

The Effect of Different Focus of Attention as Verbal Cues on Performance and Retention of Standing Long Jump

Elaheh Mirmiran

Shahid Rajae Teacher Training University
Tehran Province, Tehran, Shabanlou, Iran
Phone: +98 21 2297 0060

Gholamreza Lotfi

Shahid Rajae Teacher Training University
Tehran Province, Tehran, Shabanlou, Iran
Phone: +98 21 2297 0060

Farzaneh Hatami

Shahid Rajae Teacher Training University
Tehran Province, Tehran, Shabanlou, Iran
Phone: +98 21 2297 0060
gholamrezalotfi@yahoo.com

Abstract

The instructional guidelines play an important role in transmitting target information, and educators usually use them to teach and improve motor function of individuals at all skill levels. Directing the focus of attention is one of the important factors affecting the effectiveness of instructional guidelines. However, this study aimed to investigate the effect of different focus of attention as verbal cues on performance and retention of standing long jump among teenager female beginners. For this purpose, 45 beginner students (M age= 13.12 ± 1.82 years) in Qazvin were voluntarily selected and after pre-test, they were randomly assigned to one of three groups: external verbal cues, internal verbal cues, and control. All groups performed standing long jump for three sessions; each session consisted of 5 attempts of 2. After last session of acquisition, the posttest was conducted. After one week of untrained, the retention test was conducted. The results of descriptive statistics showed that the standing long jump performance of all groups improved from training period to retention test. The results of one-way analysis of variance showed that there was no significant difference between three groups in pretest and acquisition stage. However, this difference was significant in post-test and retention stage.

Keywords: Internal Focus; External Focus; Verbal Cues; Performance; Retention, Jumping.

1. Introduction

Due to limited capacity of individuals' information processing, the teachers and trainers of various sports fields have been compelled to provide instructional guidelines to attract the attention of learners to key elements of performance. The researchers believe that although any kind of information which is called instructional guideline before performance and is called feedback after performance may help individuals to learn motor skills, the optimal use of information depends on focus of attention at movement or movement effect (Shea & Wulf, 1999). The instructional guidelines play an important role in transmitting target information, and instructors usually use them to teach and improve motor function of individuals at all skill levels (Hodges & Franks, 2001). The sport trainers may use verbal cues to educate and attract their learners' attention to key aspects of skills. The verbal cues are brief and short phrases which attract the attention of learners to regulative information and guide them about key elements of movement performance. The researches has shown that these simple and short phrases, as verbal instructions, are very effective in facilitating learning new skills and performing pre-learned skills. The teachers, educators, and therapists may use verbal cues in a variety of ways. One way is to

provide verbal cues in displaying skills to promote visual information. Another way is to provide verbal cues to help focus on most important parts of skill (Magill, 2007).

The effect of focus of attention on performance and learning of motor skills has been considered significantly in recent years. The researchers and trainers believe that the direction of focus of attention may have an almost immediate impact on individuals' performance; this means that at the time of performance, the accuracy and quality of performer movements is associated with his/her focus of attention. The attention is a process through which one uses his/her senses to perceive outside world. The focus of attention means getting informed of one thing and ignoring other things (Roberts et. al. 1999). One of the important roles of instructional guidelines is to direct the focus of individuals' attention (Magill, 2007). The focus of attention is directed by guidelines and feedback which are given to performer. The focus of attention may be internal (focusing on body movements) or external (focusing on effects of movement in environment or its consequences). The fluency, coherence, accuracy, and quality of skill performance and the outcome of individuals' movement depends largely on focus of performer's attention during the performance of skill (Wulf & Prinz, 2001). The attention is one of the most important limitations affecting human learning and performance; focusing it is one way to improve productivity and learning (Magill, 2007). Undoubtedly, using useful information, ignoring irrelevant information, and choosing the best focus of attention in education and performance will improve learning and increase successful performance of learner (Graham, 2003). The instructors' guidelines to their learners may have a significant effect on their performance. In coaching, the internal focus cues are used frequently (Becker & Smith, 2015). The skilled athletes often report using internal focus and sometimes change different attention focuses in preparation and performance stages (Becker et. al. 2018).

