Positioning and deciding: key factors for talent development in soccer

R. Kannekens, M. T. Elferink-Gemser, C. Visscher

Center for Human Movement Sciences, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands

Corresponding author: Rianne Kannekens, Center for Human Movement Sciences, University Medical Center Groningen, Antonius Deusinglaan 1, 9713 AV Groningen, the Netherlands. Tel: +31 50 363 6231, Fax: +31 50 363 3150, E-mail: r.kannekens@med.umcg.nl

Accepted for publication 5 October 2009

Talent identification and development implicate recognizing youth players who will be successful in the future and guiding them to the top. A major determinant of this success is tactical skills. To identify possible key factors that help in predicting success over time, this study assesses the tactical skills of 105 elite youth soccer players who participated in a talent development program at an earlier stage of their sport career (mean age 17.8 ± 0.9). These skills were related to their adult performance level, specifically whether they became professionals (n = 52) or amateurs (n = 53). Defenders, midfielders and attackers completed the Tactical Skills Inventory for Sports with scales for declarative and procedural knowledge in either attacking or defensive situations. A logistic regression analysis was performed to identify the tactical skills that contribute to professional performance level in adulthood. Positioning and deciding appeared to be the tactical skill that best predicts adult performance level (P < 0.05). This is especially true for midfielders, with the correct classification of elite youth players in the range of 80%. For players scoring high on this skill, the odds ratios indicated a 6.60 times greater chance that a player became a professional than players scoring low (P < 0.05).

Positioning and deciding is a key factor in talent development in soccer. Millions of children play soccer worldwide; however, only a few may reach the top. The main goal in talent identification and development is to recognize youth players who will be successful in the future and help guide them to the top. However, the answer to the intriguing question as to which characteristics must be present at an early stage of a player’s sport career in order for them to become successful in the future is still largely unknown. To date, most research in the field of talent identification and development has focused on comparing successful youth players with their less successful counterparts on one or more performance characteristics during adolescence (Reilly et al., 2000; Williams & Reilly, 2000; Elferink-Gemser et al., 2004a; Vaeyens et al., 2007; Mohamed et al., 2009). There has been little effort in following the development of these players into adulthood. In order to gain a more comprehensive understanding of which factors most influence future success in sport, it is important to measure skill-related characteristics of talented players, not only during adolescence but also through any subsequent level of performance in adulthood. To achieve expertise, youth players must invest many hours of intensive training over at least 10 years (Ericsson, 1990; Ericsson et al., 1993; Helsen et al., 1998). By the time, soccer players are 17 or 18 years of age, they move up from youth competitions through adult competition, and in the subsequent years, it becomes apparent whether they actually reach the status of professional soccer players or not.

At the elite level, it appears that differences between players are less related to physical and physiological characteristics, and more to tactics, motivation and specific technical skills (Reilly et al., 2000; Elferink-Gemser et al., 2004a). Tactical expertise is a prerequisite for expert performance in sports (Janelle & Hillman, 2003), and studies on tactical skills underline that athletes at a higher performance level consistently outscore players at a lower performance level on these measurements (e.g., Helsen & Starkes, 1999; Reilly et al., 2000; Elferink-Gemser et al., 2007; Vaeyens et al., 2007; Kannekens et al., 2009b).

Tactical skills refer to the quality of an individual player to perform the right action at the right moment and must therefore be distinguished from strategy, which refers to choices discussed in advance with the trainer in order for the team to organize itself (Gréhaigne & Godbout, 1995). Unlike physiological-based predictors of high-level performance, tactical skills rely primarily on cognitive skills that are typically categorized as declarative (“knowing what to do”) or procedural knowledge (“doing it”) (e.g., Anderson, 1982; Thomas & Thomas, 1994; Turner & Martinek, 1999; McPherson & Kernodle,
Declarative knowledge has been defined as the knowledge of the rules and goals of the game (French & Thomas, 1987; McPherson, 1994; Williams & Davids, 1995), whereas procedural knowledge refers to the selection of an appropriate action within the context of game play (McPherson, 1994). These elements of tactical skills, particularly in invasion games such as soccer, can be further classified into “on-the-ball” and “off-the-ball” situations (Oslin et al., 1998). Furthermore, it is important to consider that different skills are necessary for the different positions on the field (e.g., defenders, midfielders, and attackers) and that each position has qualitatively different technical and tactical aspects associated with it (Grehaigne et al., 1999; Taylor et al., 2004). As such, players with certain specific skill sets are selected for certain positions to perform the specific tasks required of that position (Gil et al., 2007).

