthy level of stress and anxiety, compared to focusing on the process at hand of doing one’s job. One common method I have seen for a coach to keep the focus on the process is to create an “in-game” goal. This may be especially useful if his team is winning or losing by an overwhelming amount. For example, in a soccer match, a coach might ask players to complete ten passes before taking a shot on goal; a basketball coach might ask every player to touch the ball on each possession before anyone attempts a shot, to encourage passing, ball movement, and player movement; or a coach might challenge her players to try and win the last three minutes of every quarter. Playing the ‘game within the game’ can help many teams stay focused on the process and not the outcome, which is not entirely under their control. “They stress over winning—During a big game, athletes get anxious about winning and losing. So do people at work. The peak performers make every job important, but no job SPECIAL...It is completely normal to have stressful thoughts about a situation, but accept them for what they are...just thoughts. When we stop stressing over stressful thoughts, they don’t seem to come around as often or stay as long” (Tseng, 2013). There is no reason to let negative thoughts be permanent. “Focus on your performance instead of results. When you are in a slump it is important that you avoid focusing so much on wins or personal statistics. Instead focus on your game and the task at hand” (Edger, 2010). The task at hand will take care of the outcome.

Athletics should be fun, but, especially in ultra-competitive situations, individuals or a team as a whole sometimes stop having fun. This can lead to anxiety and ‘playing not to lose,’ instead of playing freely and for the joy of the game. During play, it is important for athletes and teams to remember what their goals are, and to enjoy the heat of competition. This means that coaches must prepare their teams to ‘enjoy the grind,’ and set team members and the team up with concrete process goals. Effective goals give athletes motivation, meaning, and a reason to

work hard (Goldberg, 2011, p. 167). Each athlete is always faced with a decision: the easy option or the difficult option. Dr. Goldberg's road exercise visualizes decisions that athletes have to make numerous times every day. No one but the athlete knows which road she is on. Will she stay up late because no one will know? Will she come up short of the line on the sprint, because no one will know? (Goldberg, 2011, p. 167). The wrong road leads straight to mediocrity. "[The left road] is always the easiest to take, especially when you're in a slump. It requires no special talent. It requires no character... You'll never become a champion by taking the easy road, nor will the easy road lead you out of your performance problems" (Goldberg, 2011, p. 168). The right road, however, is not easy to take: "This one confronts you with more obstacles, pain, and aggravation. The right fork hurts more. It makes you feel more uncomfortable, both emotionally and physically. Sometimes it makes you cry. However, the right fork, when consistently taken, will always lead you out of the valley of slump to the peak of success" (Goldberg, 2011, pp. 168-169). The right road is not pretty, and is painful, and may not have immediate gains, but in the long-term it will benefit the athlete. Every athlete needs a "[big] enough WHY" (Goldberg, 2011, p. 169). This is the reason that the individual stays on the "right road." It is different for every athlete, but must be genuine and real in order to be effective, or else it will not keep the athlete on the "right road" when adversity hits. This means that goals must be for oneself, and not for other people, such as parents, friends, or coaches. When goals are real and internal, they will push an athlete to work harder than she would for goals set by someone else (Goldberg, 2011, pp. 169-171). Effective process goals are detailed, difficult but realistic to accomplish, and revisited and recorded both for the short and long-term (Weinberg & Gould, 2011, pp. 344-350). Keeping the focus on process goals will encourage athletes to focus on useful and valuable information, instead of distractions, such as opponents or the score. "Stay motivated and committed to your goals in sports. When you are in a slump, it is easy to begin questioning your goals. Stay patient and remind yourself what motivates [you] to play the game" (Edger, 2010).

Every athlete participates for different reasons, and I believe that it is necessary for a coach to find these reasons out. After understanding why an athlete is participating, a coach will be able to remind an athlete why she is competing, and hopefully enable the athlete to feel more comfortable.

Long-term goals are necessary to see the big picture. However, effective goals are broken up into smaller and manageable parts, in order for an athlete to make progress every single day (Goldberg, 2011, p. 173-175). Goals must be time-oriented and have deadlines. This keeps them at the front of one's mind and prioritizes athletes' efforts (Goldberg, 2011, p. 180). While some outcome goals (such as winning the championship) are valuable for the long-term, process goals (such as running for 30 minutes every day), are the key to success in sports (Goldberg, 2011, p. 181). Goals must be specific because they guide action and effort (Goldberg, 2011, p. 183). In addition, goals must be measurable in order to be aware that an athlete is making improvements (Goldberg, 2011, p. 189). Goals must be framed positively, because the brain works as follows: If a coach instructs, "don't hit a groundball" during a softball game, the way the brain processes that phrase is internalizing the word "groundball." For this reason, a coach or athlete must always try to phrase his goals and suggestions in a positive light (Goldberg, 2011, p. 187). "When you frame your goals negatively in this manner, you may end up getting exactly what you don't want. A negative frame conjures up the wrong pictures and doesn't spell out what you *do* want. Since the images that you create in your mind's eye preprogram your performance, it is critical that your goals lead you to see what you want to happen" (Goldberg, 2011, p. 187). The last piece of advice that Dr. Goldberg gives on goal setting is for an athlete to write his goals down and put the list in a visible place. This makes goals more formal and real, and gives the athlete a visual reminder every day (Goldberg, 2011, p. 191).

Emotions are a part of life and at times, can also lead to slumps. Whether one is an optimist or pessimist, everyone has feelings, both positive and negative. The best athlete,

however, is able to tone down her emotions and ignore them during competition. Emotions have been proven to make athletic performances worse, because they make an athlete focus on unhelpful things, instead of beneficial factors such as breathing and focusing on the task at hand. “One main mechanism whereby performance is affected negatively is the self-statements and ruminations produced by emotional struggles that interfere with attention and concentration, without which a top performance is not possible (Lazarus, 2000, p. 249). To combat negative sides of emotion, athletes should, “...clear their minds of destructive forms of thought and substitute more constructive ones that could end the vicious circle of downhill performance and restore weakened or lost motivation, attention, and concentration” (Lazarus, 2000, p. 249). This is easier said than done, since emotions are often subconscious thoughts that creep into an athlete’s mind. Nevertheless, a coach will remember the downsides of emotions, and talk about them with her team. Often, an athlete can have an emotional reaction to a failure, which blinds the individual and prevents a bounce back or advancement towards the goals (Goldberg, 2011, p. 228). Strategies for keeping emotions in check and keeping high confidence in tough times involve viewing the issue as temporary, not permanent; being specific about where the problem is, rather than making a generalization like “I just had a bad race” or externalizing the problem, as in “It is the hockey stick’s fault that I did not score that goal.” As Dr. Goldberg states, “Failure, when viewed through the correct lens, is merely delayed success” (Goldberg, 2011, p. 235). The ABCDs of mental toughness are set-back, self-talk, feelings, and defense. First there is a set-back, such as a missed shot (A) then self-talk regarding the incident, which can be either positive or negative: this is the individual’s reaction, such as “I’ll do better next time” (B) Next come the athlete’s feelings, such as determination or hopefulness (C) Last, but not least, is the defense, which is the response, such as “I’ll work on that in practice and make it next time” (D) (Goldberg, 2011, pp. 237-238). This ABCD model of mental toughness can be a useful tool. Practicing responding in a self-confident way (D) can increase confidence and motivation

(Goldberg, 2011, p. 238). As in all of mental toughness training, the response to an event, especially if it is negative, is as important as the negative occurrence itself. Being able to stay in the moment, leave that mistake in the past, and continue to have positive self-talk is the key.

