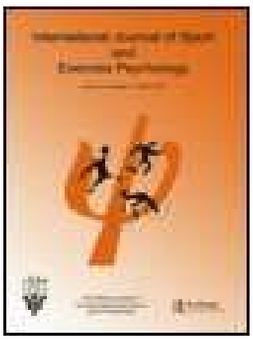

Routledge
Taylor & Francis Group

International Journal of Sport and Exercise Psychology

ISSN: 1612-197X (Print) 1557-251X (Online) Journal homepage: http://www.tandfonline.com/loi/rijs20

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To cite this article: Eder Gonçalves, Franco Noce, Márcio Assis Marques Barbosa, António José Figueiredo, Dieter Hackfort & Israel Teoldo (2017): Correlation of the peripheral perception with the maturation and the effect of the peripheral perception on the tactical behaviour of soccer players, International Journal of Sport and Exercise Psychology, DOI: 10.1080/1612197X.2017.1329222

To link to this article: http://dx.doi.org/10.1080/1612197X.2017.1329222

International Journal of Sport and Exercise Psychology, 2017
https://doi.org/10.1080/1612197X.2017.1329222

Correlation of the peripheral perception with the maturation and the effect of the peripheral perception on the tactical behaviour of soccer players

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(*Received 23 May 2015; accepted 4 May 2017*)

The purpose of this study was to (1) verify the correlation between maturation and peripheral perception and (2) to analyse the effect of peripheral perception on the efficiency of tactical behaviour in young soccer players. Fifty-four (U-11, U-13 and U-15) young male soccer players participated in the study. The maturation was evaluated by the Khamis-Roche method, the peripheral perception by a computer-based test in the Mental Test and Training System, and the efficiency of the tactical behaviour by the System of Tactical Assessment in Soccer. Descriptive analysis, Kolmogorov-Smirnov, Spearman bivariate correlation, and multivariate analysis of variance tests were performed. The significance level adopted was $p < .05$. Correlations have been observed between the percentage of predicted adult height and the performance in peripheral perception. It was also detected that the peripheral perception has an effect on the efficiency of the tactical behaviour in young players. It has been concluded that the maturation of an individual has an association with the peripheral perception, and that it can make players more efficient to perceive the environment and in the execution of fundamental tactical principles of the soccer game.

Keywords: soccer; tactical behaviour; peripheral perception; maturation

Introduction

The soccer game is considered as essentially tactical and the success of a team in a soccer match depends on the players' organisation skills in the offensive and defensive areas (Duprat & Caty, 2008; Garganta, 1997). In addition to the necessity to manage the action space of the game, the visual perception has drawn the attention of researches who aim to contribute to the training process of soccer players (Williams, 2000). The visual perception is conceptualised as a set of perceptual-cognitive processes through which an individual is able to capture, recognise, organise and understand information derived from the environment (Sternberg, 2013a).

The visual perception includes the central and peripheral perceptions (Ando, Kida, & Oda, 2001). The peripheral perception is characterised by less spatial resolution, low perception of colours and higher sensibility to light and movement (Bear, Connors, & Paradiso, 2008). It is assumed that the individual is able to quickly respond to peripheral stimulus, and ignore the

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irrelevant ones (Williams & Davids, 1998). Finally, players interact with the environment, thus not only being influenced by it. Therefore, they learn to retrieve information and provide answers through constant interaction with the environment (Tenenbaum, Basevitch, Gershgoren, & Filho, 2013).

To make perception efficient it is necessary to manage appropriate levels of selective attention, which is defined as the ability to choose one stimulus and ignore others (Sternberg, 2013b). The efficiency of this attention process in soccer will enable the player to perceive the actions of his teammates and opponents, while keeping track of the ball (Abernethy, 1987; Garganta, Guilherme, Barreira, Brito, & Rebelo, 2013; Gréhaigne, 1992).

