

EFFECT OF THE INDIVIDUAL REGULATION METHOD ACCORDING TO THE DUAL CODING IN IMPROVING THE VISION SPEED AND LEARNING THE FRONT AND BACK SHOT SKILLS OF TENNIS

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Abstract: This study aims to identify the effect of the individual regulation method according to the double-coding in improving the vision speed and learning the skills of front and back shots in tennis. The researcher used the experimental method with three equal experimental groups. The study included a random sample of 66 students from the College of Physical Education and Sport Sciences at the University of Baghdad for the academic year 2018-2019. The study sample represents 30% of the target population. The research groups were classified using the double-coding scale. The number of learners in the first group is 24 (image coding), the second experimental group (verbal coding) (n = 20), and the third experimental group (double-coding) (n = 22).

Keywords: double-coding, regulation method, target population, sport, Sport Sciences

INTRODUCCIÓN

To measure the dependent variables, the vision speed test was adopted for the visual response speed of the modified color stimulus of the Nelson test, the front and back shot tennis tests (Ground Stroke Accuracy). The learning method was applied. For each skill, four educational sessions were allocated without any difference in experimenting with this independent variable for the three groups. After accomplishing the experiment, the pretest and posttest results were processed using the statistical package for social sciences (SPSS) version 26 for windows, Chicago, IL. The study results revealed that the displayed model and the number of the performance with the freedom of individual regulation in the regular tennis field in improving the visual speed for the learners. Giving a freedom in for the learner according to what he/she is characterized by of coding for information helps him/her to individually regulate his/her educational activity in learning the skills of front and back shots in tennis. Furthermore, the individual learning method fits the double-coding learners and be more appropriate from them compared to learners with other information coding in the skillful learning in tennis. It is necessary to pay attention for individualizing the teaching in the practical lessons for tennis and integrating the cognitive and behavioral learning in order to better achieve the objectives of the skillful learning.

Keywords: Individual Regulation; Double-Coding; Vision Speed; Front and Back Shot Skills of Tennis

Although kinetic behavior depends on the skills the learner displays when judging the level of his/her skillful motor learning, we cannot overlook the role of the brain and thinking and the processes that occur in it for this type of human learning.

Obaid and Afaah (2003) state: "The results of research related to the two hemispheres have displayed that we have two different but complementary methods of processing information.

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The human brain processes information in two different ways. The right hemisphere of the brain specializes in rebuilding and installing parts to form an integrated whole. It also recognizes the relationships between separate parts and it does not move linearly but rather works in parallel, while the left side is linear (step by step) and analyzes the parts that make up patterns."

"The idea of dual coding theory is based on the ideas of the owner of this theory, which is Paivio, which is known as the dual representation. This theory assumes that there are two different systems for visualizing and processing information, but they are related. The first system is known as verbal coding and is specialized to process and represent verbal information arranged in a specific sequence. As for the second system, which is known as visual coding, it specializes in the representation of spatial information. Paivio also emphasized that the human brain contains multiple cognitive structures that constitute the methods of thinking which may be in the form of pictures, linguistic, tactile, auditory, or mental images. These structures exist at different locations of different neural inputs. He also indicated that words that are difficult to imagine are more difficult than words that have pictures in mind (Al-Zaghlol & Al-Zaghlol, 2003).

Al-Samawi states, "The nature of the symbol lays in that nothing can just replace another, and it is not sufficient to merely signify, since the two parties are the party of the indicative relationship and the party of the denoted object work together" (Al-Samawi, 2011).

Shepherd quotes for Qattami is that, "Theorists believe in dual coding: that the stored encodings are not pictures but similar representations or similar memories, that the imaginations are related in their composition to the real things in the same sense that they include the keys and the locks associated from a sensory point of view that the keys and its lock completely different. The appropriate key will open the specified lock, and that there are specific things that will activate the nervous processes in which things are represented. Also, individuals can code and store in both systems and one of the two coding systems can be more effective and easier than the other, as the process of verbal stimuli occurs in a sequence. While, the visual processing of sensory stimuli occurs all once (Qattami, 2005).

