

Outcome of the Teaching Games for Understanding (TGfU) approach when applied to tactical understanding of strategy and tactics in the game of tennis for young people.

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ABSTRACT

The goal of the present study was to determine if the “Teaching Games for Understanding” (TGFU) approach would help young tennis players (9-12) improve their strategic and tactical decisions as compared to tennis instruction using a traditional or strictly technical approach.

METHODS:

Instruction was carried out using the TGFU approach in the experimental group at a frequency of two sessions of 45 minutes per week over an eight-week period while the control group applied the so-called traditional technical approach. Two situations were taken into account during the study: 1) “service and return”; and 2) “volley exchange.”

RESULTS:

Results indicate that service return showed an improvement of 52%, on average, of attack balls between experimental and control groups. A reduction of approximately 19% in the percentage of defensive bullets was observed for the experimental group as compared to the control group. Taken together, they point to a significant improvement in performance and better tactical understanding when a TGFU-like approach is used. With respect to volley exchanges during a game, an increase of won balls by more than 34% in the TGFU group was noted.

CONCLUSION:

In conclusion, it can be observed that the TGFU group demonstrated a net superiority as compared to the traditional technology-oriented pedagogical approach to training.

KEYWORDS:

Tennis, learning and understanding the game; decision-making; educational intervention; cognitive sport; tactical understanding.

INTRODUCTION

Hopper (2007) has shown that the Teaching Games for Understanding (TGFU) approach has been less frequently applied to tennis than to other sports disciplines. Apart from McPherson and French (1991), who examined the TGFU approach, very few studies have focused on tennis. McPherson and French explain their positive results (in terms of technical improvement) by the use of direct technique-related instruction. Nonetheless, tennis remains a very promising area for the application of TGFU because of the challenges peculiar to this sport. Hopper (2007) asserts that playing tennis, by nature, can be frustrating: balls

regularly leave the court; students must wait their turn to be able to hit the ball, etc. Frustrations among younger players are stronger still, since they, as a rule, have not mastered the mechanics of the game as thoroughly as adults. Since the benefits and limitations of the TGFU approach have not yet been studied in children's tennis, the present study focuses on this age group. Thus, the aim was to ascertain whether the TGFU approach can have a beneficial effect on performance, and consequently, on tactical understanding in youth (age 9 - 12) tennis as compared with those who train using the technical approach.

Tennis instruction using methods that focus on technics, i.e., a technical approach, is sometimes labelled as a classical approach and appears to show some limits in developing young tennis players. In fact, it has been shown by Butler (2006) that young tennis players who have learned using traditional methods tend to abandon the sport prematurely (Butler, 2006; Mandigo et al, 2007; Bunker and Thorpe, 1982; Mitchell and Oslin, 1999; Turner and Martine, 1992). However, new approaches—including TGFU—have since been developed. These approaches place primary emphasis on strategy and tactics, and on a sense of enjoyment, to increase efficiency and trainee retention. So, in answer to the following research question: "What are the effects of TGFU approach on performance, and consequently, on the tactical understanding of the game in tennis among young people aged 9 to 12?" we hypothesized that young people would benefit from the TGFU approach by showing improved performance, and consequently, better tactical understanding of tennis when compared with those who train using the traditional technical approach.

METHODOLOGY

A total of 28 participants were recruited for the study and their physical characteristics are presented in Table 1. Participants were separated into two groups. The groups were randomly assigned as either experimental or control. The experimental group (n=14) followed a training program using the TGFU approach, while the control group (n=14) received "classical" tennis instruction based on the technical approach. Both groups trained for a total of eight weeks (16 sessions of 45 minutes each). The duration of the experiment was comparable to that found in the literature: Giménez, A. M., Valenzuela, A. V., & Casey, A. (2010).

EXPERIMENTAL PROCEDURE

The primary outcome variables were based on two sets of circumstances: (i) service and return; and (ii) volley exchange during the game. The service and return outcome was based on analysis of 20 successful service and return sequences. A total of twenty balls were randomly served in order to attain an equal opportunity of ten balls for each side (left and right). The coach for each group (experimental and control) conducted the service for each group and for all players.