Thus, given the importance of tactical skills as a predictor of future success, this study assessed the tactical skills of elite youth soccer players at an early stage of their sport career and made a comparison between the players who reached professional performance level in adulthood and those who became amateurs.

Materials and method

Subjects

Participants were elite youth soccer players of Dutch premier league clubs who participated in their club’s talent development program. They competed, on average, in one match per week at the highest level of performance and belonged to the top 0.5% of all soccer players in their age group (Royal Netherlands Football Association; KNVB, 2008). Overall, the level of Dutch soccer is high, with the national team currently ranked in the third place in the FIFA world ranking (http://www.fifa.com). Data were collected in the period 2001–2008. Data from players who reached adulthood (21 years or older in 2009) were analyzed in this study, resulting in a final data set of 105 players (age range: 16–18 years; mean age: 17.81 ± 0.92 years). These players were divided into two groups based on their adult performance level. Amateurs (n = 53) are players who play for an amateur club (second-division national league or lower). Professionals (n = 52) are players who are playing either with a Premier league club or on the first team of the first division of the national league. The amateurs comprised of 22 defenders, 15 midfielders, and 16 attackers. The professional group was comprised of 19 defenders, 16 midfielders, and 17 attackers. Table 1 presents the general characteristics concerning age and sport practice.

Procedure

All players were informed of the procedures to be used in the study, following which they provided their informed consent. All of the soccer clubs and trainers also gave their permission for the study. All procedures were in accordance with the standards of the ethics committee of the University Medical Center, Groningen, and the University of Groningen.

Tactical Skills Inventory for Sports

The Tactical Skills Inventory for Sports (TACSIS; Elferink-Gemser et al., 2004b), with subscales of declarative and procedural knowledge, was used to assess the players’ tactical skills. The scales Knowing about ball actions (e.g., “I know exactly when to pass the ball to a teammate when not to”) and Knowing about others (e.g., “I know quickly how the opponent is playing”) contain four and five items, respectively, that were related to declarative knowledge. The scales Positioning and deciding (e.g., “My getting open and choosing positions is”) and Acting in changing situations (e.g., “My interception of the opponents is”) consisted of nine and four items, respectively, that gauged procedural knowledge. Questions in the scales Knowing about ball actions and Positioning and deciding concern attacking situations (i.e., situations in which the team possesses the ball), whereas questions in the scales Knowing about others and Acting in changing situations are related to defensive situations (i.e., situations in which the opposing team possesses the ball). When rating their soccer performance, the players were instructed to compare themselves with the top players in the same age category, scoring the items on a 6-point Likert scale, ranging from “Very poor” to “Excellent” or from “Almost never” to “Always.”

In a previous research with competitive youth field hockey and soccer players (mean age: 15.90 ± 1.60), the TACSIS was shown to have good psychometric characteristics with internal consistency coefficients (Cronbach’s $\alpha$) of all four subscales ranging from 0.72 to 0.89 (Elferink-Gemser et al., 2004b). The intraclass correlation coefficients (ICC) for repeated measures was 0.76 for Knowing about others and 0.88 and 0.82 for Positioning and deciding and Acting in changing situations, respectively. The scale Knowing about ball actions had an ICC of 0.87.

Table 1. General characteristics (means, SDs) of elite youth soccer players (N = 105) specified per performance level in adulthood and field position

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Defenders</th>
<th>Midfielders</th>
<th>Attackers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amateurs n = 53</td>
<td>Professionals n = 52</td>
<td>Amateurs n = 22</td>
<td>Professionals n = 15</td>
</tr>
<tr>
<td>Age (years)</td>
<td>17.72 (0.96)</td>
<td>17.89 (0.88)</td>
<td>17.80 (0.90)</td>
<td>17.95 (0.88)</td>
</tr>
<tr>
<td>Accumulated organized soccer experience (years)</td>
<td>10.90 (2.54)</td>
<td>11.71 (2.13)</td>
<td>11.14 (1.89)</td>
<td>11.95 (2.54)</td>
</tr>
<tr>
<td>Soccer practice (h/week)</td>
<td>9.58 (1.58)</td>
<td>11.24 (2.33)*</td>
<td>9.90 (1.89)</td>
<td>11.26 (1.93)*</td>
</tr>
<tr>
<td>Non-specific sport practice (h/week)</td>
<td>2.30 (2.11)</td>
<td>2.78 (3.80)</td>
<td>2.36 (2.33)</td>
<td>2.42 (2.16)</td>
</tr>
</tbody>
</table>

*Significant difference between amateur and professional performance level (P < 0.05).