One method a coach can employ to improve an athlete's emotional control is to put him in emotional situations during practice and encourage him to be calm and not let the emotions show. Every athlete will deal with failure and have frustrations, but it is important for athletes to improve how they explain their failure to themselves (Goldberg, 2011, p. 230). There is a difference in performance between athletes who state, "These bad breaks always happen to me" and the ones who state, "The other team just got lucky today." Regardless of the facts of the scenario, a self-describing style is very important to the ultimate success of an athlete, because the descriptions affect motivation and persistence (Goldberg, 2011, p. 231). It is important to remember that each athlete feels what is inside of him, and not outside factors. "The truth is nothing outside of you can affect how you feel. If it could, then everyone would react the same way in the same situation and we know that doesn't happen. Feelings can only come from one place—thought. And thought is generated from inside us. We feel our thinking, not our circumstances" (Tseng, 2013). Athletes, "...cannot control what thoughts come into our heads, but we can always choose which ones we give attention to and make grow, and which ones we ignore or dismiss, thereby keeping them powerless over us" (Tseng, 2013). Controlling emotions and thoughts is a key factor in preventing and working out of slumps. An athlete must improve his ability focus on the right ones.

Managing emotions is an important factor for coaches to consider, but as Goldberg states, "Building Self-Confidence" is also important for a coach to facilitate. Confidence is a visible trait that great athletes possess. Tough situations, which make an athlete uncomfortable, are confidence-building opportunities (Goldberg, 2011, p. 200). The base of confidence is a prepared body; this is one of the reasons it is so important for athletes to train hard and with purpose.

Confidence comes from knowing that an individual has what it takes to be a winner, which means she is prepared physically and mentally (Goldberg, 2011, pp. 202-204). Athletes are the ones who are responsible for the outcome of their performance, not anyone else. It is important that an individual athlete take responsibility for her preparedness, which in part is her training (Goldberg, 2011, pp. 205-208). Building confidence comes from turning weaknesses into strengths, or at least putting work into the less advanced parts of one's game (Goldberg, 2011, p. 209). The environment the athlete is in during training must be conducive to encouraging and strengthening confidence. This can come from having written visible goals, that are posted in order to keep an athlete motivated (Goldberg, 2011, p. 210). Often, an athlete is her own harshest critic, but it is important for athletes to, "catch themselves doing something right" to increase confidence. In addition, an athlete should work with a coach who believes in her, which will also help foster confidence.

As a coach, it is essential to realize that it is easier for an athlete to navigate himself out of a slump when a plan is in place (McCarthy, 2012). Every athlete has his own back-story and past experiences, which make him a unique individual. Successful coaches understand this and tailor approaches to communicate and relate to each player in a thoughtful and appropriate manner. At a basic level, past experiences help shape who an individual is, what he thinks, and what he believes about his future. An individual develops belief in himself based on his ability to produce in the past (Bandura, 1997).

We learn to associate poor performance or perceived failure with aversive physiological arousal and success with pleasant feeling states. Thus, when I become aware of unpleasant physiological arousal, I am more likely to doubt my competence...Physiological indicants of self-efficacy expectancy...extend beyond autonomic arousal. For example, in...athletic performances, perceived efficacy is influenced by such experiences as fatigue and pain. (Maddox, 2000, p. 10)

Anyone who has ever erred in front of people, such as misspelling a word while in front of a class, knows this feeling. At that moment there is immediate doubt and questioning of your own

ability to write words correctly. This does not only have to be on the negative side of this continuum however, as a more comfortable and positive physiological state can also influence self-efficiency in a positive and useful manner (Bandura, 1997).

Goldberg's final step of getting out of a slump is preparing for the future, "Insuring Against Future Slumps." Every athlete will have subpar performances. However, every athlete can also be sure of two things: 1) that these outliers are the exception and not the rule, and 2) that failures are not permanent and do not equate to long-term slumps (Goldberg, 2011, p. 242). This final step has two main points. First, to be able to recognize disruptions (such as oncoming stress) that can negatively affect performances and second, to consciously and effectively be able to control one's level of psychological arousal (Goldberg, 2011, p. 210). As aforementioned, a certain amount of arousal is necessary for an individual to reach peak performance (Goldberg, 2011, p. 244). Not aroused enough, and an athlete will often under-perform due to a lack of enthusiasm, while over-arousal may result in "choking" (Goldberg, 2011, p. 244). This is important, but what is more significant is for an individual to be able to read what level her performance nervousness level is. This requires attention to what and how she thinks, feels, and acts (Goldberg, 2011, p. 245). Some athletes who are over-aroused just need to start the game and they will settle into a "good nervousness level," while others need to do special breathing techniques or physically exert themselves during warm-ups to get to a level of arousal where they can reach peak performance. Every person is different, but the best athletes and coaches are able to identify how each person works best before and during competition (Goldberg, 2011, p. 245-250). A useful way to steer clear of a slump is to be able to recognize the early signs "of an impending slump" (Goldberg, 2011, p. 256). For instance, an athlete who is headed for a slump may be trying harder but getting worse results, engaging in negative self-talk, imagining failure, or not having fun before, during, or after competition or practice. Though the onset of a slump may be unavoidable, early detection can make the damage last for a shorter duration and be less

severe. “The best slump insurance you can possibly have is an *awareness* of the early-warning signs of an impending slump. If you know a slump’s early-warning signs then you can immediately take action to defuse it“ (Goldberg, 2011, p. 256).

Conclusion

In conclusion, slumps are inevitable. No athlete is immune to getting into a funk. For this reason, every coach should educate himself on factors that are responsible for leading an athlete into a slump, and the best ways to navigate an individual out of this dark mental place. When in a slump, athletes often feel like they will never be able to gain their self-confidence back. Overtraining often causes physical slumps. Coaches should pace their athletes and make sure that they are giving their teams adequate recovery time and rest days. Psychological slumps occur for a number of reasons, including, too much ego, excessive amounts of stress, not focusing on the present, focusing on opponents, focusing on winning at all costs, not staying focused on goals, and not controlling one’s emotions successfully. For me, the most important factor in avoiding slumps is to not let athletes think about their recent failures, because this will both keep them thinking in the wrong time zone, and focusing on a negative aspect of their game. Instead, as a coach, I should get my athletes to stay present-minded. The best coaches have a system and culture, which address a number of these factors, and push team members to work on fighting these difficulties in practice, daily. Coaches must remember that each individual has a different psychological makeup, formed in part by his past experiences. This will dictate the way a coach should communicate with each individual, to allow each athlete to understand and use the coach’s advice to the fullest. Imagery is a beneficial practice, which can help an athlete work his way out of a slump and increase performance. Even if you have not had your slump yet, it is coming. But do not view this as bad news. Instead, look forward to the challenge of working

yourself out of a deep dark place, to a happy and light mental space where optimal performance is possible. Remember, athletics, just like life, is supposed to be fun!

Chapter 2: Quiet Eye

There are two different kinds of visual concentration, focused and relaxed. I will center on the QE technique, a kind of focused vision in the following chapters. QE is best used when an individual needs to focus on one target, and gain excellent and exact information about where to aim. In contrast, another type of vision is when an individual wants to decipher what is happening all around herself; here a more relaxed type of vision rather than the focused kind, is used.

Relaxed Vision

Players that have proficient ‘court-sense’ do not use QE in the flow of a game. During the action of a game, a player must be aware of himself, his teammates, and opponents, as well as where he is on the court related to these other constantly moving parts. In contrast to focusing on one thing--the basket--here, an individual wants to be aware of what is happening in a 360-degree view around himself, with constantly changing parts. This is the time to use his relaxed type of vision, which takes in all information and gives the individual perspective about everything around himself.

There has been a tremendous amount of research done on the relaxed type of vision and it is very prevalent in athletics. Athletes preparing for the NFL draft train using technology which improves their peripheral vision, decision making, and awareness, which all embody this relaxed type of vision (Wiltfong, 2013). This is commonplace in athletics, as coaches have figured out that athletes who can quickly interpret what is happening all around them make quicker and better decisions.

