1949

A study of shooting methods employed by basketball players in the professional basketball association of America

Thesis 1949
Ferazzi, Gabriel E.

A Study of Shooting Methods employed by Basketball players in the Prof. Bsktball Assoc. of America.

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A STUDY OF SHOOTING METHODS EMPLOYED BY BASKETBALL PLAYERS IN THE PROFESSIONAL BASKETBALL ASSOCIATION OF AMERICA

A Thesis

Presented to

the Faculty of the School of Education

Boston University

In Partial Fulfillment

of the Requirements for the Degree

Master of Education

by

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1949

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CHAPTER I

INTRODUCTION

Nearly every basketball program in Madison Square Garden plays to a capacity house of nineteen thousand, and this game, which is little morethan fifty years old, is still growing in popularity. Its steady growth indicates that arenas accommodating twenty-five to thirty thousand will be built in the near future.

The major rules have been changed also and these changes have greatly improved the game. For example one man used to shoot all of the free throws for his team. Now the man fouled shoots the free throws which is logical as it compensates him for the foul and it also gives all players a chance to shoot free throws. Another important change made it compulsory to move the ball from the back court to the front court within ten seconds. This helped eliminate stalling. The elimination of the center jump was perhaps the change that has done more than any other to speed up the game.

There is still research being done on the rules and other good changes will probably follow, as basketball is still in the developmental stage as compared to our older games.

Indications are that basketball may be the most popular game in the world within the next decade.[1]

Basketball has become increasingly popular due to the fact that the game has been adjusted to the spectators desires. The basketball fan usually is interested in the offensive style of basketball where scoring is the primary pleasure of the team followers. Rule changes have been made to please the fans and maintain the calibre of play. Some of these changes such as the "three second rule" and the elimination of the center jump have been inaugurated to help the small man. This has streamlined

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[1]Howard A. Hobson, Basketball Illustrated (New York: A. S. Barnes & Co., 1948), p. 1-3

the game with emphasis on speed and offense. Lambert[2] states, "In the early years of the game of basketball the organization of team offense was not well developed but consisted of rapid passing of the ball from one offensive man to another." Today players must be more alert and must react more quickly to a situation than previously due to this new offensive trend with emphasis on scoring by all team members. The day of the standing guard has passed and the result has been the development of better all around players who must be both good on offense and defense in order to play organized ball.

Many of the basketball coaches and students of the game have their own personal opinions as to the most effective method of shooting field goals and free throws. In many cases these are opinions based on personal experiences and are subjective opinions without any scientific data to justify their contentions. This appears to be especially true in the matter of shooting fouls. Therefore, the primary basis for this study was to determine if there is any "best" method for free throw shooting.

Statement of the Problem. It has been the purpose of this investigation to study certain aspects of basket shooting as noted by observing players of the Basketball Association of America during the 1947-48 basketball season. More specifically the study was restricted to the following: (1) an analysis of the relative effectiveness of four methods of shooting free throws; namely, the two hand under, the two hand push shot, the one hand push and the two hand overhead shot; (2) a

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[2]Ward L. Lambert, Practical Basketball (Chicago, Illinois: Athletic Journal Publishing Company, 1932), p. 121

determination of the frequency and relative effectiveness of different methods of shooting field goals from various regions of the floor; (3) a determination of the professional players normal scoring expectancy from various areas of the playing court; (4) a comparison of scoring effectiveness between professional basketball and college basketball.

Justification for the study. Due to the varying opinions among outstanding basketball coaches in regard to certain phases of the game, it is evident that objective research might shed some light upon these debatable issues.

Meanwell[3], coach of the University of Wisconsin in 1922, stated, "I have come to feel that the style of the free throw shot is an individual matter, though certain basic factors in the technique of the shot should be maintained."

Holman[4] states, "The underhand foul shot is the type of foul shot which I recommend for all players. While I personally have used the overhand method, I still am a firm believer in the underhand type of throw because in this method there is less muscular resistance and greater freedom of movement. Another free throw shot is the overhand. If a player is a good shot, style is unimportant. There should be an absence of muscle tension."

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[3]Walter E. Meanwell, Basketball for Men (Madison, Wisconsin: Democratic Printing Company, 1922), p. 80

[4]Nat Holman, Winning Basketball (New York: Chas. Scribner & Sons, 1932), p. 18

Allen[5] states, "The basketball player who neglects free throw practice or shoots less than 100 free throw shots a day is neglecting his basketball fundamentals. The free throw shot, both from the foul line and from the field, has been responsible for more victories than have any other two shots combined."

Bunn[6] states, "The two hand underhand, or free throw shot is without a doubt the most accurate floor shot. It is the most mechanical, and therefore there are fewer chances for errors. It should always be used for free throws."

Barbour and Sarra state[7], "Foul shooting should be one of the simplest and surest ways to score; first because the performers can make use of a manner of shooting denied him at most other times, which is at once natural and easily perfected the underhand shot. Ordinarily impractical, since it can be readily wrecked by an opponent, the underhand shot becomes the perfect means of scoring from the foul line where the defense is powerless against it."

