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ORIGINAL

CONTEXTUAL INTELLIGENCE AND EXPERTISE IN SOCCER

INTELIGENCIA CONTEXTUAL Y PERICIA EN EL FÚTBOL

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ABSTRACT

Coaches consider that game intelligence is one of the main elements that can predict success in competition. The objective of this study was to analyze the perceptions that soccer players of different level of expertise had about their intelligence in the field. The Contextual Intelligence Questionnaire (ICD) was applied to a sample of spanish soccer players. This instrument evaluate three dimensions: Anticipatory intelligence, Tactical Intelligence and Competitive

Intelligence. Six hundred and ninety of spanish soccer players of different level of expertise, participated in this study. Results showed that this self-perception increased with the level of the players. This study confirmed the relevance of feeling able of solve tactical problems in the game, and how this feeling increase with the level of expertise.

KEY WORDS: Intelligence, Context, Expert Performance, Sport, Expertise

RESUMEN

Para los entrenadores la inteligencia en el juego es uno de los intangibles que predicen el éxito en la competición. De ahí que el objetivo de este estudio fuera analizar la percepción que jugadores de fútbol de diferente nivel de pericia tenían de su inteligencia para el juego. Se aplicó el Cuestionario de Inteligencia Contextual en el Deporte (ICD) que evalúa tres dimensiones: Inteligencia Anticipatoria, Inteligencia Táctica e Inteligencia Competitiva. En este estudio participaron 690 jugadores de fútbol de diferente nivel competitivo. Los resultados mostraron que a medida que aumentaba el nivel competitivo se incrementaba la percepción de los jugadores sobre su inteligencia contextual. Este estudio confirma el papel que para los jugadores posee el sentirse competentes para solucionar los problemas tácticos de su deporte y que este sentimiento aumenta con su nivel de competencia.

PALABRAS CLAVE: Inteligencia, Contexto, Rendimiento Experto, Deporte, Pericia.

INTRODUCTION

There is renewed interest in considering the intelligence linked to the context as an important and predicting single factor of success in the job (Drasgow, 2003). Furnham (2005) considers the existence of different intelligences such as analytical, embodied, creative, mathematical, emotional, etc., which have already been highlighted by authors such as Sternberg, Gardner, Salovey and Goleman. All of them refer to the ability to successfully perform in different contexts of action, and reflect the complexity of intelligence as a construct (Gardner, 1983, 1987, 1993, 2001; Goleman, 1996; Cherniss and Goleman, 2001; Goleman, 2006; Sternberg, 2000 or Terenzini, 1993).

For sport coaches, the players' intelligence refers to having discernment, character, anticipating the opponents' actions, reading the game situations, capturing the moves, domination of the context, or having vision of the game. They emphasize that what underlies an intelligent performance in team sports is the ability to understand the dynamics of the game, to understand the current demands of game situations, to know how to achieve success and learn what aspects are critical to achieving this goal. That is, a practical or contextual intelligence that allows athletes to succeed in sport (Sternberg et al., 2000).

It would be the intelligence of acting, of carrying out solutions, of the *know-how* and tacit knowledge (Wagner, 1987). It is expression of expertise and excellence, allowing the athlete to know when to take the initiative, to decide, to anticipate, to compete, to learn about their own strengths and weaknesses, to adapt, to learn and plan in a timely manner the most plausible response to demanding situations both in the psychological and the physiological way.

Previous studies (Ruiz, Graupera and Navarro, 1998; García, Ruiz and Graupera, 2009, García, 2009) showed how both, the contextual intelligence and the decisional competence increased throughout the process of developing expertise.

Despite the number of theoretical works, the shortage of experimental studies concerned with this cognitive dimension is manifested (De la Vega, Del Valle, Maldonado and Moreno, 2008; Elferink - Gemser, Visscher, Richard, and Lemmink, 2005). In other words, to what extent context intelligence relates to sport expertise? In the present study, we aimed to analyze the soccer players' self-perceptions about their competence to solve problems related to their performance context (Contextual Intelligence in Sport) in different competitive levels.

METHOD

Participants

Six hundred ninety football players ($M = 21.46$, $SD = 5.43$ age) from 46 clubs volunteered to participate in the study. The level of expertise was established based on the level of the team they played: Local (156), National (402) and International (132), including several Spanish National Teams. All of them were required to sign a consent inform by themselves or by their parents or tutors when athletes were under 18 years old. The acceptance was also required by their clubs.

Instrument

Perceived Contextual Intelligence in Sport Questionnaire (PCISQ)

This questionnaire was created and validated by Ruiz, García and Graupera (2008) and García (2009). The questionnaire consists on 24 items divided into 3 factors/scales: *Anticipatory Intelligence* (e.g., I can anticipate the actions of my opponents). This factor is related to the intuition, the signal capture or the prior oversight to the performance. *Tactic Intelligence* (e.g., I usually choose the appropriate technique for a certain competition moment). It refers to the competence to make the correct solutions in those situations the athlete encounters.

The last factor is the *Competitive Intelligence* (e.g., I react very fast to the changes that occur during the competition), which reflects the capacity of the athletes to put into action the plans established in the competition.