Relaxed vision is taught in Aikido, in order to be aware of what is happening all around the individual, for example, to be able to “see” an attacker coming from behind. Relaxed vision is also taught to Navy SEALs, who must have an acute sense of their surroundings and be able to

distinguish between potential dangers and normal occurrences. The best athlete is able to have a proficient sense of what is happening around her, yet is also aware enough to know when to focus extensively on one target, where she will use QE. Thus, I am not arguing that QE training will solve all an athlete's problems, or even that it is the most important visual skill for an athlete. I argue only that QE is an understudied and extremely useful technique, specifically for improvement in free throw shooting.

Sports Performance-Enhancement

QE is not the only method to improve athletic performance. There are many other topics that may have been explored, which have been proven to at least help a struggling athlete. One could focus on meditation, weight training, or healthy lifestyle—which would cover sub-categories such as: healthy nutrition/dieting, hydration and sleeping patterns, and substance abuse. Other questions could be explored: does meditation affect the brain and an individual's physiology? If characteristics of the human body, such as blood pressure and breathing, are both slowed down through meditation then this is very useful information for an athlete to have, especially if these physical states are viewed as positive during competition (Brook et al., 2013, p. 1360). It is important to understand that a person's behavior impacts her body.

The decision to focus on QE was made to explore a less familiar tool or variable, to bring light to this different approach and understand it better for my future as a basketball coach. In reality, as a coach, I will bring together many of these aforementioned topics, in order to create a healthy and competitive environment wherever I am fortunate enough to coach.

Before looking directly at QE and free throw shooting, let's take a look at one other sports performance enhancement tool, mental imagery. Imagery has been proven to help athletes get out of slumps. This makes sense, because imagery gives an athlete a mental picture of success instead of repeated failure. According to Munroe, Giacobbi, Hall, and Weinberg (2000),

imagery can be used for a variety of reasons, including controlling emotions. An individual might imagine a past situation where he lost control over his emotions and performed poorly, and instead replace that reaction with an image of a more positive and appropriate response (Munroe et al., 2000). “This may help a goaltender overcome drops in performance (i.e., slumps), or even prevent a reduction in performance following a bad goal, due to interfering emotions” (Gelinas & Munroe-Chandler, 2006, pp. 67-68). Just like athletic skills themselves, such as hitting a baseball, imagery also has to be practiced, in order to be effective (Gelinas & Munroe-Chandler, 2006, p. 68).

An athlete in a slump generally imagines herself making mistakes, whereas a successful athlete sees herself having success. Visualization is a useful tool for athletes; “...the quality of your mental imagery directly preprograms your performance” (Goldberg, 2011, p. 133). Mental imagery is a legitimate and encouraged strategy to help athletes deal with aspects of athletics, with no risk of providing the athlete with any negative value. “It provides you with a safe vehicle to practice the scary, embarrassing, or difficult without fear of negative consequences” (Goldberg, 2011, p. 135). When done right, mentally imagery should include all senses; this makes the event appear more realistic. “When you mentally re-create an experience in vivid detail [color, smell, feel...etc.] you experience a similar physiological response. That is, your brain records the experience as if it were actually happening. Your nerves and muscles respond to the imagined performance, and repeated ‘practice’ can actually program your muscles to react in a particular way” (Goldberg, 2011, p. 135). By using imagery effectively, the athlete improves with practice, so that the athlete will have an easier time knowing what to do when placed in similar situations during competition. “The more lifelike your images, the more powerful they will be in enhancing your performance” (Goldberg, 2011, p. 141). Imagery can be done with an internal perspective (as if seeing your actions from your own point of view) and an external perspective (as if you were watching yourself in a movie). While both of these techniques have benefits, the internal is considered better, because it will make the body and mind feel as if the individual has actually

experienced the event (Goldberg, 2011, p. 139-140). Before visualizing, an athlete must be relaxed, as anxiety and stress may interfere. Relaxation helps facilitate effective imagery (Goldberg, 2011, p. 145).

In a study conducted on free throw shooting for college basketball players, the benefit of imagery was unmistakable. "...94.44% reported that the imagery training had led to technical and/or psychological improvements in their basketball performance. Examples of technical improvements included increases in skill technique and overall game play, while psychological improvements included enhancements in concentration and self-confidence" (Cumming, Hall, Shambrook, 2004, p. 66). When imagery is practiced, and matched with physical practice of a skill, imagery can be a very useful tool in helping an athlete get out of a slump, and prevent further slumps from occurring in the future. This technique would be a perfect compliment for QE to try and help an athlete get out of a slump, as Dr. Goldberg explained, because it gives the slumping athlete 'practice' in doing correct actions. Imagery can be used preceding competition, as a compliment to QE, which is used during competition.

Quiet Eye

Quiet Eye (QE) is the ability to gaze at a target longer and more accurately than normal. "QE is an objective measure of the location, onset, offset, and the [sic.] duration of the gaze recorded while the participant performs a motor skill" (Harle & Vickers, 2001, p. 290). The gaze of an athlete is locked in on an extremely specific target. In all experiments relating to QE, it has been discovered that expert athletes have a longer gaze at a specific target, right before their release, compared to near-experts (Harle & Vickers, 2001, p. 303). In other words, it has been proven that an elite athlete's QE is more advanced than that of a non-elite, skilled, athlete.

QE effects more than just athletes in sports. It can also help other people who are involved in sports, such as baseball umpires. In one study conducted by Millslagle, Hines, and Smith (2013), it was shown that expert umpires with excellent QE were able to locate, see, and in

turn realize where a pitcher would release the ball during a pitch better than non-expert umpires. This is significant because it means that the expert umpires would be able to track the baseball for a longer period of time, which results in more accurate calls (Millslagle, Hines, & Smith, 2013, p. 74). The more time put into researching QE, the more relevant it becomes. Having better QE is significant because it results in better performance across all arenas, including sports, law enforcement, and medical training (Harle & Vickers, 2001), (Vickers & Lewinski, 2012), (Causer, Harvey, Snelgrove, Arsenault, & Vickers, 2014). Vision is crucial to all sports, for every participant, including, athlete, coach, referee, and even to a certain extent fans, who need to be able to locate and focus on the most important aspects of the game, at the right time. There are so many different aspects to each game, vision and the ability of knowing where to look help the people participating in all areas of athletics.

Can athletes adopt a QE training technique to help improve performance? In an experiment performed by Wood and Wilson (2011), a group of soccer players who received QE training and a placebo group were tested in penalty kicks. The results of their tests showed that the QE group had far better control of their visual attention, were much more accurate, and had 50% fewer shots saved by the goalkeeper, compared to the placebo group (Appendix D) (Wood & Wilson, 2011, p. 257). Many of the tests of QE are given in terms of final results of experiments such as Wood and Wilson's, comparing the performance of a group of QE trained athletes to those of a control group. To get better results however, and to learn about what is taking place in the brain when an athlete uses QE, experimenters also used the "Applied Science Laboratories Mobile Eye gaze registration system (ASL; Bedford, MA) that measures eye-line of gaze at 25 Hz with respect to eye and scene cameras mounted on a pair of glasses" (Moore, Vine, & Wilson, 2011, p. 2). This apparatus is attached to a recording system that the participants wear, which transfers the data to a computer (Moore et al., 2011, p. 2). Using this technology,

researchers are able to gather specific information about where the participants' eyes are looking and the duration of the participants' gaze.