Hobson[8], in his recent edition of Basketball Illustrated, states, "The free throw from the chest is advocated by some coaches because it is felt that the player needs only to learn the one shot since he can also use the same shot from the floor. This is true of the one handed shot. While these shots are sound in their fundamentals,

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[5]Forrest C. Allen, Better Basketball (New York: McGraw-Hill Book Company, Inc., 1937), p. 154

[6]John W. Bunn, Basketball Methods (New York: MacMillan Co., 1939), p. 136

[7]Ralph H. Barbour and LaMarr Sarra, How to Play Better Basketball (New York: Appleton Century Company, 1941), p. 48

[8]Hobson, op. cit., p. 43

statistics still definitely show that the underhand shot is the most accurate and I believe it is time well spent to learn and to practice this style."

Lapchick[9] states, "Most tightly contested games are won or lost at the foul line and the importance of making your foul shots count cannot be stressed too greatly. The most popular manner to make this shot is to take a stance close to the line with both feet spread comfortably and shoot underhand. Keep your eye on the basket and release the ball with a smooth motion. Arch the ball slightly. Some players shoot overhand with one foot forward. Adopt the style which is easiest and most comfortable for you and don't change."

In a personal interview concerning the various methods of shooting free throws, Everett S. Dean stated, "It is my belief that the best method of free throw shooting is the two hand underhand method. However, I would permit certain players on my teams to vary this method only if they could score at least 70% of the time from the free throw line with the different method."

These opinions are a few among the many as stated by some of our leading exponents of the game, and it is hoped that this study and its findings will be of some use in evaluating certain theories possessed by many of us.

Review of the literature. There is little published objective research concerning the relative merits of the various types of shooting.

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[9]Joe Lapchick, Pamphlet-Play a Winning Game, p. 3

Staton[10] endeavored to study this problem statistically by analyzing the results of intercollegiate basketball games played at the Boston Garden and Boston Arena during the 1946-47 season.

Staton designed a chart for recording foul shots and field goals attempted from various areas on the playing court. This chart, Figure 1, was also utilized in this study. This chart has spaces available for recording lineups, substitutions, methods of offense, whether fast break or slow break, and ball possession time. Staton worked with an assistant who served as a recorder in collecting this data. Each had particular duties to perform and each also checked on the other to facilitate the recording of the data collected.

Some of the conclusions indicated by Staton's study are: "Ball possession did not have any significant effect upon scoring or winning performances, free throw data from this group shows no significant differences in any of the three basic methods used, and accuracy of shooting is the keynote of success in winning games." [11]

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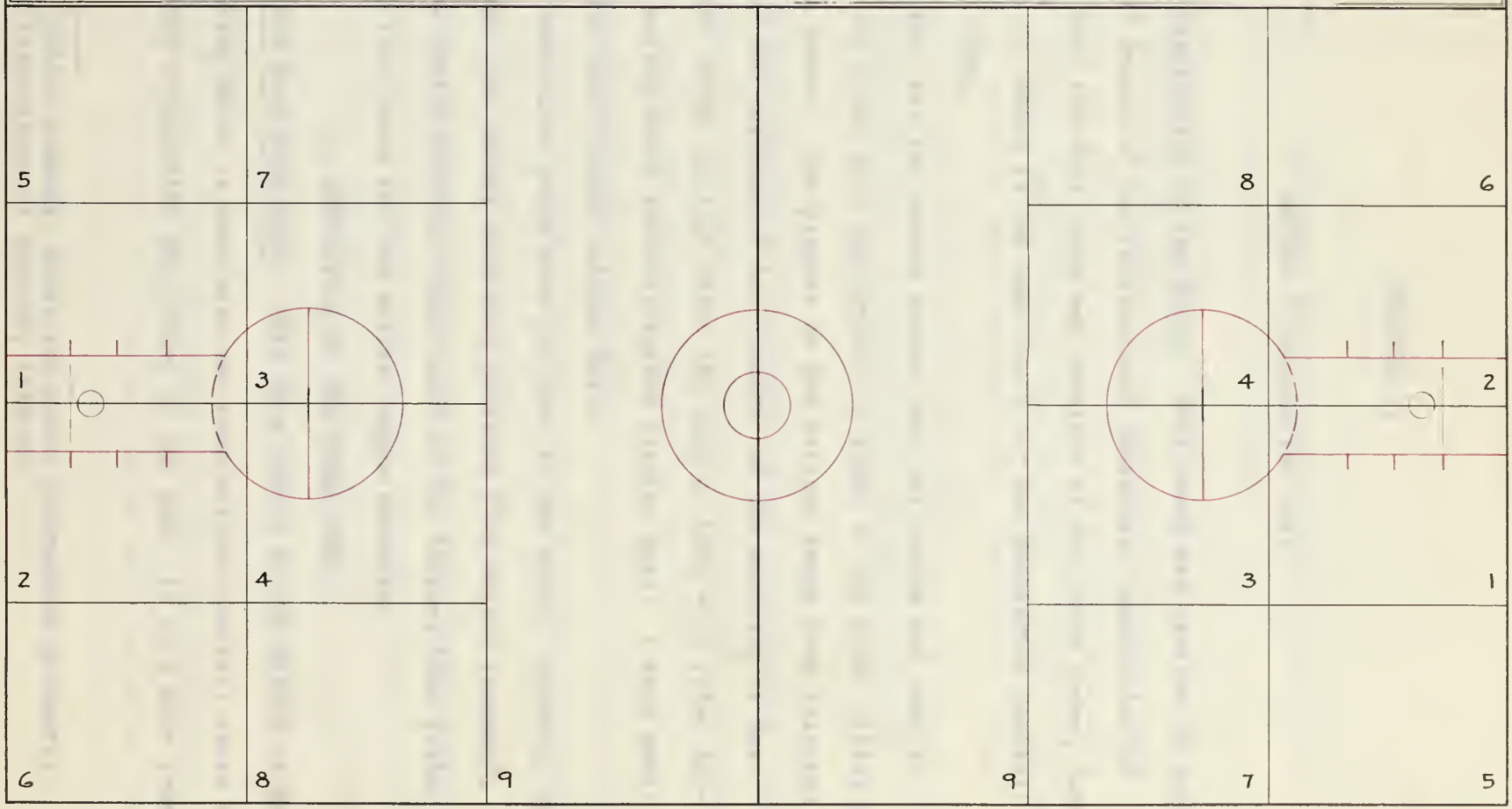
[10] Wesley Staton, Masters Thesis (Boston University, 1947) - A Study of Certain Factors Associated with Individual and Team Performance in Collegiate Basketball, p. 8

