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# Comparing the effects of self and expert models observation on performance and learning of futsal side foot pass

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**ABSTRACT**

*The purpose of the present study was to compare the effects of self and expert models observation on performance and learning of futsal side foot pass. Therefore, 36 non-athlete female students (mean age=21±2.5 yr.) were selected and assigned randomly to the expert model, self-observation, and control (without model) groups. After instruction, participants performed pretest and practiced the skill after receiving the related models (videotape of their last session or an expert player) for 4 sessions. The control group practiced without modeling. In the last session, acquisition test and after a week, retention (in the same condition) and transfer tests (with spectators) were performed without modeling. Movement pattern was measured by a researcher-made scale. The results of 3*4 ANOVA with repeated measures of test factor indicated that acquisition and transfer of expert model group was better than others (p<.05) and modeling had not the significant effect on movement pattern of futsal side foot pass skill in retention test (p>.05). According to the results, futsal instructors have to demonstrate an expert model to teach movement patterns of simple skills in early stages of learning.*

**Key words**: futsal pass, modeling, observational learning

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## INTRODUCTION

Similar to soccer, futsal is considered as an outstanding sport among people today. In this decade, the women's futsal has become one of the most attractive women's sports. As a result, the motor learning researchers and practitioners have focused on the effective methods of teaching the futsal skills. Demonstration or modeling is a method commonly used by the instructors and practitioners to teach sport skills. Modeling facilitates performance and learning of the skills and helps in producing movement patterns during the initial stages of learning in particular [1,2]. The research evidence indicates that the observers understand some phenomena related to the coordination pattern of the skill through observation and the most useful effect of performance takes place when learning of the new coordination pattern is required [3]. The efforts to explain how modeling affects on learning have been resulted in presenting several theories. For instance, according to the Adam's closed loop theory [4], a perceptual trace will be developed as a reference for comparison with feedback and error detection after observing the pattern. Based on the Bandura's cognitive mediation theory [5], modeling can develop a cognitive representation as a reference which assists the observer in producing movements. According to the Schmidt's schema theory [6], the gathered data through observation of the pattern are memorized in the recall and recognition memory and are used during performance of the movement. The advocates of the direct visual perception perspective [7] believe that the visual system processes the information automatically and such information will be changed into actions without the requirement of a cognitive mediator.

There are many studies which have provided support and approval for the effects of the modeling on learning the movement and sport skills [8,9]. Although the modeling has been accepted as an effective instructional method in most of the sports, but there are different opinions about its type and presentation method. Through the efforts for evaluation of an effective type and method of the modeling, it was understood that its effectiveness is related to different factors such as learner characteristics, model characteristics, and task [6]. The skill level of the model is a factor which has drawn the attention of many researchers. In the majority of the researches, the expert models have been used and their effect on the performance and learning has been approved [10]. Some studies have taken place for the comparison of the expert and learning models and a number of researchers, e.g., Hatami [11], have indicated the advocates of the expert models. According to Sheffield [12], observation of the expert model will result in a perceptual trace of the model action in the observer's memory which will be used as a reference for comparison and correction of the action; as a result, the performance quality will be improved in accordance with the higher quality of the demonstration. On the other hand, many researchers such as Arabameri, Farrokhi, Bagherzadeh, and Mousavi [13] and McCullagh and Meyer [14] have shown the advantages of learning model. They believe that these advantages are due to the active involvement of the observer in trial and error process and problem resolving by learning model.

Self-modeling is a special method of the modeling which includes different types such as feedforward self-modeling, positive self review self-modeling, and self-observation [15,16]. Unlike other methods of the self-modeling, self-observation method makes no changes in the watched videotapes and the learner watches himself/herself performing the skill as a learning model without any changes [17,18,19]. The effect of self-modeling on performance and learning of different sport skills is an approved fact [18,20,21,22,23]. In Bandura's social cognitive theory [24], the advantage of the self-modeling is supported. Bandura believes that the similarity between the model and the observer improves the attention and retention processes in the observational learning and therefore results in better learning. Also from the neurological perspective, Holmes and Calmels [25] stated in their review article that self-observation, compared to observation of other individuals, has more functional similarity between action and observation with regard to neurological activation.

On the other hand, positive effect of self-modeling was not found in some studies; for example, Barbi and Diane [26] found no significant differences between the effects of self-modeling types and control group on performance of skate jumping. Conflicting results have been obtained in studies in which the effects of the self and the expert models were compared. For example, Baudry, Leroy, and Chollet [20] found that self-modeling is more effective than expert modeling in their study on 16 Gymnasts performing on vaulting horse. Zetou, Tzetzis, Vernadakis, and Kioumourtzoglou [27] compared the effects of self and expert models on learning of volleyball pass and service skills and found that the expert model group performed significantly better than self model group in retention test. Souzandehpour, Movahedi, Mazaheri, and Sharifi [28] showed that video demonstration of expert model, compared to self model, resulted in better retention of volleyball service skill performed by novice male students. In some studies, no significant difference was found between the effects of self and expert models; e.g., Barzouka, Bergeles, and Hatziharistos [29] found no significant difference in acquisition of volleyball skills between expert and self model groups of students at the age of 12-15 yr.