In most ASL experiments involving QE there is a control group (referred to sometimes as the placebo group) and the trained group (taught how to use QE.) The control group simply does what they always do, and completes a task, such as putting a golf-ball or shooting a free throw (Wood & Wilson, 2011, p. 257). The control group is given false but plausible information at the beginning of the study, to make them work with maximum effort. For instance, in the soccer study mentioned above conducted by Wood & Wilson (2011), the placebo group was told the research revolved around determining if practicing penalty kicks would make performance better. The QE group, however, received specific training on how to utilize the QE approach. In this same study, the QE group was told to focus on one of the two optimal scoring places. These spots were marked with a "1" and "2" and participants were to shout out which number they were aiming for before their kick. On their way to kick the ball, the QE participants were told to only focus on the specific area they aimed for. Both groups were fitted with an ASL apparatus, which gave the researchers more information about the participants' eyes (Wood & Wilson, 2011, p. 259). In addition, because the athletes verbalized their ideal destination, researchers were able to record whether the desired outcome was taking place (Wood & Wilson, 2011, p. 259). Sometimes video feedback and questionnaires are also used between trials to offer feedback to both groups, and to garner additional information for the researchers. It is important to also note that in experiments where one group is taught and the other group is not, both are drawn from individuals at the same competition level. This seemingly parenthetical point is essential because the difference between near-experts and actual experts often turns out to be the difference between natural QE levels in the two groups (Wood & Wilson, 2011, p. 259).

QE can improve more than just vision. The eyes' fixatation on a very specific target has a whole-body effect. Moore et al. (2011) conducted research on golf putting and measured how

QE influences performance, gaze duration, the speed at which the golf club was swung, and heart rate. Moore et al. (2011) states that, “The quiet eye group performed more accurately and displayed more effective gaze control, lower clubhead acceleration, greater heart rate deceleration, and lesser muscle activity than the technically trained group [the “placebo” group, taught basic putting instructions] during retention and pressure tests (Moore et al., 2011, p. 1005). As Moore states, QE can have an optimal effect throughout the human physiology. This makes sense, because the body of an athlete with a well-trained QE is more relaxed and focused both in general and also specifically, on the target. This, in turn, helps an athlete be more accurate, because there are fewer unnecessary movements and fewer symptoms of anxiety throughout the body. A second study by Wood and Wilson (2012) also aimed to prove this benefit of QE (Wood & Wilson, 2012). This study was set up similarly to the previous one, but this experiment aimed to investigate whether QE can increase psychological control, and how these personal beliefs related to skill change in times of anxiety and pressure (Wood & Wilson, p. 721, 2012). The results show that the QE group not only increased their accuracy and gaze behavior accuracy (which was also proved during their first study), but also, “...QE participants significantly reduced their perceptions of outcome uncertainty (contingency) and increased their perceptions of shooting ability (competence) and ability to score and cope with the pressure (control), compared to practice participants” (Wood & Wilson, p. 721, 2012). The QE group felt more confident in their ability, which is essential to perform an action, such as a penalty kick in soccer, when the athlete feels pressure and anxiety. “QE training significantly increased the levels of perceived contingency, with the QE participants reporting that the outcome was more attributable to skill rather than luck; a perception they maintained under the pressure of the transfer skill” (Wood & Wilson, p. 725, 2012). This study highlights the importance of QE training in coping with high-pressure situations, in which individuals will feel anxiety.

One reason that QE is such an important skill is because the brain can only process so much information at one time. As Vickers (2011) explains, “[performers] must constantly decide where to look, what to attend to, and how to time fixed information with precisely controlled actions. The gaze can be directed to only one location at a time and information central to success must be selected from spatially complex environments, most often under severe time constraints” (Vickers, 2011, p. 219). Sports are not one-dimensional but rather complex and demanding with many things occurring simultaneously. The best athletes know what to look for, when, and for how long. In this study Vickers (2011) investigated a number of fine motor tasks, including in golf, soccer, law enforcement, and ballet. She states, “. . .expert performers have gaze control abilities distinct from those with lower skill levels in being able to acquire the most optimal spatial information thus allowing the neural structures underlying the action to optimally organize” (Vickers, 2011, p. 219). In essence, QE enables an advanced athlete to be able to see what he has to see, when he has to see it. This is one important distinction between less and more skilled athletes in relation to vision.

This exact characteristic of advanced individuals was proven in a study done by Bernardi et al. (2013) investigating the difference between brain activities in professional racecar drivers compared to novices. Using functional magnetic resonance imaging (fMRI), the researchers looked at the difference between 11 professional drivers and 11 volunteers in completing a motor reaction and visuo-spatial task, which measures both quantitative and qualitative information (Bernadri et al, 2013). The task was a low level of difficulty, so that the professionals did not have an advantage. The researchers wanted to see if the two groups had similar brain activity, in a task where they could perform with equal accuracy. Though both groups performed similarly, the significant finding in this study was that the “. . .professional drivers showed less recruitment of task related regions in the brain, stronger connections among task-related areas, and an increased information integration as reflected by higher signal temporal variability” (Bernadri et

al, 2013). This study proves the difference between what is happening in the brain of highly skilled individuals, compared to novices. "...visuo-motor processing in highly-skilled individuals is sustained by a different brain functional architecture, with both 'quantitative' and 'qualitative' differences in brain recruitment...Indeed, the brain of highly skilled individuals processes visuo-motor information in a clearly distinctive manner" (Bernadri et al, 2013), *even* when the task at hand is fairly simple, and a novice individual can perform it at the same level of accuracy.

QE has been shown to be a positive skill in more sports than just basketball. Across the board, QE has been proven to enhance athletic performances. Having a better control of visual focus is critical when dealing with an object that is released to a target at a distance, due to the fact that a player loses all control once the object is out of her fingertips (such as a softball player throwing a ball from the outfield to second base). She may judge the distance, perceive an angle, conjecture about the impact of the air, humidity or wind, but once she lets go, the deed is done (Vickers, 1996, p. 343). No adjustment can be made once the athlete completes the task, and many tasks start with vision. As Vickers (1996) explains, "Instead of being able to maintain control over the object to the target, all control is lost once the object leaves the aiming hand. A distinction is therefore made between aiming skills to near targets and those to far targets where the individual maintains control only to the point of release" (Vickers, 1996, p. 342). This is another reason why QE is such an effective tool for shooting foul shots in basketball, because, as I mentioned, the distance from the free throw line to the basket is 15 feet, and does not change: it's a far target.

When a specific target changes location during multiple trials, an athlete must decipher new information repeatedly, which can improve QE. This is like the athlete having to learn a "new" skill over and over again, because the target is in a different place. In a study done looking at QE in dart throwing, Horn et al. (2013) had a 'random group', which had more variability in

the target both vertically and horizontally, and a 'blocked group', which had less variability in the location of the target (Horn et al, 2013). Horn et al. state that, "The participants practicing with random target changes showed significantly longer quiet eye duration (more than double the time) than those practicing with target changes occurring in blocks" (Horn et al., 2013, pp. 208-209). When the experimenters regularly changed the distance of the target, participants had to re-judge distance, "...comparing current with previous conditions and engaging in what Battig (1966) referred to as inter-task processing" (Horn et al., 2013, p. 206). This constant demand for change of focus stimulates the brain into more active functioning than if there is one constant target, at the same distance, for all trials. This skill development in the brain is increased in the random group, where there is more of a demand on attention and focus, compared to the blocked group, which had similar information that subjects had to decipher about the location of the target. Without knowing it, for example, football coaches may be improving their quarterback's QE by having them throw at receivers running different routes at random.

In addition, QE has been shown to improve even more when the target change was on the vertical axis, as opposed to the horizontal axis. An example of this can be seen in the fairly common basketball drill where the shooter takes a shot and immediately steps to the right two steps to attempt another shot. The aim might change slightly, mainly the direction, but the shot is almost the same once the shooter squares his body and releases the ball. The hoop is still 10 feet high and the distance to the basket is relatively the same. However, when there is a change to the vertical axis, there are many aspects that change, the movement parameters changes, including: the amount of force to use, release speed, the release point, and the height on which he should focus his eyes. In addition, gravity affects the ball (or arrow or dart, etc.) differently at different heights. In basketball, this is like changing the height of the hoop from ten feet to eight feet and then again to twelve feet. It would manifest a drastic difference for players. Perhaps this would be good drill to create, one that would further train the QE for elite basketball players (Horn et

al., 2013). Improving QE for jump shooting in basketball could have three or four hoops next to each other, and a player would go from hoop to hoop and catch and shoot a ball passed to her. All of the baskets would be at different heights, such as nine feet, 10 feet, 11 feet, and 12.5 feet. Though this does not simulate a game, because all baskets are always 10 feet high, this would make the participant have to focus on the different heights, and zone in on the important visuo-spatial differences between each basket, which would help improve QE (Horn et al., 2013, p. 209).

