

A Study of Cognitive Function on Agility of Soccer Players

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<Purpose of the Study>

1. To investigate if the ability to anticipate in a sports-specific situation exists
2. To establish how to quantify the ability to anticipate .

<Introduction>

When reacting to an opponent's movement, open skills in components of agility, such as anticipating what will happen or recognizing a pre-action and situation based on cognitive function with knowledge and experience, are important. However, only a few researches study about those open skills, especially an ability to anticipate. Also, not many researches study how to quantify the ability. If the existence of the ability and how to quantify that ability are clarified, it may benefit coaches in getting to know their players' strong or weak points of open skills on their ability of agility.

<Method>

◆ Experimental Approach

Video-based reactive agility tests incorporating single-direction and multiple-direction reactive agility trials were completed. Subjects were instructed to move in the direction in which a ball was passed. Subjects were allowed to anticipate when and which direction the ball is kicked.

◆ Subject

Collegiate male soccer players (n=15; age, 20.3±0.72 years) and volleyball players(n=11; age, 19.7±1.01 years) were recruited.

◆ Construction of Video Clips as Test Stimuli

The model was instructed to execute a pass toward a point 7m from the digital camera's position. A red circle was placed in the corner of the frame, indicating that the foot had made contact with the ball. Following types of passes were executed.

1. Inside kicks – a. Right, b. Left
2. Outside kick – a. Right, b. Left

1)Single direction (to the right); RTSD

Reacting toward the right from the subject only (1-a or 2-a only). The test clip comprised five randomly-selected clips each from only the 1-a and 2-a.

- Subjects know where to move but when to move.

<Task>

1. when to move

2)Multiple directions (to the right or left); RTMD

Reacting toward either the right of left from the subject (all types of passes). The test clip comprised two randomly-selected clips from each of the four types of passes.

- Subjects don't know either where to move or when to move.

