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Expression of sensory submodalities by neurolinguistic programming methods in sport training

Exprimarea submodalităţilor senzitive prin limbaj în programarea neurolingvistică din antrenamentul sportiv

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Abstract

Background. This research assumes the possible increase of athletic performance in any sport, by applying mental training techniques, particularly sensory submodalities in neurolinguistic programming.

Aims. We studied the relationships between sensory submodalities in neurolinguistic programming. We wanted to check the degree of significance of the mean difference in the studied parameters and whether the resulting significance threshold fell within the objective parameters.

Methods. We applied the Bandler & Thomson (2012) and Jacobson (2011) tests. These were applied to students of the Faculty of Physical Education and Sport, Babes-Bolyai University Cluj-Napoca. They completed the tests, with words describing feelings, perceptions and representations accompanying the description of motor acts. Motor acts are specific motor skills in every sport used in mental training. The words chosen by students who completed the questionnaires were able to provide information regarding the precision and accuracy of movement representations in mental training of FEFS students. There were two testing moments: T1 and T2, after 30 days.

Results. We evaluated the results recorded in the three major categories of visual, auditory, and kinesthetic sensations in students of the experimental group for the Bandler & Thomson and Jacobson tests at the two time points.

The statistical analysis of Bandler & Garner and Jacobson for paired samples (T1 and T2 moments) demonstrated no statistically significant differences ($p>0.05$), but there were many good and very good correlations in both tests between the values of the studied items. This is explained by the very small difference in time between the two test moments. In realizing ideomotor representations, all sensory submodalities are particularly important and underlie mental training.

Conclusions. In the Bandler & Thomson, the statistical analysis of the correlation between the values of the studied items showed a very good positive correlation between SA - SK (auditory and kinesthetic sensations) and a good positive correlation between SV-SA (visual and auditory sensations) and SV - SK (visual and kinesthetic sensations). Regarding the Jacobson test, the statistical analysis of the correlation between the values of the studied items showed a very good positive correlation between SV - SA (visual and auditory sensations), SV - SK (visual and kinesthetic sensations), SV - SOG (visual and olfactory, gustatory sensations), SA - SK (auditory and kinesthetic sensations) and SK - SOG (kinesthetic and olfactory, gustatory sensations). A good positive correlation was obtained between SA - SOG. (auditory and olfactory, gustatory sensations).

Keywords: ideomotor representation, neurolinguistic programming, sensory submodalities, sensations, training.

Rezumat

Premize. Cercetarea porneşte de la premiza posibilităţii creşterii performanţei în orice ramură sportivă, prin aplicarea tehnicilor de antrenament mental, în special prin submodalităţile senzoriale din programarea neurolingvistică.

Obiective. În cadrul programării neuro-lingvistice au fost studiate relaţiile dintre submodalităţile senzitive. S-a dorit verificarea gradului de semnificaţie a diferenţei mediilor parametrilor studiaţi şi dacă pragul de semnificaţie rezultat se încadrează în parametrii obiectivi.

Metode. Au fost aplicate testele lui Bandler & Thomson (2012) şi Jacobson (2011). Acestea au fost aplicate studenţilor de la Facultatea de Educaţie Fizică şi Sport din cadrul Universităţii Babeş-Bolyai din Cluj-Napoca. Aceştia au completat testele prin cuvinte care descriu senzaţiile, percepţiile şi reprezentările care însoţesc descrierea unor acte motrice. Actele motrice reprezintă deprinderile motrice specifice sportului respectiv, folosite în cadrul antrenamentului mental. Cuvintele alese de studenţi, care au fost completate în chestionare, pot da informaţii despre precizia şi acurateţea reprezentărilor mişcărilor din antrenamentul mental al studenţilor FEFS. S-au făcut două înregistrări: T_1 şi T_2, la interval de 30 zile.

Rezultate. Se observă rezultatele înregistrate pe cele trei categorii mai importante de senzaţii: vizuale, auditive, kinestezice la studenţii din grupul de experiment, la testul Bandler & Thomson, Jacobson, la cele două testări.