[11] Ibid., pp. 25-26

CHART* USED TO COLLECT DATA FOR THE STUDY



· FIGURE · 1 ·

*Chart designed by Wesley Staton for his study on certain factors associated with individual and team performance in collegiate basketball.

CHAPTER II

I METHOD OF COLLECTING DATA

Description of the Group. This study was carried on during the 1947-48 season of the Professional Basketball Association of America. Data for this study was obtained at the Uline Arena, Washington, D. C., which is the home court for the Washington Capitals basketball team.

This was the second season that the league has been in operation and teams were represented in eight of the major cities of the United States. The players on the various teams were selected from all of the sections of the country and the majority of the players were former college stars and many of them were rated All-Americans during their intercollegiate playing days. A very small minority had never played college ball.

Twenty-one games were included in the study. However, results of the free throws made were obtained from Walter Kennedy[1], head of the Public Relations Department of the league, thus giving the results of foul shots for the entire league schedule.

II DEFINITION OF THE TERMS USED

One Hand Push Shot. This term refers to the method of free throw shooting which is made with one hand holding the ball above the shoulder line or opposite the corner of the eye. It is a more recently

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[1]Walter Kennedy, Press and Radio Information Brochure, Basketball Association of America, 1947-48.

developed method of shooting. This shot is probably stressed more in the West than any other part of the country.

Two Hand Underhand Shot. This term refers to the type of shot which is made with the ball held on the sides with the fingers and thumb spread and the palms of the hands not touching the ball. "The arms are fully extended downward but not rigid. On the first part of the movement, bend the knees slightly, drop the position of the ball to the crotch and then bring the arms upward directly toward the basket and release the ball. Follow-through directly toward the basket."[2]

Two Hand Push Shot. "This term refers to the typical 'chest shot' or 'push-arch shot' which is thrown with two hands, in an overhand motion, from a point above the waist."[3]

Two Hand Overhead. This term refers to the free throw shot which is made with hands holding the ball above the level of the head and thrown in such a manner as an overhead pass.

Normal Scoring Expectancy. This term shall be interpreted as the percentage of successful shots scored by players from a particular area of the floor. The term as used in this study is restricted to players in the Professional Basketball Association of America for the 1947-48 season.

Scoring Zone. This term refers to an area on the basketball court theoretically set up from which shots taken during the game

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[2]Hobson, op. cit., p. 42

[3]Staton, op. cit., p. 3

were plotted. The area is approximately fifteen square feet to each zone, Zone No. 9 being somewhat larger. Figure 1 shows a diagram of these zones. The scoring chart was patterned after the one used by Staton in his study of college teams. The tabulation chart utilized was the same as the one developed by Staton. It was relatively easy to observe these zones objectively as the floor was laid out in sections which conformed nearly perfectly to the pattern of zones set up on the recording chart.

III CHARTING METHOD EMPLOYED

Charting Method. The shots and methods of shots taken were plotted on a chart designed by Staton. This chart, Figure 1, has been previously described and was designed primarily to plot shots taken during the game. Four charts were used for each game, one for each period. The number of the players shooting was recorded in the zone or area to coincide with player's position on the court. The type of shot was recorded by a system of dots. One dot to the right of the number indicated a one hand shot using the right hand. Two dots to the right of the number indicated a two hand push or chest shot. Two dots over the number indicated that the shot was taken with the two hands extended above the head. Position of the dots indicated the type of shot used. A successful attempt was designated by a circle being drawn around the player's number and code used. Unsuccessful attempts would be recorded with the code number and dots but without a circle.

A separate chart was used to record free shots taken. The players taking the shots were recorded in chronological order for each

game regardless of what team they were on. A sample of this is shown in Figure 2. A code was used to plot the data; the initials of the team were recorded in a column provided, and next to this column was a space to record the player's number who was attempting the foul. The style of the foul attempt was recorded in code as explained in the key in Figure 2. If the player was successful in his attempt, the letter "M" was listed next to the style the player was using. An unsuccessful attempt was left blank after the code letters.

