JOURNAL OF CURRENT RESEARCH IN SCIENCE (ISSN 2322-5009)
CODEN (USA): JCRSDJ
2014, Vol. 2, No. 1, pp:100-103
Available at www.jcrs010.com

ORIGINAL ARTICLE

ESPECIAL SKILL IN THE FAVORITE LOCATIONS OF EXPERIENCED BASKETBALL PLAYERS

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ABSTRACT: The aim of this study is exploring for especial skills in favorite locations of experienced basketball players. Eight experimented basketball players perform 210 jump shots from favorite and other six locations. A linear regression equation was used for estimating predicted performance and then the actual performance was compared with the predicted performance. The analysis showed a significant difference between performance in favorite locations and the predictions and supports the existence of especial skills. The results support the special effects for the self-selected distance of experienced basketball players. These results don't support the generalizability of generalized motor program that derive more investigate about the potential factor for the especial skills.

KEYWORDS: especial skills, schema theory, memory representations

INTRODUCTION

One of the research fields related to learning motor skills and memory representations is the "especial skills" that emerged some years ago (Keetch *et al.,* 2005; Schmidt, 1975). Especial skills are “special and extremely proficient” performance of experienced players in over-practiced locations in some of skills, such as the free-throw in the game of basketball (Keetch *et al.,* 2005; Breslin *et al.,* 2010; Nabavi Nik *et al.,* 2011) and the pitch in the game of baseball (Simons *et al.,* 2009). Extensive practice at certain distances from the goal leads to significantly more effective performance in these particular distances (i.e., 15 ft. in basketball; 60 ft., 6 in. in baseball) compared to other nearby distances. This enhanced performance is not predicted by either of the theories mentioned earlier. Keetch *et al.,* (2005) studied the performance of experienced basketball players in different distances from the basket. They asked players to perform their free throws from distances of 9, 11, 13, 15, 17, 19, 21 feet. They expected systematic and significant performance decrements as the distances increased, which they did find. But, additionally, they found that performance was significantly more accurate at the 15 ft. distance than predicted based on the accuracy at the other distances. Note that the 15 ft. position was at the foul line where players certainly had massive amounts of practices relative to any of the other positions.

These challenging results motivated other researchers to conduct further studies of this effect. Simons *et al.,* (2009) studied especial skills in baseball. Like basketball players, baseball players also have massive amount of practice from the standard throw distance (60 ft. 6 in.). Throwing-accuracy scores from different distances were reviewed, and there was a significant difference between players’ actual and predicted performance at 60.5 ft. Nabavi Nik *et al.,* (2011) studied especial skills in basketball in two different levels of skill. Data analysis confirmed the results of study conducted by Keetch *et al.,* (2005) and especial skills of experienced basketball players were seen again. Keetch *et al.,* (2008) considered visual context and Learned-parameters hypothesis for the especial skills effects. Visual context was confirmed as one of the possible causes for performance of experienced players (Keetch *et al.,* 2008; Bernstein, 1947). Learned-parameters hypothesis refers to another probability reason for existence of especial skills. Years of practice have resulted in highly over learned specifications for the parameterizations of a practiced distance (velocity, angle, spin, etc.), and this unique, learned capability has produced especial skills such as the free throw within the general class of set shots (Keetch *et al.,* 2008).

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Breslin *et al.,* (2012) studied this hypothesis by manipulating force parameter in experienced players' free throws (by artificially weighting the ball). Their result supports the learned parameters hypothesis. Until now, especial skills have been studied in the limits determined by the rules of relevant sport. Players naturally practice excessively at the regulated distances. However, for the game of basketball, there may be locations with different distances and angles toward the goal that researches did not study their properties. One of these positions might be the locations on the court selected by players themselves—i.e., a given player's "favorite location." All previous studies (Keetch *et al.,* 2005; Keetch *et al.,* 2008; Nabavi Nik *et al.,* 2011; Adams, 1971) on basketball were concerned mainly with accuracy from the foul line. From one point of view, the foul line could bring about some limitations for experienced players. They have no role in choosing this distance, and angle toward the goal. For instance, set shot (The shot usually used in free-throw practice is called a "set-shot," where the feet remain on the court surface). The jump-shot (where the feet are off the court) is one of the most time-consuming tasks, and players are free to perform them from any locations in the court. Experienced players usually select special locations for their jump-shots, as and their most accurate performances are achieved from these "favorite" locations. Keetch *et al.,* (2005) used the jump-shot in their experiment and asked experienced players perform it from the foul lines and other locations. They did not find a difference between actual and predicted performance of jump-shots from foul line, which is understandable because jump-shots are seldom, if ever, used in free-throw practice. We predict that favorite locations of the experienced players appear the special effect in that zone. The objective of the present study is evaluating the especial skills in the "favorite locations" using the task of basketball jump-shot. The comparison is made with other distances around those locations.

