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TERESA ZWIERKO  
University of Szczecin, Physical Culture Institute, Szczecin

## SELECTED ASPECTS OF ANTICIPATION OF SOCCER PLAYERS

### INTRODUCTION

The term 'anticipation' usually describes an ability to predict an event shortly before occurring. This ability is crucial in most sports where decisions must be taken before the opponent's move. Anticipation also means an ability to recognize the pattern of the play and use situational probability, often referred to as 'reading the game'. It is one of the clearest signs of skilled perception [7].

Some sources argue that anticipation skills depend on the exposure to task-specific practice, and not on physical development or height [1]. Konzag [4] observed that soccer players of different ages and experience needed the same time to solve a simple tactical problem shown on tape, but when they had to choose between four options, more experienced players were significantly faster in anticipating an action and making the most effective decision.

Williams & Burwitz [8], using a temporal occlusion paradigm, observed that skilled soccer players were more efficient than inexperienced ones in anticipating the direction of a penalty shot. They used the temporal occlusion paradigm, where participants are presented with film clips that are selectively edited to provide a varying extent of run up and ball flight information, and participants are required to predict the end result of the sequence being observed.

In a study by Savelsbergh et al [5] expert players were more accurate in predicting the direction of the penalty shot as they allowed more time before initiating a response and made fewer corrective movements. Their visual strategy was more efficient, as it involved fewer ocular fixations of longer durations to less disparate areas of the display than their novice counterparts.

However, some other sources show that anticipation does depend on the overall maturity. Schubert [6] reported a dynamic increase in anticipation during adolescence (14 and 15 years of age). According to

Buchmann et al. [2] it is even earlier, i.e. between 6 and 10 years of age, whereas a moderate increase occurs between 10 and 14 years of age.

The aforementioned studies provoke certain questions. To what extent is anticipation an individual predisposition and to what extent is it a skill acquired during a task specific practice? Is anticipation a general ability or is it only developed within a specific sport context?

This report attempts to examine anticipation in both laboratory and sport-specific conditions. In laboratory conditions I measured the anticipation of time and direction, while in sport specific conditions I examined the recognition and prediction of situations in the game of soccer.

### METHODS

This study involved two groups. The first was 12 soccer players aged  $22.3 \pm 2.7$  from the third and fourth Polish national soccer divisions. Their mean experience in professional football was  $9.5 \pm 2.35$  years. The other group consisted of 12 physical education students from the Higher Vocational State School in Leszno. The students were not training systematically in any specific sport. Their mean age was  $21.3 \pm 1.6$  years.

Anticipation was measured using a motor-temporal test included in the Vienna Test System, version S2. The participants had to guess when a point moving on the screen was to reach one of two parallel lines visible on the screen. The point moved in various ways (linear, sinusoidal, on a circle) and after reaching the first of the lines it disappeared. The participants had to guess when and where the point would reach the other line. The temporal anticipation was measured by the median of the time deviation (seconds) and the directional anticipation by the median of deviation from the actual point of contact (pixels). The test was

preceded by a pre-test to get the participants acquainted with the format (minimum 5 trial attempts).

The anticipation of the shot direction was measured with a video presenting 10 situations from a match (free shots, penalty shots, & others). Temporal occlusion was used to present the situations [8]. The participant was presented a particular movie three times. The task was to predict the direction of the shot and indicate one of the six zones of the goal where the ball would land. The percentage of correct answers was the measure of anticipation. Each individual was informed about the nature and goal of the experiment.

## RESULTS

Table 1 presents the results of anticipation tests in the studied groups.

**Table 1.** Statistical analysis of the anticipation test in the studied groups

Test	Soccer players			Students			Idl
	$\bar{x} \pm SD$	min-max	V(%)	$\bar{x} \pm SD$	min-max	V(%)	
Directional anticipation (median of deviation in pixels)	64.42±22.76	15–12	35.34	74.71±33.93	22–140	45.41	10.29
Temporal anticipation (median of deviation in seconds)	1.14±0.62	0.43–2.17	54.38	1.06±0.65	0.25–2.48	61.32	0.08
Anticipation of the shots at the goal (%)	46.42±8.41	30–60	18.11	34.28±13.42	10–60	39.14	12.14*

\*  $p \leq 0.05$

On average, professional footballers were better than the students' group in anticipating the direction of the point by 10.29 pixels. However, the statistical difference was not significant. Variation coefficients ( $V=35.34\%$  and  $V=45.41\%$ ) were quite high and indicated significant differences in the studied variables.

In the temporal anticipation mean results in both groups were similar. However, they differed greatly within the groups. In the professional players' group the variation coefficient was 54.38% and in the students' group it was even higher, at 61.32%. The soccer players correctly predicted the direction of the shot in 46% of the presented video clips.

The mean anticipation of the shots at the goal was 12.14% better than the students' group. The statistical difference was significant, at  $p \leq 0.05$ .

## DISCUSSION

The ability of the human psyche to process information makes it possible to create certain predictions and to anticipate upcoming events.

Perception is a process that provides us with information about the surrounding environment. It is estimated that 80% of all information about the world comes from the sense of sight [3]. It applies to all domains of human activity, and sport is not excluded here. Across years and years of practice, athletes develop certain structures of knowledge, which help them encode, process and retrieve information in an efficient and selective manner.

Anticipation is based on stimuli or signals, but first of all, it depends on the inner knowledge structure about a particular situation [7]. The results of our own tests on the anticipation of shot direction fully confirm these relationships.

However, the temporal and directional tests in laboratory conditions were not so equivocal. Soccer players were on average better at directional anticipation than the control group, but the difference was not statistically significant. The results of the temporal anticipation test also did not differ much between the two groups.

It seems that the results confirm a presumption that the differences in anticipation may be observed only within a specific domain, and anticipation tested under laboratory conditions does not depend on specific sport experiences.

However, it is not consistent with another study by Zwierko and Głowacki (2006, in preparation) where we observed in a laboratory test a significant difference ( $p < 0.05$ ) of temporal anticipation between team game players and music students. It is then likely that the lack of significant difference in laboratory conditions in this study was due to a too small difference in sport level

between the studied groups. It is also possible that laboratory anticipation tests have no direct connection with anticipation in real-life situations. These questions could be addressed by future studies on highly-skilled players.

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