Besides visual perception, the analysis of maturation has also been considered to be relevant for a sufficient understanding of the performance of youth soccer players (Figueiredo, Gonçalves, Silva, & Malina, 2009). This is due to a possible imbalance between the chronological and biological age during the first years in the human development (Baxter-Jones, Eisenmann, & Sherar, 2005). Players who show an advanced state in their maturational process with obvious differences in functional skills do have advantages as they are given more opportunities of training and competition (Figueiredo et al., 2009; Malina et al., 2010). Maturation can be understood as a biological phenomenon, related to the development of an individual through time (Malina, Bouchard, & Bar-Or, 2004).

Ward and Williams (2003) analysed the relation of age and time of experience with the visual perception of soccer players. In addition to cognitive abilities and variables related to visual acuity, this study also assessed the peripheral perception of players. Results show differences of reactions by players in the age group of U-9 and U-13. Moreover, it was observed that U-11 and U-13 players answered to peripheral stimuli quicker than their less experienced fellows.

More recently, Vänttinen, Blomqvist, Luhtanen, and Häkkinen (2010) analysed the effect of maturation on the peripheral perception, the reaction time to peripheral visual stimulus and the eye-hand-feet coordination. In order to analyse the maturation, these authors assessed the level of testosterone in the blood of children who practiced soccer and children who did not (n = 245). The results indicate that the reaction time as well as the peripheral perception and motor skills undergo a developmental process during adolescence.

Although some studies have shown progress in this area, there is no study up to date that has addressed a relation between perceptual-cognitive, tactical and maturation. Particularly in Brazil, there is still a lack of investigations on the perceptual-cognitive, tactical and maturational aspects of young players, despite there already is a relatively broad scope of knowledge from exercise physiology to be used in soccer. However, it is necessary to develop a knowledge base that provides coaches and directors with specific parameters, which are essential in the decision-making process (Baker, Horton, Robertson-Wilson, & Wall, 2003).

Accordingly, we highlight the importance of assessing soccer players, through the control of the highest possible number of variables. Laboratory analysis may provide important indications and is not different from players' and game's assessment methods currently employed (Ripoll, 2009). In addition, it is necessary to point out the importance of internal reliability of the instruments selected for the assessment of players in soccer, or in any other sport.

It is hypothesised that the maturational aspects are related to the development of the peripheral perception system. In addition, it is assumed that peripheral perception will constrain the way soccer players perform the management of the playing space during their development process. Thus, the aims of this study are twofold: to clarify whether there is an association between maturation and peripheral perception (first experiment) and to analyse the potential effect of peripheral perception on the efficiency of tactical behaviour in soccer players (second experiment).

Experiment 1

Analysing players' visual behaviour based on their age may be inefficient due to the unbalance between chronological and biological ages (Baxter-Jones et al., 2005). Therefore, the purpose of this experiment is to verify whether there is a correlation between maturation and the peripheral visual perception of soccer players.

Method

Participants

The sample comprised 54 (U-11 (n = 18; 9.86 ± .23 years), U-13 (n = 18; 12.87 ± .21 years) and U-15 (n = 18; 14.89 ± .25 years)) male soccer players. All players are affiliated to the Rio de Janeiro Soccer Federation in Brazil and to the Brazilian Soccer Confederation. Informed consent was obtained in accordance with the Scientific Committee of the Universidade Federal de Viçosa and the Declaration of Helsinki.

Measurements and procedures

Maturation

The Khamis-Roche (1994) method was utilised to characterise the level of maturation of individuals. This method informs about the status of maturational process in percentage. The following measures are used: decimal age (DA) (in years), weight (kg), height (cm) and the average parents' height (APH = father's height + mother's height / 2).

The individuals' birthdates (BDs) were collected through the questionnaire of sample characterisation. In order to obtain the players' DA, the following calculation was performed using the date of the evaluation of the anthropometric measures (AMs) and the BD of each individual (BD = (AM–DA)/365).

A Sanny® stadiometer fixed to the wall and a Filizola® analogic scale was used to measure the height and weight (anthropometric data needed to assess the maturation with the Khamis-Roche method (1994)). The parents' height was reported.

