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The Effect of Teammates Support on Player's Free-Throws Effectiveness

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Abstract

Free-throw is the only isolated and stable situation in basketball where psychological aspects can be isolated during the competition. The aim of the current study is to analyze the effectiveness of free-throws according to the number of teammates who supported (i.e., showed affection) the shooter before throwing. The study sample included 319 free-throws of men's and women's semi-finals and finals of the Spanish Under-16 and Under-14 Championship. The results showed significant differences when receiving affection in the free-throws after a foul. The significant variables are the shooter's free-throws percentage during the game and in the first free-throw. This finding leads the author to suggest that coaches should dedicate enough time to practice the free-throw as an individual task in the training sessions, as well as encouraging teammates' cohesion and affection when the shooter is performing a free-throw.

Keywords: competition, shooting, performance, affection

Introduction

Free-throw in basketball is the only behavior performed unopposed in a stable situation, so that, when the skill is automated, psychological aspects such as confidence or concentration can be key factors to succeed (Oñoro Asenjo, Jiménez Sáiz, & Lorenzo Calvo, 2017) Rivares, 1997). Available research shows that the percentage in competition is lower than training conditions (Rodríguez & Sáez, 2009). In fact, there are many factors that may influence its effectiveness during games such as (i) physiological aspects such as fatigue (Ortega, 2005); (ii) psychological aspects considering anxiety, pressure or fear due to competition situations (Gutiérrez & Torres, 2013; Maher, Marchant, Morris, & Fazel, 2020) or mental fatigue (Alarcón, Ureña, & Cárdenas, 2017); and (iii) sociological ones including group cohesion or leadership (Collado-Mateo et al., 2019). Along these lines, there is evidence in existing literature that relates cohesion and effectiveness, since the players who perceive more cohesion in the team have better performances during competition (Leo Marcos, García Calvo, Parejo, Sánchez-Miguel, & Sánchez-Oliva, 2010). The affection behaviors that many players show to his/her teammate shooting free-throws, influence the team cohesion and could have short-term effects on the effectiveness of this frequent game situation. In fact, about 25% of the points are scored by a team via free-throws (Collado-Mateo et al., 2019). Thus, these shots are especially critical in even games (Gutiérrez & Torres, 2013; Ibáñez, García, Feu, Parejo, & Cañadas, 2009; Martinez & Martinez, 2013; Ruano & Calvo, 2007; Toro, Calvo, & Ruano, 2006; Tran & Silverberg, 2008). For these reasons, free-throws are well- investigated in basketball from different perspectives, such as the moment of the game (Gutiérrez & Torres, 2013) mental fatigue (Alarcón et al., 2017) or the influence in the match outcome (Toro et al., 2006). However, there is no precedent that analyzes the influence of teammates support, usually through touching with their hands, in this specific kind of shot.

In addition, the existing body of research focusing on free-throws has been carried out in professional basketball (García-Tormo, Manzano, Jiménez, & Rábago, 2015). Then, it is necessary to analyse data from youth players in order to improve training processes (Ortega, 2005). If shooting a free-throw is a stressful situation for professional players, youth players could be highly affected by psychological factors such as stress, anxiety, confidence. The effect of teammates' support on the shooter in the short-term performance is still unknown.

In light of the above rationale, the aim of this study is to analyze the effectiveness of free-throws based on the number of encouragements the player received before throwing. The study also explores the influence of other context-specific variables such as the moment of the game, the score-line and the percentage of success in the free-throws up to that moment of the player who throws. It was analyzed through an observation tool designed ad hoc.

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Method

The sample was obtained during the male and female U16 and U14 categories of the Spanish Championship played by the Autonomous Teams (held in Huelva, from January 3 to 7, 2020). The games played in the semifinal, final and third and fourth place phases have been observed. Thus, a total of 16 matches were analyzed (see table 1).

Table 1

Games analyzed.

