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EDITORIAL

Nutrition, Hydration and Sport Possible Antiaging Solutions

We live in a "smart" world, everything that surrounds us is smart, from the TV, phone to clothing and maybe everything that belongs to a current generation of products, all of this was created by human. Science of life, medicine and genetic engineering couldn't find a smart solution that keeps us away from the incurable diseases and preserve our youth. Researching various domains interference, nutrition studies, couldn't stop the aging process, only managed to slow the process. Most of the time, the solutions are closer than we expect and we should look for them in simple accessible things around us.

We also live in a world where our image not only that matters, but can even influence our destiny. Well care look, sizes closer to the ones from standards, positive attitude, always attract and can advantage a person in a certain situation. Of course, a life style that can concretize in movement, nutrition and education is the one that imposes the attitude, the positive thinking and the self-confidence. But in this entire carousel, time plays the main part, and most of the time is the biggest enemy. Aging is a progressive process, irreversible and most of the time sad. The fight against aging must be approached with courage, dignity and power but especially with knowledge because aging is not an incurable disease, but a life

stage that determines a decrease of all capacities and causes irreversible appearance changes.

Even though is universal, the aging phenomenon manifests differently on women in comparison with men, and this is influenced by the lifestyle they had before age 40, age that is medical considered starting of the decline.

Unfortunately, as the years pass by, also the excesses from youth are cumulating; the amount being settled at the age when fighting against aging is harder, always opening new situations on which the person does not expect.

The comparative studies of aging phenomenon at women and men are the ones that determine measures in order to slow the process limit the effects and increase the life time and quality it.

Human antiaging nutrition is, at the moment, a highly debated subject starting from a group problem to a book subject and also conference theme. This is a sign and a message towards a research area that can demonstrate through results that aging, even though cannot be defeated, can be slowed… more or less. The approaches regarding antiaging nutrition are various, suggesting nutrition plans and diets which take into account the glycemic index of foods, the color of these, diets based on food combinations, dissociated diet, Mediterranean diet, hypocaloric diet, diets against diseases, antiaging diets and so on, all of these having the same goal in maintaining the great privilege of youth.

The causes of aging are multiple and complex, the factors which accelerate the process are stress of all kind which is also equal with genetics, pollution factors from atmosphere that can concretize with pollution from life style and work, active or worse, passive smoking, prolonged exposure at UV radiation (is one of the favoring facts of skin aging that manifest with "unbearable" stains apparition, moles and "impossible" wrinkles), nutrition based on excessive processed food, rich in "empty calories" and poor in vitamins, minerals, enzymes that are specific in "raw" healthy food, sedentariness with all the bad consequences, the third millennium diseases (hypertension, dyslipidemia, diabetes type I or II – WHO statistics), free radicals.

The aggressiveness of free radicals manifests by starting of the chain reactions that degrades the cellular membrane, protein, lipids or even the DNA molecules. Basically, free radicals attack every cell which comes in contact with, take from its electrons and the attacked molecule becomes unstable and in search of electrons, the final result is the apparition of new free radicals. The negative effects of these factors are unfortunately, most of the time late.

It is known that the immune system is the one which can "neutralize" some of the excess of free radicals, but also the deterioration of the immune system manifest only with years passing.

In this situation, the fight against years can be taken at the interference of at least four domains: medicine, psychology, genetic engineering and sports.

In the present, cellular antiaging researches are orientated towards the study of the telomeres' length, DNA repetitive regions which are found at the termination of every chromosome and the influence of telomeres' length on aging process and longevity (Texas University, Health Sciences Center).

Other researchers are orientated towards prolongation of the synthesis capacity of some antiaging enzymes like superoxide dismutase (SOD) and glutathione peroxidase (GP), which synthesis is reduced after age 30 (dr. Mihaela Bilic – Health Tastes).