Abdul-Hameed, S. & Khalifah, A. (2000) also mentioned, "The nature of mental

images and imagination drew the philosophers' attention before the birth of cognitive psychology, as it is an essential and effective element in the system of thinking and mental activity. The imagination was defined by more than one definition, the most important of which is psychological activity during which the processes of installation and merging between the components of memory and perception and between mental images that was formed by past experiences, and the formation of the outcomes of all of these new mental forms and forms."

Kantor sees it as "the form in which people communicate, and symbols of language are the most common symbolic systems in different patterns, and there are illustrations and logical presentations, as well as special symbolic systems" (Kantor, 1996).

Felder and Sifferman, quoting Awwad and others, state that "individuals are divided into verbal versus visual, and that visual individuals deal with what they see well, whether it is picture, diagram, graph, films, or illustrations."

As for verbal individuals, they deal more with letters, words, sentences, written texts and verbal instructions. In fact, individuals learn better when information are presented visually and verbally. They affirmed that most people are visual thinkers, that is, they understand more by using pictures, graphics and illustrations, but a good learner is able to process the information, whether verbally or visually presented" (Awad et al., 2012). The speed factor in the performance of the front and back shots skills of tennis requires users to improve the range of visions through improving the visual response to the tennis court's boundaries and toward the ball and estimating its speed to control the muscles via the appropriate stimuli to face these tasks.

Shehata states, "The clarity of vision and perception can only be achieved with attention and visual intact" (Rabeea, 2010). Abu Jado (2003) states, "The theory of learning; from an information processing perspective, focuses on attention, but it does not neglect the results of research related to the concept of vision and perception."

Zaghlol and Others (2001) see, "Through the presentation processes and then the use of the information revenue (feedback), a positive impact can be made in building and developing the motor perception." Since modern schools of

different kinds of learning emphasize increasing the learner's activity and activating his/her role in the educational process, the individual regulation according to what he/she codes in his/her brain is considered to be controlling the type of this regulation.

Pintrich and Schunk (2004) points out that the individual regulation method "is the process in which the learner maintains a level of perceptions, behaviors, and emotions directed toward achieving certain goals and they are driven toward achieving these goals. They carry out self-regulation activities they believe that these activities will help them achieve their goals" such as listening to information, the question about any ambiguity in the material).

Pintrich (2000) defines it as "a purposeful and active process, where learners set their learning objectives and then attempt to monitor, regulate, and control their cognitive, motivational, and behavioral characteristics, and their attitudes in the educational environment."

Zimmerman (2008) defines it as "self-directed processes and self-beliefs that transform a student's mental abilities - such as language preparation - into an academic performance skill - such as writing - which is a form of frequent activity that students does to gain an academic skill, such as setting goals, reviewing and selecting strategies, and effective self-monitoring, in contrast to the types of activities that occur for unconscious reasons."

From the researcher's observation of learning the front and back shot skills of tennis for students of the College of Physical Education and Sports Science, it was found that this process requires their teachers to consider the individualization of education according to the characteristics of the learner himself/herself to parallel the goals of international schools in learning to give him/her the role, energy, and freedom according to the determinants of regulation and control over the course of the educational process in the lesson.

This study aims to identify the effect of the individual regulation method according the dual-coding in improving the vision speed and learning the skills of front and back shots in tennis. The researcher hypothesized that there are statistically significant differences in the values of the pretest and posttest of the visual speed and learning the skills of the front and back shots in tennis for the three experimental groups at a significance level of 0.05. Furthermore, there will be statistically significant differences in the values of the visual speed and learning the skills of the front and back shots in tennis in the posttest time at a significance level of 0.05.

Methods

The researcher adopted the experimental research method, which is defined as "objective observation of a specific phenomenon that occurs in a situation characterized by control and includes a variable (factor) or more varied, while other variables (factors) are not manipulated." (Allawi&Ratib, 2017), in a manner fits the research hypotheses and classification of the dual coding scale (photic, verbal, and dual). The experimental design with three experimental groups with tight control with the pre and posttests was chosen, with one experimental factor, which is the individual regulation method to identify its fit for any of the groups after completing the experiment.