Peripheral perception

The peripheral perception test operated with the Vienna Test System (VTS by Schuhfried; see, e.g. Schuhfried, Prieler, & Bauer, 2006) and also a tool in the Mental Test and Training System (MTTS sensu Hackfort; see Hackfort, Kilgallen, & Hao, 2009) was used to assess peripheral perception. The MTTS is a tool developed to objectively assess and provide an opportunity and approach to train mental aspects, cognitive processes or functioning, general and specific aptitudes, attitudes, and interests, and influence or shape the development of personality factors.

The peripheral perception test is part of the system and a tool to test and assess the perception and processing of peripheral visual information skills in individuals. The provided measures are: visual field (degrees), tracking deviation (s), amount of omitted reactions and reaction time to peripheral stimulus (s). It is worth mentioning that the measure of tracking deviation is related to the individuals' capacity of selective attention (Schuhfried et al., 2006).

In the peripheral perception test, participant performs a task, which consists in tracking an object while luminous LEDs are presented on the peripheral perception panels attached to the MTTS. When a complete vertical LED line appears on the panel, the subject must respond pressing a pedal as fast as possible (https://www.schuhfried.com/test/PP-R). The test has duration of 15 minutes (Figure 1).

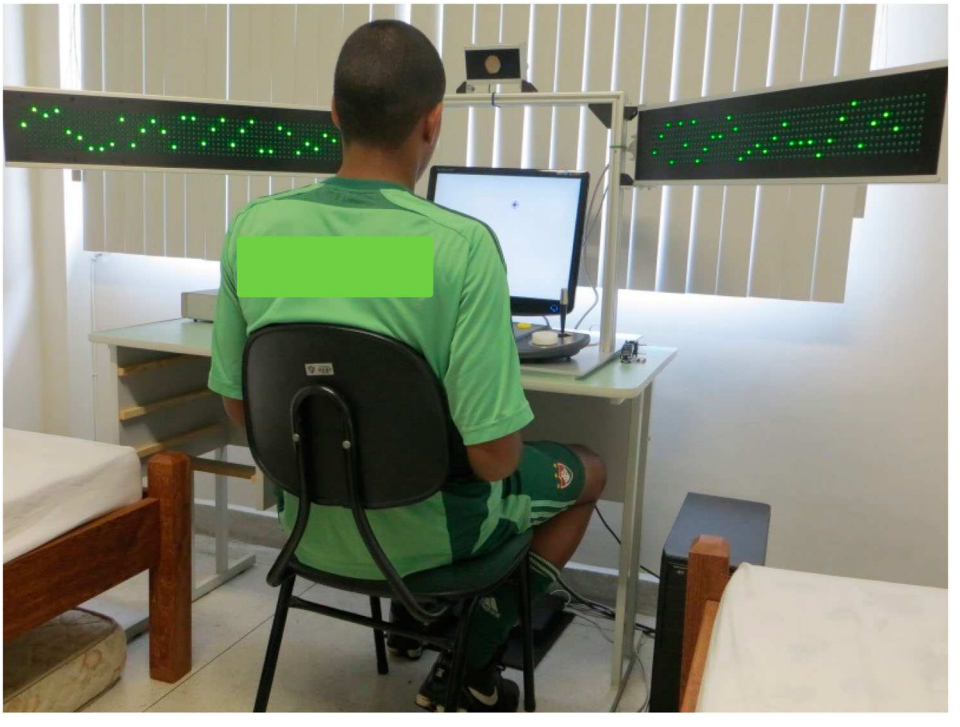

Figure 1. Peripheral Perception Test.

Statistical analysis

Descriptive analysis (including means, standard deviation, maximum and minimum values) was performed in order to verify aspects related to the sample. The Kolmogorov-Smirnov test was performed to verify data distribution. As it was observed that the data distribution was not normal, the bivariate Spearman correlation test was used to verify the existence of correlation between the percentage of predicted adult height and peripheral perception.

