

# The Effects of External and Internal Focus of Attention on Upper Volleyball Serve

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## ABSTRACT

Previous studies have reported that focus of attention plays an important role in improving performance in a variety of motor skills. The purpose of the study was to compare the effectiveness of instructional feedback based on external or internal focus of attention on performing the volleyball serve. Participants ( $n=66$ ; age: 17 -27 years old) healthy male secondary school and undergraduate students were recruited. Participants were randomly assigned to either external, internal focus or control groups ( $n= 22$  each). After the pre test of performing five overhead volleyball serves, nine sessions of practice based on the groups' focus of attention were conducted before the post test. A 3 group x 2 tests with repeated measures on the second factor analysis of variance was used to analyze the data. There was a main effect between groups  $F(2, 63) = 12.9, p < 0.05$ . There was an interaction effect between test and groups  $F(2, 63) = 59.2, p < 0.05$ . In the pretest the internal focus (IF) group scored ( $M=6.5$  points,  $SD=2.0$ ), the external focus (EF) group ( $M=7.0$  points,  $SD=2.0$ ) and control group ( $M=7.1$ ,  $SD=2.4$ ). The post-test scores for the IF group ( $M=7.1$ ,  $SD=2.1$ ), EF group ( $M=12.2$ ,  $SD=1.7$ ) and the control group ( $M=7.2$ ,  $SD=3.2$ ). This result demonstrated that external focus of attention was significantly more efficient in assisting the learning of a motor skill than the internal focus. We recommend that the coaches provide external focus of attention instructions to enhance performance in sports skills.

**Keywords:** attention, performance, focus, external, volleyball.

## 1. Introduction

A number of studies have shown that focus of attention plays an important role in improving performance. Simply viewing the focus as internal or external was sufficient to generate different results Therefore, further research would be necessary to verify this.

Thus, many researchers have examined effects of different types of focus of attention instructions on the improvement of motor learning in a variety of sport skills. An external focus of attention leads one's attention to the movement effects, while an internal focus of attention leads one's attention to the movements themselves (Wulf&Dufek, 2009). In the motor learning literature, the widely held of studies have awesomely supported that inducing external focus is more effective and beneficial for skill acquisition than inducing internal focus of attention. For example, (Mehdi & Fathi, 2012), participant performed five maximum effort trials on discus throwing under each attentional focus condition (external and internal).

The findings showing enhanced motor performance as a result of using external versus internal focus of attention on discus throwing. Moreover (Wulf & Tollner, 2004) demonstrated that the external focus promotes the use of more automatic control processes when they used electromyography (EMG) to determine whether differences between external and internal foci would also be manifested at the neuromuscular level. External focus is not only better than internal focus but also than control condition (Freudenheim & Wulf, 2010) examined effects of attentional focus on swimming speed where the control condition was included.

Participants' task was to swim one length of a pool (16 m) using the front crawl stroke or the leg kick respectively, results of the research demonstrated that the times were significantly faster in the external focus compared with both the internal focus and control conditions. The advantages of adopting an external focus of attention over the internal focus of attention is that the external focusing promotes automatic movement control, while the internal focusing constrains the motor system by intervening with automatic processes (Wulf, 2007). Another study supported the growing consensus that encouraging individuals to adopt an internal focusing strategy is counterproductive in complex sensor motor tasks (Weiss & Owen, 2008).

These findings are in line with other findings showing that those external participants focused on the task-related environment to enhance tactile input to somatosensory areas that closely connect to motor areas. (Zentgraf et al., 2009). Since the studies has proved the importance of focus attention instruction in improving performance , this has prompted us to study this case taking in consideration the lack of scientific knowledge in this field, epically in volleyball . It is noted that one of the most popular group sport in the world is volleyball, which needs High concentration of capabilities. In this sport; the processing of critical visual information and the ability to self-regulate cognitive and emotional activity are keys to successful execution of self-paced movement skills.

More specifically, this sport involves an aiming component to some degree. Volleyball requires far aiming skills in which an object is directed toward a distant target located in space (e.g., volleyball serve) .in our research purpose of the study was to compare the effectiveness of instructional feedback based on external or internal focus of attention on performing the volleyball serve. We used a within-participant design and hypothesized that participants would show better performance in terms of accuracy in playing volleyball serve after external instructions than internal or control group.

