



Original Research

The Effect of Dyad Training on the Learning of Layup Shot in Basketball

Sahar Kosarifard¹, Elaheh Azadian^{1*}

1. Department of Motor Behavior, Faculty of Humanities, Islamic Azad University, Hamedan Branch, Hamedan, Iran.

ABSTRACT

The impact of cooperative and observational training on learning motor skills has been studied separately. Investigating the impact of dyad training is a new approach that combined observational and cooperative training that has not yet been fully studied. The purpose of this study was to investigate the effect of dyad training on basketball lay-up performance. Twenty-two female students volunteered in this study. After the initial instruction, participants completed six attempts for the pre-test and were divided into two groups (control and experimental) based on pre-test scores. Lay-up shot was training in six sessions. The post-test and retention were implemented, immediately and three days after session training. For intergroup comparison independent sample t-test was used, and for intragroup analysis of variance was performed, using SPSS software with $p < 0.05$ was considered significant. The results showed that both groups had a significant decrease in time of performance and the number of errors ($p < 0.05$), but the number of goals only increased in the control group ($p < 0.05$). The difference between the two groups was not significant ($p > 0.05$). These results showed that dyad training with 50% physical effort is more effective than individual training with 100% physical effort. Also, due to less physical effort, the risk of injury and fatigue was lower and also causes cognitive training in beginners.

Keywords: Basketball, Dyad training, Cooperative training, Lay-up Shot

Corresponding Author: Elaheh Azadian, Department of Motor Behavior, Faculty of Humanities, Islamic Azad University, Hamedan Branch, Hamedan, Iran. Email: azadian1@yahoo.com, Tel: +98 918 319 8476

INTRODUCTION

One of the main goals in researches of learning and motor control was to identify the variables that play a role in optimizing learning and motor control (1). For many years, psychologists and researchers in the field of motor behavior have been looking for training methods to optimize the learning of motor skills, saving time and costs (2, 3). Accordingly, recognized the factors that affected the learning and performing of skills are among the topics that researchers in the field of behavioral sciences have tried to identify for years.

Learning through observation or patterning is a common technique used to teach movement skills (4). Observational learning is the process of learning a movement or behavior that using representation of that motion (5), although observational learning is not more beneficial than physical exercise, but it's a good practice for learning motor skills, especially complex ones (6). Research results clearly show that observation can enhance learning in a wide range of movement skills (7-11). In recent years, some researchers have achieved considerable results by performing observational exercises among physical exercises (combination exercises). For example, Shea et al. (2000) (12) showed in their research that the combination of observational and physical exercises is more effective than only physical exercise, with this combination, unique features can be used in both methods. One of the important points in this research is related to efficiency, because observational efforts have been replaced with physical efforts. Therefore dyad training more cost-effective in terms of energy expenditure and risk of injury.

Cooperative learning is another method of learning that has received a great deal of attention. In this method, each member of the group takes part in the whole task to achieve success, and the goal achievement of one member of the group is dependent on the other members of the group (13). In some studies showed that the positive effects of cooperative exercises on adherence to training (14), increased physical fitness (15, 16), learning short, long, and sharp badminton service (17), as well as the role of cooperative exercises in improving primary education (18).

Dyad training is combination of cooperative and observational training, where the learning situation two learners, pair together and alternatively practice the skill. This type of exercise is one of the best combinatorial practices that has attracted the attention of researchers in recent years. In this method, when one person is performing a skill, another one observes and changes role in the next trial (19, 20). In principle, an optimal training method, not only improve performance but also factors of efficiency should be considered. Efficiency means that the method is low in terms of energy, time, and cost; therefore, an optimal exercise method should maximize learning with minimum energy consumption (19). Research of Granados and Wolf (21) has investigated the impact of the contribution of observation and dialog explanations on learning of speed cup stacking. The results showed that observation was more important than verbal explanation.

In our country, in particular, research has rarely been conducted on the effectiveness of this method and often studies have focused on individual sports. Parvinpour et al. (22) showed that dyad training in 10 m swimming learning is more effective than traditional training methods. McNevin et al. (2000) (23) and Shea et al. (2000) (12) also concluded that dyad training is more effective than individual training in rehabilitation and also in balancing learning on stabilization devices (19). Since previous research has focused more on individual sports, a group sport has been used in this study. Therefore, in this study, the dyad training method was used for basketball layup shot training and the purpose of this study was to answer the following questions. Can observing someone else practice effect on beginner performance? Is the performance of dyad training better than individual training for basketball lay-up shot?