The proposal from Morrow, Jackson, Disch, and Mood (2005) was used to classify the found correlations, and to explicit their strength. In this proposal, correlations are classified as positive ($r > 0$), negative ($r < 0$), or perfect positive ($r = 1$) and perfect negative ($r = -1$). Strengths are classified as follows: (i) very low (<.20); (ii) low (from .20 to.39); (iii) moderate (from .40 to .59); (iv) high (from .60 to .79); and (v) very high (from .80 to 1.00).

All statistical procedures adopted the significance level of $p < .05$ and were performed through SPSS (Statistical Package for the Social Sciences) for Windows®, version 20.0.

Results

The result of bivariate Spearman correlation between the percentage of predicted adult height (%PAH) and the participants' peripheral perception, is presented in Table 1. A high and positive correlation can be observed between the %PAH and players' visual field ($r = .784$; $p < .001$). A moderate and negative correlation is also observed between the %PAH and the tracking deviation ($r = -.516$; $p < .001$) as well as between the %PAH and the reaction time to peripheral visual stimuli ($r = -.523$; $p < .001$).

Table 1. Descriptive statistics and bivariate Spearman correlation between the percentage of Predicted Adult Height (%PAH) and measures of peripheral perception test.

	Sample (n = 54)					
	M	SD	1	2	3	4
1. % PAH	87.77	7.98	–			
2. Visual field (degree)	180.33	13.53	.784**	–		
3. Tracking deviation (s)	9.87	2.36	−.516**	−.344*	–	
4. Reaction time (s)	.74	.10	−.523**	−.548**	.402**	–
5. Amount of omitted reactions	9.92	5.29	−.098	−.264	.050	.346*

Note: (% PAH) = percentage of predicted adult height;(*)$p < .05$;(**)$p < .01$.

When analysing age categories separately, it is observed that correlations are only maintained for the measures of visual field (r = .825; $p < .001$) and the reaction time to peripheral visual stimulus (r = −.496; p = .036) in the U-13 age level.

Discussion

The purpose of this experiment was to verify whether there is a correlation between maturation and peripheral visual perception in soccer players. Results reveal improvement in the peripheral perception as players undergo their maturational process. Moderated to high correlations were found between maturation and nearly all measures of peripheral perception (visual field, tracking deviation and reaction time). This observation evidences that growth in height gives the player a wider visual field, better selective attention as well as better reaction time to peripheral stimulus.

These results confirm what is reported in the relevant literature despite being limited with respect to this specific topic, especially with associations between biological maturation and most of the perceptual-cognitive skills in young players (Vänttinen et al., 2010). This can be understood as soccer players show greater body size when compared to young individuals of the same age who are only participating to scholar physical education classes (Seabra, Maia, & Garganta, 2001). Accordingly, a greater body size can be presupposed for players who are more advanced in their maturation process, and probably, who would have practiced the modality for a longer period of time.

This superior body development also implies a larger skull size, suggesting a wider visual field due to a greater distance between the nose and the centre of the eyes (Sternberg, 2013b). This might be an explanation for the findings of this study in relation to the size of the visual field of players with higher maturation levels.

Similarly, there are improvements in attention skills and reaction time to peripheral stimulus. However, a higher maturational level implies a seemingly necessary knowledge base to perceive relevant stimuli presented in the game while scanning the environment (Vänttinen et al., 2010; Williams & Davids, 1998).

Experiment 2

During training sessions and competitions, soccer players have to face the inherent complexity of the game, which demands abilities to perceive, select and interpret the various signals and stimuli presented during the game (Gréhaigne, Godbout, & Bouthier, 1999). Players still need to move efficiently to perform the tactical principles and solve the tactical problems presented during game.

In a study by Lemmink, Dijkstra, and Visscher (2005), it was possible to observe that the decrease of visual field has a negative influence on sprints performed by soccer players. Keeping in mind the influence of the reduction of the visual field on the individuals' movement capacity, this experiment aims to analyse the effect that peripheral perception has on the efficiency of tactical behaviour of soccer players.

Method

Participants

The players who participated in this experiment were the same from Experiment 1. However, the sample for this experiment was the tactical actions performed by these players, as well as the data collected through the Mental Test and Training System.