Health is a balanced but fragile condition and involves efforts to keep it. Health is "expensive", healthy food is expensive, sports practice at gym costs money and involves time, but the hardest thing is to respect a balanced diet. ***Why is so hard to follow a diet? The answer is maybe because we "eat with the brain" and "we live with three elements: water, electrolyte and hormones",*** and this is why we don't have the capacity to permanently control our nutrition.

Hunger and thirst sensation, satiety sensation, body temperature regulation take place between the endocrine system, central nervous system and autonomic nervous system, in the hypothalamus. Gherlin and leptin are two hormones that adjust the hunger, and also satiety. Gherlin is a hormone produced by geese lining epsilon cells from pancreas and by the gastrointestinal mucosa, that

causes hunger and accumulation of fat. Gherlin has hyperglycemic effect by inhibiting the secretion of insulin. Leptin is a hormone secreted by fat cells that can truly be considered an endocrine organ. In the hypothalamus, leptin joins the receptors that cause the satiety sensation. This is how the hunger-satiety mechanism is set, in conclusion "we are led by hormones" and we often cannot control how much, what and how we eat if there is the slightest disorder in the hormonal level.

The nutritional intake should always be correlated with age and the type of activity and must be balanced with food proteins, carbohydrate, lipids, vitamins, minerals, and all these must be consumed from the best quality and safe sources. The balance between the demand and the nutritional intake results the nutritional status, which if it is optimum, the person is perfectly healthy.

Alkaline or acidic nutrition?

Alkaline or acidic nutrition is a long discussed and analyzed topic, the most disputed aspect being the loss of calcium. In conclusion, the alkaline nutrition reduces or limits the urinary losses and the acid nutrition favors urinary calcium elimination. Usually, in the human body doesn't exist overdoses of calcium and is recommended alkaline food with all its benefits, acid food is rarely recommended, only in some pathologies.

Hydration is the magic word at any age, but especially with older age. One of the rules says that is necessary 1 ml of water at every kcal swallowed, but of course a higher consumption can only have beneficial effects. Water cleans the body of toxins and is recommended to drink water even if the thirsty sensation is not present. Another big property of water is that doesn't have calories, water consumption fantastic results is that it doesn't fatten. Dehydration causes hydrolectrolitic disorder with all its negative and very serious consequences.

A balanced nutrition diet has the role of ensuring the function of all body organs and systems and to control and minimize food consumption, the distribution of the meals should be made to ensure the glucose maintenance at constant levels and the food proteins should be as small as possible. To control everything we must have a brain that works perfectly and for this is required the synthe-

sis of some neurotransmitters which require phosphorus, vitamins, minerals, essential aminoacids.

The skin is the largest organ of the body and is the one that provides information about the health of the whole body. The skin is the barrier between the interior and exterior environment, and belongs to the sense organs group with numerous sensory nerve endings, is well vascularized. Skin appearance is influenced both from interior by nutrition and hydration and also from exterior by the involvement of the environmental factors.

The movement is as important as nutrition and hydration for a healthy lifestyle in the intense battle with age. *Basically, movement and hydration always compete each other.*

Sports or any kind of movement, preferably outdoors, must be included in a lifestyle in order to fight against the passing years and with the weight gained. At least two hours after a meal, practicing a medium intensity outdoor "march" with a correct breathing, for at least 30 minutes, leads to burning fat deposits. The effort is called "aerobic" because the muscle energy is given from "the lipids burned in the carbohydrates fire" in presence of oxygen. The body position control is very important and must become a habit.