MATERIAL AND METHODS

Subjects

The design of this study is semi-experimental with control and experimental groups. The statistical population of the study included all female university students who had taken a physical education course. Two classes were randomly selected from among these subjects and all students in those classes participated in the study. The statistical sample consisted of 22 females who were divided into two groups according to the pre-test score. Ten people were in the experimental group (dyad training) and 12 were in the control group (individual training). The inclusion criteria for this study were age range of 20 to 25 years, being a beginner in basketball and having no history of upper and lower extremity injuries in the past year. First, the steps of conducting the

research were explained to the participants, and then the consent form to participate in this study was completed. The present research protocol was approved by the Azad University Research Committee.

Procedure

In the first of two sessions, the initial instruction of the layup shot was done, and then in the third session, the pre-test was performed. Based on the pre-test scores, two control and experimental groups were selected. Thereafter, both groups practiced lay-up shoot for six sessions. At the end of the ninth session, the post-test was performed and the retention test was performed three days later (Table 1).

In dyad practice, players are randomly divided into Two-person groups. After the initial training and observation of a skilled model, one of them performs the lay-up shoot and his partner observes it carefully and then and then gives feedback to the executor. In this method, the interaction between the two beginners was increased in each session. But in the individual practice group, after observing the coach and her explanations, they all entered the playground and practiced.

Layup Shot Test

To perform this test, two chairs were placed in accordance with Fig. 1, at a distance of 5.5 meters with a 45-degree angle from the ring. By hearing the catcall, the participants should pick up the ball from the number one seat and dribbles towards the ring. Then, by performing a lay-up shot and rebounding the ball, they dribble back to the number one seat, and puts the ball in its place and moves to chair and ball number two. This test must be repeated for six time. The time taken is a person's record. Throws that lead to a goal are awarded two points. If the ball touches the ring or board, one point is considered, and no points are awarded for throws that it does not collide with any of them (24). The total points earned is considered as an accuracy record, and one second is added for each ruining or double error. The data were obtained in three stages: pre-test, post-test, and test.

Statistical analysis

The Shapiro-Wilk Test was used to check the normality of the data distribution. Regarding the normality of the data, an independent t-test was used for intergroup differences, and analysis of variance for repeated measures data was used to examine intra-group differences (comparing pre-test, post-test and retention scores). Statistical analysis was performed using SPSS software with a significant level of $p < 0.05$.

Table 1. Outline and timing of exercises

sessions	Warm-up	Activity		Cool down
The first and second session	15 minutes Stretching and flexing movements	Dribbling Training (15 minutes)	Dribbling Technique: Dribbling along the basketball court	5 minutes of stretching and stroking
		Shoot Training (15 minutes)	Shoot Technique: Training and practicing throwing balls on the wall and ring	
		Pass training (15 minutes)	Pass Technique: Training and practicing wall pass and pairs	
		Combined exercises (15 minutes)	Combining techniques and training with games	
third session		pre-test	executed six shots from both sides of the ring	
Fourth to Eighth Session		lay-Up shot Training	At this level, we will learn how to step and throw the ball into the ring (step-to-shoot teaching method)	
Ninth Session	Post-test	executed six shots from both sides of the ring		
Tenth session	Retention test	executed shots from both sides of the ring, after 3 days delay		

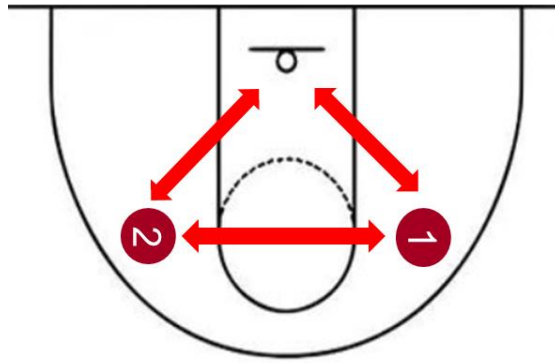


Fig. 1. The location of the seats (number 1,2) and the steps of the Lay-Up Shot Test

RESULTS

Demographic characteristics showed in Table 2. Intergroup comparisons showed that both groups were similar in these characteristics ($p>0.05$).