La analiza statistică atât a valorilor testului Bandler & Garner, cât şi la testul Jacobson, pentru probe perechi (momentele T_1 şi T_2), nu au fost observate diferenţe statistic semnificative ($p>0,05$), dar există foarte multe corelaţii bune şi foarte bune la ambele teste, între valorile itemilor studiaţi. Aceasta se explică prin diferenţa de timp foarte mică între momemntele celor două testări. În realizarea reprezentărilor ideomotorii toate submodalităţile senzitive sunt deosebit de importante şi stau la baza antrenamentului mental.

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Concluzii. Pentru testul Bandler & Thomson, analiza statistică de corelaţie între valorile itemilor studiaţi arată că există o corelaţie foarte bună şi de acelaşi sens între SA - SK (senzaţii auditive şi kinestezice) şi o corelaţie bună şi de acelaşi sens între SV - SA (senzaţii vizuale şi auditive) şi SV - SK (senzaţii vizuale şi kinestezice). Pentru testul Jacobson, analiza statistică de corelaţie între valorile itemilor studiaţi arată o corelaţie foarte bună şi de acelaşi sens între SV - SA (senzaţii vizuale şi auditive), SV - SK (senzaţii vizuale şi kinestezice), SV - SOG (senzaţii vizuale şi olfactiv, gustative), SA - SK (senzaţii auditive şi kinestezice) şi SK - SOG (senzaţii kinestezice şi olfactiv, gustative). O corelaţie bună şi de acelaşi sens s-a obţinut între SA - SOG. (senzaţii auditive şi olfactiv, gustative).

Cuvinte cheie: reprezentare ideomotorie, programare neurolingvistică, submodalităţi senzitive senzaţii, antrenament.

Introduction

The four pillars that support neurolinguistic programming according to (Ready & Burton, 2010) are: building a relation between the coach and athlete, awareness of sensations, externalization of thought, flexibility of behavior.

Movement representations provide the basis for the voluntary control of skilled movements in the form of a suitable organized perceptual-cognitive reference structured in long-term memory, according to Rosenbaum (2010) cited by Weigelt et al. (2011).

Bläsing et al. (2009) were able to demonstrate differences in the cognitive skill representations between novices, advanced and expert dancers for two complex ballet skills. From this observation, it can be inferred that becoming an expert in a particular sport may also rely upon the development of cognitive skill representations.

Sport has an agonistic dimension, providing a model by which we understand the multitude of significations and values that characterize it (Isidori, 2012).

Before establishing the objectives of the study, it is necessary to understand another important tool derived from NLP, which is the metamodel. It is a particular language model, which relates specifically to motor learning according to every sport. The various models that each of us create start from the experience and reality perceptions of each (Fanelli, 2010).

The subjectivity of reality depends on certain structural causes, their origin being neurological, social and individual. Draeger (2012) shows that mental training is based on knowledge, education and training.

Mental strategies have been suggested to be a promising approach to improve motor skills in athletes. This behavioral effect was shown to be associated with changes in neuronal activity in premotor areas not only during movement, but also while performing ideomotor representations with underlying trigger action time (Binder et al., 2014). The feedback in the communication process is very important, representing a retrospective that occurs in various systems (Pop, 2014), in our case the biological and psychological system.

When we ask our students to describe a motion, they are using a set of verbs that are not important to us and represent reality through a small linguistic structure. This is called a superficial structure and is the representation of the deep, complete structure (Fanelli, 2010), which in our case is motor learning.

We want to show that to achieve performance in any field, our attitude is very important (Gonzalez, 2013), which means that a conscious attitude will certainly lead to good results.

The research is part of a larger work, aimed at increasing sports performance by applying mental training techniques, in particular through sensory submodalities of neurolinguistic programming.

