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Effects of mental training practice in Alpine skiers through imagery and NLP techniques

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Abstract

The pupose of the study is to determine the effects of applying mental training techniques in alpine skiers aged 12 ± 6 and 19± 2. It is to determine whether by applying mental training techniques certain psychological factors able to influence performance optimization in alpine skiing can be modified. The experimental series comprised 20 skiers, from the clubs CSS Gheorgheni (HR), CSS Baia – Sprie (MM), and FEFS students. The control series comprising 20 skiers, from the clubs CSM Gheorgheni (HR), CSS Sibiu (SB), CS Corona Brasov (BV), CSS Sinaia (PH), CSS Petroșani (HD), CSS Toplița (HR), CS Miercurea-Ciuc (CV), Crazy – Byke (SB). Psychological tests for attention (MA- focused, AP2 – perceptual attention, AD – distributed), EMAS S – state of anxiety, PDE – emotional distress were used as data collection tools and The Jacobson S., Bandler R.& Thomson G tests were used. We used SPSS for statistical analysis. Findings reveal that by using mental training techniques through imagery and NLP techniques, we managed to improve performance on the level of visual, auditory and kinaesthetic acuity, as well as the level of perceptual attention (AP2). Findings show that the application of mental training techniques leads to lower anxiety issues (EMAS) and emotional distress (PDE) in skiers' behaviour. Performance in alpine skiers can be improved by increasing perceptual attention, following the stimulation of visual, auditory, and kinaesthetic channel in alpine skiers.

Keywords: Mental training, Alpine skiing, training, imagery, neuro-linguistic programming, sport performance.

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1. Introduction

The purpose of the study is to determine whether by applying of mental training techniques certain psychological factors able to influence performance optimization in alpine skiing can be modified. The three factors analyzed were the following:

1. The study of cognitive components involved in constructing complex images in alpine skiing, conducted as follows: testing attention capacity by applying attention tests (MA), AD) (AP2) in athletes (initial, final). The monitoring of stress, cause for anxiety (EMAS) and emotional distress (PDE).

2. The study of sensations participating to the process of forming complex images through mental imagery or NLP techniques. It was possible by identifying the semantics of certain words (initial, final) by the applying the Jacobson, (2009) and Bandler & Thomson, G (2012) tests (initial, final) and by determining clearly the main communication channel of each athlete.

3. The optimization of sports performance, through associated–dissociated NLP techniques, "keywords" and "anchors", metalanguage is part of the doctoral thesis of the first author.

Many previous studies have reported that medals (Gould, Dieffenbach & Moffet, 2000; Jones, Hanton & Connaaughthon, 2007, Gucciardi, Gordon & Dimmock, 2008), and athletes' success are actually the ones that measure achievements in sport at various levels.

At the beginnings of mental training development in sport, several studies were conducted on the importance and necessity of mental toughness (Goldberg, 1998; Jones, Hanton and Connaughton, 2002; Loehr, 1982, 1986) in becoming a champion.

Following the direction of previous studies, other scientists elaborated sport-specific questionnaires to test the mental skills of athletes across different competitive standards and sports. On the other hand, researches have also found that negative self-talk can lower an athlete's self-confidence (Caruso, 2005). Research findings have shown that elite and successful athletes are more committed, motivated, self-confident, focused, and able to cope with adversity, and peak under pressure.

Specialists can use such body of knowledge to plan, implement, and optimize psychological treatments, thereby helping experienced performers and beginners achieve their best. (Sadeghi, Omar-Fauzee, Jamalis, Ab – Latif Rozita, Cheric & Ch, 2010)

Researchers have focused on individual psychological factors (goal setting, relaxation, imagery and self-talk) and their influences on performance. Empirical studies have also focused on individual psychological factors (e.g., confidence, motivation, attention, visualization and psychosomatic skills) and on their influence upon performance (Gucciardi, Gordon and Dimmock, 2009).

Through internal neuron systems of actions, external copies are created that are responsible for triggering the actions at the level of the same stimuli, while during observation they will be created through active repetitions (Rizzolatti and Craighero, 2004). The last can represent an example to fully explain the way in which cognitive skills within a movement may be improved through mental training (Immenroth, Eberspächer and Hermann, 2008).