Table 2. Demographic characteristics of the participants in the groups

	Research groups						Sig.
	Dyad training group			Individual training group			
	Average	SD	SE	Average	SD	SE	
Age (years)	22.33	1.82	0.52	22.45	2.26	1.79	0.90
Height (m)	1.62	0.062	0.017	1.63	0.05	0/01	0.61
Mass (kg)	57.41	8.96	2.58	58.81	2.07	2.73	0.71
BMI	21.86	2.56	0.77	21.67	2.62	0.76	0.86

Abbreviations: BMI = Body Mass Index (Weight / Height Squared), SD = standard deviation, SE = standard Error

The results of the intra-group analysis of the lay-up test in three stages of pre-test, post-test, and retention showed in Table 3. These results showed that the time of the exam in the dyad training group in the retention phase was significantly reduced compared with the post-test and pre-test ($p<0.05$), also there was a significant difference between the time of test in the post-test and the pre-test ($p<0.05$). The results of the control group showed that the time of the lay-up shot in the retention phase was significantly decreased compared to the two previous stages. The error rate during the lay-up test in both groups in the retention phase was significantly lower than in the pre/post-test. The number of goals increased in the control group in the retention test while no significant increase in the dyad group.

The results of intergroup comparisons showed that there was no significant difference between the group in time, error, and goal. This means that in the three stages of pre/post-test and retention there was no significant difference between the two training groups. The results are shown in Fig. 2.

Table 3. Results of intra-group analysis of Layup test in three test stages

Groups	Test variables	Pre-test	Post-test	Intention	Sig.
Control	Time	72.34 (6.12)	66.91 (8.36)	59.19 (4.67)	P ₁ = 0.075 P ₂ = 0.004 P ₃ = 0.004
	Number of goal	5.72 (1.61)	6.36 (2.50)	7.90 (1.30)	P ₁ = 0.07 P ₂ = 0.004 P ₃ = 0.004
	Error	1.90 (1.22)	1.45 (0.36)	0.81 (0.87)	P ₁ = 0.27 P ₂ = 0.02 P ₃ = 0.1
Dyad training	Time	79.28 (11.48)	66.15 (8.24)	58.36 (5.48)	P ₁ = 0.003 P ₂ = 0.002 P ₃ = 0.004
	Number of goal	6.01 (1.85)	6.75 (1.76)	7.41 (1.67)	P ₁ = 0.27 P ₂ = 0.1 P ₃ = 0.23
	Error	2.83 (1.26)	1.66 (0.98)	1.0 (0.95)	P ₁ = 0.12 P ₂ = 0.002 P ₃ = 0.02

Note: Significant difference was obtained between pre-test and post-test (P1); between pre-test and retention (P2); between post-test and retention (P3).