Hypothesis

Neurolinguistic programming through sensory submodalities helps improve ideomotor representations. As more words coming from multiple sensory registers are used by students, the sensory submodalities are more numerous and representations are complete and complex. In this way, they can be used more effectively in mental training, ideomotor representations helping to improve motor skills.

We assume that a good ideomotor representation can increase sport performance.

Material and methods

Research protocol

a) *Period and place of the research*

We received the approval from the Ethics Committee of the Babes-Bolyai University to conduct our research. We also obtained an informed consent of the subjects participating in the research.

The period of the survey was the second semester of the 2012-2013 academic year, during 30 days.

The research was conducted at the Faculty of Physical Education and Sport, University "Babes-Bolyai" from Cluj-Napoca, on graduate students from the department of training and sports performance (APS).

b) *Subjects and groups*

The subjects were 22 students with different specialties (10 female and 12 male) aged 23 to 35 years, former practitioners of different sports. The performance level of the subjects of this research was variable, and some of them practiced high performance sports. Absenteeism from the first or second test led us to continue our research for a reconfirmation of the results.

A single experimental group was used, consisting of master students from the Faculty of Physical Education and Sport, training and sports performance specialization.

c) *Tests applied*

In neurolinguistic programming, the relationships between sensory submodalities were studied by applying the following tests: Bandler & Thomson (2012) and Jacobson (2011).

After applying the two mentioned tests, records were made in two stages: initial (T1) and final (T2) at the beginning and at the end of the neurolinguistic-programming module.

For the initial and final testing, the master students were asked to consider three motor skills specific to their practiced sport and to complete the two tests - Bandler & Garner and Jacobson.

In neurolinguistic programming, Jacobson relaxation techniques were applied with an activation phase. The Jacobson relaxation techniques were applied between

Table I

Test moments I and II in the experimental group, master APS students (Bandler & Thomson and Jacobson tests).

No.	Name and surname	T_1		T_2		Motor act in ideomotor representation
		Bandler & Thomson	Jacobson	Bandler & Thomson	Jacobson	
1	BA	55	37	56	61	Football – leading the ball, gate completion
2	B P	24	26	0	0	Football – leading the ball - kick
3	C(J)A.M	36	77	48	91	Swimming - crawl 50 m
4	D.R	42	78	0	0	Football - technique
5	DG	0	0	39	88	Sky – oblique descent
6	FC	21	19	19	56	Swimming - backstroke learning
7	FL	23	110	64	120	Basketball - game
8	GD	53	75	42	129	Athletics - throwing, correcting some execution errors
9	IR	16	48	0	0	Football - dribbling, takeover, 4-4-2 system
10	MC	65	137	68	164	Football - tactical organization
11	MN	0	0	28	114	Volleyball
12	MM	28	64	53	136	Swimming crawl
13	MD	22	66	59	118	Speed running - 50 m
14	MA	18	96	0	0	Football
15	NV	31	34	0	0	Gymnastics - rolling
16	NA	32	26	42	66	Swimming - breast stroke 20 m
17	P S	33	16	0	0	Swimming
18	RM	47	98	0	0	Football – lace kick
19	SD	27	55	27	63	Field tennis – forehand, backhand
20	SK	0	0	43	111	Basketball
21	SR	52	69	43	94	Field tennis – serve (right, left), forehand, backhand
22	VN	24	77	56	177	Basketball - throwing the ball by jumping

the two tests. Focus was on keywords, triggers of action in the technique of each sport. We also insisted on the metalanguage of each sport.

The students completed in the tests all the sensations felt within the ideomotor representations, focusing on proprioception, which is according to Mauti (2012) the ability to feel and recognize their body position in space, giving particular attention to focusing on their muscles.

After one month there was a second test, in order to highlight correlations between sensory submodalities, finalizing the study *by the self-perception profile* of each student participating in the experiment, which was defined by Kenneth & Fox (2000).

Ideomotor mental representations of the training were made based on keywords (Grosu, 2012) and trigger motor actions. In sport, this technique is used to reduce blood pressure before competition and promoting overall physical and mental relaxation (Brugnoli, 2005).

d) *Statistical processing*

Statistical indicators were calculated, elements of descriptive statistics, the data are presented using indicators of centrality, location and distribution.