Measurements and procedures

Peripheral perception

The instrument and procedures used to collect the data referring to the peripheral perception of the assessed subjects are the same as in Experiment 1.

Efficiency of tactical behaviour

The System of Tactical Assessment in Soccer (FUT-SAT) (Teoldo, Garganta, Greco, Mesquita, & Maia, 2011) was used to collect data regarding the efficiency of tactical behaviour. This system of assessment takes in consideration the frequency of execution of (offensive or defensive) tactical principles and their success rate, to characterise the efficiency of tactical behaviour. FUT-SAT is based on 10 core tactical principles of the soccer game, which are, in the offensive phase: penetration, offensive coverage, depth mobility, width and length and offensive unity; and for the defensive phase: delay, defensive coverage, balance, concentration and defensive unity (Teoldo, Garganta, Greco, & Mesquita, 2009a). A field test in small-sized game format was designed for FUT-SAT: the game is played in a field of 36 m per 27 m with the "GK + 3 vs. 3 + GK" arrangement (goalkeeper + 3 players vs. 3 players + goalkeeper), during four minutes. Figure 2 shows the physical representation of the aforementioned test.

The test was chosen because its numerical arrangement ensures the occurrence of all tactical principles inherent to formal game (Garganta, 2002). In addition, the playing time of four minutes is sufficient for all players to perform the actions regarding all the tactical principles which are assessed by the instrument (Teoldo, Garganta, Greco, & Mesquita, 2009b).

Players were oriented to play according to the rules of soccer, except for the offside rule. Players used coloured vests identified with different numbers to facilitate their identification during video analyses. Players were provided with 30 seconds for familiarisation with the task prior to the start of the test.

After obtaining video footage the procedure consisted of observing and analysing the actions performed by the players during the game. According to Teoldo and colleagues (2011), the observation and analysis units are based on the possession of the ball, which is achieved when a player fulfils one of the following conditions: performs at least three consecutive contacts with the ball, performs a positive pass to a teammate (allowing to keep possession of the ball), or shoots at goal (Garganta, 1997). The three steps for the analysis of the game with FUT-SAT comprise: (i) the analysis of the actions performed by the player during the game (ii) the assessment, classification and recording of tactical actions (iii) the calculation of the variables in the categories Tactical

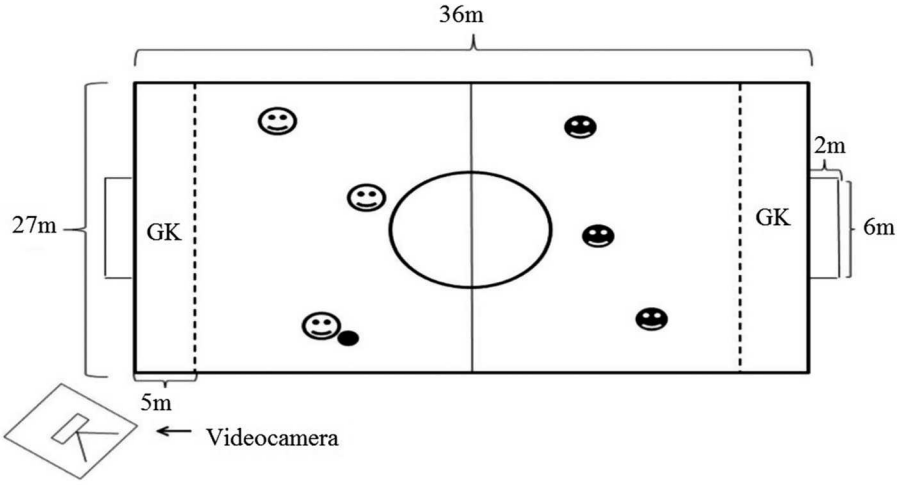

Figure 2. Representation of the physical structure of the "GK + 3 vs. 3 + GK Test".

Performance Index, Tactical Actions, Percentage of Errors and Place of Action Related to the Principle (Teoldo et al., 2011).

