

## **RESEARCH ARTICLE**

Available online at http://www.journalijdr.com



International Journal of Development Research Vol. 10, Issue, 12, pp. 42623-42628, December, 2020 https://doi.org/10.37118/ijdr.20648.12.2020



**OPEN ACCESS** 

# **EFFECT OF GOAL DIFFICULTY ON LEARNING OF THE VOLLEYBALL SERVE**

# Cicero Luciano Alves Costa<sup>1</sup>, Márcia Salomão de Castro<sup>2</sup>, Márcio Mário Vieira<sup>2</sup> and Herbert Ugrinowitsch<sup>2</sup>

<sup>1</sup>Instituto Federal de Educação, Ciência e Tecnologia do Ceará <sup>2</sup>Escola de Educação Física, Fisioterapia e Terapia Ocupacional, Universidade Federal de Minas Gerais

#### ARTICLE INFO

#### Article History:

Received 10<sup>th</sup> September, 2020 Received in revised form 19<sup>th</sup> October, 2020 Accepted 26<sup>th</sup> November, 2020 Published online 30<sup>th</sup> December, 2020

Key Words: Sport skill, Volleyball, Sport performance, Goal setting.

\*Corresponding author: Cicero Luciano Alves Costa

### ABSTRACT

The objective of this study was to evaluate the effect of the goal difficulty level in the learning of the volleyball serve, in both precision and the movement pattern. Ten adolescents (13 to 15 years old) inexperienced participated in this study. The dependents variables were accuracy to target and movement pattern of serve. The experiment was composed of three phases: pretest, acquisition phase, and retention test. The results demonstrated higher effectiveness of difficult goal for improve accuracy to target as well as in the movement pattern in comparison with easy goal. Perhaps, easy goals are not able of provide sufficient motivation for individuals with high competence in compare with difficult goals. This occurs because individuals with high self-efficacy are unlikely to choose or commit toless challenging goals. The current results support the predictions of Locke and Latham in opposite to some studies that investigated the effect of goal difficulty in sports skills learning. The study goes beyond because also assesses the movement pattern of the skill, it that can explain the lack of differences in the previous studies that used sport skills.

**Copyright** © 2020, Cicero Luciano Alves Costa et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Cicero Luciano Alves Costa, Márcia Salomão de Castro, Márcio Mário Vieira and Herbert Ugrinowitsch. "Effect of goal difficulty on learning of the volleyball serve", International Journal of Development Research, 10, (12), 42623-42628.

# **INTRODUCTION**

In the process of learning sports skills is possible to observe individuals who behave in different ways to meet the specific demands of the task. This occurs not only due to individual differences in motor proficiency level but also to motivational aspects. Schmidt and Lee (2005) argue that highly motivated people strive more in the practice of tasks with greater attention and devote more time to learning sessions. Among the factors that can increase the motivation level of the performers, the setting of specific and challenging goal has been cited as an able strategy to increase the performance of individuals (Locke & Latham, 2006). Although the goal setting strategies have emerged in the industrial and organizational psychology (Locke & Latham, 1985), some studies have investigated their effect on the sport context (Boyce et al., 2001; Mellalieu et al., 2006; Wack et al., 2014). Among the attributes of goals setting that has been investigated in sports performance are the degree of goal difficulty, goal temporality, collectivity, and specificity of the goal (Burton, 1994).

Regarding the level of goal difficulty, Locke (Locke, 1991) argues that more difficult goal (if it is attainable) are associated with greater effort and persistence to achieve them, which can result in better performance. This behavior has been observed in some studies using tasks that involve endurance (Bar-Eli, Tenenbaum, Pie, Btesh, & Almog, 1997; Tenenbaum, Pinchas, Elbaz, Bar-eli, & Weinberg, 1991), but in learning sports skills the effect of goal difficulty level is still inconclusive (Lane & Streeter, 2003; Marinho *et al.*, 2009; Mooney & Mutrie, 2000). In a review, Kyllo and Landers (1995) observed a greater effect of the moderate level of difficulty compared to the easy and hard goal.

