Focus of Attention for Strength and Conditioning Training

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ABSTRACT

FOR WELL OVER A DECADE, RESEARCHERS HAVE DEMONSTRATED THAT OPTIMAL SKILL PERFORMANCE IS ACHieved WHEN FOCUS OF ATTENTION IS DIRECTED EXTERNALLY RATHER THAN INTERNALLY OR NEUTRALLY. IN THIS ARTICLE, WE REVIEW RESEARCH ON THIS TOPIC THAT IS SPECIFICALLY RELATED TO THE FIELD OF STRENGTH AND CONDITIONING. IN DOING THIS, WE DISCUSS FINDINGS AND PRACTICAL APPLICATIONS RELATED TO RESISTANCE TRAINING, RUNNING AND AGILITY TRAINING, JUMP TRAINING, AND FUNCTIONAL BALANCE TRAINING. ADDITIONALLY, WE PROVIDE TIPS FOR COACHES SO THAT THEY CAN MORE EFFECTIVELY DIRECT THEIR ATHLETE’S ATTENTION DURING PRACTICE AND IN THE COMPETITIVE ARENA. A VIDEO ABSTRACT DESCRIBING THIS ARTICLE CAN BE FOUND IN SUPPLEMENTAL DIGITAL CONTENT 1 (SEE VIDEO, HTTP://LINKS.LWW.COM/SCJ/A120).

INTRODUCTION

One of the most meaningful ways a coach can convey information to an athlete is through the use of verbal instructions. Verbal instructions are primarily used to inform athletes about what needs to be accomplished on an upcoming repetition (rep). Coaches also use instructions to inform an athlete about what technical changes are needed to improve athletic performance. If used correctly, skilled coaches can use instructions during practice and in competitive venues to guide the athlete, or team, toward desired outcomes. However, if the instructions are not clear, overly complicated, or inaccurate, then it is not surprising that this technique can result in undesirable outcomes such as a missed scoring opportunity during a game, or worse, a physical injury.

The process of practicing with a proper focus of attention also directly effects how well an athlete learns sport-related skills (13). Moreover, through the course of proper practice, an athlete develops skill and learns how to better perform in game situations. So, not surprisingly, the structure of practice directly impacts not only how well an athlete learns a movement but also prepares them to perform those movements in game situations at more optimal levels.

An athlete’s focus of attention can be placed into 1 of 3 categories: internal, external, or neutral. When athletes are using an “internal” focus of attention, it means that they are thinking about the movements of their body. This is in contrast to adopting an “external” focus of attention, which means the athlete is focusing on the

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resulting outcome of the movement rather than the movement itself. For example, if athletes are performing a standing long jump to achieve maximum distance, they could focus their attention on extending the knees as quickly as possible while executing the jump. This type of focus is an example of an internal focus of attention because mental resources are directed toward the movement of the body (i.e., extending the knees). However, if the athlete were to think about jumping toward a particular line on the floor in front of him or her, this would be an example of directing his or her attentional resources externally because he or she is thinking about the result of the movement (i.e., reaching the line) rather than the movement itself. It is also possible that the athlete does not consciously focus on anything while performing a skill; this is commonly referred to as a “neutral” focus of attention because conscious mental resources are not allocated to the performance or result of the task. A neutral focus of attention is frequently associated with the performance of highly skilled athletes executing well-learned movements. Skilled athletes are frequently able to perform well-learned movements without thinking about them; the skill is performed automatically without overt mental effort or attentional awareness directed to the performance of the task.

Empirical findings reported in this area of research have fairly consistently demonstrated that adopting an external focus of attention results in superior physical performance compared with utilizing an internal or a neutral focus of attention (for a complete review, see Ref. 17). The constrained action hypothesis is frequently used to explain why adopting an external rather than an internal or a neutral focus of attention elevates movement performance. This hypothesis proposes that by overtly focusing on the result of the movement (i.e., externally) the motor control system is able to operate at a mostly autonomous or nonconscious level. This allows movements to happen more rapidly, more efficiently, and in a more effective coordination pattern. However, when an internal focus of attention is used, movements are generated through conscious control of the motor control system. This interference in automatic processing “constrains” the motor program and results in a less than optimal movement pattern, which consequently depresses movement performance (21).