Soccer practice includes soccer matches.
of 0.60 (Elferink-Gemser et al., 2004b). For detailed information about the development of the TACSIS, see Elferink-Gemser et al. (2004b). In the current study, the internal consistency of the four TACSIS scales indicates good internal consistency (Nunnally, 1978), with Cronbach’s α of 0.84 for Knowing about ball actions, 0.74 for Knowing about others, 0.88 for Positioning and deciding and 0.72 for Acting in changing situations.

Data analysis

A logistic regression analysis was performed using SPSS (version 16) to identify the tactical skills (i.e., the four TACSIS subscales) that contribute to the professional performance level of soccer in adulthood. The tactical variables were checked on linearity of the logits. If the logits were not linear, the variables were split into categories at a stationary point on the logit curve. To check the linearity of the logits, the predictor variables were divided into groups, creating dummy variables. Thereafter, a logistic regression analysis was performed, with the lowest group as a reference point. The mid-points of the groups, on the x-axis, were plotted against the regression coefficients (the β of the reference group being 0). Where appropriate, the variables were split at a cut-off point where the curve of the logits showed a clear decrease or increase. From this plot, the shape of the curve (e.g., linear, quadratic) could be derived. This robust eye-ball method was considered accurate (see also Hosmer & Lemeshow, 1989; Frankena & Graat, 1997). After the logits were checked, the tactical variables were divided into three categories (low, moderate and high). Spearman’s correlation coefficients between the predictor variables were examined. All variables were included in the further analysis as the variables were not highly correlated (p < 0.60; Hosmer & Lemeshow, 1989). The logistic regression analysis was performed using the enter procedure. The accuracy of the model was assessed using the Hosmer and Lemeshow test (P > 0.05; Hosmer & Lemeshow, 1989). The percentage of correct classification was calculated for the different field positions.

Results

Table 2 presents the means and standard deviations of the four TACSIS subscales for the amateur and the professional performance levels and field positions.

The Hosmer and Lemeshow test was not significant (P = 0.57), which indicated that the model fitted well. The professional performance level was associated with the TACSIS subscale Positioning and deciding (Table 3). For players scoring moderate (Fair–Good), the odds ratios indicated a 3.52 times greater chance of becoming a professional than players scoring low (Very Poor–Poor–Fair), whereas for players scoring high (Good–Very Good–Excellent), this chance is even 6.60 times greater.

The correct classification of the adult performance level based on tactical skills was 69.2% for the defenders, 80.0% for the midfielders, while the attackers were classified correctly in 75.0%.

Figure 1 presents the percentage of amateurs and professionals in either the low, moderate, or high category on the TACSIS subscale Positioning and deciding for the different field positions. Overall, the percentage of professionals was higher than the percentage of amateurs scoring in the highest categories (28% of the amateurs vs 40% of the professionals). Defenders in both adult performance levels had a normal distribution around the moderate category “Fair” to “Good” (50% of the amateurs and 47% of the professionals). For midfielders, the distribution of amateurs was normal around the moderate category (40% of the amateurs scored “Fair” to “Good”). In contrast, data from the professional midfielders revealed a skewed distribution, with 67% of the professionals scoring “Good” to “Excellent.” For the attackers, the distribution of amateurs was skewed to the lowest category, with 38% of the amateurs scoring “Very Poor” to “Fair.” In contrast, scores from the professional attackers revealed a normal distribution around the moderate category, with 56% of the professionals.