A possible matter that can influence the effect of goals setting can be related to the individual's learning stage in a given task (Corrêa *et al.*, 2006), because the first attempts to execute a skill are characterized by absence of consistent movement pattern. Although quantitative characteristic of the goal used in the studies that have investigated the effect of the goal difficulty, it is possible to relate the effect of goals setting with the efficiency of movement pattern (Ugrinowitsch & Dantas, 2002). Thus, it is supposed that people who have efficient movement pattern in a skill can address greater effort and attention to refine aspects related to the task goal.

In addition, it may be that individuals with more efficient movement patterns feel more challenged and motivated in the face of difficult goals. This greater commitment with the task should contribute for the acquisition of sport skills to be more effective compared to easy goals setting. In this sense, the objective of this study was to evaluate the effect of goal difficulty level in the learning of the volleyball serve, in both precision and the movement pattern.

### **MATERIALS AND METHODS**

**Participants:** Ten adolescents (6 boys and 4 girls), 13 to 15 years old, that do not have participated of training in the volleyball modality. Participants were recruited in public school of the Belo Horizonte city. All volunteers expressed interest in participating of the study and those responsible for adolescents agreed with the participation through of the written consent. The study was approved by the Institutional Review Board of the University of Minas Gerais.

*Instruments:* Two dependent variables were used in this study. First, the score of accuracy to target was used for measuring the performance in relationship the goal setting. Second, the score of movement pattern was used for assessment the efficiency of volleyball serve. The task consisted in performing a volleyball serve from side A of the court to side B with the aim of towards a target (Santos-Naves *et al.*, 2014). Participants were positioned 4 m away to net and 7 m from the target center (Figure 1).

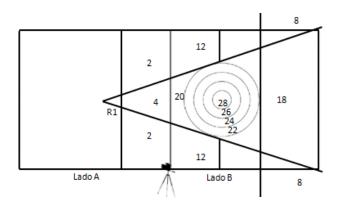


Figure 1. Experimental environment and task

The target was divided in four round areas with diameter of the 1.0 m, 2.0 m, 3.0, 4.0 m and score were 28 points, 26 points, 24 points, and 22 points, respectively. Moreover, two lines delimited the target zone beginning of the serve place center in toward target. For the areas out of target the scores were: 2 points for the trials that did not passed the net and fell out of the delimited zone; 4 points for the trials that did not passed the net and fell out of the delimited zone; 4 points for the trials that did not passed the net but reach the delimited zone; 12 points for the trials that reached the side B, but fell out of the delimited zone; 20 points for the trials that reached the delimited zone but out of the target; 18 points for the serves that exceeded the target limit line but the ball fell inside the delimited zone; 10 points for the trials that exceeded the limit line but fell out of the target limit line but fell out.

The width of all limiting line measured 5 cm and when the ball reached some these limiting line was considered the highest score.

The data were collected in a gym, in an official court of the volleyball. The serve zone and limiting lines were marked with adhesive tape. The net was fixed to 2 m of height. Were used one digital cam, 5 volleyball balls, and one target with 4 m of the diameter. The cam was positioned perpendicularly, close to net and lateral line of right side of the court for to film the movement pattern of serve.

The movement pattern was recorded and assessed through of the qualitative analyze checklist (Meira Jr, 2003). The movement pattern was recorded only in the tests phase (pretest and retention) and analyzed in slow motion posterior to data collection. The interobserver agreement was assessed on 80% of the trials distributed equally between the conditions. Agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Interobserver agreement was 93,7%.

*Experimental design and procedure: Pretest:* During this phase was demonstrated to participants a video with skillful person in the task performing the volleyball serve. Then the subjects performed 15 trials of the volleyball serve for evaluation of the initial performance level in the dependent variables. After the explanation of the aim of task (i.e., try to reach the target center with the ball using the demonstrated skill), the participants were directed to serve zone and from the command "prepares" and "go" performed the trials.