Video analyses were performed by trained evaluators, who underwent a training process regarding the procedures and methods of analysis with FUT-SAT. So that they are allowed to perform the analysis, the evaluators are subjected to a reliability analysis with another trained evaluator.

Statistical analysis

Descriptive analysis (including absolute and relative frequency, means and standard deviation) was performed to obtain information about various aspects of the sample. The Kolmogorov–Smirnov test was used to verify data distribution.

In order to perform the analyses, the sample was split considering the median values of the four measures of peripheral perception test (visual field, tracking deviation, reaction time to peripheral stimulus and amount of omitted reactions). Therefore, two groups were created: group 1 (low performance) and group 2 (high performance) that was compared on the three dependent variables (offensive phase, defensive phase and game). Since there are three dependent variables and four comparison groups, a multivariate analysis of variance, multivariate analysis of variance (MANOVA) test, with Bonferroni adjustment for multiple comparisons was used to avoid the occurrence of type I error. This analysis is indicated when one has a set of dependent variables (O'Donoghue, 2012). In this sense, it is possible to obtain the results from a single inferential test.

The test–retest design was used to verify the reliability of the analyses performed by the evaluators. The sessions to determine the reliability were performed respecting a three weeks interval, in order to avoid task familiarity issues. The coefficient of reliability was calculated through Cohen's Kappa test (Robinson & O'Donoghue, 2007). A total of 1968 tactical actions were reassessed: 521 were performed by U-11, 785 by U-13 and 662 by U-15 players (Tabachnick & Fidell, 2012). Reliability values are shown in Table 2.

All the statistical procedures adopted the significance level of $p < .05$ and were performed on SPSS (Statistical Package for the Social Sciences) for Windows®, version 20.0.

Table 2. Values of reliability intra and inter-evaluaters.

	U-11		U-13		U-15	
	Minimum (SE)	Maximum (SE)	Minimum (SE)	Maximum (SE)	Minimum (SE)	Maximum (SE)
Intra-observers	.833 (.017)	.946 (.011)	.921 (.010)	.997 (.002)	.901 (.012)	.996 (.003)
Inter-observers	.862 (.017)	.941 (.012)	.847 (.013)	.989 (.004)	.887 (.013)	.956 (.009)

Note: (SE) = standard error.

Results

The results referring to the comparison of the groups of low and high performance in the test of peripheral performance are presented in Table 3. MANOVA test revealed that amount of omitted reactions had a statistically significant influence on the efficiency of defensive tactical behaviour ($F(1,38) = 12.508$; $p = .001$; $\eta^2 = .248$) and on the efficiency of the game tactical behaviour ($F(1,38) = 10.697$; $p = .002$; $\eta^2 = .220$) variables. MANOVA test also indicated a significant difference in the efficiency of offensive tactical behaviour between the low and high visual field groups ($F(1,38) = 7.514$; $p = .009$; $\eta^2 = .165$). Finally, there was no significant influence of reaction time and tracking deviation on the three dependent variables.

Discussion

This experiment intended to analyse the effect of peripheral perception on the efficiency of tactical behaviour of youth soccer players. Findings indicate that the size of visual field has an influence on the efficiency of offensive behaviour, and the number of omitted reactions has an effect on the defensive and overall efficiency.

A limited visual field has an negative influence on soccer players' capacity to move rapidly (Lemmink et al., 2005). In addition, to efficiently perceive the environment and to have a

Table 3. Values of mean (M), standard deviation (SD) and of the comparison of the percentage of success rate in tactical actions between the groups of low and high performance in the test of peripheral perception (PP) of the MTTS.