The assessment of the questionnaire is presented in a Likert Scale of 10 points ranging from 1 (strongly disagree) to 10 (strongly agree). The Global Score of the questionnaire shows the Perceived Contextual Intelligence in Sport Index (GSCI). This instrument proved to have psychometric qualities, which are necessary, if the aim is to use it in different contexts, including the research context. The reliability was .90 for Anticipatory Intelligence, .87 for Tactic Intelligence and .84 for the Competitive Intelligence (García, 2009; Romero, 2011).

RESULTS

Table 1 shows the descriptive values of the sample related to the three variables across the expertise levels.

Table 1. Descriptive summary from the Perceived Contextual Intelligence in Sport Questionnaire on the three participants groups

PCISQ Scales	Local (N=156)		National (N=402)		International (N=132)	
	Mean	SD	Mean	SD	Mean	SD
Anticipatory Intelligence	7,04	1,33	7,15	1,05	7,39	,88
Tactic Intelligence	6,86	1,43	6,92	1,09	7,22	,96
Competitive Intelligence	7,14	1,35	7,26	1,11	7,50	,97

We conducted an analysis of the variance including the years of experience and the age as covariables and the expertise level (three levels) as independent variable, given that both that both variables could contaminate the variance analysis. Substantial differences were found across the age ($\eta^2 = .10$) and also across the years of experience ($\eta^2 = .05$) and significant differences were found depending on the expertise level (Table 2).

Table 2. Univariate analysis of the age and years of experience depending on the expertise level.

Variable	Source	gl	F	p
Age	Inter-groups	2	19,30	.000
	Error	690		
Years of experience	Inter-groups	2	6,99	.001
	Error	690		

Albeit it was not an aim of the study, the reliability of the global scale as well as of the subscales were assessed. The results showed favorable and similar scores to those obtained by Garcia (2009) in her PhD dissertation (Table 3), which confirmed internal consistency of the instrument

Table 3. Reliability of the global scale and of the subscales.

	Ruiz <i>et al.</i> (2014) (n= 690) (Football, Futsal, Football 7)	García (2009) (n=1.253) (Volleyball, Football, Futsal, Handball, Basketball, Others)
Anticipatory Intelligence	.86	.90
Tactical Intelligence	.85	.87
Competitive Intelligence	.76	.87
Global Score	.93	.95

A Multivariate Analysis of Covariance was conducted to analyze the relationships between the different variables of the study and the level of expertise of the participants.

MANCOVA Results

The dependent variables in the Multivariate Analysis of Covariance were the three scales of the Contextual Intelligence: Anticipatory, Tactical and Competitive.

The independent variable (or inter – group factors) was the expertise´s level of the participants: local, national and international. The age and the years of experience were included as co-variables to control the effect of those aspects. Firstly, the multivariate contrasts were calculated. The age was the only co-variable that showed a significant relationship with the dependent variables taken together ($\eta^2 = .025$; $p < .001$). Then, the univariate contrasts were carried out, finding significantly differences depending on the age in the competitive intelligence ($p = .027$). The international athletes were those that obtained the highest scores. The multivariate contrast related to the effect of the expertise level in the whole dependent variables, showed that it was significant in two factors: Anticipatory Intelligence ($p = .038$), although a moderate effect ($\eta^2 = .010$) and Tactical Intelligence ($p = .015$; $\eta^2 = .012$).

The post hoc analysis using the Bonferroni method, showed that the differences in the Anticipatory Intelligence were found between Local and International level ($p = .023$), showing the latter the highest scores. Regarding the Tactical Intelligence the post hoc analysis revealed differences between the Local and International Level ($p = .029$) and also between the National and International Level ($p = .034$). This result shows that the Contextual Intelligence increase as a function of expertise level.

Global Contextual Intelligence and Expertise Level

We performed a covariance analysis to analyze the Global Contextual Intelligence as a function of participants' expertise level. This global scale was not included in the previously reported Multivariate Analysis because it was calculated based on the partial scales. As can be found in Table 4, the ANCOVA reported a significant effect of expertise level on GCI ($p < .016$), but with a moderate effect ($\eta^2 = .012$) (Table 4).

Table 4. ANCOVA contrasts: Contextual Intelligence differences depending on the expertise level.

Source	gl	F	P	η^2
<i>Covariables</i>				
Age	1	.719	.397	.001
Years of Experience	1	2.186	.149	.003
<i>Indeps. Vars.</i>				
Level of expertise	2	4.130	.016	.012

The reader can clearly appreciate the positive linear progression of the Global Contextual Intelligence score as the levels of expertise increase (Figure 1), obtaining the international football players higher values than national and local counterparts.