Possible antiaging solutions are: stress elimination, respecting the rest period, respecting a daily schedule of meals, small portions of food, balanced nutritional intake with food principles (proteins, lipids, carbohydrates, minerals and vitamins) food without genetic changes, from unpolluted areas, adequate hydration, alkaline diets rich in raw foods, deeply colored, that contain enzymes, flavonoids, phytonutrients, water-soluble vitamins (B, C), lycopene, minerals (selenium, potassium, calcium, magnesium, phosphorus), essential fatty acids (EPA and DHA), diets that contain complete proteins: eggs, white turkey and chicken meat, fish, liver, giving up smoking, drinking alcohol occasionally and when consumed, natural red wine, rich in tannins with powerful antioxidant, giving up or at least reduce confectionery and pastry sweets and sugar, giving up eating chocolate, and if it is consumed, to be dark chocolate containing 70% cocoa, nutrition through the skin, hydrating with mineral water, nutrition and hydration with natural oils and creams

without parabens and without too many synthetic chemicals, using herbal of clay cosmetic masks, homemade and immediately used to prevent the oxidation of components, respecting a weekly exercise program (light exercise, sports or at least 10,000 steps/day with proper breathing).

Natural food supplements can help, but will be recommended with caution, knowing their side effects, possible associations or interaction with other medicines.

Genetic research conclusions demonstrate a lower activity of genes regarding the aging process in case of a ***reduced calorie intake***. The antiaging diets need to take into account the fact that *human must eat less to live long*.

In our world, the amount of information overwhelms us, stress is omnipresent, rest time is always pressed, it is impossible respect meals program and relaxation is a rarely used term. Now is the time for each of us to be the "zero" priority and have the will and power to rearrange our goals. Everyone who takes care of himself through "smart" nutrition, hydration and sports will face challenges and will always be a winner. But of course it is difficult, and the decisions on healthy lifestyle send you on a battlefield with food temptations, but always remember ... ***"Look for helping hand on end of own arm."*** *Confucius*

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Body fat. In and out of the fitness center

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Abstract
A relevant aspect of physical condition is represented by the adipose tissue; it is actually the goal of those who visit frequently the gym. **The purpose** of this current research is to pinpoint the importance and the role of the personal trainer regarding the efficiency of the services offered to clients in a gym. **Methods.** The research developed in two phases in two fitness centers; in the first phase the subjects (N=20), divided in two groups, the control group (C.GR, N=10, $M_{(y)}$=28.8±4.8y, $M_{(h)}$=1.66±0.04m, $M_{(w)}$=64.2±10.28kg) and the experimental group (E.GR, N=10, $M_{(y)}$=30.4±5.8y, $M_{(h)}$= 1.68±0.08y, $M_{(w)}$= 62.7±8.52kg) accomplished a number of 30 sessions. At C.GR they worked by the classical method and at E.GR they worked by the personal trainer method. Both groups were determined at the beginning of the research (I.T) and at the end of the research (F.T) the fat areas in three parts: belly(b), arm(a) and hip(h) as well as BMI. In the second phase, the subjects (N=10), divided in two groups, the control group (C.GR , N=5, $M_{(y)}$=29.4±8.2y, $M_{(h)}$=1.69±0.15m, $M_{(w)}$=71±21.4kg) and the experimental group (E.GR, N=5, $M_{(y)}$=30.8±4.4y, $M_{(h)}$=1.71±0.01m, $M_{(w)}$=83±17.4kg) attended a number of 30 sessions by the personal trainer method in the gym. Before the experiment started, each subject from E.GR was calculated the daily water intake (from liquids and from food). During

the first 15 sessions, the subjects belonging to this group voluntarily gave up to a quantity of approximately 500 ml water/ day (DWI), and during the next 15 sessions to a quantity of approximately 1000 ml water/ day. **Results.** Between the limitations of our research we can say that, the subjects who work by the personal trainer method have greater fat loss in relation to the subjects who work by classical methods. These losses are broader if associated with modifications of the daily diet, in the case of our research we talk about the daily intake of liquids.