Measure PP's test	Game phases	G1 ($n = 27$) $M \pm$ SD	G2 (n = 27) $M \pm$ SD	$F(1,38)$	p
Visual field (degree)	Offensive*	93.21 ± 3.91	95.45 ± 2.24	7.514	.009
	Defensive	79.84 ± 5.74	80.51 ± 6.39	.043	.836
	Game	86.52 ± 3.88	87.98 ± 3.79	1.795	.188
Tracking deviation (s)	Offensive	94.45 ± 2.86	94.21 ± 3.84	.163	.689
	Defensive	79.75 ± 6.41	80.60 ± 5.70	.116	.736
	Game	87.10 ± 3.89	87.41 ± 3.92	.009	.925
Reaction time (s)	Offensive	94.49 ± 2.99	94.17 ± 3.73	.066	.798
	Defensive	80.09 ± 6.72	80.25 ± 5.37	.102	.752
	Game	87.29 ± 3.73	87.21 ± 4.07	.020	.888
Amount of omitted reactions	Offensive	93.68 ± 3.51	95.14 ± 3.03	1.220	.276
	Defensive*	77.82 ± 5.42	83.11 ± 5.51	12.508	.001
	Game*	85.75 ± 3.42	89.13 ± 3.62	10.697	.002

Note: (*)$p < .01$, (G1) = group of low performance in the peripheral perception test; (G2) = group of high performance in the peripheral perception test.

sufficient knowledge to respond to tactical problems of the game, players need to deliver these responses rapidly in order to decrease the opponent's time of action (Garganta et al., 2013).

These findings show that players with narrower peripheral perception display more difficulties to efficiently perform their tactical behaviour. This is mainly due to the fact that a weak peripheral perception makes it harder for a player to perceive the necessary demands of the game, as for instance, the movement of opponents behind the defense's back or a through pass.

Moreover, soccer players need to develop their peripheral perception aiming, above all, to improve the accuracy of the identification of options for their decision-making. This is due to quick changes in perceptual-cognitive aspects that occur during the game, including the information (position of the ball, the teammates and the opponents) the players have to perceive, interpret and process before choosing the best decision to be made. This way, it is necessary to provide youth soccer players with a teaching-learning-training environment based on the development of intelligence and autonomy to solve such problems in the game, efficiently and rapidly (Dyson, Griffin, & Hastie, 2004). In other words, players should be involved in an environment where learning and teaching are materialised through practice, understanding that a complex process planned with the purpose to obtain improvement in the performance in a certain action field or keep it. Thus, inserting a player in such environment aiming at increasing the repertoire of technical-tactical options in order to make choices that favour the team without the trainer indication of which option could be more profitable (Silva & Greco, 2009).

General discussion

This study aimed to clarify the association between maturation and peripheral perception (Experiment 1) and analyse the effect that the peripheral perception exercises on the efficiency of tactical behaviour in soccer players (Experiment 2).

The results indicate that the maturation has a positive effect on peripheral perception, whereas significant improvements of that quality are observed as the player go through the maturational process. It is also observed that soccer players show significant improvements in the efficiency of their tactical behaviour as the peripheral perception increases.

These findings indicate that the associations between maturation and peripheral perception, as well as the effect of peripheral perception on tactical behaviour, are essential for the development of players. As the players undergo the process of maturation, they improve their proficiency of peripheral perception, which are the skills necessary to: (i) better identify the teammates in timely position to receive the ball; (ii) assertively predict the likely position of a teammate at a future time; (iii) better judge their expectations; (iv) determine the real importance of likely options; (v) search for new information without the need of the central vision and (vi) ensure that the most important contextual information is extracted from the visual system (Williams & Ericsson, 2005; Wilson, Vine, & Wood, 2009). This way, players efficiently succeed to perform their tactical behaviour in the game.

The findings within this study provide indications to soccer professionals with respect to the qualification and systematisation of players' development process in earlier stages. It is suggested that clubs consider the maturational process that each individual undergoes. This would prevent players' capacities that are still under development to be discarded when progressing to subsequent age levels.

The perceptual processes must be taken in consideration in the teaching-learning-training process, meaning that training sessions should be planned to make them respond to certain demands of the game (Garganta et al., 2013; Greco, 2009). Nevertheless, this learning process in the development of youth soccer players might be experienced in a training environment featuring game-specific contexts.

