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Differences between offensive and defensive ratings of rookies and sophomores in the NBA basketball league

Diferencias en las estadísticas ofensivas y defensivas entre novatos y jugadores de segundo año en la liga NBA de baloncesto

As diferenças nas estatísticas ofensivas e defensivas entre os novatos e jogadores de segundo ano na liga de basketball NBA

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Abstract: The purpose of this study was to analyse and compare the offensive and defensive performance of rookies (first-year players) and sophomores (second-year players) in the NBA basketball league, in order to ascertain whether a second year of experience in the league results in higher performances. We hypothesised to find overall higher offensive and defensive performances in second-year players when compared to first-year. Offensive and defensive rating statistics for rookies and sophomores for seasons 2014/2015 and 2015/2016 were downloaded and filtered from the stats section of the NBA official web portal for a total of 144 players under analysis. A multivariate analysis of covariance (MANCOVA) was computed. 'Offensive Rating' and 'Defensive Rating' were used as dependent variables; 'Level of Experience' (rookie vs. sophomore) was used as independent variable. The average number of minutes played by each player during the league was considered as a covariate. Contrary to what was hypothesised, although both offensive and defensive ratings showed slightly higher values for second-year players when compared to first-year players, the differences were not statistically significant. These results suggest that one more year of experience in the league is not sufficient to significantly increase the performance of the players on their way from rookies to sophomores. Hence, the results might suggest that the road to excellence has begun to be travelled, with two seasons in the league still being insufficient to show significant differences in the overall performance of these yet novice players.
Keywords: performance analysis, expert, novice, expertise, sport
Resumen: El objetivo del trabajo fue analizar y comparar el rendimiento ofensivo y defensivo de *rookies* (jugadores de primer año) y *sophomores* (jugadores de segundo año) en la liga de baloncesto NBA, con el objetivo de evaluar si un segundo año de experiencia en la liga muestra un rendimiento más alto. Como hipótesis se planteó encontrar mayor rendimiento ofensivo y defensivo en los jugadores de segundo año en comparación con los de primer año. Las estadísticas ofensivas y defensivas de *rookies* y *sophomores* para las temporadas 2014/2015 y 2015/2016 fueron descargadas y filtradas de la web de la NBA, para un total de 144 jugadores analizados. Se realizó un análisis multivariado de covarianza (MANCOVA). Los ratios ofensivos y defensivos fueron usados como variables dependientes. El nivel de experiencia (*rookie* vs *sophomore*) fue usado como variable independiente. El número medio de minutos jugados por cada jugador fueron considerados como covariable. Contrariamente a la hipótesis, aunque tanto los ratios ofensivos y defensivos mostraron valores ligeramente superiores en los jugadores de segundo año en comparación con los jugadores de primer año, las diferencias no fueron estadísticamente significativas. Estos resultados sugieren que un año más de experiencia en la liga no es suficiente para incrementar de forma significativa el rendimiento de los jugadores en su paso de *rookies* a *sophomores*. Los resultados podrían sugerir que el camino a la excelencia ha empezado a ser recorrido, siendo aún insuficientes dos temporadas en la liga para mostrar diferencias significativas en el rendimiento de estos todavía jugadores novatos.
Palabras Clave: análisis del rendimiento, expertos, novatos, pericia, deporte.
Resumo: O objetivo foi analisar e comparar o desempenho ofensivo e defensivo de *rookies* (iniciantes) e *sophomores* (jogador no segundo ano) na liga de basquete NBA, com o objectivo de avaliar se um segundo ano de experiência na liga é resultando em rendimentos mais elevados. A hipótese era encontrar maiores desempenhos ofensivos e defensivos no segundo ano em comparação com os iniciantes. As estatísticas ofensivas e defensivas de *rookies* e *sophomor*es para temporadas 2014/2015 e 2015/2016 foram obtidas e filtrada no site da NBA, para um total de 144 jogadores analisados. Uma análise multivariada de covariância (MANCOVA) foi realizada. Índices ofensivos e defensivos foram usados como variáveis dependentes. O nível de experiência (*Rookie* vs *Sophomore*) foi usado como uma variável independente. O número médio de minutos por cada jogador foram considerados como uma co-variável. Ao contrário da expectativa, embora ambos os rácios ofensivas e defensivas apresentaram valores ligeiramente mais elevados no segundo ano em comparação com jogadores de primeiro ano, as diferenças não foram estatisticamente significativas. Estes resultados sugerem que um ano extra de experiência na liga não é suficiente para aumentar significativamente o desempenho dos jogadores no seu caminho de *rookies* para *sophomores*. Os resultados podem sugerir que o caminho para a excelência começou a ser percorrido, embora ainda insuficientes duas temporadas na liga de mostrar diferenças significativas no desempenho desses jogadores ainda novatos.
Palavras-chave: análise de desempenho, especialistas, novatos, habilidade, esporte

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Introduction

A rookie is a player of a sports team in their first full season. A sophomore is a second-year player. These terms of Anglo-Saxon origin are used to denominate first- and second-year players in the NBA basketball league. This classification of players is used, for example, for selecting standout first- and second-year players for the Rising Stars Challenge by the NBA's assistant coaches as part of the All-Star Weekend. Furthermore, the rookies and sophomores classification is considered in shaping the statistics of the game alongside veteran players in terms of level of experience in the league. In this regard, NBA sophomores, with a full year of experience under the belt with respect to their rookie year (i.e. one season of training and competition experience), are expected to experience a jump in their overall effectiveness between their first and second seasons in the league (Bohl, 2015).