RESEARCH METHODOLOGY

Sample and sampling:

The study targeted the students who are in good standing for the academic years 2018-2019; their total number is 220. Of them, 66 students were randomly selected to represent 30% of the target population. They were assigned into groups according to their coding for the information using the classification scale according to the determinants of experimental study design for the current study.

Tests and Measurements

The groups were classified using the dual-coding scale which includes 44 items (Tawfeeq, 2015). These items are measured on a 5-point Likert type scale of 1 (*Strongly disagree*) to 5 (*Strongly agree*). Such a scale was adopted to assign the study subjects into groups; the first experimental group (photic coding)(n = 24), the second experimental group (verbal coding) (n = 20), and the third experimental group (dual coding) (n = 22). To measure the dependent

variables, the researcher adopted the visual speed test related to the visual response speed for the color stimulant for Nelson modified test (Al-Kaabi, 2006) with a measurement unit of second and its parts, the tests of front and back shots in tennis (Ground Stroke Accuracy) in which the maximum score is 30 mark for each of them (Hashim, 2004).

The researcher applied the educational method for the two skills in that the learners have a role in selecting their regulation for the individual competition or the collaborative learning inside the tennis court. This can be done by employing the practical applications included in the current study about the content of the method. Four educational sessions were assigned for each skill; two sessions per week without a difference in experimenting the independent variable for the three groups. After accomplishing the experiment, data were analyzed using the statistical package for social sciences (SPSS), version 26 for windows, Chicago, IL. The statistical measures of arithmetic mean, standard deviation (SD), paired-sample t-test, one-way analysis of variance (ANOVA), and least significant difference (LSD) were used.

RESULTS AND DISCUSSION

The study results reveal that there were improvements in the three experimental groups in the posttests. The dual-coded group witnessed greater improvement compared to the first experimental group (photic coded) and the third experimental group (verbal coded) respectively. The researcher attributes the improvement in the vision to the effectiveness of the individual regulation method which puts the learner in a situation that requires him/her to focus, concentrate, and quickly percept the surrounding. Such a method is characterized by performing the skills of front and back shots their performance requires continuous transition in the tennis court according the instantaneous situation of the performance, which leads to imagine the determination of the measurements that represent the boundaries of both sides of the stadium, in addition to the width and height of the net that divides them. This is activated the dual-coding memory as a result of the number of exercises performed within this educational method. Al-Saadi (2002).mentions that "The athletes' perception develops through repetition, practice, personal experience, sufficiency of the individual and his ability. The more the athlete exercises movement or skill, the more he/she develops the attribute of perception in relation to this skill." Table 1,2,3,4

Abdul-Khaliq (2002) sees that "The visual perception is among the types of perception as an active process includes multiple activities (such as attention - sensation - awareness - memory) as he emphasizes that attention is a key to perception. (Abdul-Khaliq, 2002). Abdul-Kareem (2006) states, "The old saying (what you do is more influential than what you say) closely relates to giving models of behavior and physical education that are of the fastest and most efficient methods for teaching physical activity (sports) are influential and effective models that highlight the transition points in performance. This means that the successful teacher who places focus points in actual formulation so that the student can know what they notice. " As for the skill improvement for learning each of the undermined skills, the researcher attributes it to the role of the educational method and the frequency of performing the appropriate exercises to encode the audio and visual information that activated the mental processes they have and the freedom granted by this regulation for each learner, which focused on individualism in making appropriate decisions for the motor responses that enabled them to progress at this level. Farraj (2008) states that "The brain is like a forest in which systems interact continuously and objectively, and that individuals may live in an environment that provides many layers of sensory and cultural problems, and these ideas also indicate that individuals possess the capabilities of learning, understanding, and growth. Farhan and Others (1994) see that "There is no effective skill in the absence of the basic knowledge necessary for it, but without exaggeration in enlarging the role of knowledge as one of the components of the skill. The performance component of the skill is important in it, and one of the conditions for performance in the skill is that it be done quickly, thoroughly, effectively, with little effort, and at a low cost. In order to interpret the occurrence of learning with the exercises used in this study, it is necessary to refer to the learning schools, where Al-Rubaie (2011a) notes, "Behavioral correlative learning theories interpret the learning as a change in the learner's behavior as a result of repetition of associations between stimuli and response ... As for cognitive theories, they explained this by insight, perception, regulation, and

Table 1. Pretest results.