Over the past 15 years, the research has shown that focusing on effect of movement (external focus) improves performance and learning compared with focusing on movement itself (internal focus). The findings also confirm the use of guidelines or feedback which are given to participants based on type of task, skill level, and gender (Wulf, 2013). In fact, the focus on body (internal focus) disrupts performance and learning, while focusing on effect of movement (external focus) improves performance and learning. Also, several studies have shown that those who were in controlled conditions tended to use the same guidelines with internal focus at their performance. In fact, these groups tended to act in the same way as internal focus group with conscious control of movement and destruction of automated processing (Becker & Smith, 2013).

There are several hypotheses regarding learning stages and attention focus guidelines; most of them have supported the guidelines of external attention focus and some of them have supported from guidelines of internal attention focus. Wulf et. al. (2001) tested the limited function hypothesis to explain the benefit of external attention focus. They suggested that the external attention focus improves performance compared to internal attention focus through improving automated processing and reducing the consciousness processing. However, the internal attention focus improves conscious control and in turn reduces automated processing (Becker & Smith, 2013). Based on limited function hypothesis, the attempts to consciously control the movement, depending on conditions of internal attention, limit the motor system and prevent automatic processes which control the movement. However, the focus on effects of movement (external attention) allows the motor system to be naturally self-organized and does not be limited to conscious control processes (Salajeghe et. al. 2014). In other words, the external attention focus reduces attention requirements, while the internal attention focus involves more processing processes, increases conscious control and attention needs of performance, and leads to limited motor system and degrees of freedom. Thus, the necessary automation for performing accurate movement gets disrupted and the performance becomes weak (Abdoli et. al. 2012). The second hypothesis for attention focus is the automatic processing hypothesis. The apparent processing hypothesis states that in external attention, the performer only processes one source of information, i.e. what is external to performer. However in internal attention, the focus is on internal information and undoubtedly, the external outstanding information are also processed. As a result, the internal guidelines put more burdens on working memory; the more burdens on working memory in

internal attention focus will weaken performance (Moghaddam et. al., 2008). In this regard, another hypothesis is non-automaticity of skills. According to this hypothesis, the internal attention focus is problematic only when individuals reach high levels of skill; it interferes with automated processing processes. The internal attention focus is more suitable for beginners (Salajeghe et. al. 2014). Based on James' Movement Idea (1890), the movement effects and external attention effectively provide a stable representation for performing skill. Therefore, the attention to movement effects may stimulate the movement systems to move.

There are many researches on adoption of internal and external attention focus. Most research has shown that the impact of adopting internal attention at the time of applying skills is weak and focusing on movement effects may lead to more effective performance and learning. Some studies such as Beilock et. al. (2002) and Uehara (2008) also showed that the impact of internal focus on performance of subjects is more than external focus. These research concluded that the external focus is not always effective; sometimes, the internal focus leads to better performance. They argued that the effectiveness of focus of attention depends on skill and efficiency of individuals (Pashabadi et. al., 2014).

Many research showed that in the process of learning motor skills, the training with an emphasis on external attention leads to more effective performance and learning than internal attention (Tahmasebi et. al. 2009). The different studies which have used various laboratory tasks and considered various sports skills have shown that the external focus is more advantageous than internal focus. The previous studies have shown that providing training for learners with an emphasis on outcome and effect of movement rather than the movement itself may improve the accuracy of golf shoots (Wulf et. al. 1999), volleyball services (Wulf et. al. 2003), Tennis hit (Lewis & Linder, 1997), and basketball free throw (Zachry, 2005). However, Salmoni et. al. (1984), learning theories argue that the learning is improved by directing learners' attention to his/her body movements and using controlled processing; this is not consistent with recent findings.