It was evident in this study that players should take part in appropriate session training in order to be able to appropriately use their visual search strategies, since the information obtained in peripheral areas of the visual field might influence this variable (Ryu, Abernethy, Mann, Poolton, & Gorman, 2013; Williams, Ward, Bell-Walker, & Ford, 2012). For instance, players that collect information of teammates and opponents outside of the central visual field might be more efficient in choosing the best option in the game (Ryu et al., 2013; Williams et al., 2012). Therefore, training will allow the player to use and improve his visual search strategies, to evaluate the best situations that emerge from the game, and make more adequate decisions. This also allows this player to display better performances in the game (Williams & Ericsson, 2005; Williams & Ward, 2007).

For practice, these results indicate the necessity to assess players' maturational level, and, consequently, to provide them with adequate training that will allow the development of their perceptual skills, in particular the peripheral perception. These activities should provide various stimuli, for instance in the amount of involved players, space of game, number of passes and time pressure (Bunker & Thorpe, 1986; Dyson et al., 2004; Kirk & MacPhail, 2002).

Furthermore, it is important that players undergoing sports development experience all tasks and positions envisaged by his team's model of game (Gréhaigne, Wallian, & Godbout, 2005). For instance, if a player spends his entire development process playing as a right- or left-back, it is likely that his ability to read the game becomes reduced. On the other hand, if a player, even if playing essentially a right- or left-back, training and playing as a midfielder, or even a centre-back, may increase his ability to the read the game.

In a study that analysed expert and non-expert players, Roca, Ford, McRobert, and Williams (2013) found that the central and peripheral visual search rate in game-related tasks are different as the distance between the player performing the task and the player in possession of the ball is changed. Therefore, during the training process, a drill deemed interesting to develop soccer players' peripheral perception involves the performance of tasks in different numerical settings (1 vs. 1, 3 vs. 3, etc.) and different distances (close and far from the player in possession).

In another recent study that resorted to the MTTS in order to assess some cognitive skills of youth players, Baláková, Boschek, and Skalíková (2015) did not find significant differences in performance for the peripheral perception test in both groups analysed. Findings in the abovementioned study are not in accordance to our findings. However, it should be taken into account that in the aforementioned study, in order to divide the groups for analysis, the authors resorted to a questionnaire, while in the present investigation, we conducted a field test, which assesses players' tactical behaviour and performance, in order to group the players according to their specific skills in the sport. Also according to Baláková and colleagues (2015), more studies with MTTS should be conducted. Therefore, the present study increases the body of knowledge regarding the relation between laboratory tests and tests that replicate actual sporting environments. Hence, it may be interesting that future research address the analysis of tactical behaviour and performance in actual game settings, so that performance can be assessed in a context in which players are involved in a competitive environment. Thus, the division of groups with high and low performance levels will be made according to the real demands of the sport.

In addition, psychological practices that allow the player to manage competitive stress and maintain the level of perceptual skills are highly recommended (Arnold & Sarkar, 2015). However, all training should be planned in advance and be consistent with the physical, cognitive and psychological level of each player (Collins & Cruickshank, 2015). This type of training requires the players to identify information in a complex environment, where they should mainly use their peripheral perception to search for information in order to make adequate decisions. It is important to emphasise that the whole planning and interventions towards the young players should take into consideration their age level.

Conclusion

The findings of this study indicate that peripheral perception and the efficiency of the tactical organisation are closely related. Therefore, it is concluded that the development of peripheral information processing skills might help soccer players to be more efficient in performing the core tactical principles of soccer, and, consequently, in their management of the space of game.

Acknowledgements

The authors also wish to acknowledge the contribution of Mr Rodrigo Santos for his English review of the manuscript.

Funding

This study was funded by the State Department of Tourism and Sport of Minas Gerais (SETES-MG) through the State Act of Incentive to Sports, by FAPEMIG, CAPES, CNPQ, FUNARBE, the Dean's Office for Graduate and Research Studies and the Centre of Life and Health Sciences from the Universidade Federal de Viçosa, Brazil. This work was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior.

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