99 - ATTENTIONAL STRATEGY AND TENNIS PERFORMANCE

LAURENT OLIVIER ABES
LANESPE and NETEC, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil.
laurentabes@hotmail.com

Nowadays, tennis has an intense component of agressiveness, basing mainly its effectiveness on the power and efficiency of the serve, therefore this stroke is proven to be one of most important of the game (GARCÍA, DAMAS & FUENTES, 1999). The tennis serve also is a self-paced activity in wich the player controls the situation and its performance depends almost exclusively on the technical, physical and psychological conditions of the player before and during its performance. Moreover, among the diverse psychological aspects involved, an adequate attention is essential to have a good performance, therefore in spite of having few cues in which the attention must be focused, there is a high number of irrelevant information present during the match (WEINBERG, 1988). Based in these facts, this research aim to study the psychological phenomenon of the attention and the existing relation between the attentional strategy and the performance in tennis sport, more precisely on serve stroke.

This study is a field research of attention, with amateur tennis players of several technical levels and ages, which compares its results with those obtained from other sports and cognitive acivities studies.

This research establishes the following problem of research: is there a difference between external and internal attentional focus and tennis first serve performance?

The main objective is to verify in tennis serve performance the differences between tennis players with external and internal attentional focus.

Attention is the process that directs our vigil when the information is caught by our senses, it also can be seen as a mechanism that consists in the stimulation of the selective and directed perception (GUALLAR & PONS, 1994; MARTENS, 1987; SAMULSKI, 2002).

NIDEFFER (1976 apud SERVERA & ESCUDERO, 1994) elaborated a two-dimensional model to illustrate the four types of focus of attention. These two dimensions are the width of the focus (wide or narrow) and the direction (internal or external). Four types of focus can be identified: wide internal, wide external, narrow internal and narrow external attentional focus (CERVELLÓ,1999). When an individual maintains the first type of focus they are capable of organizing and integrating a great number of thoughts and perceptions, is the best type for an analysis and for a plan of action. The second type allows the subject to explore, to perceive and to organize a great number of external cues. It is the best attentional focus to be used in complex situations and with a great number of information. The third type assists the person to focus their attention on one definitive line of thought, and it is indicated to solve concrete problems or for meditation. The last attentional type helps the individual focus the attention on a more or less complex activity preventing the distractions, with the objective of accomplishing one definitive action. It is usefull for a great number of sports. The wide focus is related with a great number of information and the narrow focus with only one or two more important cues. On the other hand, the direction of the focus refers to directing the attention for external or internal aspects of the individual.

To be able to better understand the activity studied in this research it is important to know a little more of its characteristics. The tennis serve can be considered a self-paced activity, that is, this type of activity is realized in a relatively steady and predictable environment. In addition to this, it has na adjusted time to be prepared and acheived (SINGER, 2001 apud LINDOR & SINGER, 2003; LINDOR & SINGER, 2003). In the tennis serve, the player has control on the situation, on the ball and has enough time to decide what to do. Moreover, the authors affirm that in this type of task the athlete can prepare a strategy, a plan of action, a protocol, a routine or a ritual daily before the performance.

Several studies had already been carried out relating the attention strategy type with the performance. RADLO, STEINBERG, SINGER, BARBA & MELNIKOV (2002) in their research with individuals that had to launch darts trying to hit a target on the wall and whom were divided in two groups, one with internal focus and another one with external focus. The results had shown that the participants who had committed less errors were those who received the orientation, between each try, to keep an external focus.

An other study, realized by SHEA & WULF (1999), has evaluated the influence of the attention on an external or internal focus (groups 1 and 2) and of the feedback of external or internal focus (groups 3 and 4) on the learning. The task accomplished by the subjects was of staying balanced on a stabilometer (equipment to evaluate the balance). The results indicated that the group of external focus a had a better learning. Other authors, WULF, MCCONNEL, GÄRTNER & SCHWARZ (2002) realized a study with two field experiements, one with volleyball and the other one with soccer, studying the type of feedback (of external or internal focus) and the performance. The results showed that giving a feedback of external focus influenced more positively in the acquisition and improves as in the motor task precision as in the mechanics of the movement than a feedback of internal focus.