Vance et. al. (2004), Zachry (2005) and Zachry et. al. (2005) showed that the application of external attention focus reduces the activity of muscular electrification and thus, increases the efficiency of movement. Therefore, it is expected that the advantages of external attention to be seen at tasks which require accuracy and power such as throwing an object such as throwing a weight and discus or throwing the body such as long jump and high jump.

Damanpak et. al. (2012) considered vertical jump task and showed that when participants adopted external attention, they created more power and this resulted in higher jump. Becker and Smith (2013) studied whether age, gender, and complexity of task regulate the effect of attention focus on motor learning? They observed that in simple task, there was no significant difference between children and adults in terms of internal and external focus. In complex task, however, the male adults with external focus had better performance than other groups. Becker and Smith (2015) conducted a study to investigate the effect of applying internal focus cues on performance of athletes at long jump. The findings showed that the group which had received external focus guidelines jumped significantly higher than other groups. However, there was no significant difference between two groups which had received internal focus guidelines. They suggested that in professional conditions, the coaches should use the vocabularies as a guide which instills external focus as much as possible on athlete. Abdollahipour and Psotta (2017) reported that the external focus is advantageous at the task of receiving tennis balls by children. Becker et. al. (2018) showed that the group which had adopted external focus at long jump task performed significantly better than other groups. They suggested that in the case of using internal focus at preparation stage, the athletes should use external focus at performance stage in order to achieve success.

The application of this research to educate learners about adopting external or internal focus may improve their performance, optimize their energy consumption, and lead to successful experiences for them. The success may increase students' motivation for continuing training. The key to effectiveness of verbal cues is that a link is created between cues and movements. Therefore, the learner will not be

required to pay attention to different verbal guidelines. Rather, the motor and cognitive components of skill will be considered.

Since there is no combined study on impact of type of attention focus as verbal cue on performance of fundamental skill of standing long jump and there are contradictions in findings of previous studies, it is necessary to do such research.

2. Methodology

This was an applied semi-experimental field study. The pre-test, post-test, and control group were used.

The population consisted of all female first grade high school students in Qazvin. However, 45 beginner students ($M_{age} = 13.12 \pm 1.82$ years) in Qazvin were voluntarily selected as sample; after pre-test, they were randomly assigned to one of three groups ($n = 15$): external verbal cues, internal verbal cues, and control. During training sessions, the acquisition scores of subjects were recorded and one week after exercises, the retention test was conducted.

In this study, the standing long jump test was conducted. At this test, the participants were placed behind a line on the floor. They should performed standing long jump with the help of throwing their arms. The location of heels at line indicated the jump score. This movement was performed at two turns and the maximum jump length was recorded for each participant.

At all stages, the participants were asked to warm themselves up for 10 minutes by running and stretching. Before pre-test, the information of test was given to subjects. After pretest, the participants were randomly assigned to one of three groups: external attention focus, internal attention focus, and control. All groups performed standing long jump for three sessions; each session consisted of 5 attempts of 2. The verbal cue with external attention focus group received the words "line, jump"; this meant looking at target. The verbal cue with internal attention focus group received the words "hand, jump"; this meant throwing hands. The concept and reason of using these keywords were said to experimental groups. It should be noted that for external focus group, there was a line 180 cm distant from first line; the participants set it as a criteria for their exercises. During research, the test was performed in groups of 5 subjects to reduce the effects of fatigue and make equal conditions for all participants. The timing of each session, number of attempts, and training method of coach was similar for all participants in all sessions. Immediately after last acquisition session, the post-test was conducted. After one week of inactivity, the retention test was conducted.

The collected data were analyzed using SPSS software, version 21. The mean and standard deviation were used to describe statistically the data. The Excel software was used to create charts. The Shapiro-Wilk test was used to examine data distribution normality and Levene's test was used to study the homogeneity of variances. The inferential statistics included repeated measures and one-way analysis of variance. The significance level in all analyses was considered to be .05.

