Coincidence Timing Accuracy of Junior Tennis Players

8-10 Yaş Grubu Tenis Oyuncularının Sezinleme Zamanı

Araştırma Makalesi

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ABSTRACT

The purpose of the study was to investigate the effects of age and gender on coincidence timing accuracy (CTA) of junior tennis players (ages of 8-9-10). The Bassin Anticipation Timer Device was administered to measure CTA of participants (n=228). A 3x2 ANOVA was conducted to analyze age groups and gender differences on CTA. Results revealed that 10 year-old players had significantly lower CTA scores than eight year-old players and male players performed more precisely on CTA than their female counterparts. These results suggest that both age and gender have effects on CTA.

Key Words
Coincidence timing accuracy, Tennis

ÖZET

Bu çalışmanın amacı 8-10 yaş grubu elit tenis oyuncularında yaşın ve cinsiyetin sezinleme zamanı performansı üzerindeki etkilerinin incelenmesidir. Araştırma grubunun (n=228) sezinleme zamanı performanslarının ölçümünde Bassin Anticipation Timer ölçüm aracı kullanılmıştır. Yaşın ve cinsiyetin sezinleme zamanı performansı üzerindeki etkilerinin incelenmesinde 3x2 Varyans Analizi yöntemi kullanılmıştır. Araştırma sonuçları 10 yaş grubundaki oyuncuların 8 yaş grubundakilere oranla ve erkek oyuncularının kız oyunculara oranla sezinleme zamanı performanslarının daha başarılı olduğunu göstermiştir. Elde edilen bu bulgular, yaşın ve cinsiyetin, sezinleme zamanı üzerinde etkileri olduğunu göstermektedir.

Anahtar Kelimeler
Sezinleme zamanı, Tenis

INTRODUCTION

Perceptual and perceptuo-motor processes can be studied in coincidence timing tasks (Lobjois et al., 2006). Coincidence timing ability (CTA) can be defined as the estimation of arrival of a stimulus and the required time for a response to intercept it (Flyger et al., 2006). Since CTA involves some aspects of complex behaviors found in life and sport skills, it has gained much more attention (Haywood, 1983). Supportively, Ramella (1984) asserted that correct anticipation of a moving object is a major determinant of many effective motor responses.

Playing ball games requires the ability to produce extremely accurate coincidence timing behavior (Ripoll and Latiri, 1997). Tennis is one of the fastest ball games and open skill sports requiring rapid judgments and effective timing. The sequence of shots during a rally demands that tennis players make immediate decisions based on only partial stroke execution information from their opponent in order to anticipate the direction and force of an upcoming return (Cauraugh and Janelle 2002). Rudisill and Jackson (1992) pointed out that for the sports characterized as open skills (hitting a baseball, catching a ball, or volleying a tennis ball) players should be able to anticipate the next move of the opponent and predict the trajectory of the ball so that they will have enough time to respond and accomplish the task.

According to Rudisill and Jackson (1992) anticipation timing is affected by the amount of practice and performer's age. They asserted that since the practice enables the learner to develop a strong memory representation of previous experiences which in result provides learner to anticipate future outcomes and bases the response on these predicted outcomes, anticipation skills can be improved through experience and practice. An accurate response for all kinds of stimulus can be accomplished by improving the memory system or schema for all different types of spatial/temporal patterns for varying stimulus speeds (Rudisill and Jackson, 1992).

Previous studies showed no consensus about the role of gender on CTA. Wrisberg and Mead (1983), Petrakis (1985), Dunham and Reeve (1990), and Millslagle (2004) reported that gender has no effect on CTA. In contrast, Dunham (1977), Bard et al. (1981), and Williams et al. (2002) stated that males show a better performance than females in terms of CTA. Petrakis (1985) attributed the gender differences in CTA to socio-cultural training and prior experiences which may also be in relation with differences in perceptual-motor skills between two groups. In addition, Singer (1980) suggested that the relative performances of boys and girls at comparative ages may be attributed to social approval, in which boys are encouraged to develop athletic prowess, whereas girls have been told to act feminine, preventing them participating in most sports and vigorous activities.

This current study attempted to analyze the role of age and gender on CTA of junior tennis players. It was hypothesized that age and gender would be differentiating factors for CTA. Understanding such differences will provide valuable information for the trainers and other tennis staff to evaluate their players and implement necessary exercises to improve anticipation and CTA.

METHOD

Participants: The participants were consisted of all tennis players participating in Turkish national championship of under and equivalent 10 year-old players in 2006. They were, in three age groups of 8 (n= 77), 9 (n= 68), and 10 (n= 83), competitive male (n= 118) and female (n=110) junior tennis players. All participants were informed on the nature and purpose of the study. Informed consent was signed by the parents of the participants.