Another research emphasizing the type of focus was developped by LIAO & MASTERS (2002) with university hockey and basketball players. In the first experiment, two teams of hockey, a male and to another female, had participated of the study. The results indicated that stress would make the athletes cocentrate on themselves. Moreover, the two teams lost theirs games. The other experiment was done with beginning basketball players, in two phases, and were divided in control group and experimental group. The task was to realize free throwing shots. The results reveled that in a stressfull situation the players with an internal focus of attention, shown a decrease in their performance.

METHOD

This study is a descriptive field research and has been realized in a sport association in the city of Florianópolis. The data was collected in the tennis courts from the association.

Population and sample

The chosen population for this study was the amateur tennis players from Florianópolis. The sample was composed by 12 male tennis players (11 right-handed and 1 left-handed) to one sport association. The age of the subjects varied between 14 ans 45 years old. These participants were selected according to their level and experience of competition (beginners, intermediate and advanced) through a profile questionnaire.

Instruments

A questionnaire has been used to evaluate the players profile. Protocol of data collection was used for scores record of the serves executed during each session.

Proceedure

The profile questionnaires were delivered to the voluntary tennis players.

12 participants/subjects were selected to be categorized in three technique levels: beginners, intermediate and advanced, with four tennis players in each category. To define categories, the technical level and competition experience were used. The average age mean from the external focus group was 26,33 years (± 9,96) and from the internal focus was 26 years (± 9,01). 10 of the participants were tennis students and 2 were olny tennis players.

In each one of the three groups two participants were chosen randomly to compose the external and internal focus groups, just like it was done in RADLO et al. (2002) study, and two tasks were attributed: focus attention on a pre-established target before and during the performance of each tennis serve (external focus group), and focus attention on the tennis serve technique (internal focus group).

The research was done at the end of the tennis classes of each student (for 7 players the duration of the class was 30 minutes and for 3 it was 1 hour class), and for the players who were not students, the data was collected after a one hour tennis match in each session. The data was collected in three moments of the day: in the morning, in the afternoon and in the evening according to the participants availability.

Each tennis player had 10 to 15 warming tennis serves and then, each participant realized 20 serves as if they were playing a real tennis match (powerful and without effect serves), trying to hit 5 pre-established target. The tennis player was instructed to take only one ball at the time with the objective of keeping a 10 t0 20 seconds interval between each serve, just like it happens in a real match. Three sessions were realized for each group, and the total score of each player was recorded.

Evaluating the serve

Each serve box was divided in three areas (fig. 1), so that when the player could score zero to three points depending on the hitten target (area). The score of each target was defined according to the difficulty level of the task.

The tennis player had to serve 5 time in each of the following targets: « cross-court in the deuce court » (AI), « down the line in the deuce court » (FI), « down the line in the advantage court » (FV) and « cross-court in the advantage court » (AV), totalizing 20 serves. The target area was defined according to the difficulty level (WULF et al., 2002) of success and to the difficulty level of the opponent's return.

Legend
AI - cross-court in the deuce court
FI down the line in the deuce court
FV down the line in the advantage court
AV cross-court in the advantage court
Int. Intermediate area
PI Deuce court serve position
PV Advantage court serve posititon

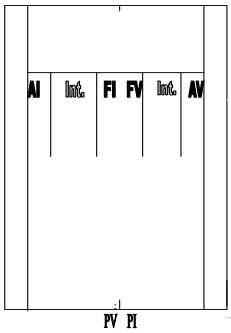

Fig.1. Target areas of the tennis court.

Data analysis

After collecting the data, the mean (M) and standard deviation (SD) of the serve performance of each player was calcutaded (table 1).

After that, the data from the groups were compared: external and internal focus. The mean and standard desviation of each player scores from the groups were calculated. It was observed that the external focus group reach a higher mean of points (26,33) that the internal group (22), but the SD of the external group was higher (7,03) than the internal group (5,71) too. The variance analysis (Anova) showed that the difference of scores between the groups was significant ($F = 5,36$, $p<0,01$).