**Intervention:** In the intervention phase, through 4 days, the participants of both groups practiced 4 sessions with two blocks of the 20 trials each (a total of 160 trials). Each session was conducted on a different day in four consecutive days. Participants were divided in two experimental groups from pretest performance: was seated the goal of hitting 5 consecutive trials in the two smaller target areas (difficult goal), while for the participants 6 to 10 was seated the goal of hitting 5 consecutive trials in any target location (easy target). After each trials block was provided the feedback informing if the goal was reached or not.

*Retention:* The retention phase was conducted 72 hours after the last session of practice to assess whether occurred learning. The conditions of the retention phase were identical to pretest.

**Data analysis:** Descriptive statistic of mean was used for the trial's blocks of intervention and tests. The change between pretest and retention was calculated by the delta between the tests of each participant.

## RESULTS

Results of the movement pattern of serve are shown in Figure 2 (a and b). The data demonstrated dissimilar intervention effects between the difficult and easy goals participants. For difficult goal, occurred increases in the score from pretest to retention in 4 of the 5 participants. Participant 1 increased thepretest mean score from 19.4 to 23.2 (i.e., a 19.6% increase) after the intervention. Participant 2 demonstrated increase of thepretest mean score from 17.2 to 18.4 (i.e., a 7% increase) in the retention. Participant 3 showed increase of thepretest mean score from 17.2 to 20.7 (i.e., a 20.3% increase).

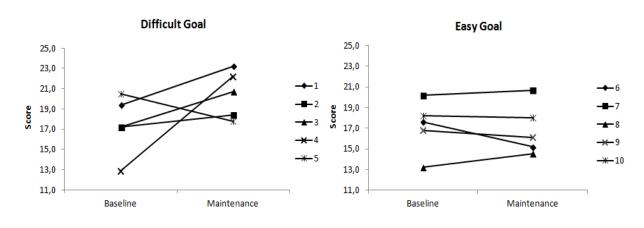


Figure 2. Means score of movement pattern of serve for participants with easy goal and difficult goal

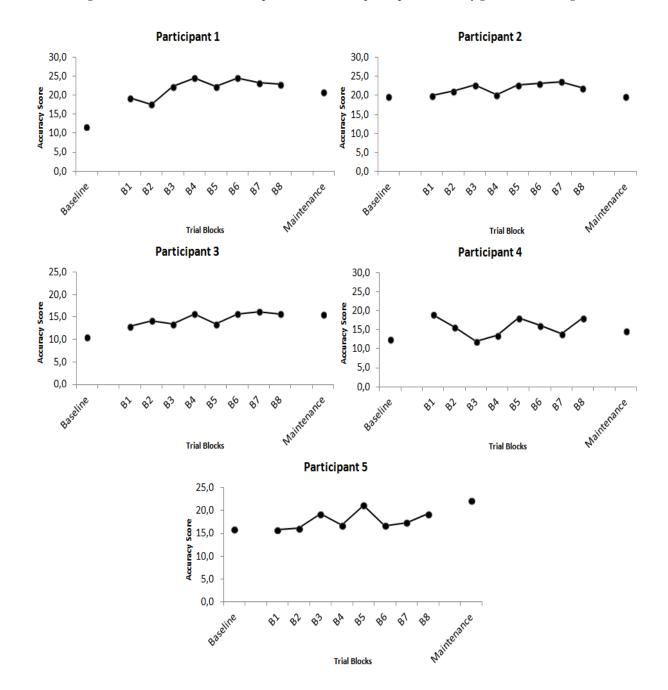


Figure 3. Means of the accuracy scores of serve for participants with difficult goal during pretest, intervention, and retention phases

