HIGH SCHOOL EDITION
Journal of Student Research
Volume 12 Issue 3 (2023)

How Fear Training and Other Unique Training Methods Help South Korea Maintain Dominance in Archery?

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ABSTRACT

In the modern day, South Korea is the most successful country in archery at the Olympics. The South Korean Women's team is particularly known for their legendary record of gold at every Olympic Games since 1988. This success is not mere luck, however, as the South Korean archery team goes through much more rigorous and unique training compared to other countries. For one, archery is more widespread in Korea, allowing more people to try out the sport. The school system set in place in South Korea encourages the development of archers at a young age, which ultimately leads to more and more South Koreans pursuing archery as a career. In addition, the South Korean archery team goes through unique forms of training, such as mindfulness training, exposure therapy, heart rate analysis, equipment optimization through shooting robots, and general sports psychology techniques like positive self-talk and imagery. All of these training methods provide South Korean archers with benefits such as increased confidence, reduction of fear, higher concentration and focus levels, as well as superior insight into how their shot goes through. South Korea's long success in archery is backed up by South Korea's intense dedication to their training, through their long hours, as well as their commitment to go through various forms of unique training to improve.

Introduction

Archery is a sport that requires one to have the physical capabilities to shoot every arrow the exact same, as well as the mental capacity to maintain this consistency even when the stakes are high such as during a competition (Einsmann, 2020). Every arrow must be shot with intense focus and control in order to consistently receive high scores and perform well at competitions. Competitions can also last up to 4 hours and require the archer to shoot nearly 100 arrows. Therefore, archers must train themselves to build up physical stamina. To support the physical side of archery, professional archers need to maintain good health and strength in order to shoot at peak performance. They do so by doing exercises such as cardio and weightlifting, outside of archery (Walston, 2018). Top archers also often take nutrition into consideration, controlling what foods they eat to ensure they get a proper, well-balanced diet (Walston, 2018). As mentioned before, archery is a sport that prioritizes consistency, as it involves repeating the same action over and over again. To train, professional archers may shoot multiple hours on end almost everyday to perfect their technique and build up their physical stamina and endurance (Holbrook, 2019). Casey Kaufhold, a United States Archery Team member and 2020 Tokyo Olympics, stated that when she was 15, she practiced up to five hours a day after school, almost daily, in order to build the focus, strength, and endurance needed for competitive success (Holbrook, 2019). Other professional archers may practice upwards of 8 to 9 hours a day, nearly daily, in order to perfect their craft.

While training physically for archery is important, an even larger part of archery is the mental aspect. Kim Youngsook from the Korean Institute of Sports Science, also the sports psychologist for the Korean archery team, once said, "In other sports, sports psychology is typically only about 20 to 30 percent of performance. In archery, they say it's probably closer to 80 percent. The real deciding factor of performance in archery is an archer's mental strength and confidence" (Manocha, 2018). The heavy reliance on mental strength in archery is due to the pressure that comes

with the extremely small margin of error in order to win archery competitions. The outcome of an archery competition can be completely changed as a result of a single arrow. By improving one's mental strength, archers can better isolate themselves from these outside pressures, and achieve complete focus solely on their process, not the outcome ("An Intro To Archery Mental Training," 2021). In addition, a strong mental game can help archers control their emotions, some of which can harm performance, such as nervousness and fear. Common methods to build this strong mental game include adopting a positive mindset, focusing on every individual arrow, understanding and trusting the process of a shot, and evaluating mistakes after every arrow ("An Intro To Archery Mental Training," 2021). In addition, general sports psychology techniques also play into archery, such as imagery and positive self-talk ("An Intro To Archery Mental Training," 2021). In archery, every little advantage is important, as the difference between first or second place is often as close as a single point. By having superior mental strength over their opponents, archers get a large advantage during competitions.