Test	n	Source of Variance	Sum of squares	df	Mean square	F	p-value	Sig.
Vision	66	Between groups	0.026	2	0.013	1.037	0.36	NS
		Within groups	0.791	63	0.013			
Front Shot	66	Between groups	15.746	2	7.873	2.288	0.11	NS
		Within groups	216.739	63	3.44			
Back Shot	66	Between groups	0.314	2	0.157	0.031	0.969	NS
		Within groups	318.55	63	5.056			

Number of groups = 3, (n = 22) for each group, Significance level is 0.05, Significant at $p \leq 0.05$, NS = Non-significant

Table 2. Pretest and posttest results for the experimental groups.

Tests and Groups			Pretest		Posttest		F	SD	T-value	p-value	Sig.
			Mean	SD	Mean	SD					
Vision speed	Group1	24	1.55	0.11	1.32	0.05	0.23	0.09	12.011	0.000	S
	Group2	20	1.57	0.11	1.44	0.1	0.132	0.05	11.93	0.000	S
	Group3	22	1.6	0.12	1.19	0.03	0.41	0.12	15.598	0.000	S
Front Shot	Group1	24	11.13	1.8	19.04	1.12	7.92	2.45	15.843	0.000	S
	Group2	20	12.25	1.21	15.7	1.26	3.45	1.5	10.262	0.000	S
	Group3	22	11.27	2.33	21.95	0.95	10.68	2.32	21.62	0.000	S
Back Shot	Group1	24	9	1.59	16.79	1.02	7.79	1.62	23.642	0.000	S
	Group2	20	8.85	2.8	15.45	1.1	6.6	2.89	10.21	0.000	S
	Group3	22	9	2.31	19.36	1.18	10.36	2.75	17.661	0.000	S

df = (n-1) for each group, Significance level is 0.05, Significant at $p \leq 0.05$, S = Significant

Table 3. One-way analysis of variance for the posttests for the experimental groups.

Tests	n	Source of Variance	Sum of squares	df	Mean square	F	p-value	Sig.
Vision speed	66	Between groups	0.644	2	0.322	77.828	.000	S
		Within groups	0.26	63	0.004			
Front Shot	66	Between groups	409.887	2	204.944	165.292	.000	S
		Within groups	78.113	63	1.24			
Back Shot	66	Between groups	168.122	2	84.061	69.683	.000	S
		Within groups	75.999	63	1.206			

Number of groups = 3, (n = 22) for each group, Significance level is 0.05, Significant at $p \leq 0.05$, S = Significant

Table 4. Least significant differences (LSD) for the posttests in the experimental groups.

Tests, Measurement Unit, and Groups	Mean Differences	P-value	Sig.	
Vision speed	1 - 2	-.11492*	.000	Significant in favor of first experimental group
	1 - 3	0.13231*	.000	Significant in favor of third experimental group
	2 - 3	0.24723*	.000	Significant in favor of third experimental group
Front Shot	1 - 2	3.342*	.000	Significant in favor of first experimental group
	1 - 3	-2.913*	.000	Significant in favor of third experimental group
	2 - 3	6.255*	.000	Significant in favor of third experimental group
Back Shot	1 - 2	1.342*	.000	Significant in favor of first experimental group
	1 - 3	-2.572*	.000	Significant in favor of third experimental group
	2 - 3	3.914*	.000	Significant in favor of third experimental group