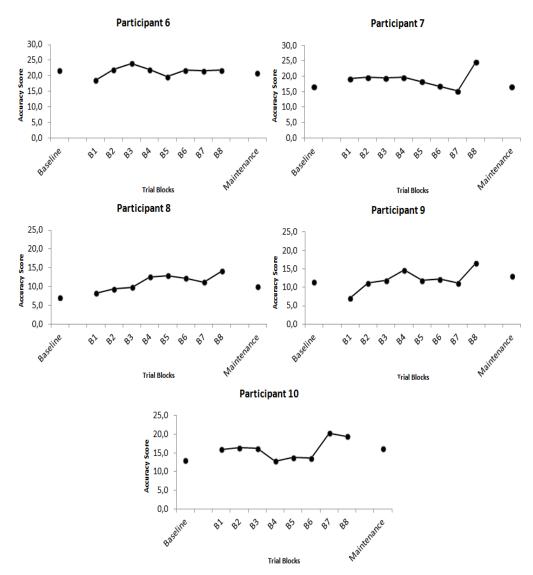


Figure 4. Means of the accuracy scores of serve for participants with easy goal during pretest, intervention, and Retention phases

Participant 4 achieved a change of 72.1% in the movement pattern behavior, increasing from 12.9 in the pretest to 22.2 in the retention. Only the participant 5 demonstrated a decrease in the movement pattern score from 20.5 in the pretest to 17.8 points in the retention (i.e., a 13.2% decrease). Participants with easy goal in the intervention showed the movement pattern behavior more stable. Participant 6 demonstrated the change main with a decrease from 17.6 in the pretest to 15.2 after the intervention (i.e., a 13.6% decrease). Participants 7, 9, and 10 demonstrated stable behavior from pretest to retention no substantial changes (2.5%, -4.2% and -1.1%, respectively). Finally, participant 8 obtained increase from 13.2 in the pretest to 14,5 in the retention (i.e., a 9.8% increase). Figure 3 show the results of the accuracy score of serve for the participants with difficult goal setting. There was improvement of performance in 4 of the 5 participants. Participant 1 demonstrated the higher increase from a pretest mean score of 11.7 to a mean score of 20.8 after the intervention (i.e., a 77.8% increase). Participant 2 showed behavior stable in performance of accuracy with means of 19.7 in both pretest and retention. Participant 3 demonstrated increase from 10.4 to 15.5 (i.e., a 48.7% increase) in the mean scores. Participant 4 increased from 12.5 to 14.8 in the retention (i.e., 18.1% increase). Participant 5 enhanced his performance from a pretest mean score of 15.9 to 22.1 after the intervention (i.e., 39.5% increase).

During the intervention, only the participant 3 no achieved the goal settled in any of trial blocks. Figure 4 show the results of the accuracy score of serve for the participants with easy goal setting. Participants 6 and 7 showed stable behavior on accuracy score with mean of 21.9 in the pretest and 21.1 in the retention for the participant 1 and 16.7 in both pretest and retention for participant 2. Participant 8 demonstrated the higher increase from 7.1 to 10 (i.e., a 40.8% increase) in the retention. Participant 9 increased the pretest mean score from 11.5 to 13.2 after the intervention (i.e., 14.8% increase). Finally, the participant 10 enhanced his performance from 13.1 to 16.1 after the intervention (i.e., 23.2% increase). During the intervention, only the participant 9 no achieved the goal settled in any of practice sessions. In comparison with the participants in that were settled difficult goal, the participants with easy goal showed percentage smaller of change.

#### DISCUSSION

In this study was used an intervention for investigating the effect of difficulty goal in the learning of volleyball serve. Although the goals established is linked to accuracy to target, was hypothesized that the behaviors of both accuracy score and movement pattern would present change after the intervention due the relations between product and process measure movement (Mally *et al.*, 2011; Roberton & Konczak,

2001). Regarding the goal difficulty, it was hypothesized that the difficult goal would provide greater commitment of participants and consequently higher learning of the volleyball serve after intervention. Thereby, learning was assessed by means of changes in the performance of the accuracy to target and movement pattern of volleyball serve.