Key words: personal trainer, body mass index, skin fold thickness, daily intake of water

Introduction

It is hard to imagine that an individual attends the gym without being preoccupied with the evolution of his physical condition, especially regarding the fat layer. This motivation is a reflex of the promotion of the 'thin individual' as an aesthetic model, by the contemporary society. On the other hand, the same society, permanently draws attention on the risk of the emergence of some diseases associated to physical inactivity and an unhealthy diet. The statistics [9] furnished by the World Health Organization (WHO) are alarming: in 2008, approximately 38% of adults over 25 years have an increased level of cholesterol; approximately 39% of the adult population is obese (2014) and 23% is insufficiently physically active (2010). Specialists[5] think that physical activity represents the most efficient and powerful way to promote a healthy life and to increase longevity amongst the population regardless of age or gender. Public health policy promotes 'health and nutrition instructors'[7,6] for the deployment of a healthy life style. The program has as a goal the prevention of obesity and the cutback of chronic diseases[4]. There is a direct relation between obesity and cardiovascular diseases[1] but also between these and the physical inactivity[2] (sedentary life). Otherwise, diabetes types, cardiovascular diseases or cancer types are consequences of what we eat and how we spend are free time[3]. One of the solutions is attend-

ing gyms. In the current research we want to show that, positive results – in regards to the control of the fat layer – obtained as a result of physical activity **in** the gym, can be improved **outside** the gym, through the supervision of the diet. It is obvious that gyms represent a business and the quality of the services offered there depend mainly on the training level of the trainers[11,12]. At some gyms classical methods are used to work with clients, while at other gyms they use the personal trainer method. Other gyms benefit from the support of diet specialists (the association of physical activity with diet improves the activity, the efficiency), or the client's diet is exterior to the gym.

Methods

Participants

30 subjects, clients of two gyms took part voluntarily in the research. The subjects were informed about the terms of the development of the research and they agreed in writing. In the first phase 20 subjects took part: 10 subjects in the control group (C.GR, N=10, $M_{(y)}$ =28.8±4.8y, $M_{(h)}$=1.66±0.04m, $M_{(w)}$ =64.2±10.28kg) and 10 subjects in the experimental group (E.GR, N=10, $M_{(y)}$=30.4±5.8y, $M_{(h)}$= 1.68±0.08y, $M_{(w)}$= 62.7±8.52kg). in the second phase 10 subjects attended: 5 subjects in the control group (C.GR , N=5, $M_{(y)}$=29.4±8.2y, $M_{(h)}$=1.69±0.15m, $M_{(w)}$=71±21.4kg) and 5 subjects in the experimental group (E.GR, N=5, $M_{(y)}$=30.8±4.4y, $M_{(h)}$=1.71±0.01m, $M_{(w)}$=83±17.4kg). The research developed on a period of 30 sessions (3 sessions/ week) for both teams. The research got the approval of the Research Centre for Physical Activities of Aurel Vlaicu University from Arad.

Experimental Design

In the first phase, a part of the subjects (C.GR) attended three sessions weekly by the classical method (First session: pectorals

(chest) + triceps; Second session: dorsals (back) + biceps; Third session: deltoids (shoulders) + abdomen) and the other part (E.GR) attended the same number of sessions weekly by the personal trainer method (First session: Hiit Training; Second session: Complete workout + Cardio; Third session: Workout Circuit Inferior Train + Cardio). At the beginning (I.T) and the end (F.T.) of the research, the subjects of the two teams, were determined their fat areas in three parts[8]: belly, arm, hip, as well as BMI. For measurements we used the following instruments: Medical Export waist meter (Italy, 2010), Phillips electronic scale (China, 2014), Kettler manual caliper (Germany, 2014). In the second phase, all subjects worked by the personal trainer method, but at E.GR the independent variable (the daily water intake, D.W.I.) belongs to the diet, so outside the gym and the dietician. We started with the following theoretical premises: water is a component of the daily diet; the quantity of water from our organism is relatively constant; most of the biochemical reactions(hydrolysis, oxidations, hydrations) take place in the presence of water(water also promotes the digestion); the decrease of the water quantity through nourishment determines the organism to reach out to mechanisms that causes it; the burnout of lipids through physical effort is one of these ways[10]. At the beginning (I.T) and the end (F.T) of the research, the subjects were determined their fat areas in three parts: belly, arms, hip, BMI, following the same protocol regarding the measurements. For the subjects in E.GR, the supervision of the liquid intake was done like this: each subject registered daily his intake of liquids (water, tea, coffee, juices) as well as the quantity and the type of eaten food. On the basis of these reports, they were calculated the daily water intake[13] (D.W.I.). During the first 5 weeks, the E.GR subjects used approximately 500 ml water less daily to the ordinary use determined at the beginning of the research (water quantity meaning: liquids and nourishment percentage).