It is worth noting that when a person uses a neutral focus, they typically perform similarly to reps that are completed using an internal focus (8,10,12). It may seem logical to then assume that individuals are choosing to direct their attention internally when provided instructions that are designed to direct their attention neutrally. However, findings from a recent study suggest that it is likely not a correct assumption. In a study by Porter et al. (10), subjects were surveyed after they practiced an agility-based skill. The findings from that study suggested that when participants were provided neutral instructions that were not designed to direct their attention internally or externally, the subjects tended to focus their attention erratically. Meaning they frequently switched their focus during and between trials, and they frequently focused on cues that were not effective to improving their agility performance. More research is needed to clearly understand why instructing a neutral focus or allowing a person to naturally focus their attention results in a less than optimal movement performance.

It should also be highlighted that it is possible to provide too much instruction, and simply providing more externally directing instructions does not continue to magnify the positive effects. For example, Poolton et al. (7) reported that too much instruction about an exercise overloaded working memory and deteriorated performance regardless of whether the instructions facilitated an internal or external focus of attention. An additional factor to consider is when the practiced task is highly complex and the sporting environment is highly unpredictable. In that type of environment, it might be difficult for a coach to think of verbal instructions that can be used to appropriately prompt the athletes to focus their attention properly. In this type of situation, coaches may find it more effective to provide analogies and metaphors to illicit an external focus of attention. The use of analogies and metaphors can be a very effective way to indirectly prompt the athlete to think about the desired outcome of the movement rather than the movement itself. For example, when performing a sprint, coaches may find it more conducive to use a metaphor like telling the athletes the ground is a “hot plate” and they should minimize their contact with it. Using this type of metaphor results in the athlete using an external focus of attention without the coach having to provide an abundance of instruction about the result of the athlete’s sprinting mechanics, which can quickly become mentally overwhelming and cause a “paralysis by analysis.”

In the following sections, we will discuss scientific findings and provide evidence-based methods that can be adopted by coaches to improve an athlete’s performance in resistance training, speed development, jumping performance, and functional balance. The aforementioned categories of training typically fall under the responsibility of the strength and conditioning specialist; thus, it is critical that coaches understand how to instruct their athletes in the most meaningful way. In addition to reviewing pertinent research on these topics, we also provide examples of how coaches can easily adopt these techniques into their training regimens when working with athletes.

**RESISTANCE TRAINING**

**FORCE PRODUCTION**

In a study conducted by Marchant et al. (5), subjects performing a biceps curl were instructed to either focus externally by directing their attention toward the curl bar or internally by focusing on contracting their biceps...
muscle. The researchers measured maximum force production and used electromyography (EMG) to assess the activity of the biceps muscle. The results of the study indicated that when participants focused externally on the bar, they produced greater force while at the same time generating lower EMG activity compared with attempts completed while directing attention internally toward the contraction of the muscle.

These findings provide evidence of a more efficient motor unit recruitment pattern produced when attentional resources are directed externally rather than internally. Thus, it seems that using an external focus of attention not only provides better gains in force production but it also allows for a more efficient workout. Similar motor unit recruitment patterns have also been observed while performing the vertical jump (18); however, this will be discussed in more detail in the “Jump Training” section.

**STRENGTH ENDURANCE TRAINING**

Adopting an external focus of attention not only improves force production, but there is converging evidence that doing this also enhances muscular endurance. Recent scientific findings demonstrated that promoting an external focus of attention resulted in a greater number of reps to failure than both internal and neutral instructions while performing the bench press on a Smith's machine, free weight bench press at 75% of the subject's 1 repetition maximum (1RM), and free weight squat at 75% of the participant's 1RM (4).