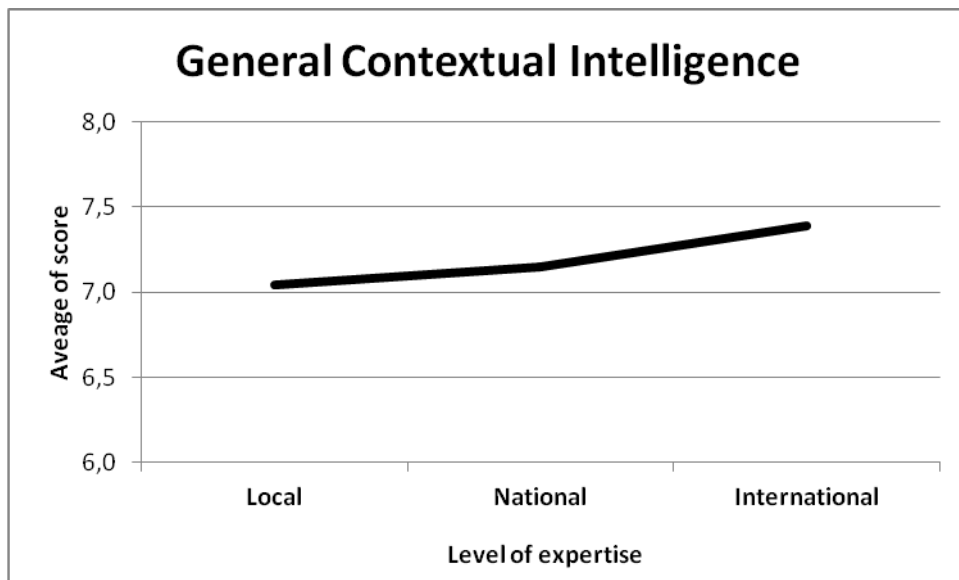


Figure 1. Global Contextual Intelligence depending of the level of expertise of the participants.

DISCUSSION

The present study started from the theoretical consideration that what underlies intelligent performance is the ability to know games dynamics, to understand the changing game context demands and to know how which critical elements

interact in the achievement of a certain goal (Ruiz, Sanchez, Duran and Jimenez, 2006). Theorists support the idea that is the Contextual Intelligence that is put into action when the person has to adapt to specific work environments characterized by dynamism and complexity, in order to obtain valuable personal goals (Cianciolo, Matthew Sternberg and Wargner, 2006 , Ruiz and Sanchez, 1997; Ruiz and Arruza, 2005).

The sport demands the ability to solve problems of different levels of complexity, in which high competence is basic in order to anticipate or plan the most appropriate and possible solution and carry it out (Elferink - Gemser, Visscher, Richard, and Lemmink, 2005). This fact claims an intelligence for this kind of problems, an intelligence linked to sporting context , and different from other intelligences more valued by academic environments (Shenk, 2011). An intelligence specialized in solving problems that, in a sport context, involves doing coordinated and precise movements in varied circumstances under psychological and environmental pressure.

This type of intelligence has always been in mind for those researchers of Football and Sports in general, as part of that set of intangibles of difficult concision, but whose presence is accepted. Vision or sense of game, are probably the best expressions to identify this intelligence that is mentioned (Fradua , 1997, Light, 2004; Wein, 1995, 2001, 2005).

The Sport Contextual Intelligence to which we refer is the one manifested in the intuitive action, in the quick decisions, immediate reading of situations, certain answers under pressure, advanced planning of what is happening and in the use of opportunities provided by the context or confusing the opponent. These different aspects are explored by the *PCISQ* Questionnaire used in this study and it divides this construct in three factors/dimensions: the responsible of anticipation or Anticipatory Intelligence; the responsible for specific solutions or Tactical Intelligence and the one involved in putting it into action or Competitive Intelligence. This conceptual structure represents the cycle of perception - decision – action, which characterizes the sport performance (De la Vega, Del Valle, Maldonado and Moreno, 2008b; Elferink – Gemser et al., 2005; McMorris, 1999).

It has been shown that there is a gradual trend of more and better self-perception in this intelligence when the players have a higher level of expertise, both in the different dimensions of Contextual Intelligence and the Global Scale, or, in other words, the players perceived themselves more competent as their level of expertise is higher. It cannot be forgotten that to reach the highest levels in football it has been necessary to have shown competencies that the questionnaire explores, or what is the same, not only they must possess enviable physical qualities, but also they must read and anticipate the intentions of their teammates and opponents, hiding one's intentions. They should be able to select the best tactical solution in situations of great pressure and in the minimum time and also put into action with the determination to have the opportunity to achieve its purpose. This means that they must have a competitive intelligence.

Studies about expert performance (Ruiz, Sanchez, Duran, and Jimenez, 2006) have shown how these competences progress after hundreds of hours of training and casual games, and thousands of hours of deliberate practice (Baker, Côté, and Abernethy, 2003). But also through training sessions in which players directly or indirectly develop and reinforce these self-perceptions, which affect and are influenced by other psychological dimensions of the player as the ability to face the problem (García, 2009; Graupera Ruiz Garcia and Smith, 2011; Romero, 2011). As Sternberg stated (1997) we are talking about a successful intelligence, the one all coaches seek to develop, the one scouts try to detect in younger players, and that players already trained, perceive as necessary to perform successfully in their sport.

It is, therefore, necessary to continue working on this dimension of the individual athlete, and suggest the question of up to which point it is possible to develop and reinforce this dimension during training, what kind of intervention, explicit or implicit, is more favorable or what type of practice reinforces more.

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