Table 1.
Serve performance during sessions.

Suject	Focus	Session 1	Session 2	Session 3	M	SD
A	Internal	18	30	30	26	6.93
D	Internal	19	18	30	22.33	6.66
E	External	26	34	45	35	9.54
G	External	25	27	29	27	1.41
L	Internal	23	27	24	24.67	2.08
R	Internal	20	12	21	17.67	4.93
T	External	14	8	26	16	9.16
V	External	18	20	23	19	1.41
F	Internal	16	17	18	17	0.71
C	Internal	23	26	24	24.33	1.53
P	External	36	20	31	29	11.31
L2	External	27	35	34	32	5.66

Note: Suject L2 reach the higher mean (32 points) and subject T had the smaller mean (16 points).

Considering the precision of the executated serves (fig.2), it can be observed that the external focus group had a better average of successfull serves on the desired target (3 points) than the other group (31,12% against 19,72%). Nevertheless, the average of serves hitting the intermediate (2 points) was higher for the internal focus group (24,69% against 19,43%). In the third area (1 point) the internal group also had a higher average (1.38% against 0,28%) and, the average of serves that did not hit the areas was 49,17% for external focus group and 54,21% for the internal focus group.

To have a better view of the serve precision, it was considered only those serves that hit one of the three areas (fig.3). It can be observed that the external focus group reached a higher average on the desired target (3 points) (61,22%) that the internal focus group (43,06%). Considering the intermediate area (2 points) the internal focus group had the higher average (53,935% against 38,22%). The internal focus group hit more serves in the third area (1 point) too (3,01% against 0,55%).

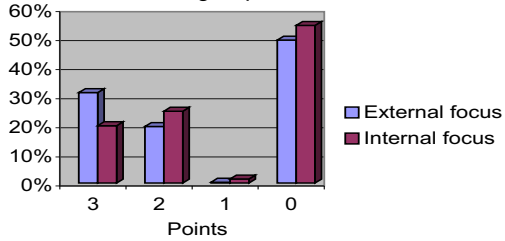

Fig.2. Serve precision considering attentional focus type.

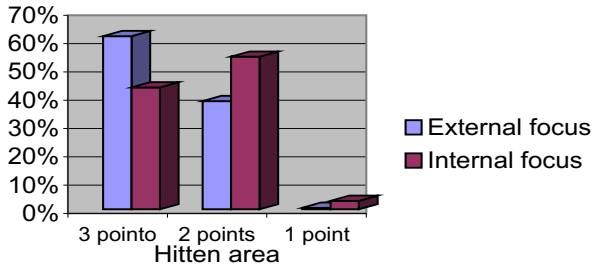

Fig. 3. Successfull serve precision considerig attentional focus type.

DISCUSSION

Considering the attentional strategy used during the serves, it was observed that the external focus group reached a higher mean score (26,33) than the internal focus group (22) and had a SD higher too (7.03 against 5.71). In spite of the fact that the SD of external focus subjects was higher than the other group, this data confirm the results of several previous researches (LIAO & MASTERS, 2002; RADLO et al., 2002; WULF et al., 2002). This data seems to show that self-paced activities (LINDOR & SINGER, 2003), such as basketball free throw, tennis or volleyball serve, soccer penalty, and so many other sport situations, the best way to be prepared is to use external attentional focus before the execution of the task.

When the serve precision is analysed, the results showed that external focus group hit a higher number of serves on the desired target (31.12%) than the other group (19.72%). In addition, the external group reached a smaller average of wrong serves than the internal group (49.17% against 54.18%). The external focus group hit less serves in the intermediate area (19.43%) and in the third area (1 point) (0.28%) than the other group (24.69% and 1.38%), showing a greater precision in tennis serves when they were executed with an external attentional focus. These results are supported by other previous studies (Wulf et al., 2002; Radlo et al., 2002).

Considering only the successfull serves, the difference between two groups is clearer because the external focus group hit 61,22% of successfull serves in the desired target and 38.22% in the intermediate area, while the internal focus group reaches 43,06% of successfull serves in the desired target and 53,93% in the intermediate area. This result showed the greater precision of the serves when these were executed with an external attentional focus.