METHODS

Participants were 8 experienced basketball players with at least 8 years of experience in basketball. All of them were men and their age range was between 18 to 23 years. All of the players were members of Iran super league teams invited, at different times, to National teams. The experiment was conducted on a standard basketball court. The distance from the basket's center to the court surface was 3.05 m (the regulation height). The "favorite locations" indicated by each player were marked. Then, three points in front of (in the direction of the basket) the "favorite location," and three points behind it, were marked. These marks were 25*5 cm. apart. The distance between the locations was 61 cm (2 feet) (Keetch *et al.,* 2005; Nabavi Nik *et al.,* 2011; Schoener and Kelso, 1988). Therefore, we used seven locations from which players performed 210 throws (30 from each location). Their throws were recorded by Sony camera (SONY- CCD- TRV238E- PALLH18-3352553) and then analysed for further accuracy. First, participants filled out consent forms for participating in the study. Then, the complete instructions were given. Half of the players completed their trials from the shortest distance sequentially to the longest distance, and the remainder performed the tasks in the opposite order. Players completed a 10 trial block, and then did 10 trials at the next location, etc. There was a 5 second break after each trial, but the pace of the shot was determined by the participant himself. There was a 5 minute break after each set of 70 trials. Participants were instructed to attempt to perform each of the throws with a similar technique, without striking the backboard. They were not allowed to utilize any other kind of movement or dribble before jump-shot. Visual feedback of the shot's accuracy was the only feedback received. Scoring throws was done using a 4 value system (0 to 3): If the ball thrown successfully in the basket without or with minimum contact with the rim. It received 3 points. If the shot was successful, but only after major contact with the rim, it received 2 points. If the shot was not successful, but did strike the rim, it received 1 point. If the ball missed the rim entirely, it was given 0 points (Keetch *et al.,* 2005; Nabavi Nik *et al.,* 2011).

RESULTS

The favorite location selected by experienced players presented in table1. Rage for the favorite angle were 30"-90" (M=5.96", SD=24.40") and favorite distance were 4.82-6.43 (M=53.75, SD=0.56). The highest percentage success score was 73.96 performed at the second distance (see Figure 1). The percentage success at the favorite location was 73.17. When a linear regression fit line was applied (Keetch *et al.,* 2005; Keetch *et al.,* 2008), the trend line showed a linear slope in performance as distance increased from the basket. A linear regression equation was first calculated across distance for each participant to calculate an expected score to be achieved at the favorite location. When compared, there was a significant difference between the expected and actual scores at the favorite location (M actual =73.17, SD = 5.90, M predicted = 67.21, SD=5.53, t (7) =3.26, p<.01), providing support for the

presence of an especial skill (table 2). The percentage difference score between actual and predicted scores was 5.96, this was lower than for previous studies in basketball, 8.8%, 8% (Keetch *et al.*, 2005), 7% (Breslin *et al.*, 2010) and 7.34% (Nabavi Nik *et al.*, 2011).