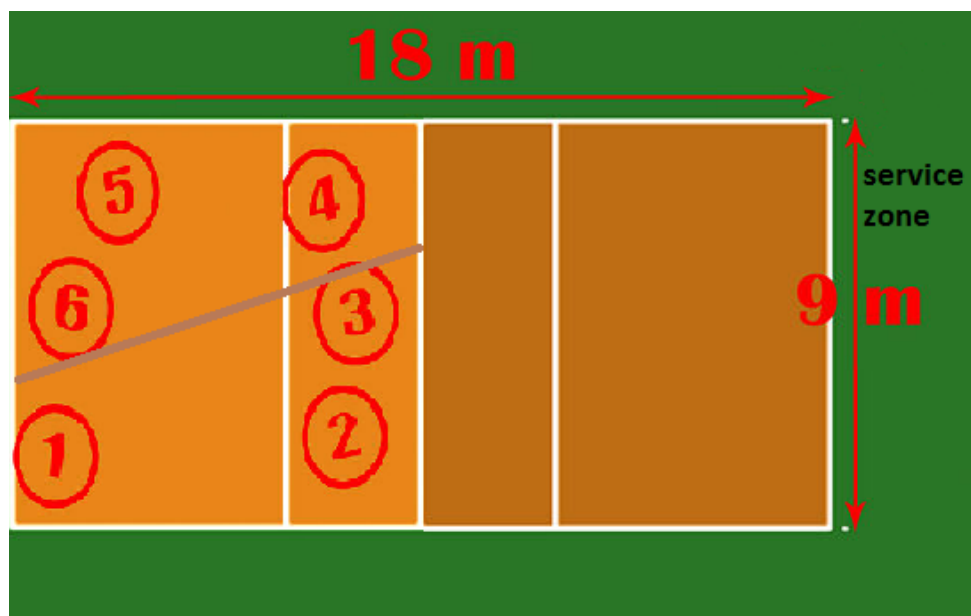
## 2. Methodology

### 2.1 Participants

(n=66; age: 17 -27 years old) healthy male secondary school and undergraduate students were recruited. Participants were randomly assigned to either external, internal focus or control groups (n= 22 each). Participants were randomly assigned to either external, internal focus or control groups (n= 22 each). None of the participants had any limitations that could have affected their performance.

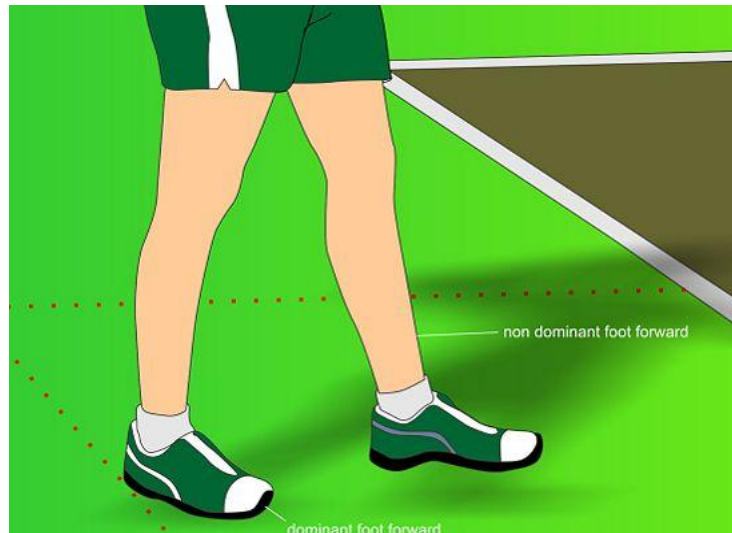
### 2.2 Instruments and procedure:

Score card and observation used to collect the data. All participants performing five overhead volleyball serves without any instructions on the day before the acquisition phase as a pretest. Based on performance on the pretest, participants were divided randomly into three groups of equal ability. On the first day, the study involves pretest and distribution of the participants into groups (internal, external focus or control groups). Nine sessions of practice based on the groups' focus of attention were conducted before the post test. Two experienced coaches gave instructions separately to one group (external or internal), participants were prevented to listen to any information from the other group or coach. A one side of a volleyball court divided into two parts the first part included the positions (1, 2, 3), while the second involved the positions (4, 5, 6); the service zone includes the full width of the 9-meter area behind the end lines.