IV RECORDERS FOR THE GAMES

Duties of the Recorders. The data for these games was collected by two recorders who gathered the same data at each game to keep any probabilities of error constant. Both recorders were experienced in the field of basketball either as former players or active as a coach in the field of basketball. The position of the recorders was approximately at the mid court and high enough above the floor level so the line of vision was not obstructed by the spectators. One of the investigators recorded all the data on the foul shots and the other recorded the field goals. In this manner, the subjective opinion of the scorers was kept relatively constant. Each of the recorders assisted the other in observing methods of shots taken and the player and position of the floor from which the shot was taken.

FIRST PERIOD			THIRD PERIOD		
Team	Player's Number	TSU	Team	Player's Number	TSU
Wash.	20	1HP-M	Wash.	15	2HU-M
Wash.	10	2HU-M	Phila.	13	1HP-M
Wash.	10	2HU-M	Wash.	17	2HO-M
Wash.	17	2HO-	Wash.	17	2HO-
Wash.	22	2HP-M	Phila.	19	2HP-
Phila.	10	2HU-			
Phila.	17	2HP-M			

SECOND PERIOD			FOURTH PERIOD		
Wash.	13	1HP-M	Wash.	13	1HP-M
Phila.	20	2HP-	Wash.	17	2HO-M
Wash.	10	2HO-	Phila.	10	1HP-
Phila.	17	2HP-M			

Key: TSU - Type shot used
1HP - One hand push shot
2HO - Two hand overhead shot
2HU - Two hand under shot
2HP - Two hand push shot
M - Signifies shot attempted was successful.
Blank after style of shot attempted signifies shot not made.

FIGURE 2

SAMPLE CHART USED TO RECORD FOUL SHOTS TAKEN DURING EACH GAME

CHAPTER III

ANALYSIS AND DISCUSSION OF THE DATA

Effectiveness of Various Methods of Free Throws Used by Professional Basketball Players.

Earlier in this study comments by some of the country's leading basketball coaches were recorded which clearly indicate that there is not universal agreement on the most effective method of shooting free throws.

Free throw data in this investigation was considered only from players shooting a minimum of fifty shots during the season. The method of shooting was determined by observation at the games played at Uline Arena, Washington, D. C., and it was assumed that the players did not change their techniques during the different games. Walter Kennedy, Public Relations Official of the Basketball Association of America, supplied the final results of the league and thus an adequate sampling was obtained. The percentage of shots made by each individual was obtained by dividing the number of attempts into the number of successful shots. This is comparable to the method used in baseball to figure out the batting averages. This was computed for each individual and listed according to the style of free throws used. The percentages made by each method are recorded in Table I and a comparison with the findings of Staton's study appears quite interesting. The Professional group has an additional

method of shooting free throws, this being the two hand overhead method. It is interesting to note that of 704 attempts, there were 501 two hand overhead free throw shots made, for a percentage of 71, which is 3% better than the two hand underhand method and the two hand push shot. It is also 4% better than the one hand push shot.

The professional players' averages for foul shooting are exceptionally high and in comparison with college players for the same methods used show a much higher percentage of shots made.

Table I shows a comparison of the effectiveness of different methods of shooting free throws between the college and professional players. The various methods of shooting fouls by the college players show a range of nearly 5% between the two hand underhand method and the two hand push method which are apparently the most popular methods as determined by Staton's study for the particular group he studied.

The professional players were nearly equal in all methods of shooting with the exception of the two hand over head method which was used by a very few members of the league. The three standardized methods of shooting fouls showed a difference of only 1% with the one hand push shot style, having a percentage of shots made of 67.5, while the two hand under and two hand push method of shooting fouls shows an accuracy of 68.5%.

TABLE I

A COMPARISON OF THE EFFECTIVENESS OF
DIFFERENT METHODS OF SHOOTING FREE THROWS
(College and Professional Players)

	COLLEGE PLAYERS*			PROFESSIONAL PLAYERS		
Type Shot	Attempts	Made	Pct.	Attempts	Made	Pct.
2 Hand Overhead				704	501	71.1
2 Hand Under	282	158	56.0	6065	4129	68.5
2 Hand Push	245	127	51.8	1553	1064	68.5
1 Hand Push	144	82	56.9	798	539	67.5

* From Staton

The findings from the data collected tend to indicate that there is little choice in selecting the "best" method of free throw shooting. This is substantiated by the fact that since the difference in percentage of shots made is so small, the style of shot used by the player should be left up to his own discretion and he should be allowed to shoot the style which he is best adapted for. Once a player selects a method of shooting free throws he should practice this method and perfect it to the best of his ability.

The Significance of Field Goals Attempted and the Highest Percentage of Shots Made in Relation to Winning.

In order to determine the importance of accuracy at the foul line on winning performance, the point total of each game, exclusive of free throws, is shown in Table II. This was determined by computing the score of the game without adding the free throws to the total. Of the 21 games recorded, only one would have ended in a tie using this method of computation. Of the 20 remaining games, it is significant that in 16 games the team making the highest percentage of field goals attempted had the highest field goal score. In only three games of the twenty-one were successful free throws the deciding factor in winning the game. Throughout the twenty games the winning teams attempted 1816 shots and made 597 for an overall winning team average of 33%. On the other hand, the losing team attempted 1728 shots and made 470 for an overall losing team average of 27%. This would tend to suggest that accuracy in shooting is the important factor in winning games and not the number of shots attempted.

