

The Effect of External Focus Distance on Learning Shooting for Beginners Male Soccer Players

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Abstract

Background

Soccer demands a unique combination of physicality and technical finesse, with precision, accuracy and ball-handling skills distinguishing great players. This study aims to investigate the impact of different external focus cues on the shooting accuracy of novice male soccer players. It aims to provide insights for coaches and players to optimize training techniques for skill development.

Methods

The study involved 45 male participants aged 18-25 assigned to Distal External Focus, Proximal External Focus and Control Group. Participants performed a practice trial followed by five experimental trials with specific focus instructions. Shooting accuracy was measured using the Loughborough Soccer Shooting Test. Statistical analysis was done using SPSS version 20, which included a mixed Paired T-Test and One-Way Anova to compare the group performances.

Results

Participants with a distal external focus ($M=2.4080$) group consistently achieved the highest scores, followed by the proximal external focus group ($M= 1.5573$), with the control group ($M = 1.3467$) having the lowest scores.

Conclusion

The study shows that, in comparison to a proximal external focus and a control group, a distal external focus significantly increases soccer shooting accuracy. These findings provide valuable insights for optimizing motor skills and enhancing shooting accuracy in soccer.

Keywords: *External Focus Distance, Soccer, Proximal Focus Distance, Motor Skills, Saudi Arabia*

Introduction:

Soccer is a sport that captivates the world with its blend of athleticism, strategy and sheer excitement. At its core, soccer demands a unique combination of physical activity and technical finesse (Brimmell et al., 2019). However, what truly separates the great players from the rest is the accuracy and skill with which players of all skill levels manipulate the ball. (Brimmell et al., 2019). A fundamental skill for soccer players is the ability to control and direct the ball with accuracy and precision. This involves striking the ball with the appropriate part of the foot and force (Cannon, 2020). Soccer is a complex field sport that calls for a variety of motor skills, including running, sprinting, and quick direction changes (Caldbeck and Dos' Santos, 2022). Players frequently have to accelerate quickly with little braking during competitive matches. Soccer highlights the importance of consistently sprinting to maintain high-speed abilities (Caldbeck and Dos' Santos, 2022). Furthermore, the sporadic bursts of maximal or near-maximal sprinting that take place during soccer games emphasize how crucial it is for players to have a variety of physical fitness and agility (Lupo et al., 2019). Due to the dynamic nature of the sport, these motor skills must be combined in order to succeed on the field (Lupo et al., 2019).

Soccer coaches and trainers are well aware of the importance of developing these ball-handling skills (Hajireza, 2023). To achieve this, they employ various drills and exercises that target specific aspects of a player's game (Hajireza, 2023). A study by Alvaro involving 61 children revealed that trained children, particularly those using an original VR environment designed with careful pedagogical progression, displayed significantly improved header motor skills compared to a control group (Lozano-Tarazona and Mauricio Rivera Pinzón, 2023). It highlights the potential

of VR training environments in enhancing the transfer of sports motor skills, emphasizing the importance of design elements for achieving positive outcomes (Lozano-Tarazona and Mauricio Rivera Pinzón, 2023). In another study, Kokstejn highlighted a significant link between fundamental motor skills (tested using TGMD-2) and game-specific motor skills (dribbling and shooting (Kokstejn and Musalek, 2019)). The horizontal jump and catch were identified as strong predictors of game-specific skills. These findings emphasize the importance of developing both fine and gross fundamental motor skills in youth football training, especially during early and middle childhood, to enhance overall motor skill proficiency (Kokstejn and Musalek, 2019). In a study employing the GoMeSy platform to assess goalkeepers' performance, a test was conducted to evaluate penalty shot-stopping skills (Rodríguez-Arce et al., 2019). The results showed that cognitive skills did not differ between novice and expert goalkeepers ($p = 0.333$), while motor skills exhibited a significant difference ($p = 0.006$) (Rodríguez-Arce et al., 2019). The study emphasized the importance of coaches not only focusing on physical training but also developing reaction time (cognitive skills) to enhance performance (Rodríguez-Arce et al., 2019).