<Task>

1. when to move
2. which direction to move

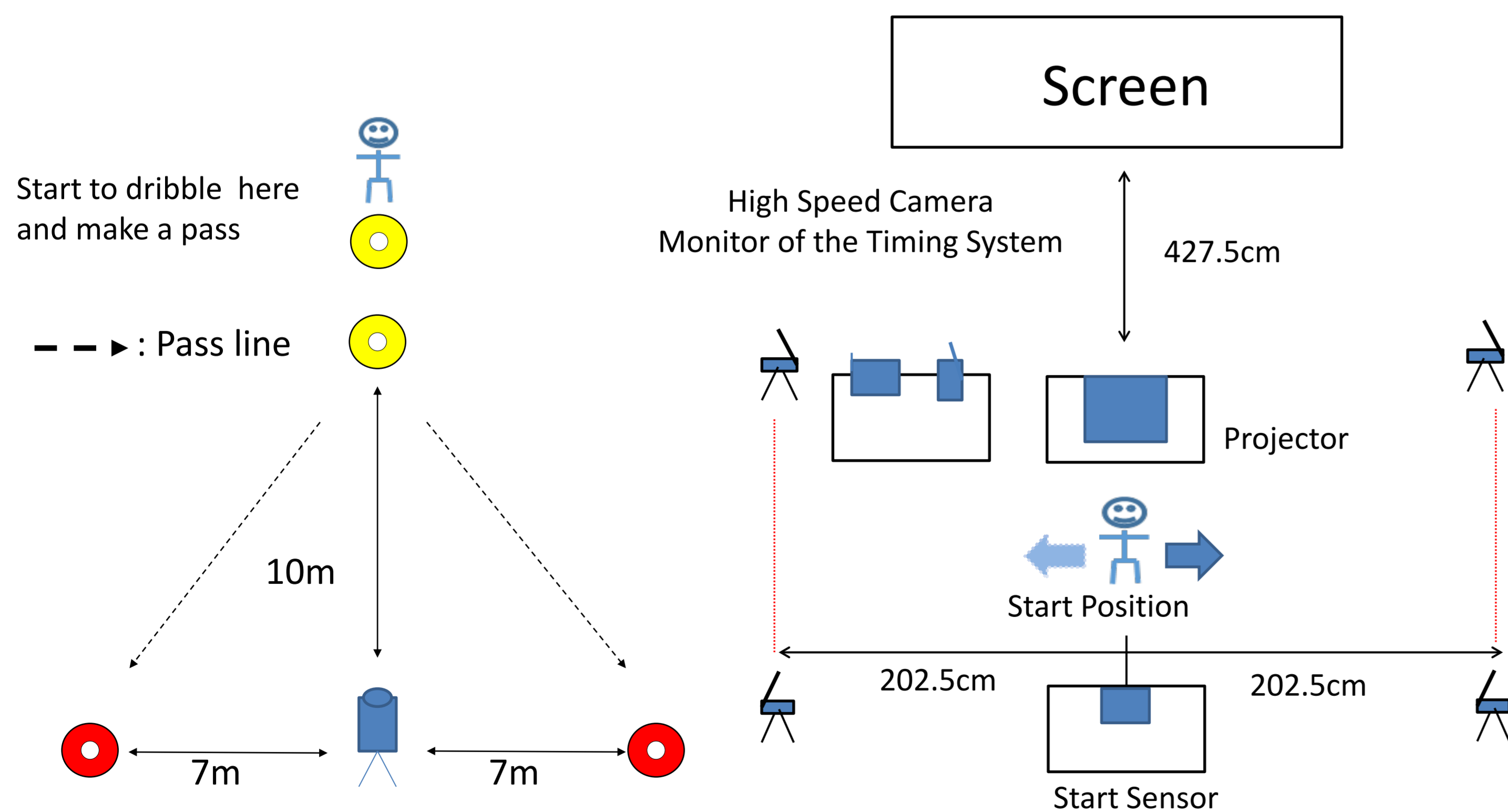
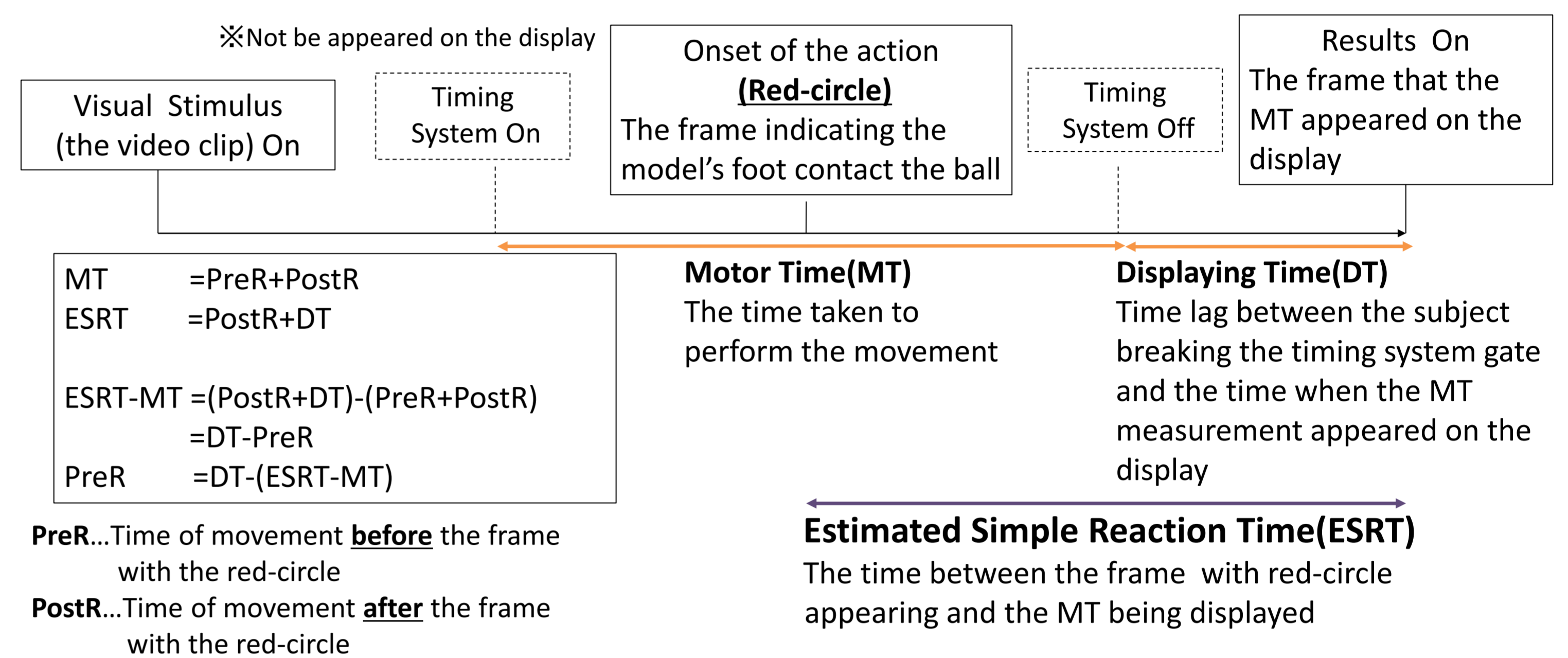


Figure1. The setting for video clip production

Figure2. The measurement setting

◆ Interpretation of the Time Measured



“DT” will not be appeared as real value.

On the equation, a **smaller** “ESRT-MT” represents a **longer** PreR, meaning moving **earlier**.

◆ Statistical Analysis

Before calculation of subject's ESRT-MT, the following data were excluded.

1. Two from the fastest and slowest results for the RTSD
2. The fastest and slowest results for the RTMD

Then, a two-way mixed analysis of variance, with a between factor “Tasks” (RTSD, RTMD) and factor “Sports” (Soccer, Volleyball) was performed to determined the difference between the groups and situations.

◆ Result

- Subjects in RTSD situation showed a significantly smaller ESRT-MT than those in RTMD situation (P<0.05) .
- The group of soccer players showed a significantly smaller ESRT-MT than volleyball players (P<0.05).
- No significant interaction was found.

Table 1. ESRT-MT between Groups

	Task	
	RTSD	RTMD
Soccer	+0.75±0.06	0.76±0.08
Volleyball	+0.80±0.09	0.86±0.07

†Significantly smaller than RTMD (p ≤ 0.05)

◆ Conclusion

- The ability to anticipate in the sports specific situation exists
- The method used in this study could be one of the ways to quantify it

◆ Practical Application

- Provide an idea that situational training and understanding of sports specific principles are important for agility training
- provide an easy and inexpensive method to measure open skills.

※この内容は、第6回NSCA国際カンファレンス(マドリード、スペイン)における口頭発表の内容をポスター形式にしたものです。

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26-29 SEPTEMBER, 2018
MADRID, SPAIN

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