Data Collection Instrument: Bassin Anticipation Timer Device (Lafayette Instrument Company, Model 50575) was used to measure the CTA of players. The Anticipation Timer (Figure 1) consists of a control unit, a start and finish lighted runway, and a response button. The objective of the task is to time a subject's response to coincide with the arrival of a target light at the end of the runway (Rudisill and Jackson, 1992).
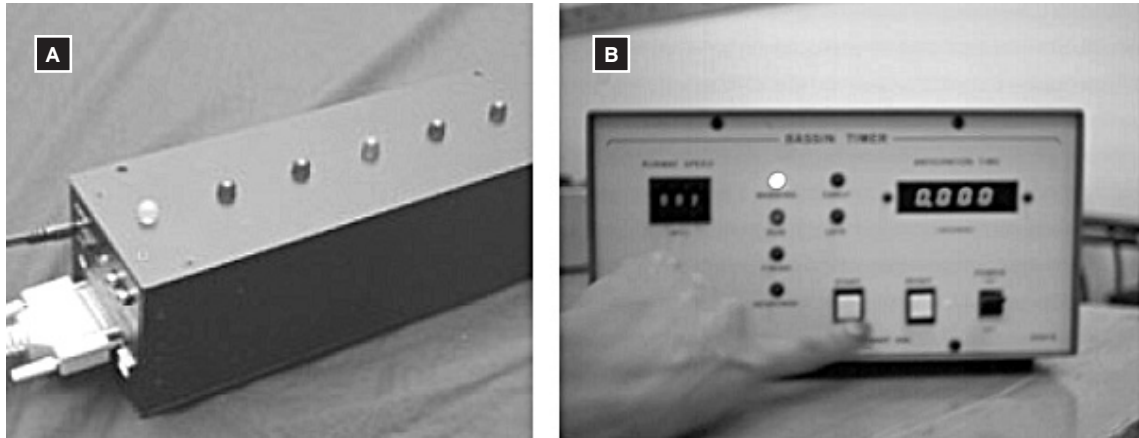
Figure 1. Bassin anticipation timer a) Runway of lights b) Control box (Arsal, 2004)

Procedures: Measurements were conducted during sessions in which regular performance tests that are set by the Turkish Tennis Federation for all national championship of under and equivalent 10 year-old players. Participants were asked to anticipate a light reaching the target and pressed a pushbutton with the preferred hand's thumb finger. The speed of the light was 2 MPH. All subjects were given three unrecorded practice trials to acquaint them with the operation of the apparatus. Afterward, five actual trials were recorded and the mean was used for the statistical analysis. The foreperiod was varied from trial to trial in order to alter the amount of time between the presentation of the warning light and the initiation of the target light (Rudisill and Jackson, 1992).

Data Analysis: A 3x2 ANOVA was conducted to analyze the effects of independent variables; age and gender on dependent variable; CTA. All statistical analyses were performed by using SPSS for Windows version 11.5.

RESULTS

The means and standard deviations of CTA as a function of two factors were presented in Table 1. The ANOVA revealed no significant interaction between age groups and gender, $F_{(2, 222)}$ = 0.80, p= .45, partial $\acute{\eta}^2$ = .01, whereas there were significant main effects for age groups, $F_{(2, 222)}$ = 9.14, p< .05, partial $\acute{\eta}^2$ = .08, and gender $F_{(2, 222)}$ = 11.21, p< .05, partial $\acute{\eta}^2$ = .05. The gender main effect yielded that female players (M= 87.03, SD= 3.26) have higher CTA scores than male players (M= 71.8, SD=3.17). The age main effect revealed that 10 year-old players (M=68.0, SD= 3.75) had significantly lower CTA scores than eight year-olds (M= 91.2, SD= 3.92). There was no significant difference between nine year-old players and others.

DISCUSSION

The purpose of the study was to investigate the effects of age and gender on CTA of junior tennis players. Results showed no significant interaction between age groups and gender. However, the gender main effect indicated that male players were more precise on CTA than female players. Bard et al. (1981) found the same result for 6-11 year-old children. Supportively, Brady (1996) studied the effects of sports classification and gender on CTA of 102 male and female students and found that men had lower absolute and constant error scores than women. Similarly, Kuhlman and Beitel (1989) investigated forty two 4-9 year-old children and stated that most of the boys had more competitive sport experience than girls, which was thought to be directly related with consistency in anticipation of coincidence.

Results of current study also indicated that 10 year-old players had significantly lower CTA scores than 8 year-old players. In other words, older players were more precise in CTA. This observa-

Table 1. Means and standard deviation for CTA

		N	Mean(m/s)	SD
Gender	Female	110	87.03	2.6
	Male	118	71.80	3.17
Age	8	77	91.20	3.92
	9	68	79.03	4.15
	10	83	68.01	3.75

tion agrees with the findings of Dunham (1977), Benguigui and Ripoll (1998), Williams et al. (2002), and Lobjois et al. (2006). Dunham (1977) conducted a study related with age and sex in CTA performance of boys and girls from ages of 7-11, and suggested that 7-year-olds' performance was inferior to those of all other age groups. Supportively, Williams et al. (2002) examined 162 regular tennis players from five age groups (10-11.5, 12, 13, 14, and 15 years). They found that coincidence timing performance of the youngest group is poorer than participants who were over the age of 13 years. They also reported that experience in playing and practicing tennis facilitates developing consistency in the laboratory situation. Additionally, Coker (2004) claimed that through practice, learners' capability to identify cues, idiosyncrasies and tendencies of opponents will improve, resulting in better anticipation of predictable events and the capacity to prepare required actions in advance.

In another recent paper, Benguigui and Ripoll (1998) noted that tennis practice has an influence on the development of CTA among younger children. They investigated 24 regional and 24 novice tennis players and reported that CTA was mainly developed between the ages of 7 and 10 years. They also pointed out that increase of accuracy in coincidence timing action across development depends on the fact that the efficiency of the perceptuo-motor coupling improves in accordance with age.

In conclusion, results of the study revealed that experienced tennis players were more precise than younger ones and the CTA of male players were more accurate than their female counterparts. These results can only be generalized to junior tennis players. Further studies are necessary to explore the differences in various sports and age groups.

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