Statistical analysis: the Wilcoxon nonparametric test was used for paired samples (data uneven distribution/ranking) (Lupu & Zanc, 1999). To detect the correlation between two quantitative continuous variables, we used the Spearman rank correlation coefficient (ρ). The analysis of correlation coefficients was performed using Colton's rule (Lupu & Lupu, 2011). Polynomial regression was the method used to obtain the mathematical equation for the addition of one continuous variable to another variable. Statistical interpretation was performed with the Excel application (Microsoft Office 2007) and StatsDirect v.2.7.2 program. The graphical representation of the results was made with the Excel application (Microsoft Office 2007) (Table I).

Results

Table II shows the results of the three most important categories of sensations: visual, auditory, kinesthetic in the experimental group, for the Bandler & Thomson test, and Table III presents the results for the Jacobson test.

Table II

Initial and final testing using the Bandler & Thomson test.

No.	Name and surname	Visual sensations		Auditory sensations		Kinesthetic sensations	
		T_1	T_2	T_1	T_2	T_1	T_2
1	BA	21	20	18	17	16	19
2	B P	13	0	7	0	4	0
3	C(J)A.M	17	18	8	15	11	15
4	D.R	17	0	12	0	13	0
5	DG	0	19	0	10	0	10
6	FC	16	10	4	5	1	4
7	FL	12	25	6	20	5	19
8	GD	21	19	17	14	15	9
9	IR	11	0	4	0	1	0
10	MC	25	25	19	20	21	23
11	MN	0	17	0	10	0	1
12	MM	10	21	12	19	6	13
13	MD	4	22	10	18	8	19
14	MA	12	0	5	0	1	0
15	NV	13	0	17	0	1	0
16	NA	13	15	12	16	7	11
17	P S	25	0	7	0	1	0
18	RM	8	0	20	0	19	0
19	SD	12	16	8	5	7	6
20	SK	0	21	0	6	0	16
21	SR	16	18	17	12	19	13
22	VN	11	23	7	16	6	17

Table III

Initial and final testing using the Jacobson test.

No.	Name and surname	Visual sensations		Auditory sensations		Kinesthetic sensations		Olfactory/ gustatory sensations	
		T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2
1	BA	21	29	12	32	4	0	0	0
2	B P	14	0	8	0	4	0	0	0
3	C(J)A.M	22	31	23	26	28	32	4	2
4	D.R	30	0	16	0	22	0	10	0
5	DG	0	33	0	27	0	22	0	6
6	FC	7	19	7	17	3	16	2	4
7	FL	36	39	28	35	32	30	14	16
8	GD	29	43	23	33	14	35	9	18
9	IR	18	0	17	0	13	0	0	0
10	MC	43	54	32	40	42	52	20	18
11	MN	0	36	0	42	0	36	0	0
12	MM	18	46	19	29	21	44	6	17
13	MD	22	30	24	33	19	39	1	16
14	MA	32	0	27	0	23	0	14	0
15	NV	17	0	17	0	0	0	0	0
16	NA	12	18	6	13	6	24	2	11
17	P S	8	0	8	0	0	0	0	0
18	RM	31	0	28	0	28	0	11	0
19	SD	30	26	9	9	10	20	6	8
20	SK	0	27	0	38	0	34	0	12
21	SR	19	27	22	36	26	28	2	3
22	VN	26	47	18	51	25	61	8	18

To detect the correlation between two variables, we used the Spearman rank correlation coefficient (ρ). The analysis of correlation coefficients was performed using Colton's rule. No statistically significant differences were observed ($p > 0.05$) in the Bandler & Thomson and Jacobson tests for paired samples (T1-T2 moments), but there were many very good correlations in both studied tests between the values of the items, see table IV.