The volley exchange situation was similar to the service and return situation explained above. Briefly, twenty exchange sequences, ten on each side, where the first tabulated return began after the player returned the ball delivered by the coach who conducted the volley exchange with all the players for both groups. All twenty balls were randomly served in order to eventually attain an average of ten balls for each side (left and right) with an exchange speed substantially similar for all players. During the volley exchanges, the coach was positioned at mid-court for the first ball exchange. The duration of ball exchanges in each sequence was taken into consideration.

Pre- and post intervention analysis was performed as thoroughly as possible on with both groups by comparing the score (ball in or out) measured on the field and with a posteriori video analysis. When discrepancies between the on-field scoring and video analysis arose, the on-field scoring was retained. This allowed us to verify apparent aberrant variables collected during the study; these, if truly aberrant, were then corrected. Training session protocol details are indicated in Table 1.

Table 1. Description and homogeneity groups (mean \pm standard deviation)

Variable	Groups		Value p
	Experimental (N = 14)	Control (N = 14)	
Age (years)	11,53 \pm 0,61	11,66 \pm 0,68	0,606
Weight (Kg)	36,72 \pm 7,50	34,71 \pm 8,28	0,508
Height (m)	1,48 \pm 0,10	1,44 \pm 0,06	0,316

STATISTICAL ANALYSIS

Analysis of the results was done first through a test of homogeneity of the two groups using the t test for continuous variables (age, weight, height) and a chi-square test for the gender-based variable. The performance of both groups was measured by using the elements of service and return, and volley exchange. Analysis of the service and return situation considered: i. the average of attack balls percentage; average defensive balls percentage; the average percentage of won balls; the average of unforced errors and stray bullets percentage. Analysis of the volley exchange situation considered the average percentage of earned bullets; the average unforced error percentage; the average percentage of stray bullets; the average volley exchange time; the correlation between volley exchange time and percentage of balls won and lost observed before and after the intervention.

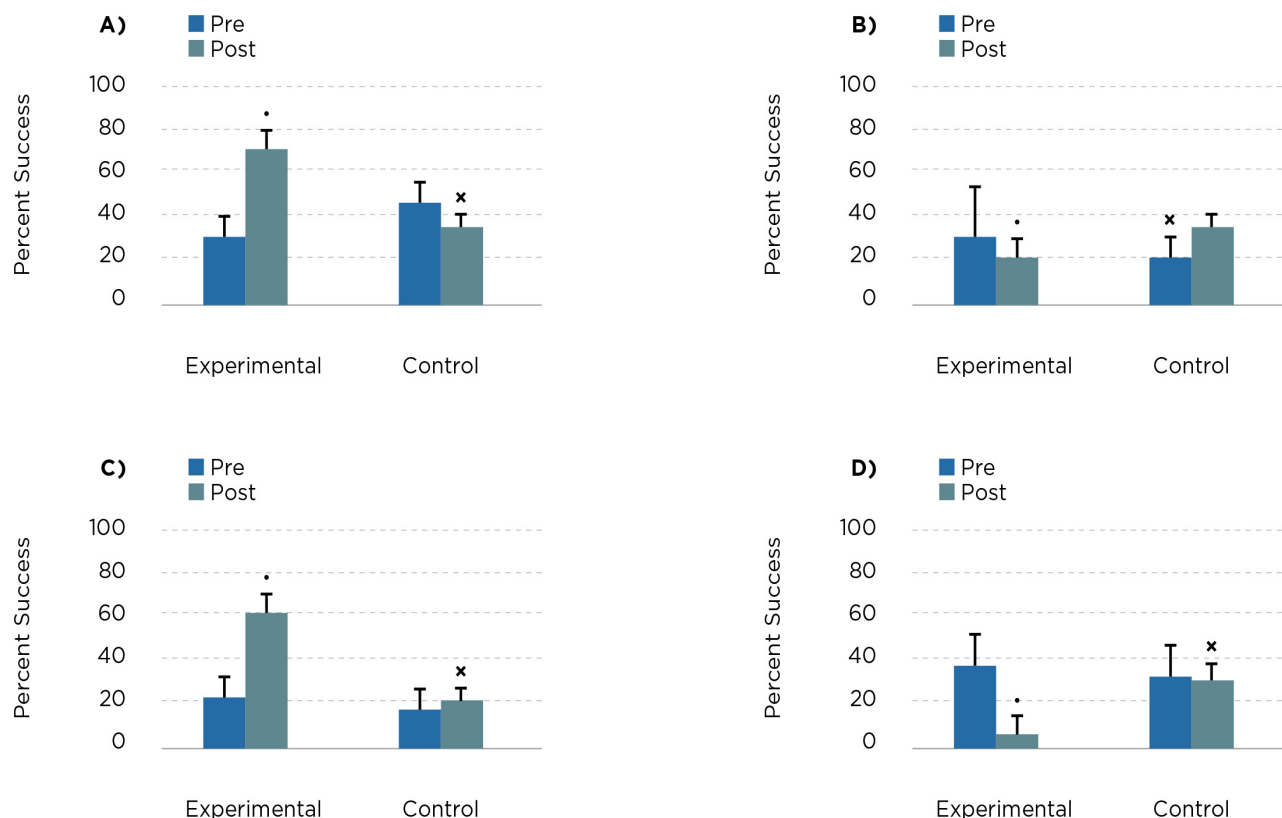
The performance comparison was made with ANOVA for repeated measures of two factors: time at two levels