Results demonstrated higher effectiveness of difficult goal for improves accuracy to target as well as in the movement pattern in comparison with easy goal. Although the participant 2 had showed a stable behavior in the accuracy score, the percentage changes were superior in Retention for participants with difficult goal in most cases. The current results support the predictions of Locke and Latham (Locke & Latham, 1985) and replicate the previous studies about difficulty of goal that used endurance tasks (Bar-Eli et al., 1997; Tenenbaum et al., 1991) in opposite to some studies that investigated the effect of goal difficulty in sports skills learning (Lane & Streeter, 2003; Mooney & Mutrie, 2000; Weinberg et al., 1991). Our study goes beyond because also assesses the movement pattern of the skill, it that can explain the lack of differences in the previous studies that used sport skills. Further, the individual analyzes allow to evaluate of more clear manner the relationship between movement pattern and accuracy score.

For example, the participant 4 had the lowest movement pattern score in pretest, but analyzing the change after intervention he obtained an improvement of the 72.1% in their performance, while the accuracy performance improved only 18.1%. It occurs because in the learning initial stage is needed to acquire the movement pattern for posteriorly to demonstrate more accuracy and consistent performance (Fitts & Posner, 1967). The results of the participant 8 also support this argument. Although had demonstrated the worse performance in the pretest, her performance showed the higher changes among the participants with easy goal.

On the other hand, the participants 6 and 7 demonstrated movement pattern score higher, but they don't showed change in the accuracy performance. This behavior is explained for two factors. First, they started of a high pretest level that may be harder to improve in comparison with a low pretest (Locke, 1991). This explanation also applies to result of the participant 2 (elevated pretest in the accuracy score) that even with difficult goal demonstrated stable behavior. Second, perhaps easy goals are not able of provide sufficient motivation for individuals with high competence in compare with difficult goals. This occurs because individuals with high self-efficacy are unlikely to choose or commit to easy goals (Latham & Locke, 2007). Therefore, it is need that the goals are challenging to motivate individuals with these characteristics.

In summary, current findings indicate the higher effectiveness of difficult goal in the learning of sport skill. Further, it is needed to consider the movement pattern to investigate the effect of goals setting in the learning of sport skills, even when the goal is established regarding the environment demand. It is suggested that future research investigate aspects that influence the self-efficacy of the participants as the perceived competence, since we considered that the competence in skill can be important for higher effectiveness of the difficult goal.

## REFERENCES

Bar-Eli, M., Tenenbaum, G., Pie, J. S., Btesh, Y., & Almog, A. 1997. Effect of goal difficulty, goal specificity and duration of practice time intervals on muscular endurance performance. *Journal of Sports Sciences*, 15, 125–135.