CONCLUSION

This study has presented methodological differences from the previous researches consulted: The study was realized with amateur tennis players with a higher age difference between them;

•The data was collected individually, on tennis court, at the end of the tennis classes, in conditions closer to the real match situation.

The research has shown a relation between the attentional strategy (internal or external focus) and the tennis serve performance, for the group that used the external attentional focus reached a higher mean scores peforming the serves, caracterizing the external attentional focus as the most efficient way to focus for that task. In addition, this group had also a greater precision in the serves.

Concluding, this study intented to better understand the attention phenomenon, highlighting the need of other researches on this subject. It could be studied in different conditions, such as: in laboratory, in field situation (during practice and competition), to understand in a better way what the amateur athlete needs in several sports and to provide a best practice quality, a smaller load in the training, and acceleration of learning process. At last, it could help a greater number of athletes to reach their goals.

REFERENCES

CERVELLÓ, E. M. G. 1999. Introducción al entrenamiento psicológico. In J. P. F. García (Org.). *Enseñanza y entrenamiento del tenis*. Cáceres, Espanha, Universidad de Extremadura, Servicio de puclicaciones. 145-182.

GARCÍA, J. A. H., DAMAS, J. S. A., FUENTES, J. P. G. 1999. *Entrenamiento en balonmano, voleibol y tenis*. Badajoz, Espanha, Universitas Editorial.

GUALLAR, A. & PONS, D. 1994. Concentración y atención en el deporte. In I. Balaguer (Org.), *Entrenamiento Psicológico en el Deporte*. Valencia, Espanha, Albatros Educación. 207-245.

LIAO, C., MASTERS, R. S. W. 2002. Self-Focused Attention and Performance Failure Under Psychological Stress. *Journal of Sport & Exercise Psychology*, **24**, 289-305.

LINDOR, R., SINGER, R. N. 2003. Preperformance Routines in Self-Paced Tasks: Developmental and Educational Considerations. In R. Lindor & K. P. Henschen (Org.), *The Psychology of Team Sports*. Morgantown, Estados Unidos da America, Fitness Information Technology, Inc. 68-98.

MARTENS, R. 1987. *Coaches guide to sport psychology*. Champaign, Estados Unidos, Human Kinectics Publishers.

MURRAY, J. F. 2002. *Tenis inteligente: Como jugar y ganar el partido mental*. Barcelona, Espanha, Editorial Paidotribo.

RADLO, S. J., STEINBERG, G. M., SINGER, R. N., BARBA, D. A. & MELNIKOV, A. 2002. The influence of an attentional focus strategy on alpha brain wave activity, heart rate, and dart-throwing performance. *International journal of sport psychology,* **33** (2), 205-217.

SAMULSKI, D. M. 2002. *Psicologia do esporte*. Barueri, Manole.

SEVERA, M. & ESCUDERO, J. T. 1994. La utilización del TAIS en el ambito deportivo: Una reflexion. *Revista de Psicología del Deporte,* **6**, 55-78.

SHEA, C. H. & WULF, G. 1999. Enhancing motor learning through external-focus instructions and feedback. *Human movement Science*. **18**, 553-571.

WEINBERG, R. S. 1988. *The mental advantage: Developing your psychological skills in tennis.* Champaign, Estados Unidos: Leisure Press.

WULF, G., MCCONNEL, N., GÄRTNER, M. & SCHWARZ, A. 2002. Enhancing the learning Sport Skills through External-Focus Feedbac. *Journal of Motor Behavior*, **34**(2), 171-182.

Endereço: R. Luis Pasteur, 362, Trindade 88036-100 Florianópolis, Santa Catarina, Brasil.
Fone: (048)9112 2357 E-mail: laurentabes@hotmail.com

ATTENTIONAL STRATEGY AND TENNIS PERFORMANCE
SUMMARY

In sport, the adjusted attentional focus use can assits to better performance. In tennis, this can be highly relevant, mainly in the serve, which is nowadays on of the most important tennis strokes. The study objective was to verify the tennis serve performance differences between tennis players using external and internal attentional fcous. 12 tennis players were selected and divided in two groups. The subjects served trying to hit targets. The first group was performing with na external focus and the other one with na internal focus. Results were analysed, calculating the mean, standard deviation (SD)and variance. The exrternal focus group achieved a 26,33 points and the internal group reached 22 points, with a SD of 7,03 for the fisrt group and 5,71 for the second. The results are in the same way of those reveled by previous researches realized with other sports, confirming a possible relation between external attentional focus and tennis serve performance.