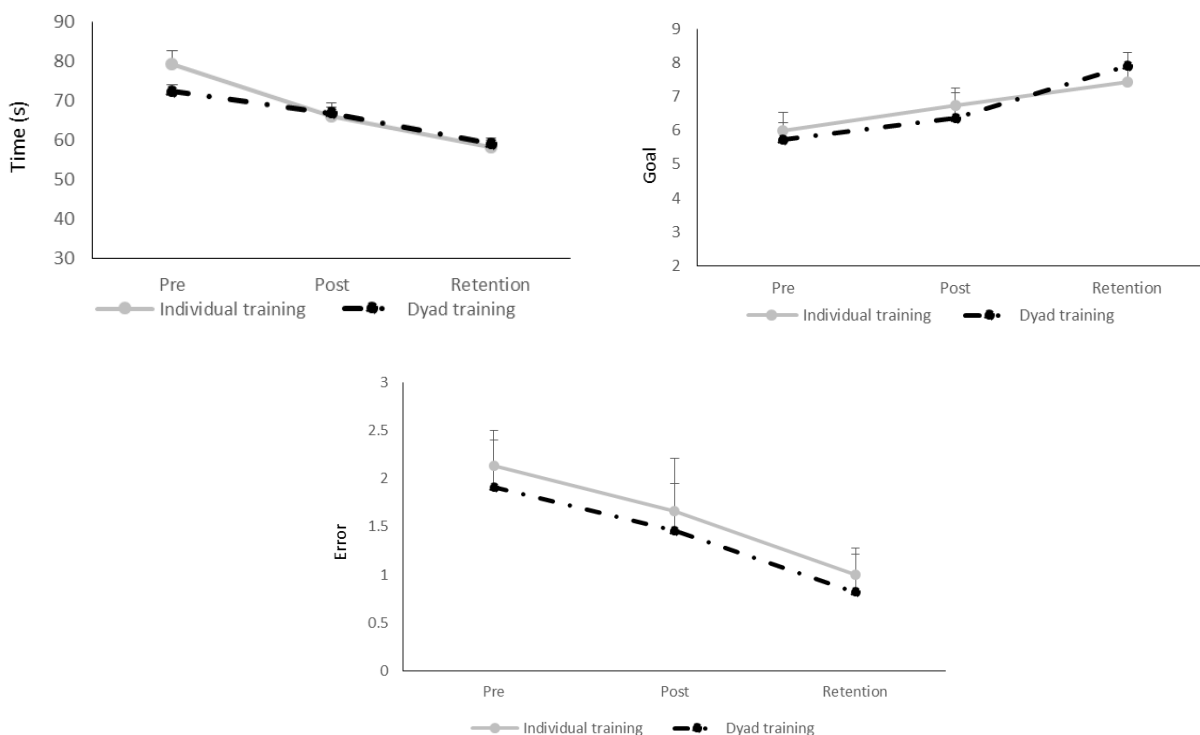


Fig. 2. Comparison, time, error, and number of goals scored in three test stages in both control and dual groups

DISCUSSION

The purpose of this study was to compare two methods of dyad training and individual training in lay-up shots. These results are in line with studies that aim to evaluate the impact of observation and cooperation of subjects in the process of skill learning. The results of this study showed that both groups had similar progress in the posttest and retention test that there was no significant difference between all the variables measured. The number of errors and the time of the exam showed a significant decrease in both groups, but the number of goals only increased significantly in the control group. According to these results, both types of exercise are effective and lead to learning dyad exercises that included 50% of physical effort and which has been replaced by 50% observation effort per person, while in individual training each person must perform 100% of physical effort per session. The result showed that both types of the dyad and individually training were similarly effective in the learning of lay-up shots, that similar to the findings of See et al. (2019) (25) their result showed dyad training saves time and is non-inferior to individual training under simulation conditions. But as explained, participants in the dyad group had only half the amount of hands-on time however the performance of this group was similar to that of 100% physical exercise. These results show that the dyad method performs better than the conventional one, which is similar to the findings of Shea et al. (1999) (19) and (26). Also, with less physical exercise, there will be less fatigue and possibly less physical injury. The dyad method involves constructive interaction that occurs between beginners after each attempt, as well as inter-trial dialogues, which were important in dyad training protocols. Observation is another main element that increased learning. Inter-trial dialogues and observation between partners create a cognitive challenge and problem-solving processes that are important for enhancing learning. Because partners must provide feedback for each other after attempts, this will actively engage in the learning process (27).

The fact that the dyad group needed significantly fewer attempts to achieve the special simulator score supports the suggestion that dyad participants were able to learn from each other's errors and avoid them during the subsequent performance. (26). The result of Panzer et al. (2019) (28) showed that dyad protocols enhance the development of a motor representation. The result of Parvinpour et al. (2017) (22) in line with our study showed that the effectiveness of dyad training in crawl swimming training was more than usual. They stated that observing the person when learning skills in the early stage of the learning process would increase learning. Granados & Wulf (2007) (21) also found that dyad training had a more impact on learning motor skills. They stated that in addition to the greater efficiency of dyad training, in this method both paired learners are practicing cognitive and physical training simultaneously. Both of these training are essential for performing different skills.

CONCLUSION

The dyad method reduces the number of sport equipment demands. Especially in schools and public places, it will make optimum use of time and money and avoid confusion between learners and educators.