* The difference is statistically significant at $p = 0.05$, n = 22 for each group

understanding relationships." Al-Otoom and others (2011) stated that, "The chronological arrangement for the provision of the conditional stimulus plays an important role in the power of conditioning It must be distinguished to be a specific, principal, and not to other similar stimuli." Al-Rubaie (2011b) stated that "Learning should be activity-based, which allows learners to gain experiences and demonstrate their talents. Milhem (2006) stated that "The remodeling of the stimulus leads to arousing attention. Therefore, it is necessary to innovate to avoid boredom. The stimulus must be attractive to attention, in terms of its nature and spatial location, and it must be changed to attract attention as well as the intensity and modernity of this stimulus to be of practical importance in many scientific disciplines."

CONCLUSION

The researcher concluded that (1) the displayed model and the number of learner's performance with the freedom of individual regulation in the regular tennis court help in improving the visual speed, (2) giving the freedom to the learner; according to what he/she is characterized by of coding for information, helps him/her in individually regulating his/her educational activity in the front and back shots skills in tennis, (3) the individual regulation method fits learners with dual coding and be more appropriate for them than learners with other information coding in skillful learning in tennis, and (4) it is necessary to pay attention to individualizing education in the practical lessons for tennis and integrating the cognitive and behavioral learning in order to better achieve skillful learning objectives.

REFERENCIAS

- Breidenbach, F., Sargent, E., & Failla, M. (2020). Rehabilitation of Shoulder Injuries in Basketball. In *Basketball Sports Medicine and Science* (pp. 687-700). Springer, Berlin, Heidelberg.
- Fluet, G. G., Qiu, Q., Crouce, A., Sia, E., Blessing, K., Patel, J., ... & Adamovich, S. (2020). Participant Adherence to a Video Game-Based Tele-rehabilitation

Program: A Mixed-Methods Case Series. In *Virtual Reality in Health and Rehabilitation* (pp. 169-184). CRC Press.

- Abouelnaga, W. A., & Aboelnour, N. H. (2019). Effectiveness of active rehabilitation program on sports hernia: randomized control trial. *Annals of rehabilitation medicine*, 43(3), 305.
- Macfarlane, G. J., Kronisch, C., Dean, L. E., Atzeni, F., Häuser, W., Fluß, E., ... & Jones, G. T. (2017). EULAR revised recommendations for the management of fibromyalgia. *Annals of the rheumatic diseases*, 76(2), 318-328.
- Sonnery-Cottet, B., Saithna, A., Quelard, B., Daggett, M., Borade, A., Ouanezar, H., ... & Blakeney, W. G. (2019). Arthroscopic muscle inhibition after ACL reconstruction: a scoping review of the efficacy of interventions. *British journal of sports medicine*, 53(5), 289-298.
- Ehliel, E., Yalamuri, S., Brudney, C. S., & Pyati, S. (2017). Analgesia in the surgical intensive care unit. *Postgraduate medical journal*, 93(1095), 38-45.
- García-González, A., Jacchetti, E., Marotta, R., Tunesi, M., Rodríguez Matas, J. F., & Raimondi, M. T. (2018). The effect of cell morphology on the permeability of the nuclear envelope to diffusive factors. *Frontiers in physiology*, 9, 925.
- Park, Y. G., Kwon, B. S., Park, J. W., Cha, D. Y., Nam, K. Y., Sim, K. B., ... & Lee, H. J. (2013). Therapeutic effect of whole body vibration on chronic knee osteoarthritis. *Annals of rehabilitation medicine*, 37(4), 505.
- Dingemans, R., Randsdorp, M., Koes, B. W., & Huisstede, B. M. (2014). Evidence for the effectiveness of electrophysical modalities for treatment of medial and lateral epicondylitis: a systematic review. *British journal of sports medicine*, 48(12), 957-965.
- Morsal, B., Shahnavazi, A., Ahmadi, A., Zamani, N., Tayebisani, M., & Rohani, A. (2014). Effects of polymeric training on explosive power in young male basketball. *European Journal of Experimental Biology*, 4(3), 437-439.