Statistics

The data in the chart represents the average of three consecutive measurements for belly, triceps and hip, both at the initial testing (IT) and the final testing (FT). We also calculated the average (M) and the standard deviation (SD) for graphical representations. We used the SPSS program.

Results

The obtained data is presented in charts 1,2,3,4. It is noticeable that, all 4 research groups are not unitary regarding the weight and the adipose tissue in the determined areas. This is a result of the fact that the groups were setup on the basis of volunteering, in this way, in the same group can be found different somatic types (the distribution of fat layer differs from one somatic type to another). In all 4 research groups can be found endomorphs, mesomorphs and ectomorphs. For instance: from GR.C (phase I) subject A.O. is endomorph while subject A.A. is ectomorph. The research groups contain both women and men and the percent of fat constitution differs: from men (3%) to women (12%)[12]. Likewise, the daily water intake (from liquids and nourishment) represents an individual matter that concerns the basic metabolism of each person, culinary habits, accuracy of the daily rapport of the quantity of eaten food but also the accuracy of the determination of the water percent of each aliment. For example: a dose of soup was reported by a subject sometimes as 200ml and other times as 250ml.

Chart 1 The data of the control group (C.GR) for phase I

Nr. crt.	Name	Age (y)	Height (m)	Weight (kg)		Belly (mm)		Triceps (mm)		Hip (mm)		BMI	
				TI	TF	TI	TF	TI	TF	TI	TF	TI	TF
1	**A.O.**	38	1,75	90	88	28	26	22	20	26	26	29,41	28,75
2	**AD. O.**	32	1,7	64	63	24	22	20	20	22	20	22,14	21,79
3	**M.G.**	30	1,65	72	70	30	28	22	20	28	26	26,18	25,37
4	**A. S.**	27	1,61	63	62	26	26	18	18	24	24	24,32	23,93
5	**C. N.**	26	1,7	63	62	24	22	20	20	22	20	21,79	21,45
6	**I.R.**	27	1,62	55	54	32	30	16	16	28	26	20,99	20,61
7	**L.H.**	30	1,65	62	61	24	22	20	20	24	22	22,79	22,42
8	**T. P.**	24	1,6	58	59	18	20	16	18	18	18	22,65	23,04
9	**D.C.**	21	1,64	59	58	26	24	20	18	26	24	22,01	21,64
10	**A. A.**	33	1,71	56	57	16	18	14	14	14	16	19,17	19,52
	M	28,80	1,66	64,20	63,40	25,78	23,80	18,80	18,40	23,20	22,20	23,15	22,85
	SD	4,87	0,05	10,28	9,64	4,92	3,71	2,70	2,07	4,44	3,58	2,88	2,65