External focus distance in soccer refers to a player's attention being directed toward objects or points outside of their own body, such as goal posts, the position of players or a specific target in the field (Jaspers et al., 2018). This type of external focus is contrasted with internal focus, where a player's attention is directed towards their body movements. External focus in soccer is often associated with better performance, as it allows players to react more effectively to the dynamic and changing environment on the field (Jaspers et al., 2018). In a study by Oliver et al. (2021), the effects of external cueing on drop jump (DJ) characteristics in young male football players were investigated (Oliver et al., 2021). They discovered that the use of a contact cue (CC) significantly decreased the ground contact time (GCT), increased the reactive strength index (RSI), and improved other performance metrics (Oliver et al., 2021). While quiet cue (QC) decreased outcomes related to injury risk, height cue (HC) increased jump height. Height cue may be especially helpful for young football players with little experience because it raises jump height without raising the risk of injury (Oliver et al., 2021). The research findings from studies involving adults (Chua et al., 2021) have repeatedly shown the potential advantages of external attentional focus, especially when related cues are prioritized over internal and nearby cues (FÁBIO SARAIVA FLÓRES, 2015). Several studies have repeatedly shown that an external focus of attention enhances learning so much that learners achieve higher competence in terms of not only effectiveness but also efficiency in a shorter period. The literature on this has a practical implication in that it shows an external focus to be a good thing for acquiring skills and improving performance (Wulf, 2007). Notably, studies such as the work by Wulf have shown that increasing the distance of the attentional focus can enhance the learning process in various contexts (Chua et al., 2019). However, it is important to note that not all external foci are equally effective. The benefits of an external focus are determined in large part by the spatial distance between an action and its intended effect, according to groundbreaking research by McNevin and colleagues (McNevin et al., 2003).

Another study investigated the impact of different focus conditions on the learning of a soccer shooting task among male children aged 9 to 11 (Abedanzadeh et al., 2023). The acquisition trials were completed by 60 participants, and after 48 hours, retention and transfer tests were administered. Interestingly, despite the fact that all groups outperformed the control group in terms of retention and transfer, the study did not clearly show a benefit of external focus over internal focus (Abedanzadeh et al., 2023). This suggests that the choice of cues and potential constraints

may influence when children benefit from external or holistic focus in motor learning (Abedanzadeh et al., 2023).

The important influence of external focus cues on sports performance, particularly in soccer, is the foundation for this study. By examining the specific effects of external focus cues on the shooting accuracy of novice male soccer players, this study seeks to add to the body of knowledge. The study aims to provide insights that can help coaches, trainers, and players by optimizing training techniques and strategies for skill development by examining how various types of external focus cues influence shooting accuracy.

Methods and Materials

Study Design

This interventional study, in which novice male soccer players aims to determine the effects of various external focus cues on shooting accuracy.

Study Duration and Location

The study was carried out on campus at Umm Al-Qura University over a two-week period. The study's timeline includes data collection and analysis. Each participant's five experimental trials, as well as the practice trial, took place within the time frame allotted for data collection. The study was conducted on a soccer field on the university's campus, with participants' shooting attempts focused on a standard-sized goal (7.32m x 2.44m).

Participant Selection

Participants for this study were selected from Umm Al-Qura University's student population, adhering to specific criteria. A total of 45 adult males aged 18-25 were included in this study. Only undergraduate and graduate students of the university were eligible, ensuring a consistent educational background. Additionally, prior to their involvement in the study, all participants underwent a health assessment to confirm their physical well-being and absence of recent injuries, particularly lower extremity or head injuries.

Participants (n=45) were randomly assigned to one of three groups: Proximal External Focus (pEF), Distal External Focus (dEF), and a Control Group (CG). This random assignment ensured an unbiased distribution of participants across the experimental conditions, enhancing the study's internal validity.

Procedures

The primary task involved assessing the impact of external focus cues on the shooting accuracy of novice male soccer players. Participants were required to shoot a soccer ball at a standard-sized goal measuring 7.32 meters in width and 2.44 meters in height. The study took place on the soccer field located within the premises of Umm Al-Qura University.

Assessment Tool

The Loughborough Soccer Shooting Test (LSST), a widely recognized and validated assessment tool, was employed to measure participants' shooting accuracy (Grgic et al., 2022). This choice of assessment tool ensured reliability and consistency with academic studies.

Figure 1 provides a visual representation of the layout of the LSST. In this illustration, the soccer field's boundary lines are clearly depicted, and they were carefully measured and marked on the floor using 5-cm wide yellow tape.

This figure highlights the "shooting zone" located inside a square-shaped area of size 8.56 x 8.5 meters. The shooting zone is positioned on the field, with its nearest edge located 16.5 meters away from the goal line. Four tall traffic cones were prominently placed at each of the corners within the shooting zone.

The full-sized goal using LSST had dimensions measuring 2.44 m in height and 7.32m in width. It was strategically divided into multiple scoring zones, as illustrated in **Figure 1**, to assess shooting accuracy. The boundary lines for these zones were clearly marked using 5 cm wide tape.