Considering the contradictions between the results of the studies that compared the effects of self-observation and expert model, role of the factors such as learner and model characteristics and task in effectiveness of modeling, and limited studies on instruction methods of futsal, it seems necessary to investigate the proper modeling method in this sport. Thus, the present study was carried out to compare the effects of observation of expert and self models on performance and learning of futsal side foot pass in young novice females. Therefore, the method of modeling was treated and learner characteristics and task were controlled by selecting novice players and a simple task of futsal. The results of the present study provide useful information for the women's futsal instructors about the more effective method of modeling in teaching of the side foot pass skill.

## MATERIALS AND METHODS

The present quasi-experimental and applied study was carried out using the mixed two-factor design, including between subjects factor of modeling (observation of self and expert models, and without model) and within subjects factor of test (pretest and the acquisition, retention, and transfer tests). The participants in this study were 36 novice right-footed female students with mean age 21 (±2.5) years who were selected randomly from students of Mazandaran University of Medical Sciences. They were assigned randomly to three groups. Written informed consent was received from all participants after verbal explanation of the experimental design.

The Coren's footedness tests [30], including ball kicking, stair climbing, and putting foot on coins, were used to determine dominant foot. Two Canon cameras of 12.1 megapixel resolution with optical zoom of 4 were used to film the performance of self-modeling groups in each session, and a 14 inch laptop, 4230 model was used to play the videotapes for the modeling groups. Objective of the pass was to hit a rectangle 50*30 cm. A researcher-made scale was used to evaluate the pattern of the side foot pass. At first, a checklist of all movements of skill pattern in preparation, execution, and follow through stages was written in a 5-point scale (very bad=1 to very good=5). Then, logic (face) and content validity of checklist were investigated by four experienced futsal coaches. Test-retest reliability coefficient was calculated .89 on 10 expert and 10 novice players.

To gather information, dominant foot of the participants was determined at first and those students who used their right foot for all three tests were selected and assigned randomly into the three groups of the observation of self and the expert models and without model (control). Then, all participants received similar verbal instructions about skill performance. After 10 trials to control warm-up decrement effect, the students participated in the pretest including 10 kicks towards the target (without instruction or feedback) and mean of movement pattern points was considered as pretest. The acquisition phase included 4 sessions (two days per week). At the beginning of each session, the participants of experimental groups watched the related models' videotapes and then performed the skill after warm-up. Shown in the laptop, the expert model group watched the performance of 10 side foot passes by a peer female player in super league level, the self-modeling group watched 10 passes by herself that had performed in previous session, and the control group watched an unrelated videotape. During each session, members of the experimental groups performed 30 passes (3 blocks of 10 trials) and the control group members performed 40 kicks[1] (4 blocks of 10 trials) towards the target. Two minutes was presented between blocks. The mean point of final 10 passes towards target which were performed during last session of practice phase was considered as the score of acquisition test. The retention test was performed one week later, including 10 passes towards the target in similar conditions but without watching the videotapes. After the retention test, transfer test with 10 passes was performed without modeling and in presence of 15 peer female spectators. The mean point of each block of trials was determined as retention and transfer scores, respectively. Data was analyzed by 3(modeling)*4(test) ANOVA with repeated measures of last factor and Bonfferoni post hoc test. The Significance level was considered p<.05.

## RESULTS

Means (± SD) of the side foot pass pattern scores in different groups are reported in figure and table 1. As it is shown, the pattern of passes was improved in all three groups during the experimental phase; however, there were no much differences between the groups.

**Table 1. Mean (± SD) of side foot pass pattern scores in different groups**

| Test / group | pretest | acquisition | retention | transfer |
|---|---|---|---|---|
| | M±SD | M±SD | M±SD | M±SD |
| Expert model | 55.3±10.8 | 87.6±14.1 | 81.1±9.5 | 84.4±9.4 |
| Self model | 53.8±10.3 | 75.7±5.4 | 77±7.6 | 82.1±5.1 |
| control | 60.2±12.8 | 76.1±9.1 | 83.2±6.5 | 81.4±7.4 |