Therefore, the results of the present study showed that one of the applications of dyad training in public places such as schools or sports clubs is that teachers and educators face a large number of new learners and limited facilities. The dyad approach is also used not only to acquire new skills but also to improve the performance of semi-skilled people. We recommend that in future studies, the role of dyad training on skilled athletes was also exam

ACKNOWLEDGEMENTS

We thank each of the subjects who participated in the study.

REFERENCES

1. Naderi M, Bahrami A, Khajavi D. The Effect of Physical Exercise and PETTLEP Mental Imagery (Constant and Variable) on Learning Basketball Free Throw Task. *Journal of Motor Learning and Movement*. 2017;9(1):137-55.
2. Black CB, Wright DL. Can observational practice facilitate error recognition and movement production? *Research Quarterly for Exercise and Sport*. 2000;71(4):331-9.

3. Zarrinkalam E, Ebadi Fara M. The Effect of Resistance Training on Performance of Gross Motor Skills and Balance in Children with Spastic Cerebral Palsy. *Journal of Sport Biomechanics*. 2016;1(3):53-60.
4. Wulf G, Raupach M, Pfeiffer F. Self-controlled observational practice enhances learning. *Research Quarterly for Exercise and Sport*. 2005;76(1):107-11.
5. Bandura A. *Social foundations of thought and action*. Englewood Cliffs, NJ. 1986;1986.
6. Wulf G, Shea CH. Principles derived from the study of simple skills do not generalize to complex skill learning. *Psychonomic bulletin & review*. 2002;9(2):185-211.
7. McCullagh P, Meyer KN. Learning versus correct models: Influence of model type on the learning of a free-weight squat lift. *Research Quarterly for Exercise and Sport*. 1997;68(1):56-61.
8. Hodges NJ, Williams AM, Hayes SJ, Breslin G. What is modelled during observational learning? *Journal of sports sciences*. 2007;25(5):531-45.
9. Vogt S, Thomaschke R. From visuo-motor interactions to imitation learning: behavioural and brain imaging studies. *Journal of Sports Sciences*. 2007;25(5):497-517.
10. Ste-Marie DM, Law B, Rymal AM, Jenny O, Hall C, McCullagh P. Observation interventions for motor skill learning and performance: an applied model for the use of observation. *International Review of Sport and Exercise Psychology*. 2012;5(2):145-76.
11. Andrieux M, Proteau L. Observational learning: Tell beginners what they are about to watch and they will learn better. *Frontiers in psychology*. 2016;7:51.
12. Shea CH, Wright DL, Wulf G, Whitacre C. Physical and observational practice afford unique learning opportunities. *Journal of motor behavior*. 2000;32(1):27-36.
13. Casey A, Goodyear VA. Can cooperative learning achieve the four learning outcomes of physical education? A review of literature. *Quest*. 2015;67(1):56-72.
14. Sahraeian I, Vaezmousavi M, Khabiri M. The Effects of Cooperative Learning on Adherence to Handball Exercise: Mediating Role of Sport Self-Efficacy and Enjoyment 2015.
15. Shams A, Abdoli B, ShamsipoorDehkordi P. The Effects of Cooperative, Competitive, and Individual Learning on Students' Physical Readiness. *Quarterly Journal Of Education*. 2014;30(3):141-56.
16. Hosseini R, Norasteh AA, Nemati N. Comparing the Balance of Male Athletes Aged 11-14 Years With and Without Genu Varum. *Journal of Sport Biomechanics*. 2019;4(4):54-65.
17. Shams A, Nosratabadi ME. The effect of contextual interference and practice type on learning badminton services. 2016.
18. Dyson B. The implementation of cooperative learning in an elementary physical education program. *Journal of teaching in Physical Education*. 2002;22(1):69-85.
19. Shea CH, Wulf G, Whltacre C. Enhancing training efficiency and effectiveness through the use of dyad training. *Journal of motor behavior*. 1999;31(2):119-25.
20. Wulf G, Mornell A. Insights about practice from the perspective of motor learning: a review. *Music Performance Research*. 2008;2:1-25.
21. Granados C, Wulf G. Enhancing motor learning through dyad practice: contributions of observation and dialogue. *Research quarterly for exercise and sport*. 2007;78(3):197-203.
22. parvinpour s, Sheikh M, Hemayattalab R, Bagherzadeh F. The Effect of Dyad Training on Learning Front Crawl Swimming. *Journal of Motor Learning and Movement*. 2017;9(1):1-14.
23. McNevin NH, Wulf G, Carlson C. Effects of attentional focus, self-control, and dyad training on motor learning: implications for physical rehabilitation. *Physical therapy*. 2000;80(4):373-85.
24. Pourmorad Kohan P, Hatami F, baghaiyan m. The Effects of Sensory Modalities of Mental Imagery on Learning Lay-up Shot in Basketball P. Pour Morad Kohan, F. Hatami, M. Baghaiyan 2018. 173-88 p.
25. See KC, Chua JW, Verstegen D, Van Merrienboer JJ, Van Mook WN. Focused echocardiography: Dyad versus individual training in an authentic clinical context. *Journal of critical care*. 2019;49:50-5.
26. Tolsgaard MG, Madsen ME, Ringsted C, Oxlund BS, Oldenburg A, Sorensen JL, et al. The effect of dyad versus individual simulation- based ultrasound training on skills transfer. *Medical education*. 2015;49(3):286-95.
27. Wulf G, Clauss A, Shea CH, Whitacre CA. Benefits of self-control in dyad practice. *Research quarterly for exercise and sport*. 2001;72(3):299-303.
28. Panzer S, Haab T, Massing M, Pfeifer C, Shea CH. Dyad training protocols and the development of a motor sequence representation. *Acta psychologica*. 2019;201:102947.