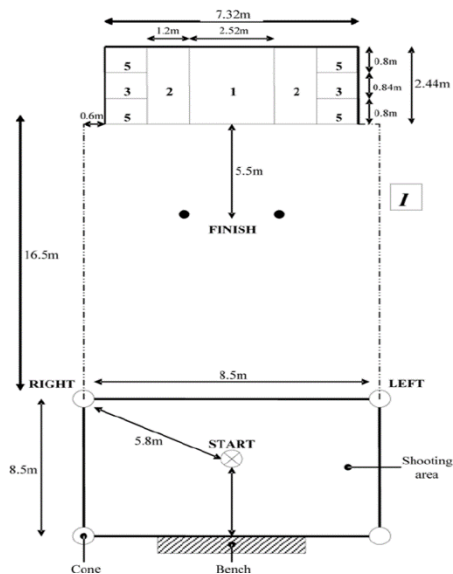


Figure 1. Schematic of the Loughborough Soccer Shooting Test (LSST)

Preparation Phase

A practice trial consisting of 10 shots was the study's first task for participants to complete. Between each series of shots, a 30-second break was required to reduce fatigue and promote consistency.

Experimental Phase

Following the practice trial, participants engaged in five experimental trials, each with a specific focus instruction based on their assigned group. These instructions were presented to participants in writing before each trial to ensure clarity and consistency.

Proximal External Focus (pEF): The instructions for the participants assigned in this group were: While looking at the target, focus on kicking the center of the ball toward the target.

Distal External Focus (dEF): The instructions for the participants assigned in this group were: While looking at the target, focus on hitting the target with the highest points.

Control Group (CG): Participants in this group were tasked with completing all trials without any specific focus instructions regarding their shooting technique.

Score Evaluation

Each shot's score was recorded on a score sheet. It is important to note that any shots made outside of the permitted shooting zones, as illustrated in **Figure 1**, or that took longer than 8.5 seconds to complete, received a score of 0. This exact scoring methodology was used to ensure fairness and consistency across all trials.

Apparatus

The study employed specific apparatus to facilitate data collection and measurement accuracy. A Casio digital stopwatch (model HS-3V-1BRDT) manufactured by Casio Electronics Co., Ltd in China was used to record the time it took to complete each shot order. This stopwatch ensured precise timing during the shooting task. Additionally, eight size 5 Adidas Rihla LGE

soccer balls were utilised to maintain uniformity in the shooting task among participants. The soccer field featured a standard-sized goal with dimensions measuring 7.32 meters in width and 2.44 meters in height, serving as the target for participants during the shooting activity.

Statistical Analysis

The study employed SPSS Version-20 to assess the influence of external focus cues on shooting accuracy. A mixed Paired T-test was conducted involving a Three Group x Five Trials design. Two separate one-way ANOVAs were conducted, one for practice trials and the other for the last trials, to specifically investigate any learning effects within each group. The significance level for all statistical tests was set at $p < .05$, indicating the threshold for statistical significance. These analyses provided a comprehensive assessment of the impact of external focus cues on shooting accuracy while considering both immediate performance and potential learning effects over time.

Ethical Consideration

Ethical considerations were paramount throughout the planning and execution of this study to safeguard the rights and well-being of the participants. The data source of this study was approved by the Officer of Graduate Studies and Scientific Research at the College of Education, Umm Al-Qura University, Saudi Arabia on 03/04/2023, reference number 64101.

Informed Consent

All participants were provided with a clear and comprehensible Research Informed Consent Form, which explained the purpose, procedures, potential risks and benefits of the study. Participants were informed that their participation was entirely voluntary and that they had the right to withdraw from the study at any time without any consequences.

Results

Paired T-Test and Two separate ANOVA tests were conducted to assess the impact of different experimental conditions on participants' performance.

In pair 1, participants with a distal external focus achieved a significantly higher mean score ($M=2.4080$) compared to those with a Proximal External Focus ($M= 1.5573$), as shown in **Table 1**. The mean difference was -0.85067 , and this difference was highly significant ($t =16.860$, $df = 149$, $p < 0.001$), as shown in **Table 2**. Therefore, the Def group outperformed the PEF group in shooting accuracy.

In pair 2, participants in the proximal External Focus group achieved significantly higher shooting scores ($M= 1.5573$) compared to the control group ($M = 1.3467$), $t(149)= 8.126$, $p < 0.001$ (**Table 1 and 2**). This suggests that participants in the PEF group performed significantly better than those in the CG.

In Pair 3, participants in the Distal External Focus (DEF) group achieved significantly higher shooting scores ($M = 2.4080$) compared to the Control Group (CG) ($M = 1.3467$), $t(149) = 19.391$, $p < 0.001$. This demonstrates that participants in the DEF group significantly outperformed those in the CG. (**Tables 1 and 2**)

The shooting scores analysis reveals significant differences in performance between the focus conditions for all three pairs. The distal external force group consistently achieved the highest scores, followed by the proximal external focus group, and the control group consistently had the lowest scores. The findings of the study provide strong evidence that a Distant external focus is associated with superior and better shooting performance in soccer.

