ANÁLISIS Y EVALUACIÓN DE LOS GOLES MARCADOS
EN LA COPA DEL MUNDO DE 2006

ANALYSIS AND EVALUATION OF GOALS SCORED IN
2006 WORLD CUP


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RESUMEN
El propósito del presente estudio fue registrar los goles marcados durante la Copa del Mundo de 2006. Todos los partidos de la Copa del Mundo fueron analizados mediante una observación sistematizada con el programa de videoanálisis Sportscout, para PC. Los resultados mostraron que se conseguían más goles en la segunda parte (52.5%, p>0.05) se encontraron diferencias estadísticamente significativas en los últimos 15 min del partido (32.8%, p<0.05). En función de la zona del campo, los porcentajes en los que se consigue gol son los siguientes: 51.3% área de penalti, 32.17% área de gol y 15.52% fuera del área de penalti.

Palabras clave: fútbol, táctica, gol, videoanálisis, indicadores de rendimiento en fútbol.

ABSTRACT
The aim of the present study was to record goal scoring characteristics of World Cup 2006. All matches of World Cup were analysed through systematic observation, with the aid of Sportscout video-analysis program for PC. The results revealed that more goals achieved in second half (52.5%, p>0.05) and statistical significant difference presented the last 15-minute period of the match (32.8%, p<0.05). More goals achieved with organized offence following set plays and counterattacks. As far as the action prior to goal scoring concerned results presented that long pass, combination play and direct shoot concentrated the higher percentages. Regarding the zone of scoring attempt, the following percentages were presented: 51.3% penalty area, 32.17% goal area, and 15.52% outside penalty area. Results should provide useful information to coaches in order to design effective training based on matches’ characteristics.

Key words: soccer, football, tactic, goal, video-analysis, performance indicators football.
INTRODUCTION

Feedback is a major factor in the improvement of sport skill performance. Recently, advances in technology (computers) have made it possible to augment and improve the feedback athletes receive during training and competition.

Information derived from this type of computer-aided system can be used for several purposes such as immediate feedback, development of a database, indication of areas requiring performance improvement, evaluation and a mechanism for selective searching through a video recording of the game (Liebermann, Katz, Hughes, Bartlett, McClement & Franks, 2002).

More specific, in soccer the development of sports science support programs hastened the acceptance of notation analysis by coaches. Olsen and Larsen (1997) described how notation analysis had benefited the national soccer team of Norway in competing with the best teams in the world. Currently its main use is in analyzing team performance post-event (Grant & Williams, 1999). In conjunction with video-editing facilities, it can provide interim feedback to players and coaches, for example, in halftime team talks. Surveillance information may also be provided about the style of play of forthcoming opponents. Whilst largely a descriptive tool, notation analysis could be employed by sports scientists to address theory-driven questions (Reilly, 2001). Such issues might include potential links between performance and individual variables characteristic of fitness or talent (Rienzi, Reilly & Malkin, 1999).

In soccer, a section that notation researchers have focused is goal scoring patterns. Low frequency of scoring is one of soccer’s characteristics; thus, an objective evaluation of the specific characteristics of scoring, that directly determines the factors that ultimately lead to successful attempts and goals, is imperative (Yiannakos & Armatas, 2006). Despite the fact that there is ample amount of studies that have examined the characteristics of goals that have been scored in various tournaments (Garganta et al., 1997; Jinshan, Xiaoke, Yamanaka & Matsumoto, 1993; Michailidis et al., 2004; Olsen, 1988; Yiannakos & Armatas, 2006), the need for constant record and evaluation of soccer characteristics is prevalent, since it presents continuous evolvement and change as far as the mode of the game is concerned (Yiannakos & Armatas, 2006).

The purpose of this study was to record and evaluate the characteristics of goal scoring patterns in 2006 World Cup. Specifically, it was examined, the relationship between time and goal scoring, the kind of offense through which the goal was scored, the way that the goal was scored, the area from which the goal was scored and first’s goal influence in match’s outcome.

METHODS

Sixty four (64) matches from all phases of World Cup 2006 were studied. 147 goals were scored in this tournament.

The selected matches were analysed through systematic observation, with the aid of Sportscout video-analysis program for PC, by two experienced observers. Additionally, the inter-rater reliability of separate observations was calculated to guarantee the quality of the observation system. A reliability index of 0.95 was observed (intra-class correlation coefficient and kappa index).

Analysis method assisted in observing:

1) goal scoring frequency: a. per 45 minutes (First half plus extra time and Second half plus extra time) b: and per 15 minutes (A: 1-15, 16-30, 31-45 plus extra time – B: 46-60, 61-75, 76-90 plus extra time).

2) style of play when goal scored: a. possession attack (indirect style of play...
that emphasizes ball control and many short passes), b. counter-attack (quick attacking play by a team who right before this was on the defensive), c. set play (corner kick, throw-in, free kick, penalty kick),

3) action prior to goal scoring: a. long pass, b. combination play (when attacking players work together to execute a play, e.g. "Give & Go", "Overlapping Run"), c. individual action, d. direct shoot, e. own goal,

4) area from which the goal was scored: a. goal area (goal box), b. penalty area (penalty box), c. outside the penalty area and

5) first’s goal influence in game’s outcome (for the team that scored goal): a. win, b. draw, c. loss.