Table 1: favorite locations" of the experienced players

Player	Angle (deg.)	Distance (m)
1	50	5.95
2	50	6.43
3	90	4.85
4	30	5.42
5	40	6.38
6	90	6.32
7	40	5.90
8	40	6.35

Table 2: Paired sample t test for comparing actual performance with predicted performance (Success Percentage) of experienced basketball players in favorite locations

Variables	Mean	Standard Deviation	t	df	p
Actual Performance	73.17	5.90	3.26	7	<.01
Predicted Performance	67.21	5.53			

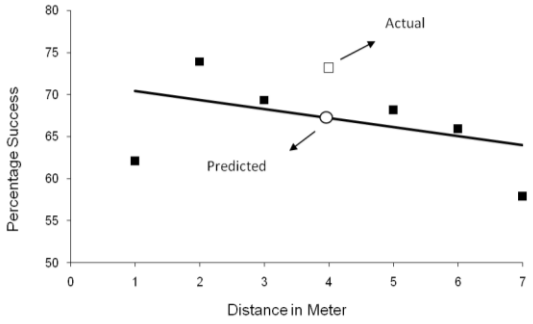

Figure 1: Comparing the actual performance with the predicted performance of players in favorite locations (location 4) and nearer and farther locations (The diamond shows actual performance in favorite location, the circle represents predicted performance in favorite location and the filled squares show actual performance of players in nearer and farther locations to the favorite location).

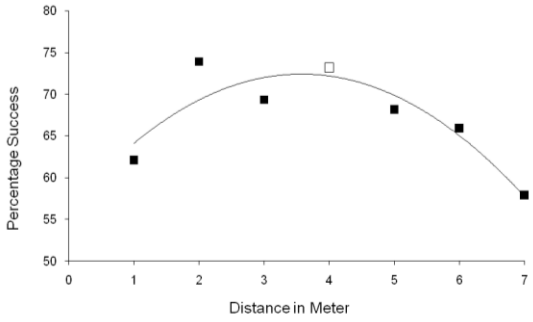

Figure 2: Urceolate performance of skilled basketball players in the "favorite locations" and nearby distances.

DISCUSSION AND CONCLUSION

In this experiment, we explored the especial skills the "favorite locations" of experienced players. Most of the studies conducted one especial skills in basketball have selected free throw as task (Keetch *et al.*, 2005; Keetch *et al.*, 2008; Nabavi Nik *et al.*, 2011; Breslin *et al.*, 2012). In the other hand, most of the scores among the basketball throws are the jump-shot. Jump-shot usually have more variability in performance but give more freedom to player for performance (from any distance and angle and essentially without limitation in terms of motor pattern; *Schmidt et al.*, 1979). Considering these properties, players usually perform this kind of shot more effectively from certain and self-selected locations. Interestingly, the players chose to perform their throws from right side of the basket. Also, we asked players to perform their throws from nearer or farther locations considering from their "favorite locations." Our data showed a significant advantage for the "favorite locations" of players, as compared to the predicted locations, predicted from performances with nearby locations. These results support the idea that especial skills exist at the players' "favorite locations" (Schmidt, 2003). Also, the present study found an urceolate performance of Experienced. As shown in Figure 2, the performance from nearer or farther locations had back fall compared to the favorite locations. These findings bring about the challenge of negative impact of massed practice in other locations to the performance of favorite location. The findings have been repeated in the previous studies as well (Nabavi Nik *et al.*, 2011). This idea can serve as for future research and can answer some questions in this regard.

Visual context of the players' favorite locations is probably one of the other reasons for especial skills. Visual context hypothesis was suggested by Keetch *et al.*, (2008) about special performance of experienced players in the foul line. They showed that there is more accurate performance in 90^0-angle (foul line) compared to other locations- with similar distance but different angles (15^o difference between the locations). These findings confirmed visual context hypothesis as one of the possible reason of special performance of experienced players in the foul line. We can test this hypothesis with constant distance of the "favorite location" from the basket and performing jump-shot from different angles (with constant distance).

After all, findings of this study, confirms the especial skills in the "favorite locations" of experienced basketball players. These results have no comparability with the generalized motor program. Future researches should clarify

the reasons of emergence of especial skills in the favorite location of the basketball and other aiming skills.

ACKNOWLEDGEMENT

Thanks too much Dr Richard Schmidt for his sincerely helps and good comments in the earlier draft of the manuscript. We thank Tim Lee and Douglas Young for their practical notes. Also, thanks to Dr. Sardar for his kindness and letting we use useful equipment and halls for conducting equipment. We also thank Hossein and Ali Nabavi Nik for their nice cooperation, Dr. Jabbari for his suitable statistical advices, all of the professional basketball players in Mashhad for their cooperation.

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