Table 1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PEF	1.5573	150	.36164	.02953
	DEF	2.4080	150	.49474	.04040
Pair 2	PEF	1.5573	150	.36164	.02953
	CG	1.3467	150	.43761	.03573
Pair 3	DEF	2.4080	150	.49474	.04040
	CG	1.3467	150	.43761	.03573

Table 2. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PEF - DEF	-.85067	.61794	.05045	-.95036	-.75097	-16.860	149	.000
Pair 2	PEF - CG	.21067	.31753	.02593	.15944	.26190	8.126	149	.000
Pair 3	DEF - CG	1.06133	.67035	.05473	.95318	1.16949	19.391	149	.000

The highly significant p-value (p 0.001) for the practice trial, which served as a benchmark for shooting accuracy, showed significant differences between the groups (Table 3). The significant p-value for the final trial (p 0.001) showed that the performance differences between the groups persisted and grew during the fifth learning trial (Table 3). This confirms the beneficial effects of external focus cues on long-term skill development and shooting accuracy in soccer. Using a distal external focus consistently outperformed proximal external and control groups in practice and learning trials, which highlights the practical significance of this approach. The outcomes of the two ANOVA tests highlight the significance of experimental conditions and external focus cues in influencing participants' soccer shooting performance. The small p-values prove that these differences are the direct result of the particular experimental circumstances and are not merely the result of chance.

Table 3. One-Way ANOVA

PRACTICE1					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38.378	4	9.595	14.226	.000
Within Groups	300.122	445	.674		
Total	338.500	449			
LEARNING5					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	25.675	3	8.558	6.705	.000
Within Groups	569.269	446	1.276		
Total	594.944	449			

Discussion

In particular when compared to other focus studies in various contexts, the findings of the present study offer invaluable insight into the influence of attentional focus on shooting performance in soccer.

In comparison to both a proximal external focus and a control group, the present study's results showed a consistent pattern that distal external focus improves shooting accuracy. The findings of the current study, which highlight the benefits of a distal external focus in enhancing soccer shooting accuracy, are consistent with those of earlier research projects conducted in a variety of fields. In particular, prior research has shown that under stable environmental conditions, skilled performers tend to benefit from distal attentional foci in short-duration, discrete tasks and serial tasks. For instance, skilled people performed better when they adopted a distal external focus when performing tasks like the standing long jump (Porter et al., 2012) and hitting golf balls (Bell and Hardy, 2009). Similar to this, it has been demonstrated that distal focus cues can enhance performance even in tasks that are serial, like playing a series of alternating notes on a piano (Duke et al., 2011).

The study conducted by Gabriele Wulf et al. (2022) focused on the effects of attentional focus on volleyball serves (Singh et al., 2022). When compared to proximal external focus and internal focus conditions, it was discovered that a distal external focus produced significantly higher accuracy scores (Singh et al., 2022). The present soccer shooting study and another one by McKay and Wulf on dart throwing both looked at the effects of distal versus proximal external attentional foci. Both studies demonstrate how a distal external focus can improve motor function. The study underscores the advantages of directing attention to a distant target or goal, reinforcing the significance of a distal external focus in optimizing motor skills and performance (McKay and Wulf, 2012). Further evidence for the effectiveness of a distal external focus is provided by Wulf's study on expert kayakers, and the findings of that study are consistent with the findings of the current study (Banks et al., 2020). Both investigations emphasize the advantage of directing one's attention to a movement effect that is farther away from the body (Banks et al., 2020). Adopting a distal external focus in the kayaking study resulted in significantly faster sprint times than both a proximal external focus and a control group (Banks et al., 2020).

Philip E. Kearney's study explored the optimal focus of attention for novice golfers during a putting task (Kearney, 2015). According to the research, using a distal external focus improved novices' putting performance more than using a proximal external focus or an internal focus (Kearney, 2015). While golf and soccer shooting may differ in some ways, both studies stress the significance of taking the task's nature into account when recommending attentional focus, with the distal external focus proving effective in certain skill acquisition contexts. (Kearney, 2015). As highlighted from the results of our present study, the superior effects from distal external focus can be attributed to several factors, as argued by (McNevin et al., 2003, Shea and Wulf, 1999). Closer effects are often intertwined with the body's actions, making it harder for the performers to control and adjust their movements precisely. In contrast, distal effects, being more distinct, allow for more accurate judgements (Shea and Wulf, 1999). The combination of spatial distinctiveness and holistic action planning likely contributed to the superior shooting accuracy observed in the distal external focus in the present study.

Conclusion

The study demonstrates that a distal External focus significantly improves soccer shooting accuracy compared to the Proximal External Focus and a Control Group. The results reaffirm the effectiveness of a distant target focus, providing valuable insights into optimizing motor skills and enhancing shooting accuracy and performance.

Limitations

The relatively small sample size of this study may limit the generalizability of the results, and the use of short-term measures necessitates further investigation into the long-term effects of attentional focus on soccer shooting accuracy.

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