(pre- and post-test) and a non-repeated factor at two levels (experimental and control). A significant intervention effect was observed when the interaction term time * group was significant. If the group * time interaction was significant, subsequent analyses were conducted to study the effect time separately for each group as well as to compare the groups at each time. Analysis was performed using SPSS Version 21 software with an alpha significance level of 5%.

RESULTS

Figure 1 illustrates the pre and post-test differences obtained on the percentage of attack, defensive, won and lost balls by each group (experimental vs control). The coaches attempted to control to the maximum possible extent service speed to all players. The results that in the experimental group (Fig. 1A), there was a significant ($p < 0.001$) 43 % points increase in average attack balls ($26\% \pm 8\%$ to $69\% \pm 9\%$) that contrasted with a significant ($p = 0.002$) 9 % points decrease in the control group ($42\% \pm 10\%$ to $33\% \pm 5\%$).

Figure 1. Percentage of balls successfully treated following the return service situation and volley situation by the experimental and control groups. A) Percentage of attack balls; B) Percentage of defensive balls; C) Percentage of won balls; D) Percentage of lost balls. Dark vertical bars represent before treatment (pre) and light vertical bars represent after treatment (post). Significance at $p < .05$; * within group differences; † between group differences.



It follows that a decrease in gap for defensive balls was observed on the order of roughly 19 % points for the experimental group compared with the control group, as shown in Fig. 1B. For the experimental group, there was a significant ($p = 0.021$) 10 % decrease in defensive balls ($31\% \pm 17\%$ to $21\% \pm 8\%$). In contrast, there was a non-statistically significant increase of 8 % in the control group ($19\% \pm 8\%$ to $28\% \pm 14\%$; $p = 0.100$). The difference in the evolution of time between the experimental and control group was statistically significant ($p = 0.007$) with an ES of 1.2 (Cohen's d). Initially, i.e., pre-intervention, the average defensive ball percentage was statistically higher in the experimental group versus the control group ($31\% \pm 17\%$ versus $19\% \pm 8\%$, respectively; $p = 0.030$). After the intervention (post), the 7% difference observed between the two groups was not statistically significant ($21\% \pm 8\%$ compared to $28\% \pm 14\%$; $p = 0.145$), but nonetheless, the experimental group appears to show a reduction in the number of defensive balls.

The average percentage of balls won, as shown in Fig. 1C, before the intervention (pre) was not statistically different between groups ($21\% \pm 14\%$ versus $15\% \pm 8\%$; $p = 0.172$). After the intervention (post), however, a statistically significant difference of 39 % points was observed between the two groups ($59\% \pm 12\%$ versus $20\% \pm 8\%$, $p < 0.001$). As well, there was a significant ($p < 0.001$) increase in the proportion of balls won in the experimental group ($21\% \pm 14\%$ to $59\% \pm 12\%$, representing a 38 % increase), whereas

in the control group, it was not statistically significant ($15\% \pm 8\%$ to $20\% \pm 8\%$; an increase of 5%; $p = 0.089$). This difference according to time (pre- vs post-) was statistically significant ($p < 0.001$) and corresponded to a 3.3 effect size (Cohen's d).