Researchers in this project wondered, “[if], in aiming tasks, the greater cognitive demand of random practice is reflected in longer quiet eye periods, could the learning benefits of random practice also be experienced in the quiet eye period? Lee and Magill, 1983, proposed the “action plan reconstruction hypothesis,” which states, ‘...variable practice benefits learning due to the necessity to reconstruct action plans for the movements ’ (Horn et al., 2013, p. 209). The brain needs to make a new plan to execute the action, throwing the dart accurately at the target, because the target is changing for each trial that the participant throws.

Chapter 3: Quiet Eye and Free Throw Shooting

Every sport and game has a single goal. Usually, the objective is to score a type of point. This is accomplished through various skills and strategies and obviously differs by sport. However, one similarity among all sports is that there are a number of distractions and obstacles which are placed in the team's or the individual's way in order to hinder accomplishing the goal of gaining a point or scoring. These challenges can come in different forms. The opposing team usually tries to disrupt offensive moves by guarding and making scoring more difficult with a defensive presence. Opposing crowds add distractions by yelling or waving hands or signs to create a hostile environment in which the opponent may be distracted. A third type of intrusion can be from poor weather or subpar facilities. Athletes may also feel pressure from their coaches, their teammates, or themselves. However, the one common denominator through all uncontrollable variables, which by design work to make the offensive team's job easier to score, is that the offensive team must be aware, understand and literally *see* the target or goal. Sport relies on vision and the ability to judge distance, and to carry out the skill in question in the most accurate manner possible. Among screaming fans waving their hands, or poor lighting which can negatively affect visibility, how well an athlete can zero in on a target and keep complete focus there for long durations, informs how good his results will be. Therefore, considerable amount of interest of late has been paid to assessing one's visual perceptions in sports, as in the role does vision have in an elite athlete when he is doing well, and conversely, when in a slump (Vickers, 2004).

With all of the bad that comes with a slump, there are positive ways to combat the frustrating state. First, there must be a belief that slumps can and will be broken. Here, there have been studies showing that visual tricks might be able to help trigger the brain into better performances, as Witt, Linkenauger, and Proffitt (2012) proved in their paper, "Get me out of this slump! Visual illusions improve sports performance" (2012). By surrounding a golf hole by

smaller circles, which made the hole appear larger, the experimenters were able to improve golfers' putting results. Similar to an optical illusion, the brain was tricked into thinking the hole was actually bigger than it was, which resulted in better putts. Conversely, when larger circles surrounded the same hole, the putting results of the subjects worsened (Witt et al., 2012, pp. 397-398).

QE is ideal for improving a free throw in basketball because the free throw line is 15 feet away from the target basket. This is far enough away to not be considered a "close" target. In addition, this is a very easy situation to measure, as most basketball players usually have a basic free throw routine, such as dribbling the ball two or three times, taking a deep breath, and releasing the ball. The whole time, a player is usually looking at the basket. There is so much variation of free throw percentage, even throughout professional basketball, that there must be something that the good shooters are doing, which the less capable shooters are not. In part, this is due to player's QE ability, as it has been proven that better free throw shooters have a more advanced QE (Vickers, 1996, p. 348). QE experts have longer and earlier durations than near experts. "Experts had a QE that began ~998ms into the preparation phase and continued for durations of ~972ms on hits and ~806ms on misses. Conversely near experts had a QE that began ~1068ms into the preparation phase and only ~357ms on hits and [actually a *longer* duration] ~393ms for misses. Results therefore highlighted the role of the QE in both the overall proficiency and precise accuracy of basketball free throw shooting (Vine, 2010, p. 25).

There are different ways to teach QE when related to free throws. I will describe how Vickers taught the subjects during her research. Vickers conducted the first official research on QE, and every study I came across referenced her work. Vickers came up with a three-step plan to teach free throw shooting using the QE technique, summarized as:

Step One: Take stance at the free throw line. Look at the rim. Bounce the ball several times and say "nothing but net."

Step Two: Fixate on one specific part of the basket for about 1.5 seconds. (Where on the basket will be different for every athlete. This is the one part of the experiment in which she let the participants have some freedom. In previous research it had been proven that looking at the front, middle, and back of the rim are all equally successful in making shots.) Keep your gaze only on that place and be stable. Say “Sight. Focus.”

Step Three: Shoot quickly, in a fluid motion. The ball will move through your vision of the basket as you bring it up to shoot, do not worry about not seeing for that small amount of time (Harle & Vickers, 2001, p. 295).

The importance of saying “nothing but net” is to calm the player down, while it is necessary for the participant to say “Sight. Focus” in order to ensure that the individual is indeed keeping a steady gaze on the basket (Harle & Vickers, 2001). There are other ways to teach a simple step-by-step process on how to use QE in free throw shooting, but this is a simple one that has been used since Vickers initially conceived it.

In this study by Harle and Vickers (2001) that I used to describe the QE teaching process, the two researchers studied three different Canadian national level basketball teams for two seasons. The researchers trained Team A in QE techniques, and used Teams B and C as control groups. After two seasons of QE instruction and practice, Team A improved their free throw percentage by 22.62% and shot a team average of 76.66%. Team B’s percentage declined by 1.5% and shot 66.18%, and Team C improved by 12.6% while shooting 74.05 (Appendix E) (Harle & Vickers, 2001, p. 298). It should be noted that the researchers state that the key to the improvement is the training that took place, how QE was taught, and most of all, what the athletes focused on when shooting a free throw (Harle & Vickers, 2001, pp. 303-304).

In another study done by Vickers (1996), she proved that experts (78% free throw shooters and above) had a much longer fixation on the basket and also possessed an earlier fixation offset in their shooting motion (Vickers, 1996, p. 342). Essentially, this means that the

experts were able to identify and zero in on their exact place on the rim that they would focus on more quickly than the non-experts, which let them look away from this spot more quickly as well. Experts were quicker to scan with their eyes *after* the fact of release. In basketball, the moment a free throw is live, if the ball misses, it is essential to be ready for play, so having speed in visual acuity after ball release is also advantageous for experts.

Psychological stress, expressed as anxiety, is an integral part of sports. Players in a slump experience are more anxious than non-slump players; they feel the anxiety more, choke more, and are more depressed than non-slump players (Vine & Wilson, 2011). Basketball is a pressurized game and often comes down to high demand situations. Often, especially in close games, free throws have to be made late in the game to win. QE training protects the athlete from being too sensitive to outside stimuli (Vine & Wilson, 2011, p. 6) and therefore allows for less anxiety, as demonstrated in the article “Quiet eye and choking: Online control breaks down at the point of performance failure” (Vine et al., 2013). In this study, Vine et al. (2013) investigated golf putters in a shootout scenario, which increased pressure and anxiety. There was a cash prize, to incentivize the winner. During the last putts that were missed in the shootout, which eliminated participants from the study, QE durations were significantly shorter (Vine et al., 2013, p. 1991). “...Maintaining a long QE duration is critical for performing an aiming task under pressure. These findings are consistent with previous research that has demonstrated that choking under pressure is related to shorter QE durations...increased anxiety impaired online control rather than preprogramming—the missed putt had a shorter QE duration than the other putts because it was attenuated rather than having started later” (Vine et al., 2013, p. 1992). Regardless of the situation, such as a circumstance that produces anxiety, QE enables an athlete to stay focused on the current task, with less attention given to the distractions.