Key words: Tennis, attention, sport psychology.

STRATEGIE ATTENTIONNELLE ET PERFOMANCE AU TENNIS
RESUME

Dans le sport l'utilisation adequate de l'attention peut aider à améliorer la performance. Au tennis, cela peut être de grand recours, principalment au service, qui est actuellement um des gestes les plus importants du jeu. L'objéctif de la recherche fu de vérifier les différences dans la performance du service au tennis, parmi des joueurs utilizant deux types d'attention (externe et interne). 12 joueurs de tennis furem selectionnés et séparés em deux groupes. Les sujets ont fait des services en essayant d'atteindre des cible correspondant à une ponctuation variant de zéro a trois points. Le premier groupe en employant une attention externe et l'autre une attention interne. Les résultats furem analysés en therme de moyenne et de variance. Le groupe en attention externe a réussi à atteindre une moyenne de 26,33 points et celui attentif internemant à atteint 22 points avec une variation de 7,03 pour le premier et de 5,71 pour le second. Les résultats confirment ceux obtennus par d'autre études et démontrant, pourtant, une possible relation entre une attention externe et une meilleure performance au service.

Palavras chave: Tennis, attention, psychologie du sport.

LA FOCALIZACIÓN DE LA ATENCIÓN Y EL RENDIMIENTO EN EL TENIS
RESUMEN

En el deporte la utilización correcta de la atención puede ayudar en la mejora del rendimiento deportivo. En tenis eso puede ser muy relevante, principalmente en el servicio, que es actualmente uno de los gestos más importante del juego. El objetivo de la investigación fue de verificar las diferencias en el rendimiento de servicio entre lujadores actuando con dos tipos de atención (externa y interna). 12 jugadores fueron seleccionados y separados en dos grupos. Los participantes hicieron servicios intentando acertar blancos con una puntuación de 0 a 3. El primer grupo actuando con atención externa y el segundo con atención interna. Los resultados fueron analisados con la media, la desviación estandard y la variancia. El primer grupo logró una media de 26,33 puntos y el segundo de 22 puntos, con una desviación estandard de 7,01 para e primero y de 5,71 para el outro. Los resultados corroboran con aquellos de outras investigaciones y, por lo tanto, muestran una relación entre el tipo de focalización de la atención y el rendimiento de servicio en tenis.

Palabras clave: Tenis, atención, psicología del deporte.

FOCOS DE ATENÇÃO E DESEMPENHO NO TÊNIS
RESUMO

No esporte o uso do foco de atenção adequado pode auxiliar na melhora do desempenho. No tênis, isto pode ser de grande relevância, principalmente no saque no saque, que atualmente é um dos golpes mais importantes. O objetivo da pesquisa foi verificar as diferenças no desempenho no saque de tênis entre tenistas com focos de atenção externos e internos. Foram selecionados 12 tenistas, separados em dois grupos. Os sujeitos sacaram tentando acertar áreas marcadas com pontuação variando de zero a três. O primeiro atuando com um foco externo de atenção e outro utilizando um foco interno. Os resultados foram analisados em termos de média e desvio padrão. O grupo atuando em foco externo obteve uma pontuação média de 26,33 pontos e o grupo de foco interno atingiu uma pontuação média de 22 pontos, sendo que o Desvio padrão foi de 7,03, para o primeiro grupo e de 5,71 para o segundo. Os resultados condizem com os dados obtidos por pesquisas realizadas com outras modalidades, confirmando, portanto, haver uma possível relação entre o foco de atenção externo e um desempenho superior no saque de tênis.

Palavras chave: Tênis, atenção, psicologia do esporte.