3. Findings

The mean of standing long jump performance of studied groups at different measurement stages are shown Figure 1.

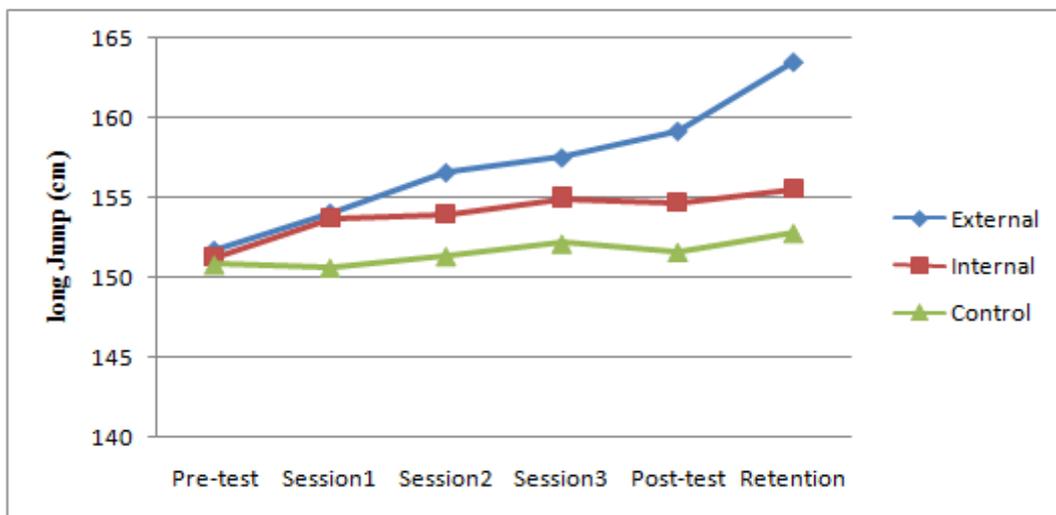
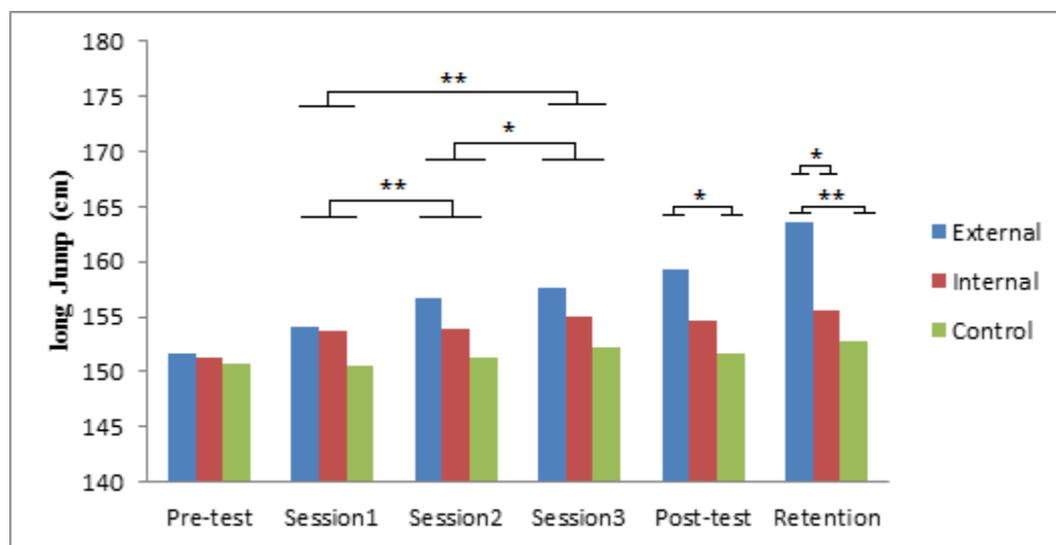