South Korea is, by far, the most dominant country in the sport of archery. After the 2020 Tokyo Olympics, South Korea holds an impressive 43 medals in archery, 27 of which are gold. The second country in running, the United States of America, has 33 total olympics medals, with only 14 being gold. Korea's success in archery can be attributed to many things, but the main factor lies in the sheer dedication that the Korean Archery Association places on optimizing the performance of the country's top archers, compared to other countries. For instance, South Korean archers often hold practices in large baseball stadiums to make the athletes more accustomed to the large crowds and loud noises normally present at large competitions ("The Secrets of Korean Archery," 2019). For the 2008 Beijing Olympics, the Korean Archery Association built a replica of the Beijing archery stadium for the Korean athletes to practice in, in order to become more familiar with the setting and feel of the stadium ("The Secrets of Korean Archery," 2019). Prior to the 2012 London Olympics, South Korea sent experts to the venue at London where the archery games would take place, in order to study the rain and wind patterns; they then used this information to find an optimal practicing location in South Korea that mimicked the conditions of the tournament as closely as possible ("The Secrets of Korean Archery," 2019).

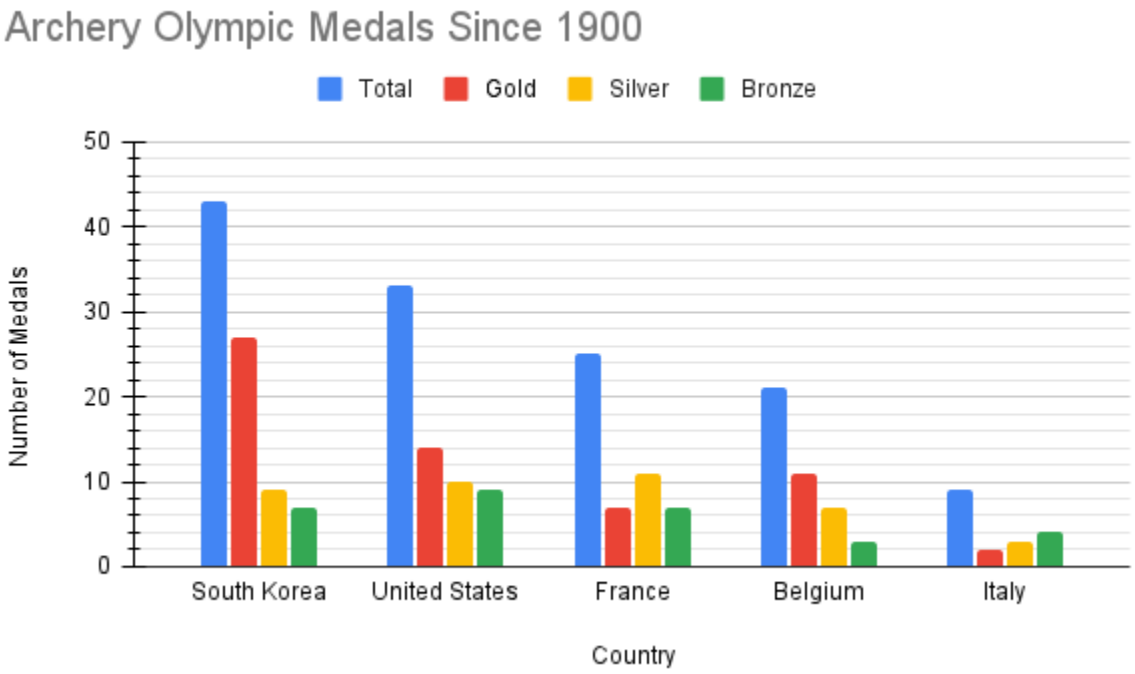

Figure 1. All archery Olympic medals won by South Korea, United States, France, Belgium, and Italy since 1900. These countries hold the top five most medals for the archery event at the Olympic Games.

South Korea's archery success is also largely due to the system in place in the country. Korea never relies on a select few archers to consistently represent their country at large competitions. Instead, the country has many talented and skilled archers to choose from, for each competition. In South Korea, talented archers are found and developed from an early age through archery programs made widely available to Korean elementary students; there are over 100 elementary level clubs around the country ("The Secrets of Korean Archery," 2019). More skilled and talented archers within this young group of children will then move on to continue archery into middle school and high school programs ("The Secrets of Korean Archery," 2019). From here, only a fraction of these archers pursue the sport into university, with those more successful joining professional teams as adults ("The Secrets of Korean Archery," 2019). This system of finding talented archers at a young age and developing them over many years is one which is unique to South Korea and is largely the reason why the country has such a large pool of skilled archers. South Korea's national team selection trials is a series of competitions spanning 7 months, designed to select the top 8 archers of each gender and category to join the national team ("The Secrets of Korean Archery," 2019). Due to the large number of high-performing archers in the country, the South Korean national archery team selection trials are widely regarded as the toughest, most competitive archery team selection process in the world. The 7-month duration also tests the athletes' endurance and consistency over a long period of time, in order to eliminate any possibility of luck or uncontrollable external factors skewing the results. In addition, no favoritism is present in these trials, so archers that have historically performed well in past competitions may be eliminated from the team if a new and upcoming archer performs better than them during the trials ("The Secrets of Korean Archery," 2019).