Table 2. Tactical skills (means; SDs) of elite youth soccer players (n = 105) specified per performance level in adulthood and field position

<table>
<thead>
<tr>
<th></th>
<th>Total n = 105</th>
<th></th>
<th>Defenders n = 22</th>
<th></th>
<th>Midfielders n = 16</th>
<th></th>
<th>Attackers n = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amateurs n = 53</td>
<td>Professionals n = 52</td>
<td>Amateurs n = 22</td>
<td>Professionals n = 19</td>
<td>Amateurs n = 15</td>
<td>Professionals n = 16</td>
<td>Amateurs n = 16</td>
</tr>
</tbody>
</table>

Declarative knowledge

<table>
<thead>
<tr>
<th>Skill</th>
<th>Amateurs</th>
<th>Professionals</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing about ball actions (attack)</td>
<td>4.30 (0.68)</td>
<td>4.42 (0.61)</td>
<td>4.39 (0.61)</td>
<td>4.25 (0.57)</td>
</tr>
<tr>
<td>Knowing about others (defense)</td>
<td>4.00 (0.56)</td>
<td>4.08 (0.56)</td>
<td>4.05 (0.61)</td>
<td>4.09 (0.55)</td>
</tr>
</tbody>
</table>

Procedural knowledge

<table>
<thead>
<tr>
<th>Skill</th>
<th>Amateurs</th>
<th>Professionals</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning and deciding (attack)</td>
<td>3.76 (0.56)</td>
<td>4.00 (0.56)</td>
<td>3.80 (0.52)</td>
<td>3.82 (0.49)</td>
</tr>
<tr>
<td>Acting in changing situations (defense)</td>
<td>4.20 (0.73)</td>
<td>4.16 (0.71)</td>
<td>4.49 (0.64)</td>
<td>4.58 (0.67)</td>
</tr>
</tbody>
</table>

Note:
*Significant difference between amateur and professional performance level (P < 0.05).
1One missing value.
2Two missing values.
Discussion

The current study assessed the tactical skills of elite youth soccer players at an early stage of their sport career and made a comparison between the players who reached the professional performance level in adulthood and those who became amateurs. In contrast to most earlier studies on talent identification and development (i.e., those that compare successful and less successful talented players at a specific moment during adolescence), this study followed these players into adulthood (see also Figueiredo et al., 2009; Huijgen et al., 2009). The data from this study suggest that, at the age of eighteen, elite youth soccer players who scored in the highest category (“Good” to “Excellent”) of the TACSIS procedural knowledge subscale Positioning and deciding were almost seven times more likely to reach the professional soccer level than those scoring in the lowest category. Thus, even though all players had accumulated more than 10 years of organized soccer experience and all had proven to be highly successful up to this point in their sports career (top 0.5% of their age group), half of them did not reach professional status in the subsequent years. The results show that to reach the professional performance level in adulthood, it is important to score at least “Fair” to “Good” on Positioning and deciding.

Fig. 1. Percentage amateurs and professionals in different field positions for the Tactical Skills Inventory for Sports (TACSIS) subscale positioning and deciding (N = 105 elite youth soccer players).

<table>
<thead>
<tr>
<th>Positioning and deciding</th>
<th>Range of scores</th>
<th>OR</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing about ball actions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00–3.50</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Moderate</td>
<td>3.51–4.00</td>
<td>2.12</td>
<td>0.35</td>
</tr>
<tr>
<td>High</td>
<td>4.01–6.00</td>
<td>1.33</td>
<td>0.69</td>
</tr>
<tr>
<td>Knowing about others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00–3.50</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Moderate</td>
<td>3.51–4.00</td>
<td>2.58</td>
<td>0.17</td>
</tr>
<tr>
<td>High</td>
<td>4.01–6.00</td>
<td>0.88</td>
<td>0.87</td>
</tr>
<tr>
<td>Positioning and deciding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00–3.50</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Moderate</td>
<td>3.51–4.00</td>
<td>3.52</td>
<td>0.04</td>
</tr>
<tr>
<td>High</td>
<td>4.01–6.00</td>
<td>6.60</td>
<td>0.01</td>
</tr>
<tr>
<td>Acting in changing situations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00–3.50</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Moderate</td>
<td>3.51–4.00</td>
<td>2.72</td>
<td>0.18</td>
</tr>
<tr>
<td>High</td>
<td>4.01–6.00</td>
<td>0.81</td>
<td>0.70</td>
</tr>
</tbody>
</table>
However, the procedural knowledge involved in the interpretation of a specific situation and the ability to be at the right place at the right moment to make the right action (French & Thomas, 1987; McPherson & Thomas, 1989; McPherson, 1994; Thomas & Thomas, 1994) appears to be the factor that best differentiates between the more and the less successful players in the future.