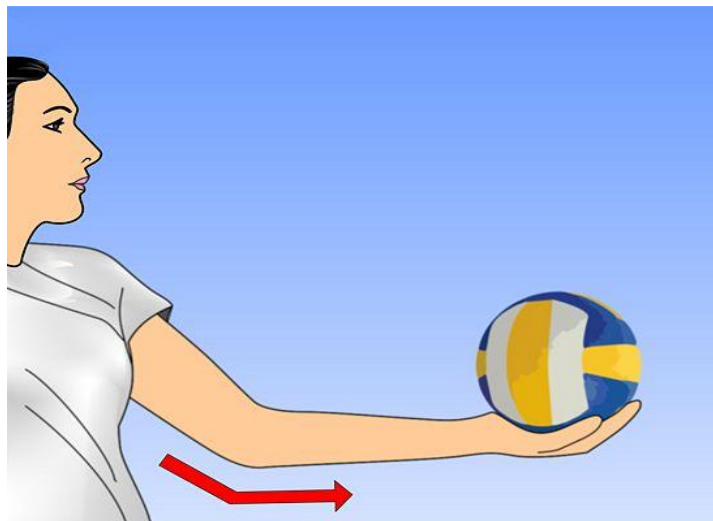


- When ball crossed the net in and target positions (1, 2,3) the participant had given (3 points),while (2 points) had given when the ball crossed the net and target areas (4,5,6) , (1 point) had given when the ball crossed with touching net, when the ball did not cross the net or get out the lines court , the participant had given (0 points).

- Before each trail, participants listen to the instructions from the coach and inquired about the non-understandable information. The external focus was:” concentrate in the counterpart court and the height of the net line then try to target and hit the back part of the ball”
- The internal focus instruction is :
- Line up both your feet about shoulder length apart. Place your non-dominant foot ahead of your dominant foot. Your shoulders and hips should be aligned with the net.



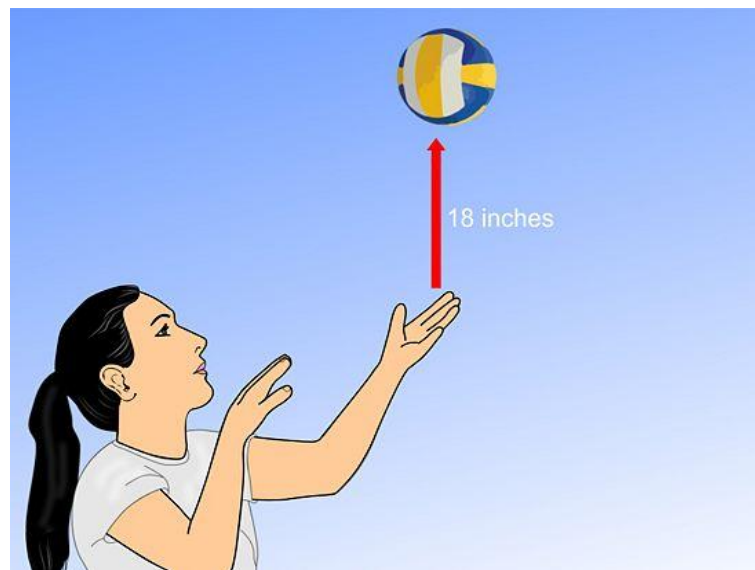
Place your non-dominant hand directly in front of you, almost completely straight (but with a flexible elbow) and palm up with the ball in it.