All data were analyzed using the statistical package for PC SPSS 14.0. (Lead Tecnologies Inc, USA). Non parametric chi-square analysis was used to determine the statistically significant differences and the level of significance was set at p<0.05.

RESULTS

Although more goals were scored in second half (52.5% vs. 47.5%, p>0.05) of the matches, no statistical differences were observed. 15-min analysis of goals showed a uniform distribution through the first five periods (Figure 1). The last 15-min period (76-90 min) of the matches presented the highest percentage in goal scoring (32.8%).

Concerning the offense type that goals were scored, it was observed that 47.1% of goals were scored after organized offensive move, 20.3% after counter-attack, and remaining 32.6% after set play (Figure 2). Data analysis showed statistically significant differences between goals scored after organized offensive moves versus set plays ($\chi^2=4.38$, p<0.05) and counter-attacks ($\chi^2=16.07$, p<0.05) and the ones scored after set plays versus counter-attacks ($\chi^2=3.88$, p<0.05).

As far as the actions prior to a goal scored concerned, the analysis presented that 36.4% scored from long passes, 23.6% from combination play, 16.4% scored individual actions, 20% scored direct shots and finally 3.6% from own goals (Figure 3).

The area of the field where the offensive attempt was materialized was recorded. The findings indicate that 32.17% of the goals were scored inside goal area, 51.3% inside penalty area and 16.52% outside the penalty area (Figure 4). The data analysis showed that there are statistically significant differences between goals scored inside the penalty area versus goals scored inside goal area ($\chi^2=7.58$, p<0.05), goals scored inside area.
the penalty area versus goals scored outside the penalty area ($X^2=27.02$, $p<0.05$, outside the penalty area ($X^2=13.14$, $p<0.01$), as well as between goals scored inside the goal area and goals scored outside the penalty area ($X^2=6.61$, $p<0.05$).

As far as first’s goal influence in matches’ outcome, data analysis showed that the team scored the first goal was the winner of the match (73.21%) and presented statistical significant difference versus draw and loss ($p<0.05$).

**DISCUSSION**

The first variable that was observed was the relation between time and goal scoring patterns. Although more goals scored in the second half of the matches no statistical differences were observed. On the contrary, 15min period analysis presented that more goals scored in the last period of the match (76-90). The review of relevant studies showed that the frequency of goals scored during a match is time dependent, while others purport that there is no immediate correlation between them (Jinshan et al., 1993; Michailidis et al., 2004). Thus, Yiannakos and Armatas (2006) in their study for Euro 2004 find that 57.4% of goals where scored in second half ($p<0.05$), Abt, Dickson and Mummery (2002) concluded that frequency of goals scored during soccer matches is time dependent. Moreover, it was observed a systematic and significant upward trend in the number of goals scored as time progressed. Also, Armatas and his colleagues (2007b) studied exclusively the correlation between time and goal scoring in the three later World Cups and concluded that statistically more goals are scored at second half of matches and on the last 15 minute period of them. Another study that examined the three later women World Cups showed similar results (Armatas, Yiannakos, Galazoulas & Hatzimanouil, 2007a).

The above results could be attributed in physiological and tactical factors. According to Reilly (1996), defenders present a greater deterioration in physical condition (thereby providing attackers with an advantage) and lapses in concentration. From a purely physiological perspective there is a strong body of knowledge supporting a reduction in physical condition over the course of a match leading to a state of fatigue and reduced physical performance (Bangsbo, 1994; Saltin, 1973). Additionally, the same author reports that play may become urgent towards the end of play as teams chase a result. Although, “urgent” game is difficult to quantify, it would appear that the players are more willing to take greater risks towards the end of a match in order to affect an outcome (Abt et al., 2002). Finally, it is also possible that the losing team pushes players forward in order to create scoring opportunities, thereby scoring themselves or conceding further goals (Reilly, 1997). Thus, frequent examination of player’s stamina and it’s improvement through proportional training methods should represent basic aim of training.
Regarding the type of offense which goals were scored, as expected, organized offensive moves presented higher percentage. The second most popular way scoring was set play and the last through counter-attacks. In a recent study, that examined the goal scoring patterns in Euro 2004 presented similar results (organized offense: 44.1, counter attacks: 20.3, set plays: 35.6) (Yiannakos & Armatas, 2006). Piecniczk (1983) found that 27% of the goals during the World Cup Tournament in 1982 were scored after a quick offense and 28% through organized offensive actions. Also, according to Dufour (1993) 88% of the goals in the World Cup Tournament in 1990 came from an organized offense and 12% from a counter-attack. A more recent study (Armatas, Ampatis & Yiannakos, 2005) found that despite the fact that frequency of counter-attacks in modern football is low (4.9%), they are considered to be more effective than organized offense moves; the following percentages are indicative and support such a proposition: 16.9% of counter-attacks lead to a goal whereas only 11.1% of organized offenses are successful.