TABLE II

CAPITALS				OPPONENTS			
FIELD GOALS				FIELD GOALS			
ATTEMPTS	MADE	PCT.	RAW SCORE	ATTEMPTS	MADE	PCT.	RAW SCORE
95(M)	26	.274*	52x	82	19	.232	38
99(M)	22	.222	44	81	30	.370*	60x
105(M)	25	.238	50	84	26	.309*	52x
78	29	.372*	58x	80(M)	22	.274	44
93(M)	24	.268	48x	78	23	.295*	46
87(M)	21	.241	42x	62	19	.290*	38
107(M)	29	.281	58	89	30	.315*	60x
107(M)	41	.383	82	86	41	.473*	82
92(M)	27	.293	54x	68	24	.353*	48
95(M)	31	.326*	62x	79	23	.291	46
85(M)	31	.365*	62x	80	26	.325	52
90(M)	17	.189*	34x	84	15	.178	30
88(M)	28	.318*	56x	82	23	.280	46
101(M)	38	.366*	76x	80	25	.312	50
107(M)	30	.280*	60x	95	21	.221	42
107(M)	32	.299	64x	74	31	.420*	62
97(M)	30	.309*	60x	87	25	.287	50
106(M)	24	.226	48	89	28	.314*	56x
88(M)	20	.227	40	68	24	.353*	48x
91	35	.384*	70x	96(M)	27	.281	54
99(M)	39	.394*	78x	96	27	.281	54

(M) - Indicates team taking most shots in game
(*) - Indicates team with highest average or percentage of shots made
(x) - Indicates team with the highest raw score, not including foul shots made

Zones and Normal Game Scoring Expectancy.

An attempt was made to supplement Staton's study to determine which zones offered the best opportunities for scoring from the floor. Important factors to be considered here are that since massed data was used for the style of shooting by zones, the individual's capabilities are not taken into consideration and also the technique of guarding was not considered in obtaining the information. Some of the players were left open from various zones and others considered top scorers such as Fulks of Philadelphia, Feerick of Washington, Zaslofsky of Chicago, and Sadowski of Boston, were guarded rather closely throughout the game. The shots plotted should take this factor into consideration since they were taken during actual game conditions. It is to be assumed that if the players were left free to shoot from these areas, their percentages would be much higher. Using Staton's shot chart, shown in Figure 1, the shots were plotted throughout the entire twenty-one games.

The data, as collected in Table III, showed a total of 3737 shots taken for all games. This was an average of 177.9 attempts per game for both teams. The number of field goals made was 1128 for an average of 53 goals per game.

"Staton's study for the college level showed 4530 shots attempted for all teams. This was an average of 161.8 per game and was the average for twenty-eight games. His study also brings out the

TABLE III

NORMAL GAME SCORING EXPECTANCIES

PROFESSIONAL LEVEL

	Number of Games	Total Attempts	Total Made	Pct. of Shots Made	Average Attempts Per Game	Average Number of Shots Made Per Game
CAPS	21	2017	599	.297	96	28.5
OPPONENTS	21	1720	529	.307	81.9	25
TOTAL	21	3737	1128	.301	177.9	53

COLLEGE LEVEL

AS SHOWN BY STATON IN HIS STUDY

TOTAL	28	4530	1166	.257	161.8	41.6

fact that a total of 1166 field goals was scored in the twenty-eight games with an average of 41.6 field goals per game for all teams together."[1]

The percentage of field goals scored for the twenty-one games in the professional games was 30.1, which is considerably higher than the findings of Staton in his study which showed a normal game scoring expectancy of 25.7%. It was also much higher than the study carried out by Elbel and Allen on the University of Kansas basketball squad. Elbel and Allen's Study showed a normal game scoring expectancy of 25.2% per game.

This study would seem to indicate that players of the Basketball Association of America could be expected to score 30% of the time or three times in ten shots attempted.

Breaking the scoring expectancy down into zones, it will be interesting to note that the zone showing the highest percentage of successful shots was zone number two. A total of 713 shots was taken from this area and 269 shots were successful for an average of 37.7% made. Ranking second in scoring expectancy was zone number one with 876 attempts and 296 shots made for an average of 33.7 made. Zone number three ranked third with 376 shots attempted and 114 successful shots for an average of 30.3% made. Zone number six, supposedly a very difficult shot and an area considered quite difficult to score from, ranked fourth in normal game scoring expectancy. This area showed a

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[1] Staton, op. cit., p. 21

total of 194 attempts with 52 successful shots for a percentage of 26.8% made. Zone number nine, which is usually considered the set shot area because of the long shots attempted, ranked fifth with 570 attempts and 152 shots made for a percentage of 26.7%. Sixth ranking zone was number five showing 270 attempts and 68 successful tries for a percentage of 25.1. Zone number eight was seventh with 180 attempts and 44 completions for an average of 24.4%. The eighth ranking zone was number four with 307 attempts and 74 shots made for an average of 24.1%. Ranking number nine was zone number seven with 251 attempts and 56 successful shots for an average of 22.3%.