South Korea also utilizes several techniques in the training of their archers. Some of these techniques are unique to South Korea, such as the use of fear training or exposure therapy and analysis of heart rate. Others are more common and seen in the training of archers in other countries, but South Korea's sheer focus and emphasis on them make them particularly important in South Korea specifically. The rest of this paper will uncover these unique aspects of South Korean archery training and the science behind them, as well as their effectiveness and importance.

The Use of Heart Rate Monitoring to Analyze Levels of Anxiety

As a part of their training, the South Korean archery team uses a video-based contactless heart rate monitoring system created by Hyundai Motor. The device works by detecting small changes in an archer's face color to measure and record their heart rate (Kang, 2021). The team records their athletes during practice using the contactless heart rate monitor (Kang, 2021). After, the archers and their coaches review the footage, along with the measured heart rate. The athletes and their coaches can see in what parts of their shot process their heart rate fluctuates the most and use that information to adjust and train effectively.

It is estimated that anywhere from 30 to 60 percent of athletes experience sports performance anxiety, the feeling of anxiety that often plagues an athlete during a stressful competition (Swaim, E). Archery is no different, as many archers face the pressure of performing well and fear the thought of failure during situations such as competitions (Walston, 2019). Heart rate increases when individuals are under pressure or under psychological stress (Ahmad, 2016). Stress response activates two main physiological systems: the fast action of the sympathetic adrenal-medullary axis and the relatively slow action of the hypothalamic-pituitary-adrenal axis (Lu & Zhong, 2023). The hypothalamus signals the pituitary gland to send another signal to the adrenal gland, which in turn releases stress hormones such as cortisol and adrenaline (Lu & Zhong, 2023). These hormones can have effects such as increasing blood sugar, heart rate, and blood pressure (Lu & Zhong, 2023). Thus, an increase in heart rate indicates an increase in these hormones, and thus increased overall stress and nervousness in the body. Stress and nervousness can interrupt with body coordination and produce tremor when performing sports, which is especially detrimental in shooting sports such as archery, which require great precision and the skill of staying still (Ahmad, 2016). Aside from this, being in a state of stress and nervousness causes all athletes, including archers, to be more prone to making mistakes (Walston, 2019). By measuring and analyzing the heart rate of each individual South Korean archer and how it fluctuates or steadies during

their shot process, the archer and the coach can work to identify moments in their shot where they may feel more nervous or stressed, and work to improve this aspect of their mental game.

The use of contactless heart rate monitoring has been tested on a large scale at the 2020 Tokyo Olympics. At the games, the heart rate of 122 archers out of the 128 competing archers was measured while shooting using a high-frame rate camera placed 12 meters from the shooting line (Lu & Zhong, 2023). The camera uses similar technology as the one created by Hyundai Motor to measure heart rate, inferring the athletes' heart rate in real-time on the basis of the athlete's skin reflectance and slight changes in color (Lu & Zhong, 2023). The researchers took the heart rates of the archer before each shot. Compiling the data recorded through the archers' scores, as well as the respective archer's heart rate, the researchers found interesting data. Across all the archers, a mean heart rate of 135.9 bpm and a mean score of 8.81 per each arrow was found (Lu & Zhong, 2023). The max score for an individual arrow is 10. Using regression analysis, the researchers found that across all archers, the general standard was that a heart rate increase of 1 bpm led to a 0.004 point decrease in the arrow score of the archer (Lu & Zhong, 2023). Through this experiment, the researchers were able to find that archers with a higher rate averaged a lower arrow score than archers with lower heart rates.

The science behind increased heart rate reveals that having a higher heart rate is indicative of higher stress levels (Lu & Zhong, 2023). This is especially detrimental to shooting sports like archery, which require great precision and steadiness to succeed, two attributes that are severely hindered by stress and nervousness (Walston, 2019). In addition, the experiment held at the 2020 Olympic Games also revealed that the archers competing in Tokyo with higher heart rates shot lower scores compared to archers with lower heart rates during the elimination matches. The combination of science and the experiment reveal that higher heart rate greatly decreases archery performance. Therefore, the use of heart rate monitoring by South Korean archers is beneficial, as it can give insight into a potential flaw for each archer. One archer may have a higher average heart rate than another, which might lead to the coach working with that athlete specifically to help train their nervousness or anxiousness.