QE training can help basketball players make their free throws late in game, in nervous situations, like that night during my sophomore year of high school. Vine et al. (2012) studied

how QE can help free throw shooters in anxious mental states brought on by high-pressure scenarios. The results showed that QE is very useful. “As sport is often performed in evaluative settings it was also noteworthy that the QE-trained participants maintained (or exceeded) their performance levels when anxious” (Vine et al., 2012, p. 6).

I have now proved how QE training can effectively help basketball players “stay cool under pressure,” just like that night during my sophomore year, and quell their anxieties in high-pressure situations. Taking this point a step further, QE training therefore has the ability to pull a basketball player out of a free throw slump as well. When an athlete is in a slump, she will become fearful of going to the free throw line. As Begel (2012) points out, a slump can give an athlete the symptoms of depression, making a simple trip to the free throw line undesirable and both mentally and physically unpleasant and uncomfortable. A player late in the game may give up the ball, or do anything *not* to get involved in a play to possibly be fouled, just to avoid this highly pressurized situation. As a coach, this QE technique is a tangible teaching process, which will help a fearful and anxious player out of her slump.

Chapter 4: Conclusion

As a Future Coach

QE makes for better performances. Expert athletes have a better QE than non-expert and near-expert athletes. It is important to remember that practice can improve skills. As a future coach, I see myself utilizing the QE technique, and teaching my players Vickers' simple three-step protocol described above. As I have explained, great shooters already have a competent QE skill. I may not want to interfere with a free throw shooter who is already shooting over 90 percent. However, I believe that I will approach the QE teaching technique with my less-skilled free throw shooters from day one. I will present it in different ways, to different athletes, as I will need to figure out what irks each individual, and what is holding them back. It could be due to form, fear, anxiety, a scarring experience, or another reason, so the onus is on me to figure this out through clear dialogue. Once I have this information, I will then present the QE method to each player who warrants it. Improvement comes from quality practice. Practicing habits such as free throw shooting with the wrong technique can hurt an athlete for the future. This is why I will target the under-average free throw shooters on day one, so that I can help them improve their fundamentals and practice the right way.

Future Research

Future research in the QE topic should investigate how QE can be used in combination with other mental training skills, for example, imagery or meditation. It is one thing to control vision to the best of one's ability. It is another thing to control the mind, through breathing exercises such as meditation. It would be interesting to see if these two combined would make for even better results. A researcher could use a control group, who are expert shooters with a trained QE. The experiment group would be expert shooters with high QE who were also led through visualization exercise before, in the middle, and after multiple free throw testing

sessions. This would make for a very interesting and relevant study and results would potentially benefit future coaches!

Another topic that should be looked at is how skilled athletes in one sport, who possess a high QE skill-level, transfer to other sports. This has been done before, but could be looked at more closely. Terrell Owens has tried to bowl professionally, and NFL quarterback Tony Romo has tried multiple times to qualify for professional golf tournaments. Owens and Romo are both superior athletes, and it is quite likely they both possess a high QE skill. However, is the problem that they have just not had enough hours of technical practice at their second sport, or is their QE only minimally transferable to a new endeavor? This would be a hard topic to research, because it would be difficult to measure the difference between QE failures and a lack of hours practicing and playing a new sport. However, if QE were transferable, even only to an intermediate margin, this would be an even stronger endorsement of the benefits of QE (Rienhoff et al., 2013, p. 1).

QE Outside of Sports

Just as there is more to life than sports, QE can also be useful outside the athletic arena. Over the last year there have been several controversial police shootings. Although there are racial and economic factors that played a part in these incidents, in all cases a police officer had to make a split-second decision about what to do, shoot or not shoot. Joan Vickers and William Lewinski (2012) actually conducted a study on this subject; the results speak clearly to the benefits of QE. The study had each participant, a police officer, standing about five meters away from an individual who had his back turned, who potentially could be a danger. This experiment was made to imitate a rapidly unfolding event, in which the visible cues to an officer will dictate his action (Vickers & Lewinski, 2012, p. 106). The assailant would turn around, either holding a cell phone or gun. There were two main conclusions from this study. Firstly, 61.5% of the rookie officers shot the individual when the assailant turned around with a cell phone, compared to just

18.5% of the elite officers. There was also a difference in shooting accuracy, 53.8% for the rookies, compared to 74.6% for elite officers. Surprisingly, there was no real difference between these two groups in how long it took them to draw, aim or fire their weapons, proving that the issue was not another physical difference between the two groups than QE, yet decision making and ability to focus in crunch time was significantly better among the elite officers (Vickers & Lewinski, 2012, p. 114). Secondly, during the last 700 milliseconds before the shot, the rookies brought their eyes back to their gun 84% of the time, compared to only 23% for the elite group. During these milliseconds, information was lost which lowered their decision-making ability, shown by the fact that in 50% of trials where the rookies took their eyes off of the assailant, they fired. The elite officer's QE duration averaged 318 milliseconds, while the rookies averaged only 262 milliseconds (Appendix F) (Vickers & Lewinski, 2012, p. 114). (There is a significant difference between shooting a pistol in a split second, and being at a free throw line with 10 seconds to complete the shot. The QE duration for an elite officer is 318 milliseconds on average, while the QE duration for an elite free throw shooter is a several seconds (Vine, 2010, p. 25). The different tasks, and severely different scenarios—a potential life-threatening scenario compared to a basketball game—explains the difference in the numbers between the two tasks. An elite officer has to pull a trigger, while a basketball player must bend knees, raise the ball, and release it) To take a step back, QE has a place in society even outside of sports. QE, as explained, can contribute to decisions that influence fatal events.

Another example of the benefit of QE, beyond the world of sports, can be seen in the medical field. In a study by Causer et al. (2013), it was proven that QE trained surgical residents had higher performance scores on tying one-hand square knots, compared to technical trained [trained with traditional methods] students (Causer et al, 2013). One-hand square knot tying is a skill that surgeons must master, as this knot is used to close sutures (Causer et al, 2013). The QE and technical trained groups both underwent pretest, training, retention, and transfer tests with

their respective styles. The QE trained group was both more effective and quicker in their performance (Causer et al, 2013). Thus, QE is relevant in many different realms, not only athletics. Having a better QE should help experts make quicker decisions based on enhanced and prompt visual possessing skills.

Chapter 4: Concluding Remarks

In order to conclude this paper I would like to take a step backwards from the specifics, to make a general point about the relevance of QE, especially related to the world of athletics. Shaquille O'Neal is generally revered as the most dominant basketball player ever. He was strong, powerful, and even dunked the ball so hard several times that he completely shattered the backboard. His kryptonite, however, was his free throw shooting. Shaq had a career free throw average of 52.7%. He is one of only two players to miss more than 5,000 free throws (along with Wilt Chamberlain) (Hollinger, 2008). During one game, in the year 2000, he missed all 11 of his attempts. Shaq was so dominant that opponents would often utilize the "Hack-A-Shaq" technique where they would intentionally foul him, making him have to earn his points at the foul line. This technique happens today with other dominant players, such as DeAndre Jordan, who also struggles from the free throw line.

Shaq's hands are gargantuan which made it hard for him to get a decent grip on the ball before shooting it. Does this mean that all of his free throw deficiencies could be attributed to physical causes? No, I do not believe so, because there are other NBA players with hands just as large, who have shot a better percentage. Shaq was very dominant as a player, but despite his size, he had mental issues and demons on the court, just like every player has. Was his pitiful free throw shooting all mental then? No, I do not believe this was solely responsible either. Shaq is a jokester, and though he worked hard at his free throw shooting in practice, I do not believe that he put his full self into trying to master how to become a better free throw shooter. He had a

disabling belief that he was unable to shoot free throws, so he did not give himself the best chance to make them. Essentially, he had already missed the shots before he stepped up to the free throw line.