	U14		U16	
	Female	**Male**	**Female**	**Male**
Semifinal 1	País Vasco- Comunidad de Madrid	Cataluña- Comunidad Valenciana	Cataluña- Canarias	Comunidad de Madrid- Canarias
Semifinal 2	Comunidad Valenciana- Cataluña	Andalucía- Comunidad de Madrid	Andalucía- Comunidad Valenciana	Cataluña- Comunidad valenciana
3º 4º game	País Vasco- Comunidad Valenciana	Comunidad Valenciana- Comunidad de Madrid	Canarias- Comunidad Valenciana	Canarias- Comunidad Valenciana
Final	Comunidad de Madrid- Cataluña	Cataluña- Andalucía	Cataluña- Andalucía	Comunidad de Madrid- Cataluña

The total number of free throws analyzed was n=319 (n=168 in U14 and n=151 in U16; 168 male and 151 female). According to Ortega (2005), an ad hoc observation tool has been designed including the following variables:

- Category, gender, match, minute and quarter of the game, score at the time of the free-throw.
- Points of difference in the moment when the player is shooting the Free-Throws.
- Number of the player who is shooting the free-throws.
- Type of free-throw (after scoring a basket, 2- or 3-points field-goals, after bonus or after a technical/ flagrant foul).
- Number of players who support to the shooter before shooting the free-throws. The number of teammates who touched the player who was going to shoot the free-throw when he was already inside the semicircle was recorded.
- Percentage of success in the free-throw shots in this situation.
- Percentage of free-throws of the player during the game.

It was deliberately decided to not introduce the variable playing position because of the added complexity of establishing an objective criterion for their classification in this sample of youth categories.

The games were observed using the matches recorded and located on the TV channel of the official website of the Spanish Basketball Federation.

Firstly, the statistical analysis was run using frequencies and distributions for the free-throw's success (success / failure) and the number of supports. The Crosstabs command analysis has been used (Pearson's Chi-square test with Montecarlo adjustment; Fisher's Test was applied to check expected frequency distribution with less than 5 cases or a lower value than 5) in order to analyze the relationships between both variables. The adjusted residuals (AR) have been considered for the analysis of the significant associations in the frequency distributions with absolute values of 2.0 (Field, 2013). Likewise, Cramer's V was used as an estimator of the effect size (ES) in the Crosstabs Command considering the following values: small = 0.05; moderate = 0.13; and high = 0.22 (Cohen, 1988).

Secondly, the binomial logistic regression model (Field, 2013) was used to test the free-throws success (dichotomous dependent variable) and the effect of independent variables (game quarter, score-line, percentage of the free-throws success before shooting the free-throw under analysis). For the free-throws after the basket and foul received and the first free-throw of a foul shot, the previous model has been used. For the second free-throw release of the foul shots the variable success in the previous shot was included to control the effect of the immediately preceding performance. The binomial logistic regression allows obtaining the odds ratios (OR) for each variable and category, and the positive or negative values points out their effect on the free-throw success. The reference value was established at 1. All the analysis has been performed using the statistical package IBM SPSS for Mac version 25.0 (Armonk, NY; IBM Corp.) and the level of significance was established at $p<0.05$.

Results

The results of the association between free-throws success (after a basket scored and an additional free-throw) and the number of supports are presented in Table 2. Fisher's exact test does not show statistically significant associations between both variables ($X^2 = 3,289$; $p = 0.567$; $ES = 0.31$).

The results of the association between free-throws success (first free-throw after a foul) and the number of supports received are presented in Table 3. Fisher's exact test shows statistically significant associations between both variables ($X^2 = 19.249$; $p = 0.001$; $ES = 0.30$). The significant distributions are associated with failure when there is no support (RA = 4.2) and with success when 2 supports are

performed (RA = 3.2).

Table 2

Frequencies of free-throws success (after a basket scored and an additional free-throw) and the number of supports received.

Number of supports		Free-throws success		
		Failure	Success	Total
0	N	10	8	18
	%	45.50	53.30	48.60
	RA	-0.5	0.5	
1	N	4	1	5
	%	18.20	6.70	13.50
	RA	1	-1	
2	N	1	3	4
	%	4.50	20.00	10.80
	RA	-1.5	1.5	
3	N	2	1	3
	%	9.10	6.70	8.10
	RA	0.3	-0.3	
4	N	5	2	7
	%	22.70	13.30	18.90
	RA	0.7	-0.7	
Total	N	22	15	37
	%	100	100	100
	RA	10	8	18

Table 3.

Frequencies of free-throws success (first free-throw shot after foul) according to the number of supports received.