Mindfulness Training to Build Better Focus

Mindfulness is a skill that is universally recognized by archers as a tool to build mental strength. While some professional archers may practice simple exercises like meditation to become more mindful, South Korean archery has mindfulness training greatly ingrained within the training regimen of its archers. For instance, Hyundai Motor Group, a longtime supporter of the archery scene in South Korea, worked with psychological experts from the Korean Sports Policy and Science Institute to design a meditation app for South Korean archers (Kang, 2021). This app was tailored specifically for archers and works to help South Korean archers maintain a comfortable and relaxed psychological state whenever they need, whether during stressful practice sessions or high-pressure competitions (Kang, 2021). It is also known that South Korean archers practice meditation extensively; the South Korean Archery Association designed personalized meditation programs for each athlete, run by professional sports psychologists (Lee, 2021). This program runs through their training and is also made available during competitions in case archers feel anxious or nervous (Lee, 2021). It is evident that South Korean archers focus on training their mindfulness ability.

The neuroscience behind mindfulness is an area of study that is still relatively new in the scientific world. One study was conducted in order to uncover the science behind this psychological practice. The study found that both the dorsal medial prefrontal cortex (dmPFC) and the anterior cingulate cortex (ACC) are activated during mindfulness meditation (Grecucci, 2017). The cingulate cortex is known to play an important role in attention, motivation, and motor control. The ACC is activated in tasks with an emotional overload, while the dmPFC is activated by cognitive control tasks (Grecucci, 2017). The researchers reasoned that when a mental event such as a thought interferes with one's focus or attention, the ACC may work to maintain attention through a regulation mechanism that prioritizes cognitive control (Grecucci, 2017). The researchers also found that the activation of the ACC is more pronounced in experienced meditators that regularly practice mindfulness compared to inexperienced meditators (Grecucci, 2017). Another study was also done, which revealed a connection between mindfulness and the hippocampus (Riopel, 2023).

The hippocampus is the region of the brain that is associated with memory and also aids in regulating the amygdala, the region of the brain primarily connected with emotional processes. The study found that the hippocampus became more active in people following mindfulness training (Riopel, 2023). The sum of these two experiments reveal that the anterior cingulate cortex and the hippocampus are both regions of the brain that become more active following mindfulness training.

Mindfulness training is important because it has been shown to provide various psychological benefits that also improve archery performance. For one, becoming more mindful is known to improve one's ability in regulating their emotions (Cherry, 2022). This is a very important skill in archery because for a shot to be smooth and fluid, the archer shooting the shot must be calm, relaxed, and confident. During competition, archers may feel anxious, so it is important that they control their emotions and mitigate any negative feelings. On a similar note, becoming more mindful has been known to reduce overall anxiety and stress (Cherry, 2022). As mentioned before, archers must stay cool and collected during competitions. Feelings of anxiety and stress work against this goal. Therefore, the reduction of these feelings helps an archer become mentally stronger and aids in better shooting performance.

A study was conducted by a set of researchers investigating the question of whether mindfulness training positively impacts skills associated with good archery performance. This study included 11 elite recurve archers in the Turkish National Archery Team. The researchers required participants to take the Ottawa Mental Skills Assessment Tool-3 (OMSAT-3) and the Five Facet Mindfulness Questionnaire, before and after an 8-week program that incorporated exercises based around focus, awareness of breathing, as well as other mindfulness practice skills (Terzioğlu & Çakir, 2020). The results of the study revealed that the participants' mean score of the OMSAT-3 in the relaxation subscale before the mindfulness program was 20.64, while the mean score in the post-program OMSAT-3 in relaxation was 22.36, indicating a 1.72 mean increase (Terzioğlu & Çakir, 2020). In addition, the researchers found that the mean score of the OMSAT-3 in the refocusing subscale before the mindfulness program was 13.09, while the mean score in the post-program OMSAT-3 in the refocusing subscale was 15.91, indicating a 2.82 increase in mean score (Terzioğlu & Çakir, 2020). Researchers were able to determine that, after the participants went through the 8-week mindfulness training program, their skill levels in relaxation and refocusing, two integral skills in archery, increased significantly.