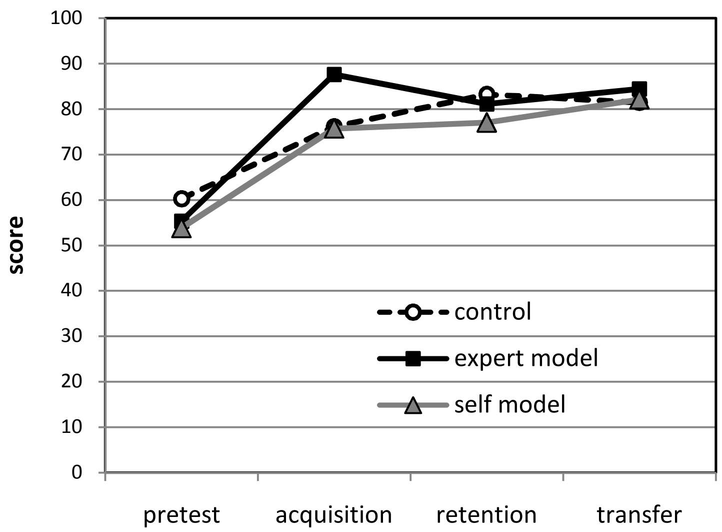


**Figure 1. Mean score of movement pattern of the groups in different tests.**

[1] *Equal to sum of observational and physical practices of experimental groups to control amount of practice.*

The results of Shapiro-Wilk test indicated normal distribution of passing scores in different groups and tests (p>.05). Moreover, the comparison of the groups pretest by one-way ANOVA indicated no initial differences (F=2.643, P=.086); as a result, the mixed 2-factor ANOVA was used to analyze the data of the pass pattern. According to the results, the main effects of the test and modeling and interaction of test and modeling were significant ($F_{(3,64)}=9.198$, P=.001; $F_{(2,64)}=3.967$, p=.024; $F_{(4,128)}=3.753$, p=.006, respectively). The Bonfferoni post hoc test indicated no significant differences between the pattern of pass in different modeling groups along with physical training in the acquisition and retention tests (p>.05), but the movement pattern of the expert model group was better than other groups in transfer test (p<.05).

## DISCUSSION AND CONCLUSION

The purpose of the present study was to investigate the effects of the two video demonstration methods of expert model and self-modeling on the performance and learning of futsal side foot pass in novice young females. According the results, there were significant differences between pretest and retention and transfer test; in other words, the amount of practice were sufficient to make relative consistent changes in capability of movement performance, however due to insignificant difference between the experimental and control groups, the effect is not attributable to the modeling. In fact, the results of this study did not approve the theories related to the effect of modeling such as Adam's closed loop theory [4], Bandura's cognitive mediation theory [24], Schmidt's schema theory [6], and the direct visual perception perspective [27].

The findings related to the significant difference in the pattern of side foot pass in the demonstration of expert model, self model, and without model groups during the acquisition, retention and transfer phases were consistent with the results of Barbi and Diane [26] and Barzouka et al. [29]; but they were inconsistent with the findings of Ste-Marie, Vertes, Rymal, and Martini [23] who indicated advantage of the self-modeling compared to the verbal instruction, with the results of Zetou et al. [27,31] and Souzandehpour et al. [28] who found the advantage of the expert model, and with the findings of Baudry et al. [20] who concluded the advantages of the self-modeling. Some researchers such as Dowrick [19] and Souzandehpour et al. [28] believed that the self-modeling effect is dependent on the type of the skill. It is likely that the self-modeling is more useful for continuous skills such as swimming [32] rather than discrete skills such as volleyball service [27, 28, 29, 31], skate jumping [26], and the side foot pass in the present study. Another factor of the self-modeling effectiveness is the observer's level of skill [28]. Presumably, the skilled adults benefit from the self-modeling more effectively due to the higher perception and motivation.

In addition, the positive effects of the modeling are approved as a proper method of the complex movement skills teaching [33]; thus, the complexity of skill is considered as an important factor for modeling effectiveness. In the present study, the skill being studied (side foot pass) was a simple skill, and such simplicity explains ineffectiveness of the modeling. In other words, it is likely that the lack of any significant difference between acquisition, retention, and transfer of the modeling groups relative to the control group without modeling is due to the simplicity of the skill under study. Therefore, the relative complexity of the task, i.e. the complexity of the task relative to performer's level of skill, shall be considered instead of absolute complexity of the task. In this case, the effect of modeling on novice and young individuals and the complex skills will be justifiable.

On the other hand, considering the fact that the modeling gathers a large amount of information and confuses the observer – novice observers in particular – in finding the related cues and overloads his/her attention capacity, the verbal cues during modeling are likely to play an important role in the effectiveness of the modeling. Therefore, ineffectiveness of the modeling in the present study may be attributed to the mentioned issue. Verbal cues draw the observer's attention to the related information during modeling; therefore it is recommended to study the effects of different types of modeling along with verbal cues on performance and learning of the movement skills in future researches. Based on the findings of the present study, two types of self and expert modeling to teach futsal side foot pass are apparently not influential on improving the learning of the young novice females. In addition, following the similar results of two methods of modeling to the control group without modeling, application of the modeling methods to teach simple skills of futsal is not efficient and economic and is not recommended to instructors. For the future studies, it is suggested to investigate the role of skill complexity in effectiveness of different types of modeling in sport.

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