In contrast to this, Staton's study showed that the zone showing the highest percentage of successful shots was zone number one. His study showed that a total of 1197 shots was taken with a scoring expectancy of 32.4% as the result of 288 successful attempts. Ranking second was zone number two with 995 attempts and 315 successful shots for an average of 31.7. Ranking third was zone number nine with 529 tries and 135 successful shots for an average of 25.5%. Zone number four ranked fourth in scoring expectancy with 429 attempts and 91 goals scored. The scoring expectancy for this area was 21.2%. Zone number three was the fifth ranking zone in the collegiate level with 492 shots attempted and 95 made for an average of 19.3%.

Zone numbers five, six, seven, and eight followed in that order. The percentages can be found in Table IV of this study.

A comparison of the shooting effectiveness with Staton's study from the various zones between the professional and college players will be found in the Appendix, Figure 3, of this study.

The findings of this study indicate that the area directly surrounding the basket, zones one and two, and the area directly to the right of the foul line, zone number three, would be the best offensive areas. The two corners, zones five and six, usually considered impractical from which to shoot due to the acute angle, seem to have excellent scoring possibilites. These combined zones showed 464 shots attempted for a scoring percentage of 25.9%. It is interesting to note that only .07% of the shots taken for the games in the professional and college study were concentrated in zone number five. In zone number six the professional players shot .05% of their shots and the collegians only .04%.

Professional coaches could utilize these areas, five and six, to a greater extent since there seems to be excellent possibilities for scoring from these zones. Table VI shows the area and the frequency of shots in terms of percent that are taken for both the college and professional level. The shots used to tabulate frequency for the college level were taken from Staton's study for 28 games, and those for the professional level were for 21 games. The percentage was determined by dividing the number of shots taken for the entire season by the attempts from each scoring zone.

TABLE IV

COMPARATIVE EFFECTIVENESS OF SHOOTING BY ZONES
(COLLEGE AND PROFESSIONAL TEAMS)

	PROFESSIONAL		COLLEGE	
	Number Shots	Percentage Made	Number Shots	Percentage Made
ZONE 1	876	.337	1197	.324
ZONE 2	713	.377	995	.317
ZONE 3	376	.303	492	.193
ZONE 4	307	.241	429	.212
ZONE 5	270	.251	327	.174
ZONE 6	194	.268	196	.163
ZONE 7	251	.223	193	.155
ZONE 8	180	.244	172	.134
ZONE 9	570	.267	529	.255

TABLE V

EFFECTIVENESS OF THE DIFFERENT METHODS OF SHOOTING FIELD GOALS USED BY PLAYERS OF THE PROFESSIONAL BASKETBALL ASSOCIATION OF AMERICA

	TWO HAND SET SHOT		TWO HAND OVERHEAD SHOT		ONE HAND SHOT	
	No. Shots Attempted	Percentage Made	No. Shots Attempted	Percentage Made	No. Shots Attempted	Percentage Made
ZONE 1 *	38	.263	45	.288	784	.330
ZONE 2	39	.333	52	.461	635	.349
ZONE 3	66	.257	46	.260	269	.312
ZONE 4	67	.253	39	.179	201	.243
ZONE 5	52	.230	49	.285	170	.246
ZONE 6	31	.193	29	.377	127	.275
ZONE 7	116	.206	28	.321	105	.257
ZONE 8	109	.238	11	.272	61	.245
ZONE 9	367	.272	24	.375	175	.251

* Zones used taken from Staton's Study

TABLE VI

FREQUENCY OF SHOTS TAKEN FROM EACH ZONE BY PROFESSIONAL AND COLLEGE BASKETBALL PLAYERS

	PROFESSIONAL	COLLEGE
	Percentage Taken	Percentage Taken
ZONE 1	.215	.264
ZONE 2	.193	.219
ZONE 3	.100	.108
ZONE 4	.082	.094
ZONE 5	.072	.072
ZONE 6	.051	.043
ZONE 7	.067	.042
ZONE 8	.048	.038
ZONE 9	.152	.116

An attempt was made to check the effectiveness of the different methods of shooting field goals as used by the professional basketball players. This study shows that in 21 games, approximately 68% of the shots attempted were one hand shots. It would appear logical that these shots would be concentrated around the basket area, but of the 2527 one hand shots taken only 1419 were taken from the basket area. Ninety percent of all the shots taken from zone number one were taken with the one hand method of shooting. Zone number two had an 87% average of one hand shots taken from this area directly to the left of the basket. As the distance from the basket increased, there was a relatively constant decrease in the percentage of one hand shots taken, but the percentages from the various areas are significantly high to warrant the justification of the use of the one hand shooting method from these areas. Zone number three showed a concentration of 70% of the shots taken with the use of one hand only. Zone number four had 65% of the shots with one hand. Zones number five and six, which are the corner areas, had 62% and 68% concentration of one hand shots from these areas. Forty-two percent of the total shots from zone number seven were one hand shots and this figure decreased to 33% from zone number eight and down to 30% from zone number nine.