Before the procedure, as indicated in Table 2, a significant correlation was observed between exchange time and the percentage of won balls ($r = 0.591$; $p = 0.001$). This significant linear association indicates that the percentage of won balls is directly proportional to the duration of volleys (see Fig. 2A, dashed line). A similar result was observed for lost balls, but was inversely proportional to volley exchange time (Fig. 2C, dashed line), suggesting that longer volley exchange durations resulted in a decrease of lost balls ($r = 0.589$; $p = 0.001$).

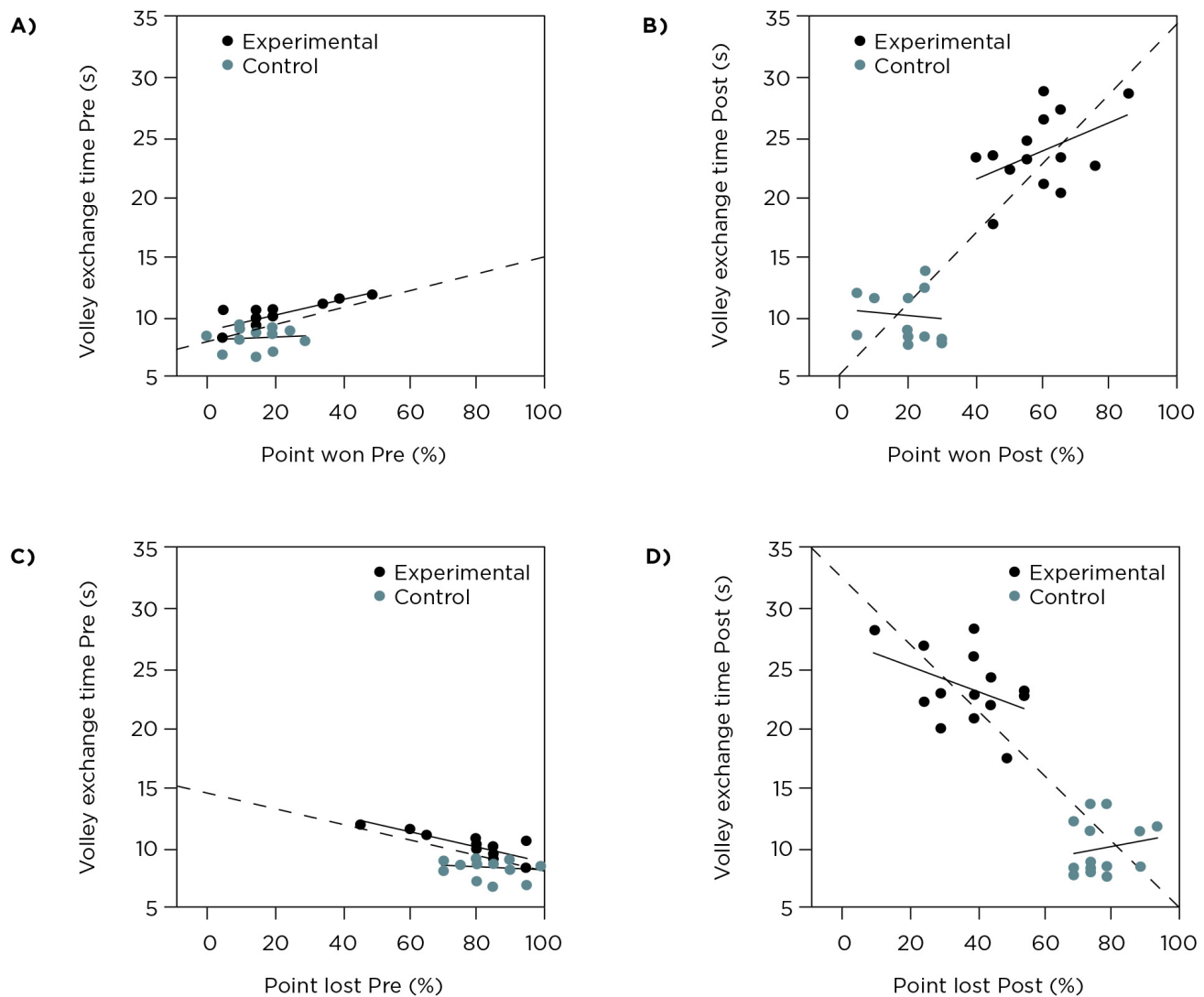
After the intervention, as shown in Table 2, similar but stronger correlations ($r = 0.875$, $p = 0.0001$) were observed between the exchange time and the percentage of won balls (Fig. 2B, dashed line) and for lost balls ($r = 0.871$, $p = 0.0001$; Fig. 2D, dashed line).