Number of supports		Free-throw's success		
		Failure	Success	Total
0	N	68	38	106
	%	66.70	37.30	52.00
	RA	4.2	-4.2	
1	N	16	24	40
	%	15.70	23.50	19.60
	RA	-1.4	1.4	
2	N	11	29	40
	%	10.80	28.40	19.60
	RA	-3.2	3.2	
3	N	5	8	13
	%	4.90	7.80	6.40
	RA	-0.9	0.9	
4	N	2	3	5
	%	2.00	2.90	2.50
	RA	-0.5	0.5	
Total	N	102	102	204
	%	100	100	100
	RA	68	38	106

The results of the association between free-throws success (the second free-throw after a foul) and the number of supports received are presented in Table 4. Fisher's exact test shows statistically significant associations between both variables (X^2 = 8.367; p = 0.046; ES = 0.22). The significant distributions are associated with failure when a single support is performed (RA = 2.5).

The results of the binomial logistic regression for each context of free-throws are presented in Table 5 and 6. First, the regression model for the situations of free-throw after a basket scored and foul received (see Table 4) shows no significant (p> 0.05) variables explaining the free-throws success (X_{10}^2 = 44.338; R^2 = 0.971; p <0.001).

Table 4

Frequencies of free-throws success (second free-throw shot after foul) according to the number of supports received.

Number of supports		Free-throws success		
		Failure	Success	Total
0	N	0	2	2
	%	0	1.60	1.00
	RA	-1.2	1.2	
1	N	4	0	4
	%	4.90	0	2.00
	RA	2.5	-2.5	
2	N	11	15	26
	%	13.60	12.30	12.80
	RA	0.3	-0.3	
3	N	27	32	59
	%	33.30	26.20	29.10
	RA	1.1	-1,1	
4	N	39	73	112
	%	48.10	59.80	55.20
	RA	-1.6	1.6	
Total	N	81	122	203
	%	100	100	100
	RA	0	2	2

Table 5

Results of the binomial logistic regression in free-throws after a basket scored and foul received.

One single free-throw			95% IC OR	
	Sig.	OR	LI	LS
Quarters	1			
1st	0.996	1.22	0	0
2nd	0.999	3.44	0	0
3rd	0.995	7.16	0	0
Score	1			
Loosing	1	0.00	0.00	0.00
Close	1	0.00	0.00	0.00
% free-throw in the game	0.993	11.41	0	24.5
Number of supports				
One	4	1		
Two	1	0.10	0.01	0.18
Three	0.998	0.01	0.00	0.02
Four	0.998	0.01	0.00	0.02
Constant	1	0.01	0.00	0.02

Note: the reference category is the fourth quarter for the quarter variable, winning for the score variable, and more than 4 supports in the number of supports; OR: odds ratio.

The binomial logistic regression model for free-throws after a foul received is presented in Table 5. The results for the first free-throw (X_{10}^2= 65.671; R^2= 0.381; p<0.001) showed a significant model that correctly classified 74.4% of the cases with the only significant variable of percentage of success of free-throws in the game (p<0.001; OR = 1.04), increasing the probability of success the higher is this percentage throughout the game. The results of the second free-throw release shows a significant model (X_{10}^2 = 81.548; R^2 = 0.464; p<0.001) that correctly classifies 82.0% of the analyzed free-throws. The significant variables are the percentage of free-throws in the game (p<0.001; OR= 1.04)

and the success of the first free-throw (p<0.001; OR= 5.45), increasing the probability of success if the percentage of free-throws is higher and if the first free-throw is scored. However, the number of supports and the rest of the context variables (quarters and score) are not significant in both regression models (p> 0.05).

Table 6

Results of the binomial logistic regression for free-throws after a foul received, differentiating for the first and second shots.

1st free-throw	Sig.	OR	95% IC OR	
			LI	LS
Quarters	0.732			
1st	0.851	1.101	0.402	3.018
2nd	0.961	0.977	0.392	2.436
3rd	0.37	0.632	0.231	1.725
Score	0.745			
Losing	0.534	1.436	0.459	4.496
Close	0.468	1.402	0.563	3.496
% free-throw in the game	<0.001*	1.038	1.025	1.051
Numbers of supports	0.074			
One	0.585	0.547	0.063	4.76
Two	0.740	1.464	0.154	13.874
Three	0.635	1.733	0.179	16.778
Four	0.897	1.179	0.097	14.38
Constant	0.094	0.134		
2nd free-throw				
Quarters	0.454			
1st	0.182	2.099	0.706	6.243
2nd	0.947	1.033	0.388	2.75
3rd	0.864	0.912	0.317	2.621
Score	0.415			
Losing	0.239	0.468	0.132	1.657
Close	0.234	0.542	.197	1.487
% free-throw in the game	<0.001*	1.056	1.039	1.073
Numbers of supports	0.799			
One	0.999	0.01	0.00	0.02
Two	0.999	0.01	0.00	0.02
Three	0.311	0.576	0.198	1.674
Four	0.294	0.632	0.269	1.488
Success previous free-throw	<0.001*	5.448	2.218	13.383
Constant	0.002	0.087		

Note: the reference category is fourth quarter for the quarter variable, winning for the score variable, and more than 4 supports in the number of supports; OR: odds ratio.