تأثیر تمرین دوتایی بر یادگیری شوت لی آپ بسکتبال

الهه آزادیان^{۱*} سحر کوثری فرد^۱

۱. گروه رفتار حرکتی، دانشکده علوم انسانی، دانشگاه آزاد اسلامی، واحد همدان، همدان، ایران

تأثیر تمرین مشارکتی و مشاهده‌ای بر یادگیری مهارت‌های حرکتی به صورت جداگانه مورد بررسی قرار گرفته است. اما بررسی تأثیر تمرینات دوتایی که ترکیبی از تمرینات مشاهده‌ای و مشارکتی می‌باشد رویکرد جدیدی است که هنوز مطالعات جامعی در این خصوص انجام نگرفته است. لذا هدف این پژوهش بررسی تأثیر تمرین دوتایی بر اجرای شوت لی آپ بسکتبال بود. در این پژوهش ۲۲ دانشجوی دختر به صورت داوطلبانه شرکت کردند. پس از آموزش اولیه، شرکت‌کنندگان شش کوشش مربوط به پیش‌آزمون را انجام دادند بر اساس نمرات پیش‌آزمون به دو گروه کنترل و تجربی (تمرین دوتایی) تقسیم شدند. سپس شش جلسه به تمرین شوت لی آپ پرداختند، بلافاصله پس از این مرحله، آزمون اکتساب و ۳ روز بعد آزمون یادداری به عمل آمد. برای بررسی اختلاف بین گروهی از آزمون تی تست مستقل و برای بررسی اختلاف درون گروهی از آزمون آنالیز واریانس ویژه داده‌های تکراری با نرم‌افزار SPSS و سطح معنی‌داری $p < 0.05$ استفاده گردید. نتایج نشان داد هر دو گروه کاهش معنی‌داری در زمان اجرای شوت لی آپ و تعداد خطاها داشتند ($p < 0.05$)، اما تعداد گل‌ها فقط در گروه کنترل افزایش معنی‌داری را نشان داد ($p < 0.05$). اختلاف بین دو گروه در متغیرهای پژوهش معنی‌دار نبود ($p > 0.05$). این نتایج نشان می‌دهند که تمرین دوتایی با وجود ۵۰ درصد کوشش بدنی نسبت به تمرینات معمولی که دارای ۱۰۰ درصد کوشش بدنی می‌باشند از اثربخشی کافی برخوردار می‌باشد. بعلاوه به دلیل کوشش بدنی کمتر، احتمال آسیب و خستگی کمتر بوده و همچنین موجب تمرین شناختی در نوآموزان نیز می‌گردد، بنابراین کارایی بیشتری نسبت به تمرینات معمول دارد.

واژه‌های کلیدی: بسکتبال، تمرینات دوتایی، تمرین مشارکتی، شوت لی آپ