Individual group analysis shows that correlations are different between the two groups (see Table 2 and Fig. 2, black circles and white circles). Before the intervention, the correlation between the exchange time and the percentage of won balls is significant in the experimental group ($r = 0.817$; $p < 0.001$) but not in the control group ($r = 0.090$; $p = 0.758$). A similar result is observed for lost balls ($r = -0.825$; $p = 0.003$ and $r = -0.126$; $p = 0.668$, respectively).

Table 2. Pearson correlations between exchange time and percentage of games won and lost balls

Variable	Relationship of variable with exchange time	
	Pre	Post
All subjects (N = 28)		
% Won balls	0,591 (0,001)	0,875 (0,0001)
% Lost balls	-0,589 (0,001)	-0,871 (0,0001)
Experimental Group (N = 14)		
% Won balls	0,817 (<0,001)	0,443 (0,112)
% Lost balls	-0,825 (<0,001)	-0,417 (0,138)
Control Group (N = 14)		
% Won balls	0,090 (0,758)	-0,09 (0,751)
% Lost balls	-0,126 (0,668)	0,18 (0,537)
Numbers represent r values (p values)		

Figure 2. Relationship between volley exchange time and the percentage of won and lost balls before (pre) and after (post) the intervention for all participants (dashed line), the experimental group (dark circle symbols) and the control group (white circle symbols).



After the intervention, there are no longer significant correlations between volley exchange time and the percentage won and lost balls, regardless of group. However, it is clear from Fig. 2B and D that the experimental and control groups (black circles and white circles) show substantial differences.

DISCUSSION

It emerges that two months of TGFU intervention with young tennis players (age 9-12) leads to an improvement

in their tennis performance through improved tactical understanding and better game playing. In the current study, a change in the mastery of the game pre- and post-intervention was noted, a point also mentioned by McPherson and French (1991).

It was likewise observed that young people in the experimental group started to adopt better field position and became faster during the course of the experiment. This may have occurred because of a better understanding of the tactical aspects of the game that as has also been reported by Crespo and Machar (2002).

In situations of service return, this indicates a significant improvement in performance and a better tactical understanding for the group that used the TGFU approach. This situation approximates the vision of authors French and McPherson (1992) and McPherson and Thomas (1989) who argue, for example, that tennis players who are instructed in the tactical approach tend to develop a game plan involving many tactical responses when compared with those involved in a real-game volley exchange situation, where the experimental group enjoyed more than a 34% superiority in terms of balls won (Figure 1). Consequently, it can be argued that the latter group was able to enjoy the benefits of the TGFU approach as documented by Hopper (2007). Likewise a 35% greater reduction in stray bullets (Figure 1) was identified in the experimental group as compared to the control group. This may well indicate a better tactical understanding of the game as McPherson and French underscore (1991) as well as McPherson and Thomas (1989) as compared to the technical approach.

CONCLUSION

In conclusion, it is quite clear that the experimental group evidenced a net difference as related to the control group that was trained with technical oriented training approach. Similarly, it would appear that training with the TGFU approach promotes improved performance with better understanding of the tactics of the game. Our data indicate that the use of the TGFU approach could help improve performance and, consequently, tactical understanding of the game of tennis. We conclude that such research tends to improve the state of knowledge of the educational aims of the TGFU approach to performance and tactical understanding of the game of tennis for young players aged 9 to 12.

Table 3. Protocol session determinants

Tactical Problem	Lesson Focus	Objective
Setting up attack by creating space on opponent's court	Awareness of court	Understanding the concept of creating space
Setting up attack by creating space on opponent's court	Understanding the value of forcing opponent to the baseline	Creating space using ground strokes
Defending space on your own court	Getting to the net to attack	Ability to push opponent back with strong ground strokes
Winning the point.	Getting to the net to attack.	Approach shot to net.
Winning the point.	Winning the point using the volley	Using a volley to win a point
Defending space on your own court.	Recovery to center baseline.	Recovering to center baseline between shots.
Defending as a pair.	Two-back formation.	Using a two-back formation in doubles.

Adapted from Griffin, L. L., Mitchell, S. A., & Oslin, J. L. (1997).



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