- Boyce, B. A., Wayda, V. K., Johnston, T., & Bunker, L. K. 2001. The effects of three types of goal setting conditions on tennis performance: a field-based study. *Journal of Teaching in Physical Education*, 20, 188–200.
- Burton, D. 1994. Goal setting in sports. In R. N. Singer, M. Murphey, & L. K. Tennant Eds., Handbook of research on sport psychology Macmillan, pp. 467–491.
- Corrêa, U. C., Souza Jr, O. P., & Santos, S. 2006. Goal Setting in Acquisition of a Volleyball Skill late on Motor Learning. *Perceptual and Motor Skills*, 103, 273–278.
- Fitts, P. M., & Posner, M. I. 1967. *Human performance*. Brooks/Cole.
- Hall, H. K., Weinberg, R. S., & Jackson, A. 1987. Effects of Goal Specificity, Goal Difficulty, and Information Feedback on Endurance Performance. *Journal of Sport Psychology*, 9, 43–55.
- Kyllo, L. B., & Landers, D. M. 1995. Goal Setting in Sport and Exercise: A Research Synthesis to Resolve the Controversy. *Journal of Sport & Exercise Psychology*, 17, 117–137.
- Lane, A., & Streeter, B. 2003. The effectiveness of goal setting as a strategy to improve basketball shooting performance. *International Journal of Sport Psychology*, 34, 138–150.
- Latham, G. P., & Locke, E. a. 2007. New Developments in and Directions for Goal-Setting Research. *European Psychologist*, 124, 290–300. https://doi.org/10.1027/1016-9040.12.4.290
- Locke, E. A. 1991. Problems with Goal-Setting Research in Sports and Their Solution. *Journal of Sport & Exercise Psychology*, 8, 311–317.
- Locke, E. A., & Latham, G. P. 1985. The application of goal setting to sports. *Journal of Sport Psychology*, 7, 205–222.
- Locke, E. A., & Latham, G. P. 2006. New Directions in Goal-Setting Theory. *Current Directions in Psychological Science*, 155, 265–268.
- Mally, K. K., Battista, R. A., & Roberton, M. A. N. 2011. Distance as a control parameter for place kicking. *Journal* of Human Sport & Exercise, 61, 122–134. https://doi.org/10.4100/jhse.2011.61.14
- Marinho, N. F. S., Gomes, T. V. B., Fonseca, F. S., Fialho, J. V. A. P., Benda, R. N., & Ugrinowitsch, H. 2009. Estabelecimento de metas impostas pelo experimentador e autoestabelecidas: efeitos na aprendizagem do arremesso de dardo de salão. *Revista Da Educação Física/UEM*, 204, 509–517. https://doi.org/10.4025/reveducfis.v20i3.6682
- Meira Jr, C. M. 2003. Validação de uma lista de checagem para análise qualitativa do saque do voleibol. *Motriz*, 93, 153–160.
- Mellalieu, S. D., Hanton, S., & M, O. 2006. The effects of goal setting on rugby performances. *Journal of Applied Behavior Analylis*, 392, 257–261. https://doi.org/10.1901/jaba.2006.36-05
- Mooney, R. P., & Mutrie, N. 2000. The effects of goal specificity and goal difficulty on the performance of badminton skills in children. *Pediatric Exercise Science*, 12, 270–283.
- Roberton, M. A. N., & Konczak, J. 2001. Predicting Children's Overarm Throw Ball Velocities from Their Developmental Levels in Throwing. *Research Quarterly for Exercise and Sport*, 722, 91–103.
- Santos-Naves, S. P., Benda, R. N., Junqueira, A. H. M., Alves, G. M., Velloso, A. L. P. M., & Ugrinowitsch, H. 2014. Efeito da demonstração distribuída na aprendizagem do

saque do voleibol. *Revista Brasileira de Educação Física e Esporte*, 284, 629–639.

- Schmidt, R. A., & Lee, T. D. 2005. Aprendizagem e Performance Motora 4th ed. Human Kinetics.
- Tenenbaum, G., Pinchas, S., Elbaz, G., Bar-eli, M., & Weinberg, R. 1991. Effect of Goal Proximity and Goal Specificity on Muscular Endurance Performance: A Replication and Extension. *Journal of Sport & Exercise Psychology*, 13, 174–187.
- Ugrinowitsch, H., & Dantas, L. E. P. B. T. 2002. Efeito do estabelecimento de metas na aprendizagem do arremesso do Basquetebol. *Revista Portuguesa de Ciências do Desporto*, 25, 58–63.
- Wack, S. R., Crosland, K. A, & Miltenberger, R. G. 2014. Using goal setting and feedback to increase weekly running distance. *Journal of Applied Behavior Analysis*, 471, 181– 185. https://doi.org/10.1002/jaba.108
- Weinberg, R., Fowler, C., Jackson, A., Bagnall, J., & Bruya, L. 1991. Effect of Goal Difficulty on Motor Performance: A Replication Across Tasks and Subjects. *Journal of Sport* and Exercise Psychology, 132, 160–173.

\*\*\*\*\*\*