Figure 1. Mean of studied groups performance at different research stages

The Shapiro-Wilk test results showed that the data had normal distribution at all study stages ($P > .05$). Also, Levin's test results showed the homogeneity of variances ($P > .05$). The one-way variance analysis at pre-test stage showed that there was no significant difference between mean of groups ($F_{(2,42)} = .042, P = .995$). The variance analysis with repeated measures was used to analyze the data of acquisition stage. The results showed that the main effect of group ($P = .331, F = 1.136$) and interactive effect of group and exercise sessions ($F = 2.205, P = .075$) were not significant; but, the main effect of training sessions was significant ($F = 16.725, P = .001$). The results of Bonferroni post-hoc test indicated that there was significant improvement in performance of subjects at each session compared to previous session; this is shown in Figure 2.



* Mean difference is significant at .01 levels
 ** Mean difference is significant at .05 levels

Figure 2. Intergroup and intra group differences in standing long jump performances of groups at different stages of measurement

The findings of one-way analysis of variance compared to mean of groups at post-test showed that there was a significant difference between groups ($F_{(2,42)} = 3.251, P = .049$). The results of Tukey post-hoc test showed that the external attention focus group was significantly more advantageous than control group ($P = .039$). In other cases, however, the observed difference was not significant.

At comparison of mean of groups at retention stage, the one-way analysis of variance showed a significant difference between groups' performance ($F_{(2,42)}=7.036$, $P=.002$). The results of Tukey post-hoc test showed that the external attention focus group was significantly better than internal attention focus group ($P=.027$) and control group ($P=.002$). However, there was no significant difference between internal attention focus group and control group; these differences are shown in Figure 3.

4. Discussion and Conclusion

This study aimed to investigate the effect of attention focus type using verbal cues on performance and retention of standing long jump among beginner female teenagers. The findings showed that the standing long jump performance of all groups was growing from training period to retention test. However, there was no significant difference between three groups in terms of standing long jump performance at pre-test and acquisition stage. But in post-test and retention stage, there was a significant difference between three groups. This is consistent with findings of Kakar et. al. (2013), Carpenter et. al. (2013), Shafinia et. al. (2006), Damanpak et. al. (2012), Ghayor et. al. (2014), Vance et. al. (2004), Zachry (2005), Zachry et. al. (2005), Abdollahipour and Psotta(2017), Becker and Smith (2010, 2013) and Becker et. al. (2018); they also indicated that the external attention focus is better. These studies are consistent with apparent processing hypothesis; it argues that in external attention, the performer processes only one source of information and in internal attention, the internal information are considered and the external information is also processed. As a result, the internal focus is associated with weaker performance.

However, these are inconsistent with findings of Beilock et. al. (2002); they showed that the internal focus is the best according to the hypothesis of non-automaticity of skills, which suggested that different attention focus guidelines lead to different performance in different individuals. In other words, providing internal attention focus guidelines to beginners leads to better performance than external attention focus guidelines. Similarly, suggested that the external attention focus is more effective in difficult tasks and skillful subjects. The probable reasons for this inconsistency may include difficulty of task and type of skill, number of training sessions, and level of expertise and skill of subjects.

Since this study showed a significant difference between two internal and external attention focuses as verbal cues at standing long jump, it can be said that this is inconsistent with findings of Tahmasebi et. al. (2009), and Uehara et. al. (2008); they showed that there was no significant difference between internal and external focus groups.

The research limitations in this study included inappropriateness of environmental conditions, low number of training sessions, fatigue, and pressure on legs by frequent jumps. All of these factors somewhat influenced the findings of research.

However, it was suggested that the future research examine other sports skills such as high jump, pole vault, and etc., considering age, gender, skill level, efficiency, and conditions and duration of exercises.

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