Another experiment was held by another group of researchers that aimed to test mindfulness training and its direct association with archery performance. The study was held with 23 competitive archers from the National Taiwan University of Sport. The researchers required the participants to go through two simulated archery competitions, one before and one after a 6-week mindfulness training program. From the analysis of the data, the researchers were able to find that the mean score in the post-program competition for the participants was 621.70 (Wu et. al, 2021). Meanwhile, the mean competition score in the pre-program competition for the participants was 613.48 (Wu et. al, 2021). An increase of 8.22 in the mean score for the participants was observed after they went through the MBPP program (Wu et. al, 2021). The overall results of this experiment revealed higher shooting scores from the participants after they went through the mindfulness training program. This revealed a positive correlation between shooting scores and mindfulness.

The Science Behind Training Through Fear

A very unusual type of training that South Korea uses for its archery team is "fear training," a practice that plays on the idea of exposure therapy or habituation (The Associated Press, 2001). Essentially, this type of training involves South Korean archers going through an unorthodox training regiment which involves exposure to fearful or mentally draining experiences. Some of these activities include staring at bodies in crematoriums, handling live snakes, walking through specially-designed haunted houses, staying up all night, cleaning up city sewage, and even climbing high-altitude mountains (The Associated Press, 2001). The purpose of these activities is said to train the archers' ability to work effectively under pressure or fearful circumstances such as large competitions. This process closely follows the main principles of a popular psychology treatment for fear, known as exposure therapy.

Exposure therapy, also known as exposure-based intervention, is when an individual repeatedly confronts a feared stimulus or situation, in order to treat anxiety-related disorders or general anxiety and stress (Abramowitz et. al, 2019). In simple terms, the theory of exposure therapy follows the idea that a patient will lose their fear of something by constantly being exposed to this fear over time. At its core, when a person experiences a fear-inducing situation, a small group of neurons in the amygdala is activated (Knowles, 2022). As someone goes through exposure therapy, a specific type of inhibitory junction between neurons is remodeled, called the perisomatic synapse (Knowles, 2022). These synapses are connected between neurons that enable a group of neurons to silence another group of neurons. Through exposure therapy, more of these perisomatic inhibitory synapses are formed around fear neurons in the amygdala, the portion of the brain most closely linked with emotions, including fear (Knowles, 2022). Therefore, the resulting effect is a silencing of the neurons most closely associated with fear and other similar emotions.

A common fear in all shooting sports, including archery, is target panic. Target panic is a psychological condition commonly caused by the archer's fear of making a mistake or misfiring an arrow (Holbrook, 2018). Target panic leads to archers losing their composure at the last moment right before releasing the arrow, often leading to an even larger mistake than previously anticipated (Holbrook, 2018). In some extreme cases, target panic can prevent an archer from properly shooting an arrow for weeks; in more minor cases, target panic decreases an archer's ability to shoot well (Holbrook, 2018). Along with target panic, there exists the general performance anxiety and nerves that archers might feel during a competition ("Managing competition nerves and performance anxiety as an archer," 2023). These feelings of anxiety can manifest into detrimental things such as trembling and increased muscle tension, which can hinder an archer's ability to steady their body and aim at the target ("Managing competition nerves and performance anxiety as an archer," 2023). These feelings can stem from many things, with a major factor being the fear of failure, as an archer might fear doing poorly at a competition ("Managing competition nerves and performance anxiety as an archer," 2023). Therefore, it is very important to mitigate any fears that an archer might have, as the presence of fear could lead to the archer making a large mistake at a high-pressure competition due to target panic.

While exposure therapy is most used outside of sports, the South Korean archery team has implemented it into the training of its archers through unusual practices such as handling live snakes and climbing tall mountains (The Associated Press, 2001). By being repeatedly exposed to new fearful stimuli as a part of their training, South Korean archers become less fearful overall. The result of this can be seen through the unusually low heart rates of South Korean archers during the 2020 Tokyo Olympic Games. From the data gathered from an experiment held at the games which measured the heart rate of the archers at the competition, South Korea's Oh Jin Hyek had the lowest heart rate of any archer in the beginning of the Men's Individual Elimination matches (Scroll Staff, 2021). In addition, in an article written by "What makes South Korea Golden Archers?" (2022), South Korea's it was revealed that South Korean archer Kim Woojin had an average heart rate in the 70s during his elimination matches, which is significantly lower than other archers' which tend to float around the 100s. Evidently, during the 2020 Tokyo Olympic Games, South Korean archers had heart rates lower than those of other archers. This could translate to South Korean archers being less fearful during the competition, which could then be a result of their unique form of training using exposure therapy and fear.