QE could not have fixed Shaq and magically turned him into a proficient free throw shooter, which, in basketball terms, is generally considered above 90%. However, I believe that I have shown through this paper that, had Shaq been trained properly with the QE technique, he could have improved his free throw percentage significantly, say to 65-70%. Though that benchmark would be nothing to brag about to anyone in the NBA, over the course of a 19-year career, this improvement surely would have helped his teams win more games, while also increasing the probability of Shaq's receiving more praise and accolades. Had Shaq missed only 4,000 free throws, he would have gone from 10th to fifth on the all-time scoring list in NBA history (Hollinger, 2008). Opposing teams would not have been able to continue with the "Hack-A-Shaq" technique, as he would have been able to make enough of his free throws to make the strategy ineffective. In addition, and maybe most importantly, Shaq would not have had to be scared and embarrassed about going to the free throw line!

This is where I believe the benefits of QE can be significant in the future of athletics. There are always going to be really tall basketball players who shoot the ball clumsily, with a poor percentage. Realistically, these players will never be great shooters. However, by being taught the QE technique explained throughout this paper, it is my opinion that they can be less bad shooters, which in turn, helps their teams win more games, and improves their self confidence.

There are two main objections against my main argument that I want to refute. The first objection is that in the grand scheme of things, vision is not the be-all-end-all in athletics. Sure, an athlete needs to be able to see her surroundings, including teammates, opponents, and targets, but this is not what the game is *truly* about. If an athlete is powerful and skilled enough, her

vision becomes less significant, because the power and skill of the athlete will take care of any visual deficiencies. In response to this point of view, I argue that this is a misunderstanding of how sports actually work. It is true that in some sports, vision is more necessary than in others. For example, vision is more central to an archer than a lineman in football. However, in all sports, there is an aspect of vision that, with QE, can be improved. My argument is not that QE will make an average player an all-time great, or help any high school basketball player make it to the WNBA. My point is that QE can help a slumping athlete improve free throw shooting. Coaching is all about finding what “buttons” to press on each athlete, to make her improve. How do you get the most out of each athlete, so that she reaches her full potential? QE is useful because it can help an athlete improve marginally, which can be useful for a coach, especially when dealing with an athlete in a slump. Another objection is that an athlete should rely on muscle memory. An example of this is a basketball player should be able to make a free throw “with her eyes’ closed,” because this skill has been practiced so often. I am one of the biggest advocates of practice. I believe that you should practice a skill not until you can do it right, but until you can’t do it wrong. However, this second objection is again a lack of understanding of how sports work. Visual attention and the ability to focus on a target *is* part of the muscle memory process in sports. In free throws, before a shooter can go into her routine, she must first locate the basket and fix her eyes’ on it. This means that when a basketball player is practicing shooting free throws, she is gaining muscle memory in her physical form, such as bending her legs, staying squared to the basket, and following-through after the release, as well as gaining practice at her visual focus, which is improving her QE.

Slumps happen to all athletes, even elite ones. Derrick Rose had a stretch this NBA season where he shot 26.3 percent from the field and 17.4 percent from the three-point line, over the course of five games (Wire, 2015). During one of these games, he shot 2-15 from the field (Wire, 2015). Derek Jeter had a two-month long slump during the 2004 season, where he only hit

4 homeruns, 23 RBI and batted .220, the year before during the same span he had 10 homeruns, 52 RBI, and hit .324, Jeter boasts a .310 career batting average (Merron, 2004). These two future hall-of-fame athletes have found themselves in slumps. These slumps influence athletes both emotionally and neurologically. Athletes perceive themselves in a worse light, and their body and their vision react differently in competition as a result. Athletes then feel more anxiety and get depressed more. I believe that I will be able to use QE training as a means to help my future athletes, especially those in a slump at the free throw line. Using QE, I will try to train my players out of this dark state. QE training lowers anxiety, helps focus, lowers distractions, and gives both a player and coach a tangible exercise to work with to help the player out of a slump.

In conclusion, athletes, coaches, and fans appreciate that vision is a significant part of success in athletics. By improving this element of vision, athletes can achieve better results. Like most effective approaches in any sport, QE is relevant to many sports, such as football and softball, and even less popular sports, such as archery and curling. The main issue regarding QE is that not many people are aware of it and as a society that loves sports, we do not understand the importance of QE and how it is related to success in athletics. I believe I have proved that it is quite relevant.

Research done on QE has shown time and again its central role in enhancing performance and increasing accuracy both in and outside of the world of athletics. As I have shown throughout this paper, when taught, QE can be adopted by individuals to increase performance, execute well under pressure, and help work out of a slump. By integrating QE with other encouraging coaching techniques, I hope to be able to raise the basketball performance of my players in general and especially those who are in a slump. Gathering effective tools that have scientific backing and a track record of success is every coach's job and I now place QE in my own quiver to take out when needed with players that I will be lucky enough to have the opportunity to coach.

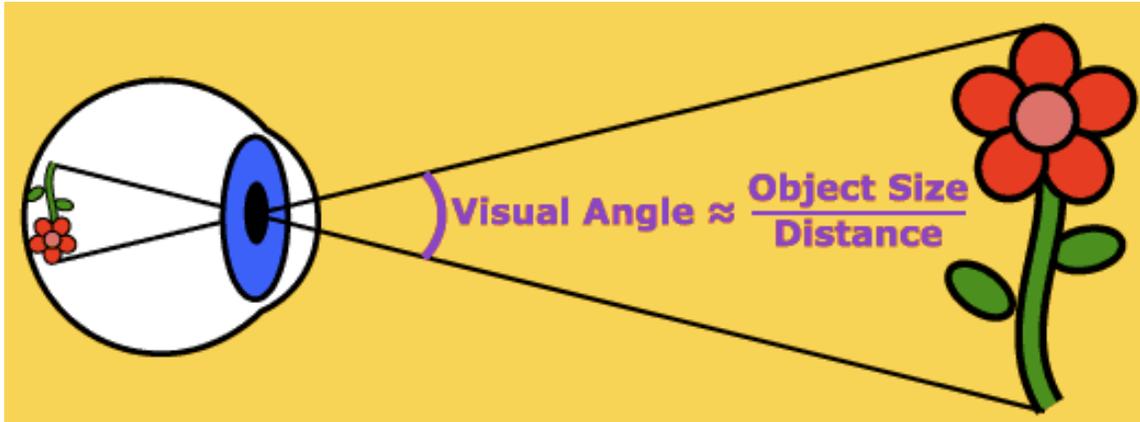
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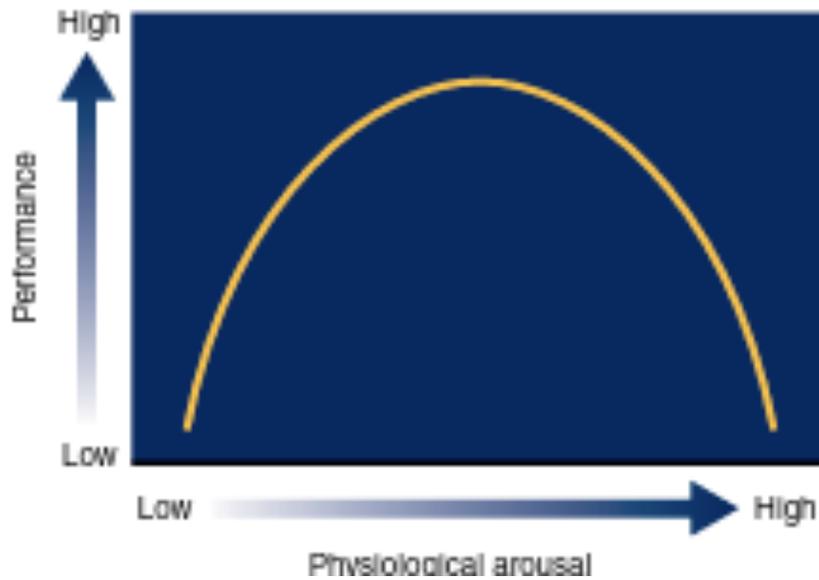
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Appendix A