Often, a combination of internal and external information of images for constructing symbolically a verbal-based intervention verbal is used, such as of mental training, which uses the description of a motor task (Mayer and Hermann, 2009; Weinberg and Gould, 2011). Through imagery, one can become aware of motor processes (cf. Spitzer, 2010). These mental processes influence the motor system, on one hand; on the other, they are activated to construct motor networks. Mental training is actually determined by these networks (Smith and Link, 2010).

2. Material and method

Subjects: The experimental series comprising 21 skiers aged 12±6 years old– 19±2 years old, children and juniors from the clubs CSS Gheorgheni (HR), CSS Baia – Sprie (MM), and FEFS students.

The control series had 20 skiers 12±6 years old– 19±2 years old, children and juniors from the club CSM Gheorgheni (HR), CSS Sibiu (SB), and FEFS students, CS Corona Brasov (BV), CSS Sinaia (PH), CSS Petroșani (HD), CSS Toplița (HR), CS Miercurea-Ciuc (CV), Crazy – Byke (SB).

For determining research hypotheses, we assumed that the application of mental imagery techniques creates new behavioural models, which will determine the optimization of alpine skiing performances:

1. Improving the skiers' ideomotor image capacity.

2. Increasing attention capacity: focused, distributed and spirit of observation.

3. The application of mental training improves the performance behavior of athletes and alters dysfunctional negative emotions: anxiety, emotional distress; it also increases positive emotions: self-confidence.

Methods: objectifying mental training by applying psychological tests: for attention (MA- focused, AP2 – perceptual attention, AD – distributed, EMAS – state of anxiety, PDE – emotional distress); for measuring the quality of NLP techniques – Jacobson Sid, Bandler Richard & Thomson Garner (visual, auditory and kinesthetic acuity).

2.1 Findings and Discussions

Data processing shows that mental training techniques improve performance for the experimental series, but not for the control series, (which has not benefitted from this intervention) concerning the following skills: Ideomotor representations – through specific tests applied, focused attention (MA), Perceptual attention (AP2), Distributed attention (AD). Lower anxiety issues (EMAS) and emotional distress (PDE) were also recorded.

Table 1. Descriptive statistics

	Series	N	Mean	Standard deviation	Standard error Mean
Jacobson_TI	Experimental	20	60.85	6.869	1.536
	Control	20	60.95	6.362	1.423
Bandler_TI	Experimental	20	58.4500	3.53144	.78965
	Control	20	58.4000	4.23519	.94702
Focused_attentionTI	Experimental	20	27.9000	6.12931	1.37056
	Control	20	28.4000	7.92996	1.77319
Perceptual_attentionTI	Experimental	20	15.4500	2.96426	.66283
	Control	20	15.2000	3.65052	.81628
Distributed_attentionTI	Experimental	20	.1515	.08635	.01931
	Control	20	.1515	.06401	.01431
EMAS_TI	Experimental	20	29.1000	7.70441	1.72276
	Control	20	29.1500	7.82893	1.75060
PDE_TI	Experimental	20	20.7500	9.33513	2.08740
	Control	20	20.9500	13.30799	2.97576

Upon the initial testing, the control and the experimental series are similar and they start from the same point before the intervention, because we obtained for Jacobson p=.862> .05, Bandler and

Thomson p=.404> .05, Focused attention p=.608 >.05, Perceptual attention p=.450> .05, Distributed attention p=.345> .05, EMAS p=.547> .05 and PDE p= .285> .05 (see Graph 1 and Table 2).

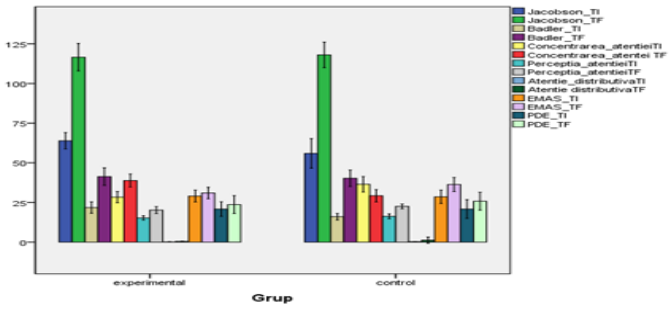

Figure 1. Comparison of means in the psychological tests Le and Lc

We applied a ***t*** test for independent samples to determine whether the series are similar before the intervention, reason for which we introduced within the analysis scores for the initial testing of measurements: Jacobson, S., Bandler, R. And Thomson, G., Focused attention, Perceptual attention, Distributed attention, EMAS and PDE (see Table 2).