The Use of General Sports Psychology Techniques

South Korea puts a significantly larger emphasis on its archers' mental game, compared to other countries. Kim Youngsook, the sports psychologist for the South Korean archery team, stated that a large focus is placed on helping the archers with feelings of insecurity, anxiety, and lack of confidence, traits that can all deter peak performance (Manocha, 2018). In addition, Kim stated that the South Korean archery team places a lot of trust on its sports psychologists, allowing for better and more effective communication and mental training (Manocha, 2018). Kim also said that the team uses sports psychology methods and techniques such as imagery and positive self-talk to help the athletes perform more confidently and at a higher level (Manocha, 2018). Based on Kim's statements, the South Korean archery team places a lot of focus on the psychological aspect behind the sport.

Imagery is one of the most popular performance enhancement techniques or psychological skills in sports (Short et. al., 2006). Imagery is the mental creation of sensory experiences that appear similar to the actual event of which the person imagining them is attempting to tie it to (Morris et. al., 2005). In sports, imagery can be used by athletes to imagine themselves performing well at a competition before it even starts, in order to build up their confidence (Morris et. al., 2005). Building up self-confidence is important because it puts athletes in a more positive mental state for an upcoming competition (Morris, 2019). Self-confidence and a more positive mindset allow athletes to mitigate feelings of stress and anxiety, as well as any negative thoughts that might influence their behavior, emotion, and overall performance during the competition (Morris, 2019). Being confident is especially important in detailed shooting sports like archery, as thoughts and emotions can greatly sway one's ability to shoot at a high level. The presence of negative thoughts and emotions in an archer can cause them to become nervous which is extremely detrimental to the precise nature of the sport that values calmness and stillness.

Positive self-talk is another popular sports psychology technique that is particularly emphasized in the South Korea archery team. General self-talk is a verbalization or statement addressed to oneself, and can occur both internally or out loud; positive self-talk is when this message is positive (Raalte & Vincent, 2017). Positive self-talk can increase confidence, enhance attentional focus, regulate effort, and control cognitive and emotional reactions (Hatzigeorgiadis et. al., 2011). Athletes who use positive self-talk are more likely to decrease anxiety and improve their concentration and focus (Hatzigeorgiadis et. al., 2011). In archery, these benefits are especially impactful. Decreasing anxiety, as mentioned before, is generally very beneficial to archery, as the sport requires great precision and calmness to succeed. In addition, improving concentration and focus are beneficial, as most of archery is reliant on the mental game, so having a clearer mind and better concentration can allow archers to better focus on their shooting process to perform better.

A study was conducted using 45 archery athletes from a national sports school in Pahang, Malaysia, with the goal of identifying differences in imagery abilities, self-talk, cognitive anxiety, somatic state anxiety, self-confidence, and archery performance before and after intervention with imagery and self-talk training (Isar et. al., 2022). The participants were divided into three groups, one group going through 6 weeks of the study intervention through imagery training, the second going through 6 weeks of self-talk training, and the final group going through 6 weeks of both imagery and self-talk training. The archers, in their respective groups, completed a set of archery trials of six ends at a target of 70 meters distance. The participants then went into 6 weeks of training based on their respective group. After, all participants participated in an identical set of archery trials of six ends at a target of the same 70-meter distance. The scores of this post test were recorded and compared to the scores found in the pretest. The results showed that the mean pretest score in the imagery group was 254.73, while the mean post test score was 271.40 (Isar et. al., 2022). The researchers also found that the mean pretest score in the self-talk group was 256.53, while the mean post test score was 280.00 (Isar et. al., 2022). Finally, the results showed that the mean pretest score for the imagery and self-talk group was 257.53, while the mean post test score was 287.93 (Isar et. al., 2022). The difference in scores in the pretest and post-test for the archers that went through imagery training, self-talk training, and both imagery and self-talk training were 16.67, 23.47, and 30.40, respectively (Isar et. al., 2022). The results of this study reveal that there was a significant increase in score for the participants who went through the imagery training, self-talk training, and both imagery and self-talk training.