The results of another study (6) suggest that an external focus is more beneficial for isometric strength endurance than an internal focus of attention. In that study, participants performed an isometric wall sit in which they had to keep their back in constant contact with a vertical wall while maintaining a 90° angle in their bent knees. The external cue was “focus on pretending like you are sitting in a chair through the duration of the trial,” and the internal cue was “focus on keeping your knee at 90° through the duration of the trial.” Findings revealed that subjects were able to perform the wall sit for a significantly longer duration on trials that followed the external instructions. Similar findings were also reported by Lohse and Sherwood (2).

The abovementioned findings support the conclusion that external-focusing instructions can benefit the performance of resistance training exercises. For example, when instructing athletes to perform a front squat (Figure 1), they should be cued to “push the bar upward” (i.e., external focus) instead of instructing the athlete internally by saying “extend your hips and knees when lifting the bar.” Additional resistance training exercises and associated external cues can be found in Figures 2-4.

**RUNNING AND AGILITY TRAINING**

**SPRINTING**

In a pair of experiments, Porter et al. (12) demonstrated that low and moderately skilled sprinters ran a 20-m dash faster when they were instructed to think externally by “focus on clawing the ground with your shoe” rather than being instructed to direct their attention internally by “focus on clawing the ground with your foot.” Sprinting attempts completed with an external focus were also faster than trials completed following neutral instructions, which cued runners to complete the 20-m dash as quickly as possible. Interestingly, the same study indicated that skilled sprinters had their optimal performance following the neutral instructions, and trials following the internal and external cues were not significantly different.

Findings from the study of Porter et al. (12) suggest that instructing low and
The focus of attention has been shown to have a significant impact on athletic performance in various contexts. For instance, it has been demonstrated that adopting an external focus of attention while performing a long distance run can result in faster running times compared to an internal focus (14). Skilled distance runners ran on a treadmill at a constant speed while being instructed to direct their attention either internally (e.g., on their breathing or on their running technique) or externally (e.g., on their surroundings). The researchers assessed the subjects’ running economy by measuring how much oxygen they consumed. Findings revealed that the runners had an increased running economy in the external focus condition.

**DISTANCE RUNNING**

One study compared methods of adopting an internal and external focus of attention while performing a long distance run. In that study (14), skilled distance runners ran on a treadmill at a constant speed while being instructed to direct their attention internally (e.g., on their breathing or on their running technique) or externally (e.g., on their surroundings). The researchers assessed the subjects’ running economy by measuring how much oxygen they consumed. Findings revealed that the runners had an increased running economy in the external focus condition.

**AGILITY**

It has also been demonstrated that adopting an external focus when performing an agility-based task is more optimal than using either an internal or neutral focus of attention (10). In that study, participants were instructed to perform the agility “L” test with maximum running speed. This test consisted of 2 parts: a sprinting component and a turning component. When participants were in the external condition, they were instructed to “focus on running toward the cone as rapidly as possible” and they were also told to focus on “pushing off the ground as forcefully as possible when turning.” The internal focus instructions were similar but cued the runner to “focus on moving your legs as rapidly as possible for the running component” and to “plant your foot as firmly as possible when turning.” The neutral instructions were to “run through the course as quickly as you can with maximum effort.” Results indicated that the external instructions resulted in a significantly faster running time compared with both the internal and neutral instructions. Additionally, the amount of time taken to complete the agility task following the internal and neutral instructions was not significantly different.

**JUMP TRAINING**

**HORIZONTAL JUMPING**

Several studies have been conducted investigating how the focus of attention effect interacts with jumping performance. In a series of experiments, Porter et al. (8) consistently demonstrated that standing long-jump performance is best when skilled and moderately skilled (9,11,16) jumpers focus on an external cue (e.g., jumping toward a target) rather than on an internal cue (e.g., rapidly extending the knees) or utilizing a neutral cue (e.g., jump to the best of your ability). Considering how frequently the standing long jump is used to assess athletic ability and potential (e.g., National Football League combine), strength and conditioning coaches should consistently instruct their athletes to focus their attention externally when performing jump-related tasks. Providing this type of instruction will likely result in the athlete jumping near their maximum ability level.