Discussions

By analyzing the items from the Bandler & Thomson test (visual, auditory, kinesthetic sensations) for paired samples, we found no statistically significant differences between the two moments ($p > 0.05$).

For the Jacobson test (visual, auditory, kinesthetic, olfactory/gustatory sensations) for paired samples, we found no statistically significant differences between the two moments ($p > 0.05$), see Figure no.1.

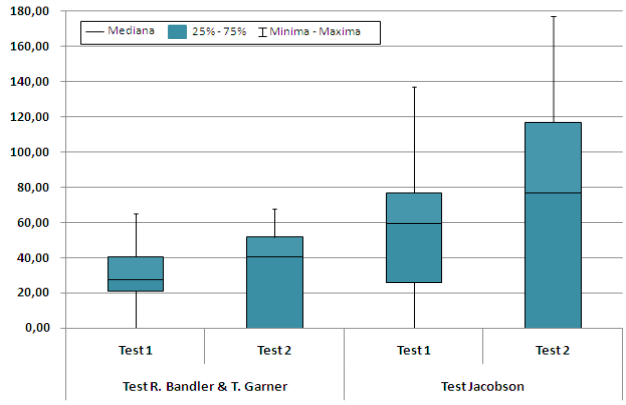

Fig. 1 – The values for T1 and T2 moments, for the studied tests.

Ready & Burton (2010) say that to see, hear, feel will make communication more efficient. Each and every one of us has a special communication channel to convince (Garratt, 2011) that we are understood when we are describing a movement.

At moment T1 for the Bandler & Thomson test, the statistical analysis of the studied items showed (Fig. 2):

- a very good positive correlation between SA - SK,
- a good positive correlation between SV - SA and SV - SK .

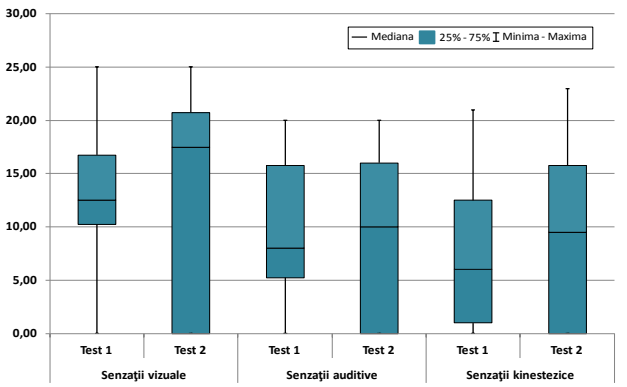

Fig. 2 – The values for T_1 and T_2 moments, for the Bandler & Thomson test.

For the Jacobson test, the statistical analysis of the studied items showed:

- a very good positive correlation between SV - SA, SV - SK, SV - SOG, SA - SK and SK - SOG,
- a good positive correlation between SA - SOG.

At moment T2 for the Bandler & Garner test, the statistical analysis of the studied items showed (Fig. 3):

- a very good positive correlation between SA - SK, SV - SA and SV - SK (SV - visual sensations, SA - auditory sensations, SK - kinesthetic sensations, SOG - olfactory/ gustatory sensations).

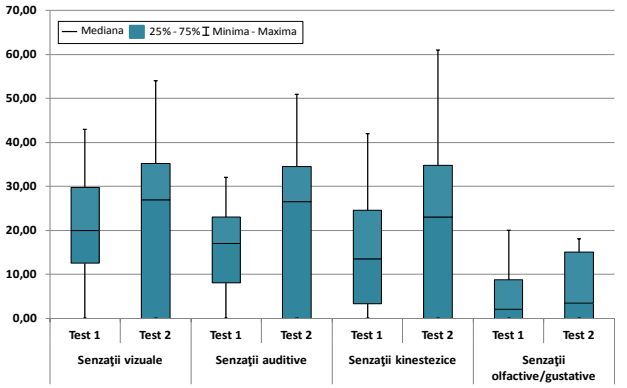

Fig. 3 –The values for T_1 and T_2 moments, for the Jacobson test.