Differences in performance between experts and novices have been studied in different contexts and situations (e.g. music, chess, typing, medical diagnosis, teaching), with experts typically demonstrating superior short-term and long-term memory, more rapid access to relevant memory, more elaborate conceptual schemes, increased sensitivity to patterns and structures, less effort and greater fluidity of action, and greater use of inferences and abstractions when compared with novices (Smith, 2007). The literature speaks of a development of expertise characterised by a progressive change in the representation of knowledge, from declarative to procedural cognitive interpretation, since experts know both *what* to do and *how* to do it (Charness, 1989; Charnes, Krampe, & Mayr, 1996; both in chess research). Research focusing on expertise and expert performance in sport has considered different approaches and methodological strategies in order to identify the factors, besides the strictly physical or physiological, that are more directly involved in the acquisition of expertise in sports (Ruiz-Pérez, 1999). In particular, previous research has studied the factors that constrain human achievement in sport and the extent to which these may be overcome by systematic engagement in training and practice (Williams & Ford, 2008).

Performance analysis in team sports aims to provide reliable performance indicators –both at the individual and the collective level– that can help coaches to better understand how their athletes and teams can improve performance and, thereby, adapt their coaching intervention. A performance indicator is defined as the selection or combination of variables that aims to define some or all aspects of performance, which to be useful should relate to successful outcome (Hughes & Bartlett, 2002). When these aspects are studied during a team sports competition we are referring to match analysis as a specific area within sport performance analysis (Carling, Williams, & Reilly, 2005), in which several aspects of performance can be brought into analysis: tactics, strategy, mechanical aspects of technique, physical aspects, coach behaviour, and/or referee behaviour (McGarry, O'Donoghue, & Sampaio, 2013). In this regard, the analysis of the game-related statistics can be useful for analysing player's and team's performance in different sports. Previous research in basketball aimed to identify the game-related statistics (e.g. fouls, free throws, offensive rebounds, turnovers, assists, steals, etc.) that discriminate between winning and losing teams in different contexts by using the variables' averages during the 40-minute game (Sampaio, Ibáñez, & Lorenzo, 2013). In particular, the offensive and defensive rating statistics are helpful to understand the performance of a player or team.

Within this context, the purpose of this study was to analyse and compare the offensive and defensive performance of rookies and sophomores in the NBA basketball league, in order to ascertain whether a second year of experience in the league results in higher performances as theoretically expected. In this sense, we hypothesised to find overall higher offensive and defensive performances in second-year players (i.e. sophomores) when compared to first-year players (i.e. rookies).

Method

Offensive and defensive rating statistics were downloaded from the stats section of the NBA official web portal (stats.nba.com). Data were filtered by level of experience: rookies (firs-year players) vs. sophomores (second-year players). In order to compare these ratings between first- and second-year players, the rookie's data were downloaded for season 2014/2015 and the sophomore's statistics were downloaded for season 2015/2016, for a total of 144 players under analysis (n=81 rookies and n=63 sophomores; the difference is explained by players coming out of the league, for example, going to Europe). For a player, the 'Offensive Rating' is the number of points per 100 possessions that the team scores while that individual player is on the court. Conversely, the 'Defensive Rating' is the number of points per 100 possessions that the team allows while that individual player is on the court. In a first step of the analysis, descriptive data (mean ± standard deviation) were computed. In a second step, with the aim of identifying possible differences between rookies' and sophomores' performance, a multivariate analysis of covariance (MANCOVA) was computed. 'Offensive Rating' and 'Defensive Rating' were used as dependent variables; 'Level of Experience' (rookie vs. sophomore) was used as independent variable. Since the offensive and defensive ratings may change with the level of participations of the players in the games, the average number of minutes played by each player during the league was considered as a covariate. The significant level was set to $P \leq 0.05$. Statistical analyses were performed using

the statistical software package SPSS 21.0 (IBM Corp., Armonk, NY, USA).

Results

The offensive and defensive ratings of rookies and sophomores are presented in Table 1. Descriptive statistics showed higher offensive and defensive ratings for sophomores when compared to rookies. However, the results of the subsequent MANCOVA did not support a significant multivariate effect for the level of experience of the players (Wilks Lambda=0.992, $F_{2,140}$=0.592, P=0.555) or a covariate effect of minutes played (Wilks Lambda=0.995, $F_{2,140}$=0.376, P=0.687).

Table 1. Offensive and defensive ratings of rookies and sophomores (mean and standard deviations (SD)).