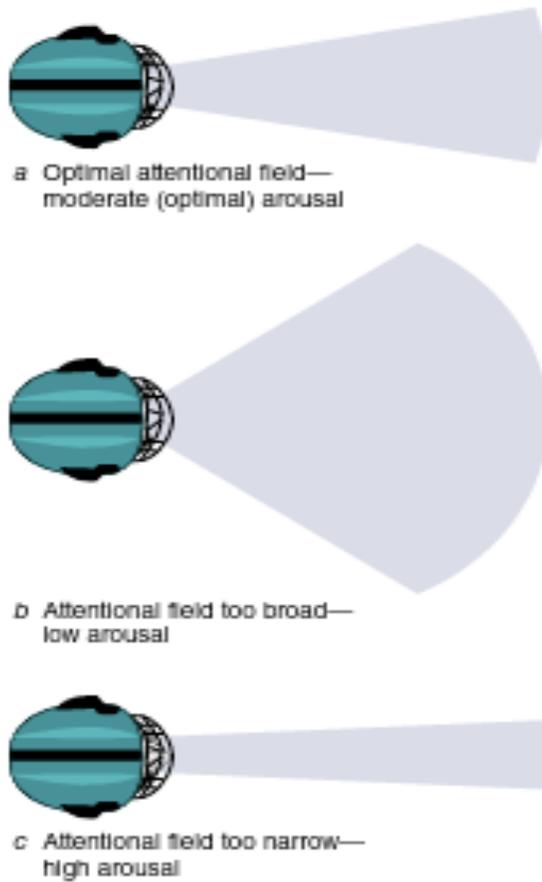
The Visual Angle is roughly the object size divided by the distance. The object is inversely projected backwards in the back of the eye at the retina (Wolfe, J., Kluender, K., & Levi, D., 2011).

Appendix B



The “Inverted-U Hypothesis” explains the relationship of an athlete’s arousal state connected to performance. There needs to be a certain amount of arousal in order to enhance performance, but too much, will hinder it (Weinberg, Gould, 2011, p. 88).

Appendix C



» **Figure 4.8** Attentional narrowing under conditions of high arousal.

Stress can affect an athlete physiologically, with relation to vision. Optimal arousal makes an athlete have the perfect attentional focus. When an athlete is not aroused enough, vision is too broad, and when an athlete is overly aroused, vision is too narrow (Weinberg, Gould, 2011, p. 94).

Appendix D

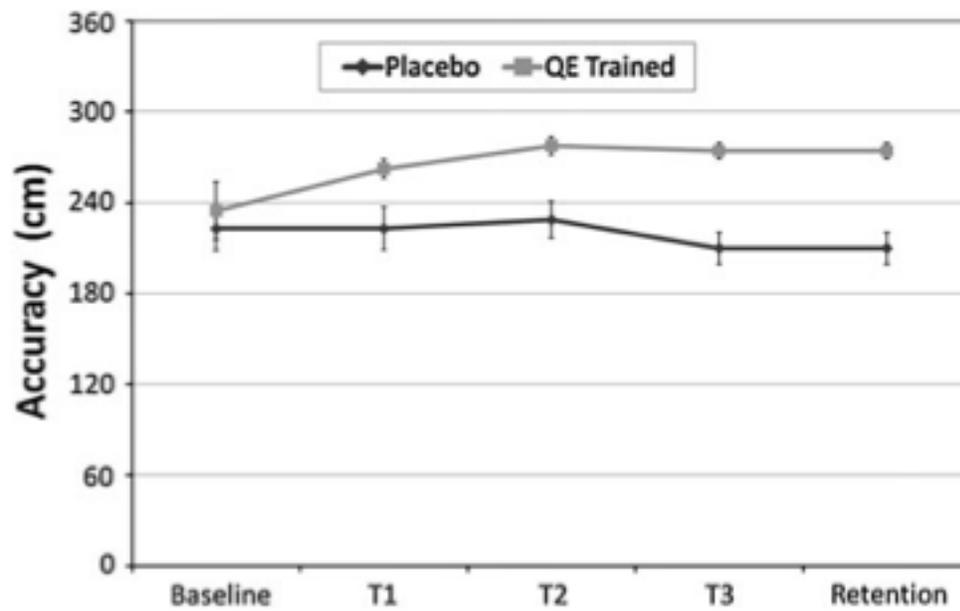


Fig. 1 Shooting accuracy (mean displacement of shot location from goal center) for QE and Placebo groups in baseline, training, and retention weeks (with s.e.m.s)

(Wood & Wilson, 2011).

Appendix E

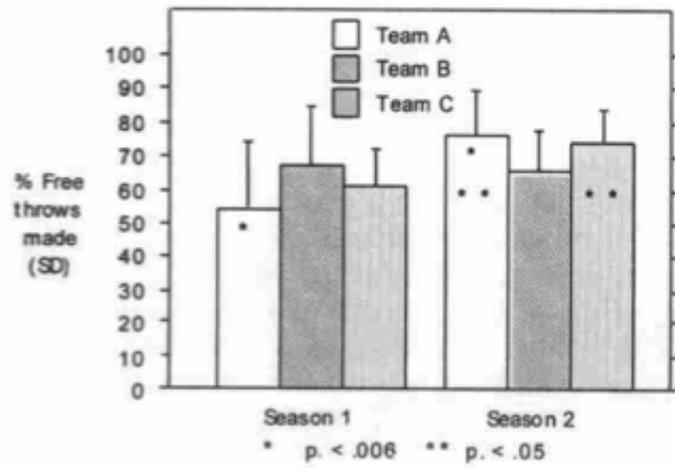


Figure 6 — Percent free throws made (FTM%) by Teams A, B, and C over Season 1 and Season 2 of league play.

(Harle & Vickers, 2001, p. 299).

Appendix F

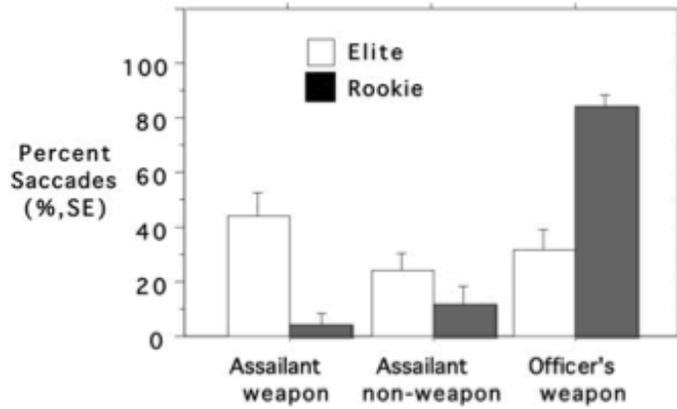


Fig. 7. Percent of final saccades of the elite and rookie officers on the assailant's weapon/cell locations, assailant non-weapon/cell locations and the officer's own weapon.

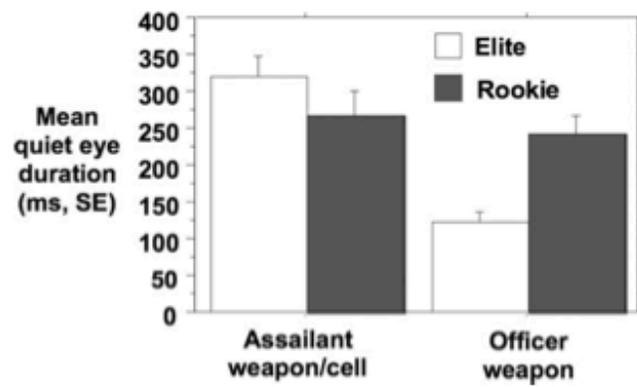


Fig. 8. Quiet eye duration of elite and rookie officers to the assailant's weapon/cell and to their own weapon.

(Vickers & Lewinski, 2012, p. 113).