**VERTICAL JUMPING**

Multiple studies have also examined how focusing on the result of the movement rather than the movement itself impacts vertical jumping. In 3 studies conducted by Wulf et al.
(18,19,23) and a study conducted by Makaruk et al. (3), participants achieved greater jump height when they were instructed to concentrate externally on the rungs of the Vertec compared with attempts when they were cued to focus on the fingers reaching the rungs, or when no attentional focusing instructions were provided. Ford et al. (1) reported similar findings. In that study (1), subjects jumped higher when they jumped toward a suspended overhead ball compared with trials in which there was no hanging ball.

It is important to highlight that during training sessions when athletes are practicing to improve their jumping mechanics, the use of devices, structures in the environment, or pieces of equipment is routinely used by the athlete. The coach can use this as an opportunity to provide verbal cues that promote the effective use of an external focus of attention. Figures 6–9 depict a few typical plyometric exercises that can easily be modified to promote a more optimal use of attentional resources.

FUNCTIONAL BALANCE TRAINING

It is not uncommon for coaches to provide instructions during functional training sessions that refer to technique-related mistakes the athlete has made. This is likely done based on the logical assumption that to correct movement errors, the athlete must be made aware of the error. On the surface, this conclusion sounds reasonable and plausible. However, this information provided by the coach about the proper or improper position of his head, trunk, and limbs during these exercises likely results in the athlete focusing internally. Fortunately, there is research that has been conducted that provides a foundation that can be used to improve functional training sessions, especially when the goal is to improve movement posture and balance. Wulf et al. (20) demonstrated beneficial effects of using an external focus of attention when balancing on an unstable platform. The primary goal of the subject was to keep the platform in a horizontal position using both an internal focus of attention and an external focus of attention. When an external focus of attention was used, the subject was instructed to focus on keeping the platform horizontal. When an internal focus was adopted, subjects were cued to focus on keeping their feet horizontal. The findings indicated that by simply instructing the subjects to think about keeping the platform horizontal rather than their feet, they improved their dynamic balance performance. This finding has been replicated in several studies (17). In a related study (22), the balance task was more challenging because participants stood on a semi-inflated rubber disk while attempting to hold a 2-m pole.
When participants’ attention was directed toward the pole (i.e., external focus), they displayed reduced sway and had enhanced postural stability compared with trials when their attention was directed toward keeping their hands still (i.e., internal focus).

Strength and conditioning coaches can create a variety of training situations that capitalize on similar instructional cues for a variety of activities. The skilled coach simply needs to use verbal cues to shift the focus of the athlete to the environment or implement rather than allowing the athlete to focus his or her attention on the movements of their body. For example, athletes who are performing a back squat should be cued to focus on keeping the bar stable as opposed to their hands, arms, shoulders, or back. We have provided additional exercises and sample instructions in Figures 10–13.

SUMMARY

In this article, we have reviewed a growing body of scientific literature demonstrating many advantages to utilizing an external focus of attention rather than directing attention internally or neutrally. Specifically, we have examined 4 categories of movement skills that are directly related to strength and conditioning: resistance, speed, jump, and functional balance training. Additionally, we have provided evidence-based training tips that can quickly be adopted by practitioners and immediately implemented into training regimens to optimize training sessions. Coaches should always be aware of the words they use when communicating with athletes; we recommend that coaches take measures to avoid verbal cues that reference specific body parts or the movements of the body. Doing so will likely induce an internal focus of attention and result in depressed skill execution. It is not always easy or obvious how to provide cues that promote an external focus of attention. In fact, it might be difficult for some to change the way they have always instructed an activity if they have relied on instructions related to the mechanics of the practiced task. However, it is our belief that the creative coach who desires to get the most out of their athletes will find a way to effectively communicate with their athletes. Ideally, that communication will result in the athlete using an external focus of attention.

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REFERENCES