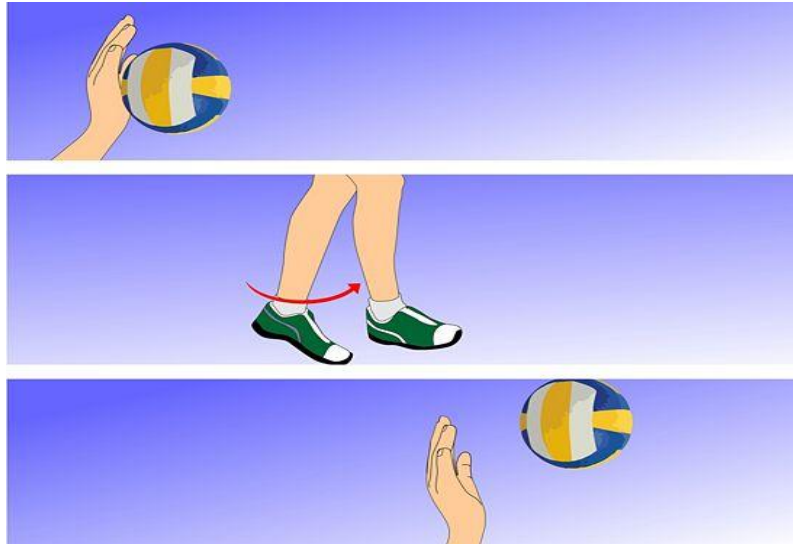
Swing your serving arm back next to your head. Make sure that your elbow is pointing upwards and your hand is at or slightly above your ear.



Toss the ball up with your palm of your left hand (not fingers) about 12 to 18 inches (30 to 45 cm) in the air. Remember that you want your dominant hand to make contact with the ball just after it changes direction and begins to drop back down. Swing your dominant arm back at the same time, keeping your wrist rigid.



Hit the ball with the heel of your dominant hand. Bring your dominant hand forward and smack the ball with the heel of your hand, or the bottom of your palm. Try not to hit it with your fingers or the flat of your palm, as this will cause the serve to have less power. (If you're worried about your fingers getting in the way, try to curl them down toward your palm.)



Add momentum to your hit by stepping forward with your dominant foot as you serve. Drag your right foot forward, and hit the bottom of the ball with the palm of your right hand. As you are hitting the ball, send all your weight from your arm to the ball; this should add a lot of speed and force. Make sure that your serving hand is slanted slightly upward. This will help loft the ball over the net. If you aim down with your hand, the ball will hit the ground before it goes over the net.

### 2.3 Statistical analyses

A 3 group x 2 tests with repeated measures on the second factor analysis of variance was used to analyze the data. The level of statistical significance was set to,  $p \leq 0.05$ .

## 3. Results & Discussion

**Tests of Normality**

Group		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pretest	internal	.163	22	.130	.959	22	.477
	External	.191	22	.036	.924	22	.094
	control	.113	22	.200*	.977	22	.856
posttest	internal	.148	22	.200*	.930	22	.126
	External	.162	22	.139	.942	22	.214
	control	.169	22	.103	.905	22	.038

a. Lilliefors Significance Correction

\*. This is a lower bound of the true significance.

$P > 0.05$  for all groups then there are significant difference between groups, that pretest for internal focus  $w_{22} = 0.959$ , external focus  $w_{22} = 0.924$  and control group  $w_{22} = 0.977$ . posttest for internal focus  $w_{22} = 0.930$ , external focus  $w_{22} = 0.942$  and control group  $w_{22} = 0.905$ . so “normality test with Shapiro-Wilk showed the data for pre and posttest of all groups are normally distributed”.

### Tests of Between-Subjects Effects

Measure: MEASURE\_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	8336.371	1	8336.371	1115.864	.000
Group	192.470	2	96.235	12.882	.000
Error	470.659	63	7.471		

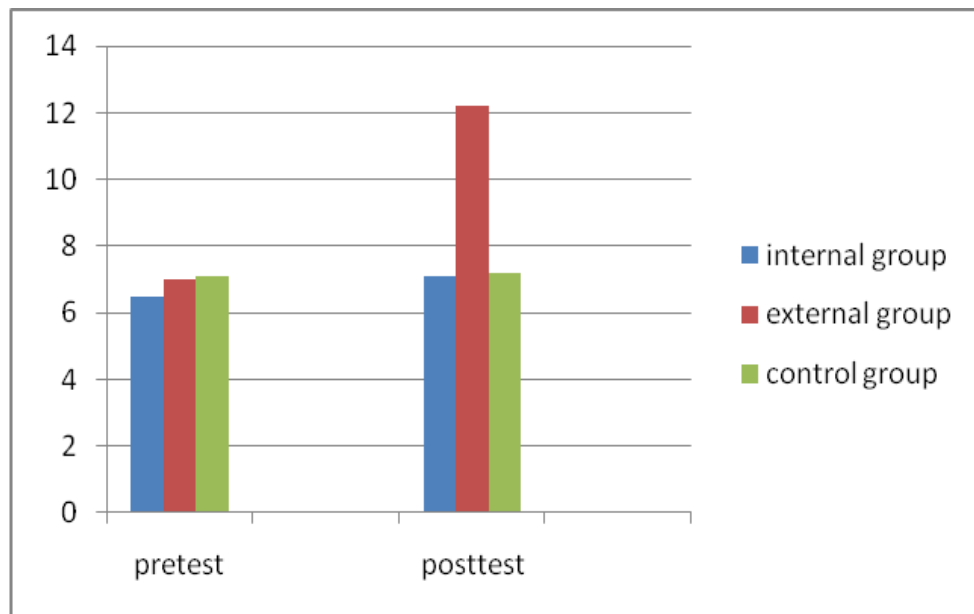
The test between subject effect indicated that there was a main effect between groups  $F(2, 63) = 12.9, p < 0.05$ .