Shooting Robots and Equipment Optimization

Hyundai Motor Group, a supporter of the Korean Archery Association since 1985, has worked in collaboration with South Korean archers to design several pieces of technology to improve performance (Kang, 2021). One such device is a shooting robot that allows South Korea archers to optimize their equipment to the best possible conditions and consistency (Kang, 2021). While shooting robots have been created in the past, the robot designed by Hyundai Motor Group greatly minimizes other variables that might alter the effectiveness of the device (Kang, 2021). Therefore, while

the design is not solely unique to South Korea, it is the most advanced and the only robot known to be used for professional equipment testing.

When arrows are shot by the machine, the robot calculates factors such as the arrow's strength, direction, and speed upon release (Korea Bizwire, 2021). Using the machine's calculations, South Korean archers can identify arrows with defects, large or small (Korea Bizwire, 2021). In archery, performance is very sensitive to the equipment; even the smallest defects in the arrows can cause large score drops. Therefore, it is crucial for archers to identify which arrows are defective, so they can replace them with those in better condition. Before the 2020 Olympics, the South Korean Archery Association reported that, through the use of the shooting robot, the quality of the arrows improved greatly (Lee, 2021). The improvement in arrow quality also reportedly boosted the confidence of the athletes with the assurance that their equipment was at its best condition (Lee, 2021).

While no research has been done on the specific shooting robot created by Hyundai Motor Group, a research experiment was run in Japan, where experimenters designed and developed their own shooting machine that could shoot at a target 70 meters away (Ohara et. al., 2020). The research designed the shooting robot to be highly advanced and closely replicate a human's shot cycle, incorporating details such as allowing the bow to naturally jump forward as a reaction of the shot and creating a realistic human hand model to draw and pull the bow (Ohara et. al., 2020). The machine was designed to be over 100kg to limit its movement after a shot, as the recoil can cause lighter robots to potentially shift, reducing the consistency of the robot (Ohara et. al., 2020). The experimenters used the robot to shoot six arrows to a target 70 meters away, but two arrows were intentionally abnormal and slightly altered (Ohara et. al., 2020). They found that the machine could successfully identify the abnormal arrows from the normal arrows, as two arrows would always hit the target in a vastly different area than the four normal arrows (Ohara et. al., 2020).

The shooting robot created by the researchers was rudimentary and basic, yet could still perform its function of identifying poor arrows. The machine developed by Hyundai was created meticulously and can detect features such as the arrow's speed. Using the shooting robot, South Korean archers can identify and replace any flawed arrows that might have otherwise caused their scores to drop.

Conclusion

South Korea has a handful of unique training methods or devices. The team uses a contactless heart rate monitor to measure the heart rate of every South Korean archer (Kang, 2021). This device is useful, as the level of heart rate can also indicate the athlete's levels of stress and anxiety, which can ultimately impact their performance (Lu & Zhong, 2023). By using heart rate monitoring in their training, South Korean archers are able to get deeper insight into their own heart rates, and see if they need to improve their individual nervousness levels. South Korean archers also go through extensive mindfulness and general sports psychology training. The South Korean archery team has access to a meditation app designed specifically for South Korean archers (Kang, 2021). In addition, sports psychologists work with the South Korean athletes to train sports psychology techniques such as imagery and positive self-talk, in order to boost confidence and enhance focus. South Korean archers also go through an unusual type of training similar to exposure therapy, in which they go through fearful situations such as handling live snakes or bungee jumping (The Associated Press, 2001). By doing so, it is said that the athletes become less fearful overall, which helps them in combatting fear in situations such as competitions where the stakes are high. The South Korean archery team also utilizes a shooting robot that helps them optimize their equipment (Kang, 2021). The machine shoots the arrow and measures factors like its speed to then identify which arrows have flaws and which do not, allowing South Korean archers to always have the best equipment possible (Lee, 2021).

Following these unique methods is South Korea's impressive record at the Olympics. The country has the most medals in Olympic archery, hosting 43 total Olympic medals with 27 of them being gold. The second most successful country is the United States, which only has 33 total medals with 14 being gold. It is clear that South Korea dominates in the Olympics. The unique training methods discussed in this review can certainly be attributed to this long history of success for the country.

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