The percentages of correct classification (ranging from 69% to 80%) are considered extremely valuable and relevant because the prediction of long-term success in adolescent soccer players is both particularly complex and the result of several factors, among which tactical skills are just one (Reilly et al., 2000; Williams & Reilly, 2000; Elferink-Gemser et al., 2004a). It is recommended for future research to combine these skills while relating them to future performance level to predict future performance level even better. Nevertheless, this study shows that for players who are about to make the transition to the adult competition, tactical skills can accurately predict, for roughly three out of four players, who will reach the professional level of performance. It remains unclear as to whether the same results hold for younger players who are in the middle of their talent development program or at the start of it.

The results of the current study confirm that tactical expertise is a prerequisite for expert performance in sports (Janelle & Hillman, 2003). At 80%, the midfielders had an extremely high correct classification rate of the adult performance level based on tactical skills, and it seems impossible for a midfielder to reach the professional performance level if his score is low on Positioning and deciding. This scale contains questions related to procedural knowledge in attacking situations. The content of the questions is related to how to get open during a match, decision making about proceeding actions, overview, anticipation and choosing positions. Midfielders are the link between the defenders and the attackers, tasked with setting up attacking situations and creating the best circumstances for the attackers. In addition, they assist defenders in their defensive task (Rienzi et al., 2000). This is in line with previous research that stated that the presenting part of tactical skills for midfielders is Positioning and deciding (Kannekens et al., 2009a).

In the current study, the TACSIS was used to measure tactical skills. This questionnaire is developed specifically for invasive game players, constructed with the help of expert trainers, and is embedded in theory (Elferink-Gemser et al., 2004b). Nevertheless, self-report measures are susceptible to a person’s self-confidence, and this might have affected the results (e.g., Mahoney et al., 1987; Woodman & Hardy, 2003). However, all participants in this study had already accumulated more than 10 years of experience and they were all part of a talent development program of a professional soccer club of national prestige, which means that they have been confronted frequently with selection moments. Therefore, regardless of their confidence, elite youth soccer player are regarded to have a realistic perspective on their tactical skills.

One has to keep in mind that the participants of this study belonged to the top 0.5% of all soccer players in their age group, and among these players, about half ultimately reach the top. Hence, there is just a scarcity of players suitable for this research. Nevertheless, the results would have been even stronger if the logistic regression would have been applied not only with the total group but also within each position. Unfortunately, the number of players in each position in the current study was too small to perform this analysis for each position separately. In addition, the literature is still lacking in data reporting goalkeepers and center-forward players. However, it is recommended to include them in future research because of their special positions in soccer.

In the current study, the distinction between players in terms of defenders, midfielders and attackers was kept quite robust for the purpose of the study. However, nowadays, soccer has become more and more of a two-sided game, forcing the players’ attacking and defensive positions. For example, in the 3-5-2 system of play, wingers of full-backs could be attackers or defenders. Basically, system of play (4-4-2, 4-3-3, etc.) might affect the positioning and stacking, being an attacker or a defender. As a consequence, it is recommended in future research to adopt clear definitions of the players’ positions.

The implications of the current study for talent development is that during the adolescent years, trainers and coaches have to pay attention to Positioning and deciding. If a soccer player does not have the ability to develop this particular part of tactical skills, it is almost impossible to become a successful player in the future. Therefore, it is recommended to consider Positioning and deciding as a major issue at selection moments, especially if a player scores in the lowest category.

**Perspectives**

To discriminate between players who are more successful vs their less successful counterparts, it is necessary to follow elite youth players into adulthood. Positioning and deciding is the tactical skill that best predicts the performance level in adulthood, with a correct classification of over 70% in players who are about to make the transition from youth competitions to the adult competition. Players with a high score have an almost seven times greater chance
to reach the professional soccer level than those scoring low. Especially for midfielders, it seems impossible to become a professional player if the score is low during adolescence. These findings highlight the importance of tactical skills and, especially, Positioning and deciding in talent development. The results may point toward a change in the content of talent development programs of elite youth soccer players that encourages trainers to pay major attention to tactical skills and especially to Positioning and deciding.

Key words: experts, position in the field, adolescence, tactics.

Acknowledgements

The authors would like to thank all players and staff of the youth soccer teams for their participation in this study. In addition, we thank the students of the Center for Human Movement Sciences for their help in collecting the data. We would also like to thank Jim Lyons for his textual and editorial suggestions.

References