Discussion

The aim of the study has been to analyze the free-throws success according to the number of supports the shooting player received before the free-throw execution, as well as other contextual variables such as the game quarter, the score-line and the shooting player's percentage free-throws success immediately before shooting the free-throw.

It has been observed that when the player shots free-throws after a foul, the support of his/her teammates has an influence on the subsequent shooting performance. With two supports, there is a greater chance of scoring and when there were no supports there is a greater probability of failure. Ferrer Maldonado (2013) confirms the need for the player who shoots a free-throw to reverse the negative emotions related to the pressure to score to positive emotions. In fact, it has been shown that, in players with some experience, the perception of positive emotions improves their effectiveness during free-throws execution (Vast, Young, & Thomas, 2011). The show of support can generate positive emotions in the shooter such as self-confidence, safety or feeling comfortable. Confidence probably influences the fact that, after a basket scored with a foul that leads to an additional free-throw, the teammates displaying affection do not influence that shot, since the player does so after a previous positive action. In addition, this fact is usually emotionally rewarded by the teammates immediately after the aforementioned action.

Free-throws success after a foul is statistically related to receiving two supports. However, when the shooter receives only one support it is associated with a missing free-throw. In this championship and these categories, the number of these supports that usually exists before a free-throw is high. The common thing is that both teammates located out of the paint trying to catch the possible rebound after the shot, are the ones who approach the shooter to support him. Perhaps this explains why, with 2 supporting behaviours, the player feels comfortable and with only 1 support, the shooter feels close to a lack of affection.

In relation to the influence of other variables, during free-throws after a foul received, the success of the first free-throw depends, mainly, on the shooter's percentage of success during the game. The higher the percentage he/she has, the more likely he/she is to score this first free-throw. The state of flow in sport explains the exceptional performance that a player can have on situations where he feels especially competent (Coll, Murcia, & Gimeno, 2010). Also, experienced players may increase a high perception of the success of their shot before seeing the final outcome (Maglott, Chiasson, & Shull, 2019)

During the second free-throw, the player's percentage of free-throws success in the game is still significant, as well as the success or failure in the first free-throw. This result is in accordance with (Martínez-Santos, Martínez-Gutiérrez, & Mujika-García, 2017) who shows the same trends in the ACB League. The cause may be that it is such a mechanical and repetitive action that, if the player scores the first free-throw, it seems easier to repeat the same action in the second free-throw and therefore its success (Rivares, 1997).

The other contextual variables analyzed (quarters and score) are not found to be significant. Particularly, previous researches, such as Gutiérrez and Torres (2013), support the absence of significant differences in the percentage of free-throws depending on the moment of the game; not even in the last five minutes in ACB. More recently, (Oñoro Asenjo, Gómez Ruano, Jiménez Sáiz, & Lorenzo Calvo, 2015) clarify that there are significant

differences in the last minute. In this professional category, it is shown that free-throws are a very stable performance indicator in this competition, a reason that could explain the little influence of the variables analyzed (Martínez-Santos et al., 2017).

In youth categories, the percentage of free-throws success decreases (Oñoro Asenjo et al., 2017), due to the scarce players' experience both during training and competition. Thus, it is necessary that free-throw training at these ages should control for psychological factors such as concentration, focusing attention on the execution itself (Collado-Mateo et al., 2019; Moradi, 2020; Rodríguez & Sáez, 2009), as well as simulating competitive scenarios (Ortega, 2005).

The author concludes that the support shown by two teammates before a free-throw improves the success rate and that the absence of support is related to the failure in a specific situation. In any case, the supports showed by two or more teammates lacks performance effects. These ways of support improve group-cohesion and are likely to affect shooter's self-confidence and self-esteem. Therefore, coaches are advised to encourage players to provide affective support (i.e., two) to the teammate shooting free-throws.

This study is exploratory and forays into a research topic that needs to be further investigated in other contexts (e.g., competitions, categories or player's level). It would also be useful knowing the perception of male and female players about this topic, as well as relating this variable to psychological variables such as group-cohesion, self-esteem, etc.

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