Table 2. *T* test for independent samples

		Levene's equal variances test	
		F	Sig.
Jacobson_TI	Equal variances assumed	.031	.862
	Equal variances not assumed		
Bandler_TI	Equal variances assumed	.713	.404
	Equal variances not assumed		
Focused_attentionTI	Equal variances assumed	.267	.608
	Equal variances not assumed		
Perceptual_attentionTI	Equal variances assumed	.583	.450
	Equal variances not assumed		
Distributed_attentionTI	Equal variances assumed	.913	.345
	Equal variances not assumed		
EMAS_TI	Equal variances assumed	.369	.547
	Equal variances not assumed		
PDE_TI	Equal variances assumed	1.177	.285
	Equal variances not assumed		

Considering that the 0.5 significance threshold was exceeded, the two series starts from the same level; had we obtained values under 0.5, the two series would have been different and there would have been no point in continuing the analysis. To determine whether the intervention is successful, we calculated a ***t*** test for paired samples, to pinpoint the differences between pre-intervention and post-intervention measurements. The means obtained illustrate a difference after applying the intervention (see Tables 3 and 4).

More precisely, the use of imagery techniques improves performance in tests measuring visual, auditory and kinesthetic acuity, (assessed through Jacobson and Bandler, R & Thomson, G. tests) as well as the level of perceptual attention (AP_2), see Table 5.

Data confirm that the application of mental training techniques leads to lower anxiety issues (EMAS) and emotional distress (PDE) in skiers' behavior.

Table 3. Descriptive statistics – Experimental series

		Mean	N	Standard deviation	Standard error mean
Pair 1	Jacobson_TI	60.85	20	6.869	1.536
	Jacobson_TF	117.35	20	17.825	3.986
Pair 2	Bandler_TI	58.4500	20	3.53144	.78965
	Bandler_TF	65.6500	20	6.36003	1.42215
Pair 3	Focused_attentionTI	27.9000	20	6.12931	1.37056
	Concentrarea_atenteiTF	41.4500	20	6.73932	1.50696
Pair 4	Perceptual_attentionTI	15.4500	20	2.96426	.66283
	Perceptual_attentionTF	21.2500	20	4.06364	.90866
Pair 5	Distributed_attentionTI	.1515	20	.08635	.01931
	Distributed_attentionTF	.5115	20	.21350	.04774
Pair 6	EMAS_TI	29.1000	20	7.70441	1.72276
	EMAS_TF	53.5500	20	9.32159	2.08437
Pair 7	PDE_TI	20.7500	20	9.33513	2.08740
	PDE_TF	32.8500	20	10.32256	2.30819

Table 4. Descriptive statistics – Control series

		Mean	N	Standard deviation	Standard error mean
Pair 1	Jacobson_TI	60.95	20	6.362	1.423
	Jacobson_TF	62.05	20	5.995	1.341
Pair 2	Bandler_TI	58.4000	20	4.23519	.94702
	Bandler_TF	61.3000	20	4.76942	1.06647
Pair 3	Focused_attentionTI	28.4000	20	7.92996	1.77319
	Concentrarea_atenteiTF	36.9500	20	10.85539	2.42734
Pair 4	Perceptual_attentionTI	15.2000	20	3.65052	.81628
	Perceptual_attentionTF	17.0500	20	2.91051	.65081
Pair 5	Distributed_attentionTI	.1515	20	.06401	.01431
	Distributed_attentionTF	.2795	20	.06605	.01477
Pair 6	EMAS_TI	29.1500	20	7.82893	1.75060
	EMAS_TF	36.9000	20	9.78129	2.18716
Pair 7	PDE_TI	20.9500	20	13.30799	2.97576
	PDE_TF	22.9500	20	10.67942	2.38799

Table 5. *T* test for independent samples, final measurements

		Levene's test for equal variances				
		F	Sig.	t	df	Sig. (2-tailed)
Jacobson_TF	Equal variances assumed	16.067	.000	13.151	38	.000
	Equal variances not assumed			13.151	23.245	.000
Bandler_TF	Equal variances assumed	1.001	.323	2.447	38	.019
	Equal variances not assumed			2.447	35.235	.020
Concentrarea_atenteiTF	Equal variances assumed	5.140	.029	1.575	38	.124