	Experience	Mean	SD
Offensive rating	Rookie	98,95	13,93
	Sophomore	100,53	5,64
Deffensive rating	Rookie	105,32	16,41
	Sophomore	106,44	10,61

Discussion

The purpose of this study was to compare the offensive and defensive performance between rookies and sophomores in the NBA basketball league, expecting to find higher figures within these performances indicators in second-year players (i.e. sophomores). Contrary to what was hypothesised, although both offensive and defensive ratings showed slightly higher values for second-year players when compared to first-year players, the differences were not statistically significant.

Previous research has examined the differences in perceptual-cognitive expertise across different skill levels (Williams, 2009) and different sports (e.g. Kioumourtzoglou, Kourtessis, Michalopoulou, & Derri, 1998, in basketball, volleyball and waterpolo). The perceptual-cognitive skills are catalogued within four main areas orientated to acquiring the ability to make decisions and anticipate future demands in game situations: (i) identifying familiarity in sporting action, (ii) knowledge of situational probabilities, (iii) picking up advance information (advance cue utilization), and (iv) use of the visual system (Causer & Williams, 2012, 2013). The acquisition of these skills has been designated under the term 'game intelligence' (Stratton, Reilly, Richardson, & Williams, 2004). The aforementioned perceptual-cognitive skills can be trained (i.e. practice) and improved upon different methods for enhancing anticipation and decision making in order to improve performance (Causer & Williams, 2013). Furthermore, the relationship between play (i.e. games) and skill development has also been highlighted (Côté, Baker, & Abernethy, 2007). Hence, the level of skill expertise increases as athletes increase their experience and accumulate training and playing time in a chosen discipline (Ericsson, 2003; Hodges, Starkes, & Macmahon, 2006).

In particular, the possibility that novices ignore the possible indicators of the evolution of the situation of play has been highlighted as the factor that might explain why novices tend to ignore several parameters that are useless for dealing adequately with the configuration of play (Gréhaigne & Godbout, 2013). In this regard, the theory of affordances –possibilities for action in a particular performer-environment setting (Gibson, 1979)– has been used to explain the dual interdependence of perception and action when comparing expert and novice performance, where affordances are the primary objects of perception and actions is the realisation of affordances (Aráujo, Davids, & Passos, 2013). In basketball, Trninić, Dizdar and Luksić (2002) found that winning teams' performances were discriminated by a higher number of defensive rebounds and suggested that less experienced players performed worst in this action of the game, allowing their opponents to capture more offensive rebounds. Several published studies used the notion of perceptual attunement to explain the differences in performance between experts and novices in different situations (Jacobs, Runeson, & Michaels, 2001; Smith, Flach, Dittman, & Stanard, 2001), highlighting the fact that novices focus on variables that do not denote the essentials of the situation leading to a worse decision-making compared with more experienced players. In the same line, and following an ecological approach, expertise effects on decision-making in sailing were studied by Araújo, Davids and Serpa (2005) through interactive computer simulations. The authors concluded that the better the sailor, the better was performance on the simulated regatta. The results showed that the expertise level was significantly predicted by the total time of the simulated regatta, in which non-sailors performed significantly more actions than sailors during almost all the regatta.

From a motor performance point of view, previous research demonstrated more stable movement patterns in expert players when compared to less-experienced players in (e.g. Schorer, Baker, Fath, & Jaitner, 2007, in handball), as well as when elite players are compared to amateurs (e.g. Granados, Izquierdo, Ibáñez, Bonnabau, & Gorostiaga, 2007, in handball). It is also worth highlighting previous research analysing the possible differences between expert and novice athletes in terms of self-determined motivation and emotional intelligence, in particular in basketball (Saeis, Arribas-Galarrag, Cecchini, Luis-De-Cos, & Otaegi, 2014). Additionally, given the multitude of approaches outlined in the literature, some researchers suggest the need to study the field of expertise and expert performance in sport from a multitasking and integrated approach in which the interaction

between the different variables and approaches is considered (Tenenbaum, 2003; Saenz, Ibánez, Giménez, Sierra, & Sánchez, 2005).

Overall, the results of the present study suggest that one more year of experience in the league is not sufficient to significantly increase the performance of the players on their way from rookies to sophomores, hence not contributing to the initially expected significant improvement in the management of the game situation, at least in terms of statistical offensive and defensive effectiveness. In this sense, the acquisition of expert performance in sports and games has been described as a road to excellence during a prolonged period of experience (Richman, Gobet, Staszewski, & Simon, 1996). Hence, the results might suggest that the road to excellence has begun to be travelled, with two seasons in the league still being insufficient to show significant differences in the overall performance of these yet novice players.

Practical applications

The results obtained in this study may be of interest to coaches and staff members (technicians, physical coaches, psychologists) of the NBA basketball teams. A more specific study of the parameters that may influence player's performance and overall effectiveness between their first and second seasons in the league by the technicians of the teams could help in building training and tutelage programs that could assist the performance of future rookies on their way from rookies to sophomores. Adapting this type of study to other basketball leagues as well as incorporating more game-related statistics that might discriminate between rookies and sophomores is potential work for the future, Furthermore, future research could focus on comparing the performance evolution of rookies and sophomores in their transition to become veteran players and contrast them with the present results.

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