These figures will give some idea as to how the shots were distributed about the court. From zone number nine, 175 one hand shots were attempted with successful shooting 25% of the time. This compares favorably with the standard long shot method, the two hand set shot, of

367 attempts and successful shooting of 27%. Table IV will show the individual shooting effectiveness by individual zones.

It was believed that a truer picture could be noted if these scoring zones were combined with similar zones. This would be combining zones one and two, which are directly about the basket; combining zones five and six, which are the corner areas; etc. This brought out some interesting observations. A combined total of 1419 attempts was taken from zones one and two with successful shooting, using the one hand method, 34% of the time. Of 97 shots taken from the same area using the two hand over the head method, 39% of the tries were successful. Zones seven and eight, which are usually considered fairly vulnerable scoring areas, show relatively little difference in the method of shot used. The two hand over the head method led, but with only 37 shots attempted with this style, it does not appear to be a fair enough sampling to consider. However, the one hand push shot showed a shooting accuracy of 25% in 166 attempts. The standard set shot method showed a shooting accuracy of 22% in 225 attempts. Table VII will show the figures for the other zones using the various methods of shooting.

Table VIII shows the comparative effectiveness of shooting in the combined zones. This does not specify any particular type of a shot but takes all the styles into consideration. Approximately 40% of the shots taken by the professional basketball players observed in this study were concentrated in zones one and two, and successful

TABLE VII

SHOOTING EFFECTIVENESS DISPLAYED BY PROFESSIONAL BASKETBALL PLAYERS AS SHOWN BY COMBINING DATA FROM SIMILAR ZONES

	TWO HAND SET SHOT		TWO HAND OVERHEAD SHOT		ONE HAND SHOT	
	No. Shots Attempted	Percentage Made	No. Shots Attempted	Percentage Made	No. Shots Attempted	Percentage Made
ZONES 1 & 2	77	.298	97	.392	1419	.344
ZONES 3 & 4	133	.271	85	.224	470	.283
ZONES 5 & 6	83	.216	78	.307	297	.259
ZONES 7 & 8	225	.222	37	.378	166	.253

TABLE VIII

COMPARATIVE EFFECTIVENESS OF SHOOTING BY COMBINED ZONES BETWEEN COLLEGE AND PROFESSIONAL BASKETBALL TEAMS

	PROFESSIONAL		COLLEGE	
	Number Shots	Percentage Made	Number Shots	Percentage Made
ZONES 1 & 2	1589	.355	2192	.320
ZONES 3 & 4	683	.275	921	.202
ZONES 5 & 6	464	.259	523	.170
ZONES 7 & 8	431	.232	365	.146
ZONE 9	570	.267	529	.255

shooting at this level was approximately 36%. Zones three and four show that 18% of the shots were concentrated in these areas with a shooting expectancy of 28%. Zones five and six have a concentration of 12% of the shots taken with successful shooting 26% of the time. Zones seven and eight have the lowest concentration of shooting from these side areas, and it is significant that only 11% of the shooting was done here and a shooting expectancy of 23% could be expected.

A comparison of college and professional basketball teams, according to zones, discloses that they concentrated their offense in nearly identical areas. Staton's study showed that the college players concentrated 48% of their shooting in zones one and two. This compares favorably with the professional players who concentrated 40% of their shots in similar zones. The collegians' effectiveness was 32%, which compares favorably with the 36% scoring expectancy of the professional group.

Approximately 68% of the total college players' offense was concentrated around the foul line in zones one, two, three, and four. This is in comparison with the professional players who shot only 58% of their shots from these same areas. This would tend to indicate that the professional player diversifies his attack over a larger playing area.

The findings of this study in regard to frequency of shots taken from the various zones and the shooting effectiveness at these particular zones would seem to indicate that the professional and college coaches are concentrating their offenses in the most vulnerable areas.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary. The results of this study show very little difference in the relative effectiveness of the various methods of shooting free throws employed by players in the Professional Basketball Association of America. One style of shooting free throws seems to be as effective as another.

A unique method of shooting free throws, the two hand overhead method, was used by three of the players who showed excellent results, making 501 free throws out of a possible 704, or 71% of the attempts.

The two hand underhand method was the most popular style of shooting free throws, and this method showed a successful shooting average of 68.5% with 4129 successful shots out of a possible 6065 attempts.

The two hand push shot had exactly the same average of successful shooting as the two hand under method. This was also 68.5% as the result of 1064 free thorws made out of 1553 attempts.

The one hand push shot was not too far behind with an average of shots made of 67.5% which was the result of 539 successful shots out of a possible 798 attempts.

These figures would indicate that the style of shooting is unimportant as far as shooting fouls in the Basketball Association of

America is concerned.

The free throw data obtained from this study shows no significant difference in the methods used and is in controversy to many opinions held by some of the leading coaches of the game.

One of the more important findings of this study was the surprisingly high number of one hand shots taken from all areas of the court. This shot was used quite extensively and was the most popular shot used by the professional basketball players. A large number of one hand shots was taken from each area, and only from the outside area was there any appreciable difference in the style of the field goal attempted. The high scoring expectancy from these areas warrants the use of this method of shooting.