Table IV

Comparative analysis of tested values and items and statistical significance (paired samples).

Test item	Moment	Mean	SE	Median	SD	Min.	Max.	Statistical significance (p)
Bandler & Thomson test	T1	29.50	3.7966	27.5	17.8078	0	65	0.7854
	T2	31.23	5.2541	40.5	24.6440	0	68	
Visual sensations	T1	12.59	1.5397	12.5	7.2221	0	25	0.7854
	T2	13.14	2.0747	17.5	9.7311	0	25	
Auditory sensations	T1	9.55	1.3544	8	6.3526	0	20	0.8987
	T2	9.23	1.6540	10	7.7578	0	20	
Kinesthetic sensations	T1	7.36	1.4867	6	6.9730	0	21	0.3535
	T2	8.86	1.7072	9.5	8.0077	0	23	
Jacobson test	T1	54.91	8.0531	59.5	37.7724	0	137	0.187
	T2	72.18	12.5202	77.0	58.7251	0	177	
Visual sensations	T1	19.77	2.5507	20	11.9640	0	43	0.4628
	T2	22.95	3.8716	27	18.1593	0	54	
Auditory sensations	T1	15.64	2.0895	17	9.8006	0	32	0.2877
	T2	20.95	3.6801	26.5	17.2612	0	51	
Kinesthetic sensations	T1	14.55	2.6966	13.5	12.6481	0	42	0.1327
	T2	21.50	4.1125	23	19.2892	0	61	
Olfactory/gustatory sensations	T1	4.95	1.2475	2	5.8511	0	20	0.2744
	T2	6.77	1.5831	3.5	7.4254	0	18	

Table V

Statistical correlation analysis between the studied items at the two test moments.

Test	Correlations between	T_1			T_2		
		ρ	Colton	*p*	ρ	Colton	*p*
Bandler & Garner	SV - SA	0.5078	***	0.0168	0.9103	****	< 0.0001
	SV - SK	0.5060	***	0.0174	0.9453	****	< 0.0001
	SA - SK	0.8685	****	< 0.0001	0.9249	****	< 0.0001
Jacobson	SV - SA	0.8568	****	< 0.0001	0.8699	****	< 0.0001
	SV - SK	0.8452	****	< 0.0001	0.8909	****	< 0.0001
	SV - SOG	0.8551	****	< 0.0001	0.7847	****	< 0.0001
	SA - SK	0.8659	****	< 0.0001	0.8592	****	< 0.0001
	SA - SOG	0.7334	***	0.0002	0.6713	***	0.0008
	SK - SOG	0.8346	****	< 0.0001	0.8377	****	< 0.0001

Legend: SV - visual sensations, SA - auditory sensations, SK - kinesthetic sensations, SOG - olfactory/gustatory sensations.

At moment T2 for the Jacobson test, the statistical analysis of the studied items showed (Table V):

- a very good positive correlation between SV - SA, SV - SK, SV - SOG, SA - SK and SK - SOG,
- a good positive correlation between SA - SOG.

Conclusions

1. All sensory submodalities are particularly important in achieving ideomotor representations, underlying the importance of mental training. If ideomotor representations are accompanied by many sensory submodalities, motor skills are richer and the motor skills specific to various sports are more complex.

2. Very good positive correlations between SV - SA, SV - SK, SV - SOG, SA - SK and SK - SOG show that the motor skill (profound structure) will be more complete if it is accompanied by its description and sensations.

3. As more words coming from various sensory registers are used by students, sensory submodalities increase and representations are more complete and complex; in this way, they can be used more effectively in mental training.

Proposals

Further research is required because the time difference between T1 and T2 was very small and we want to extend this study to a minimum of three months, during a semester. Modular lessons were made for objective reasons (space reconstruction in our faculty).

Conflicts of interests

Nothing to declare.

Acknowledgments

This work uses part of the results of the first author's ongoing PhD thesis. The other authors were involved in research on relaxation techniques and data collection.

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