Bangsbo and Peitersen (2000) point out the magnitude of set plays in modern football and reported that twenty are estimated to appear, in average, for each team in every match. They also site three other studies concerning the 1990 and 1994 World Cups and the 1996 European Championship, reporting that the goal scoring patterns in these tournaments was 32%, 25% and 27% respectively. Plenty studies report results that agree with the present study, pointing out the proposition that the percentage of goals scored after set plays makes up the 1/3 of the total number of goals scored, irrespective of the tournament (Armatas, Yiannakos & Hatzipanouil, 2007; Armatas, Yiannakos, Papadopoulou & Galazoulas, 2007; Bekris et al., 2005; Fia, 2002; Jishan et al., 1993; Olsen, 1988; Zempel & Rudolph, 1990). There are also studies that have analyzed top leveled games and presented even higher percentages of goal scoring from set plays (45%) (Hughes, 1990; Piecniczk, 1983). In order to take advantage of set play’s effectiveness, respective training should be part of weekly basis and not only before each game, like it use to. Moreover, set play’s training should be focused not only on how creating goal scoring opportunities but also from a defensive point of view.

Action examination prior to goal scoring showed that long passes present a higher percentage of occurrence (36.4%), combination play and direct shoot followed with 23.6% and 20% respectively. Jishan et al (1993) reached similar conclusions in their study on goal scored after long pass, during the 1990 World Cups games reporting a percentage of 27.8%; Hughes (1990) indicates that in top leveled matches respective percentage is 25%. In Greek Championship of 1990-91 percentage recorded was 27% (Saltas & Ladis, 1992). Finally, regarding individual actions the findings of the present study contradict previous analysis that state that the percentage of goal scoring reaches a 22% (Saltas & Ladis, 1992) and 31.6% (Manolopoulos, Komsis, Kazakas, Papadopoulos & Rizos 1999). Yiannakos and Armatas (2006) in their study presented similar results to our study (long pass: 34.1%, combination play: 29.3%, individual action: 17.1%, direct shoot: 14.6% and own goal: 4.9%). The decline in this percentage might have been caused by the improvement of the defensive actions and the contemporary inclination for greater use combination play in the match, quick transfer of the ball, as well as movement without ball possession. Theis (2001) supported that wing offensive play with long passes is primary offensive tactic in order to face defending deep. Often, defenders used to commit errors in such cases because they observe the player that has the possession of the ball and not the unmarked players. Therefore, training
should focus on improving long passes inside penalty area but also should prepare players to have the ability to score goals after an air ball. Further, shoot training should be made under match conditions while combination play should focus on wall passes, checking-off, take-over and hooking run.

As far as the area where the final effort was materialized concerned, results indicate that the majority of goals were scored inside the penalty area (51.3%), whereas 32.1% of the goals were scored inside the goal area and 16.5% outside the penalty area. Yiannakos and Armatas (2006) find that 44.4% of goals were scored inside penalty area, 32.2% inside goal area and 20.4% outside the penalty area. Hunges, Roberson and Nicholson (1988) studied the differences between the “winner” teams and the “loser” teams in the 1986 World Cup, and found that in the winning teams, the players’ goal shots are made inside the penalty area. Olsen (1988) in his study of the 1986 World Cup reaches the same conclusion and points that 90% of goals are scored inside the penalty area. Michailidis et al. (2004), after studying 2002-03 Champion’s League matches concluded that 64.4% of goals were scored inside penalty area while 36.5% inside goal area. These conclusions are consistent with the findings of other studies, such as Sotiropoulos et al. (2005) that identifies that 81.8% of goals are accomplished through efforts inside the penalty area, and that of Dufour (1993) that proposed that 80% of goals are scored inside penalty area and 15% inside goal area. The increased rate of recurrence of offensive actions and goal accomplishment inside the penalty area is justified by the fact that this area is nearer to goalpost and outside of the goalkeeper’s scope (Michailidis et al., 2004). Training should be focus on drills that contain shots inside the penalty area under match conditions.

Last variable examined was 1st goal’s effect in the outcome of the game for the team that scored it. In present tournament results showed that when a team scored the first goal managed to get victory (73.21%). Maybe the participation of very weak teams in World Cup but also the deterioration of physical condition of most teams (tournament conducted after all major leagues) resulted in a decrease reaction when a team was conceded goal. More studies should be conducted in order to compare results and to infer conclusions. Theis (1992) supported that when a team scored first goal, presents improvement in performance and increased self-confidence. Soccer coach should have his players prepared tactically and psychologically, in order to be ready to face getting back in score. Thus, training should include training matches with different number of players and time limit.

CONCLUSIONS

Results should provide useful information to coaches in order to design more effective tactic and conditioning training as well as planning an efficient match tactic. Concluding, more attention should be given from coaches and players to the latter period of matches where most goals appeared to be scored. Workout of the set plays is considered crucial, since they present significant effectiveness, while training should focus on finishing through combination play, direct shots and long passes inside the penalty area. Last but not least, coach should prepare his team’s tactical and psychological reaction after getting back in the score sheet.

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