	Equal variances not assumed			1.575	31.752	.125
Perceptual_attentionTF	Equal variances assumed	2.309	.137	3.758	38	.001
	Equal variances not assumed			3.758	34.432	.001
Distributed_attentionTF	Equal variances assumed	19.353	.000	4.643	38	.000
	Equal variances not assumed			4.643	22.604	.000
EMAS_TF	Equal variances assumed	.021	.884	5.511	38	.000
	Equal variances not assumed			5.511	37.912	.000
PDE_TF	Equal variances assumed	.412	.525	2.981	38	.005
	Equal variances not assumed			2.981	37.956	.005

According to our findings, the intervention improved performance concerning the measured dimensions because we obtained statistically significant thresholds. However, for certain dimensions, the assumption of equal variances calculated using Levene's test was not confirmed, such as for Jacobson, M=117.35 for the experimental series and M=62.05 for the control series, t(38)=13.151, p=.00<.05; Focused attention M=41.45 for the experimental series and M=36.95 for the control series, t(38)=1.575, p =.029<.05, and Distributed attention, cu M=5.11 for the experimental series and M=2.79 for the control series, t(38) = 4.643, p=.00<.05. Hence, for these dimensions, though results may appear significant, we cannot make any statements because the assumption was not confirmed. In Bandler, Perceptual attention, EMAS and PDE, statistically significant results were found; thus, they were improved following the intervention. More, precisely, the expected results for Levene's test and the assumption of equal variances were confirmed. For Bandler, we obtained M= 65.6 for the experimental series and M=61.3 for the control series, t(38) = 2.4, p = 0.02 < 0.05, for Perceptual attention, experimental series M= 21.2 and control series M= 17, t(38) = 3.7, p = 0.00 < 0.05, for EMAS, experimental series M= 53.5 and control series M= 36.9, t(38) = 5.5, p = 0.00 < 0.05, while for PDE, experimental series obtained M= 32.8 and control series M= 22.9, t(38) = 2.9, p = 0.00 < 0.05 (see Table 57).

3. Conclusions and recommendations

The first and second hypotheses were confirmed for some dimensions, while for others not. More precisely, the use of imagery techniques improves performance in tests measuring visual, auditory and kinesthetic acuity, (Jacobson and Bandler, R & Thomson, G.) and it increases the level of perceptual attention (AP_2). The third hypothesis was confirmed. Findings show that the application of mental training techniques leads to lower anxiety issues (EMAS) and emotional distress (PDE) in skiers' behavior.

Furthermore, it improves *self-confidence* and *focusing on being a winner*, to which we add *lower anxiety and emotional distress.* The aforementioned study is also supported by other authors (Burton and Raedeke, 2008), who argue that goal setting method improves game skills, techniques and performances and that it *increases concentration,* an aspect necessary for winning competitions.

The use of imagery in training leads to outstanding performances (Lefkowits, McDuff, Mullen & Joseph, 2010). Imagery is the mental training of a skill or of a task to accomplish, without executing it per se. It is more than visualization, because it includes all senses. Imagery is a strong instrument when used right. It can improve physical performances and it is useful during pre-season and competitions.

The purpose of this study was to highlight the importance of psychological factors in sport, (alpine skiing, in our case). The psychological factors were taken into account either by measuring certain emotional dimensions, or by influencing them through NLP techniques and mental imagery, naturally.

As expected and as scientific literature indicates, the use of mental imagery techniques and of NLP increased skiers' performances both during competitions and concerning certain dimensions, such as attention (focused, perceptual, distributed) and ideomotor representations. Besides attention and representation (known to affect directly skiing performance), the psychological techniques used have led to lower anxiety and emotional distress levels. Anxiety and emotional distress may interfere with and entail negative consequences concerning performance.

The goal of this study was to underscore the beneficial effects of relaxation strategies and NLP techniques for alpine skiing; future studies could clarify the underlying mechanisms of these processes. In the same line of future researches, we propose to study other psychological intervention methods meant to improve skiers' performance. We argue for interdisciplinarity and for the use of psychology knowledge to enrich the experience of skiers, to help them redirect dysfunctional and negative emotions, to self-regulate and, not least, to increase skiing performance.

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