Conclusions. The two hand under hand method of shooting fouls seems to be the most popular style of shooting, but the findings of this study would not justify the belief by the majority of coaches that this style is the most effective. The two hand over the head method of shooting fouls appears to be the most accurate and might well be utilized more frequently. On the basis of the other methods of shooting free throws, it appears that there is no "best" method among these standard types of free throws. This opinion is based on objective research and is contrary to the popular opinion held by many of the coaches of the game.

The areas immediately surrounding the basket are the best offensive zones, but the findings of this study would tend to indicate that the corner shots could be better utilized and prove to be a

profitable area from which to center an attack.

The style of shooting field goals used by the professional players tends to indicate that the one hand shot is becoming popular and effective. This shot can be utilized with a great deal of efficiency from all areas of the court and can be made by the players while still in motion, making it a difficult shot to guard against.

Suggestions for Further Research.

1. An objective study of the relative effectiveness of shooting free throws at the high school level would help to clear up controversies regarding methods of shooting free throws for this level.

2. Further study to validate the findings of this study would seem to be warranted.

3. More objective research in the field of basketball is warranted, and it should prove valuable in validating many opinions held today in the field of basketball for all levels.

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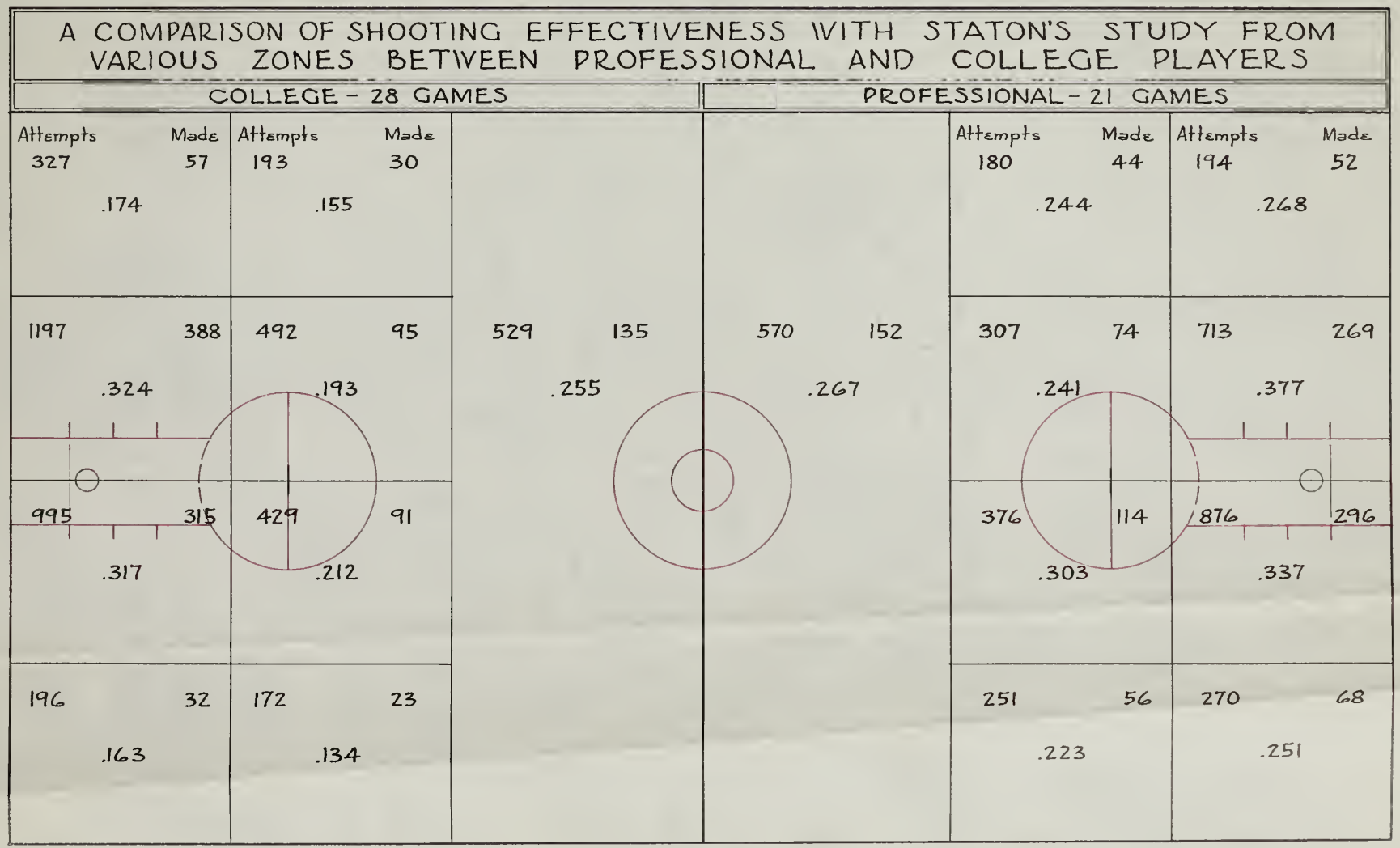
APPENDIX

A COMPARISON OF SHOOTING EFFECTIVENESS WITH STATON'S STUDY FROM VARIOUS ZONES BETWEEN PROFESSIONAL AND COLLEGE PLAYERS



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