### Tests of Within-Subjects Effects

Measure: MEASURE\_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Test	Sphericity Assumed	118.371	1	118.371	77.516	.000
	Greenhouse-Geisser	118.371	1.000	118.371	77.516	.000
	Huynh-Feldt	118.371	1.000	118.371	77.516	.000
	Lower-bound	118.371	1.000	118.371	77.516	.000
test * Group	Sphericity Assumed	180.924	2	90.462	59.240	.000
	Greenhouse-Geisser	180.924	2.000	90.462	59.240	.000
	Huynh-Feldt	180.924	2.000	90.462	59.240	.000
	Lower-bound	180.924	2.000	90.462	59.240	.000
Error(test)	Sphericity Assumed	96.205	63	1.527		
	Greenhouse-Geisser	96.205	63.000	1.527		
	Huynh-Feldt	96.205	63.000	1.527		
	Lower-bound	96.205	63.000	1.527		

The test within subject effect showed there was an interaction effect between test and groups  $F(2, 63) = 59.2, p < 0.05$ .

**Descriptive statistics:**

**Pretest:** Internal group ( $m=6.5$ ,  $SD=2.0$ ), external group  $m=7.0$ ,  $SD=2.0$ ), control group ( $m=7.1$ ,  $SD=2.4$ )

**Posttest:** Internal group ( $m=7.1$ ,  $SD=2.1$ ), external group ( $m=12.2$ ,  $SD=1.7$ ), control group ( $m=7.2$ ,  $SD=3.2$ ).

This result of descriptive statistics demonstrated that external focus of attention was significantly more efficient in assisting the learning of a motor skill than the internal focus and control group.

The purpose of this research was to compare the effectiveness of instructional feedback based on external or internal focus of attention on performing the volleyball serve. Results proved our hypotheses participants shown high accuracy when they attending to environmental aspects (external focus) demonstrated that external focus is much better than internal focus, the interpretation of these findings that an internal focus interruptions the degrees of freedom, inhibiting movement execution.

In fact the focus on one body part may even pressure the whole motor system as a result in constrained action. “Whereas an external focus of attention allows the motor system to work more naturally and consequently more efficient muscular contraction. Our finding are in line with previous findings, (Lohse, Sherwood & Healy, 2011) confirmed that An external focus led to significantly less error overall and reduced surface electromyography activity with lower median power frequencies in the antagonist muscle, but attentional focus had no effects on the agonist muscle. Thus, an external focus of attention led to more efficient motor unit recruitment patterns (reduced co contraction) and improved performance.

Posttest surveys revealed subjects were aware of their improved performance within external focus when they analyzed how the focus of attention affects a subject's ability to perform. Furthermore, several arguments support our outcomes, authors' results revealed higher activation in primary somatosensory and motor cortex .for an external compared to an internal focus. The authors conclude that external participants focused on the task-related environment (i.e., the keys) to enhance tactile input to somatosensory areas that closely connect to motor areas (Stark & Munzert, 2009).Theory of constrained-action hypothesis supported this research: an internal focus of attention causes the athlete to interfere with the automatic control processes that regulate movement, whereas an external focus allows the body to naturally self-organize.

#### 4. Conclusion

In summary, the results here strongly support previous studies; demonstrated that the external focus of attention significantly more efficient compared with both internal focus group and control group. Therefore, it is recommended that the coaches can give external instructions to enhance performance in sports skills.

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