Chart 2 The data of the experimental group grupei (E.GR) for phase I

Nr. crt.	Name	Age (y)	Height (m)	Weight (kg)		Belly (mm)		Triceps (mm)		Hip (mm)		BMI	
				TI	TF	TI	TF	TI	TF	TI	TF	*TI*	*TF*
1	**O.S.**	30	1,7	62	58	20	16	22	18	20	16	21,45	20,06
2	**C.B.**	39	1,62	57	54	22	20	18	16	22	18	21,75	20,61
3	**A.P.**	38	1,6	60	57	24	20	20	16	22	20	23,43	22,26
4	**C.R.**	32	1,73	62	58	22	18	16	12	14	12	20,73	19,39
5	**R.M.**	27	1,62	55	53	16	14	14	12	12	12	20,99	20,22
6	**D.I.**	26	1,6	58	51	32	26	16	14	28	24	22,65	19,92
7	**P.G.**	28	1,8	84	81	18	16	20	18	20	18	25,92	25
8	**O.D.**	33	1,65	58	55	18	16	14	10	14	10	21,32	20,22
9	**T.R.**	32	1,72	61	59	24	20	18	16	22	18	20,67	20
10	**D.T.**	19	1,82	70	69	16	12	14	12	14	12	21,14	20,89
	M	30,40	1,69	62,70	59,50	21,20	17,80	17,20	14,40	18,80	16,00	22,01	20,86
	SD	5,87	0,08	8,53	9,00	4,83	3,94	2,86	2,80	5,09	4,42	1,63	1,65

Chart 3 The data of the control group (C.GR) for phase II

Nr. crt.	Name	Age (y)	Height (m)	Weight (Kg)		Belly(mm)		Triceps (mm)		Hip(mm)		BMI	
				TI	TF	TI	TF	TI	TF	TI	TF	TI	TF
1	**D.E.**	20	1,65	92	88	30	23	26	24	40	40	33,82	32,35
2	**P.A**	24	1,63	55	55	29	25	19	16	31	29	33,79	32,32
3	**P.An.**	41	1,62	60	60	25	24	20	20	30	33	20,70	20,70
4	**T.I.**	28	1,96	98	97	33	31	18	14	25	15	22,86	22,86
5	**V.M.**	34	1,61	54	54	29	25	18	18	38	38	25,51	25,25
	M	29,40	1,69	71,80	70,80	29,20	25,60	20,20	18,40	32,80	31,00	27,34	26,70
	SD	8,29	0,15	21,41	20,19	2,86	3,13	3,35	3,85	6,14	9,92	6,15	5,39

Chart 4 The data of the experimental group (E.GR) for phase II

Nr crt	Name	Age (y)	Height (m)	Weight (Kg)		Belly (mm)		Triceps (mm)		Hip (mm)		BMI		CAZ(ml)		
				TI	TF	TI	TF	TI	TF	TI	TF	TI	TF	E1	E2	E3
1	**H.N.**	29	1,71	105	99	33	31	33	21	53	40	35,95	33,86	4903,00	4043,00	3543,00
2	**P.E**	27	1,69	59	59	19	13	22	13	30	26	20,66	20,66	3245,00	2745,00	2245,00
3	**P.O**	37	1,70	90	82	35	27	20	17	43	31	31,14	28,37	2462,00	3762,00	3262,00
4	**S.S.**	35	1,71	74	75	30	27	25	18	32	29	25,31	25,65	3955,00	3455,00	2955,00
5	**T.A**	26	1,74	88	90	48	31	16	15	28	25	29,07	29,73	3670,00	3170,00	2670,00
	M	30,80	1,71	83,20	81,00	33,00	25,80	23,20	16,80	37,20	30,20	28,42	27,65	3647,00	3435,00	2935,00
	SD	4,40	0,02	17,43	15,22	10,42	7,43	6,38	3,03	10,57	5,97	5,80	4,91	899,83	505,80	505,80

Discussion

From the data obtained in the first phase of the research it is noticeable that, the subjects that worked by the personal trainer method lost more adipose tissue (in all 3 measured parts: belly, triceps, hip) in relation to the subjects who carried out a classical program at the gym. (fig.1)

The effects of the personal trainer method can be considered significant in the case when the average of the body mass index for the subjects of both research groups at the IT are normal. (BMI=18.5-24.9)[8] in relation to cathegory (untrained), age (28- 30 y) and sex (men and women): $M_{BMI(C.GR,IT)}$=23.14 and $M_{BMI(E.GR,F.T)}$=22.00. In other words, the target of the first phase was not aiming a great quantity of adipose tissue (fig. 2).

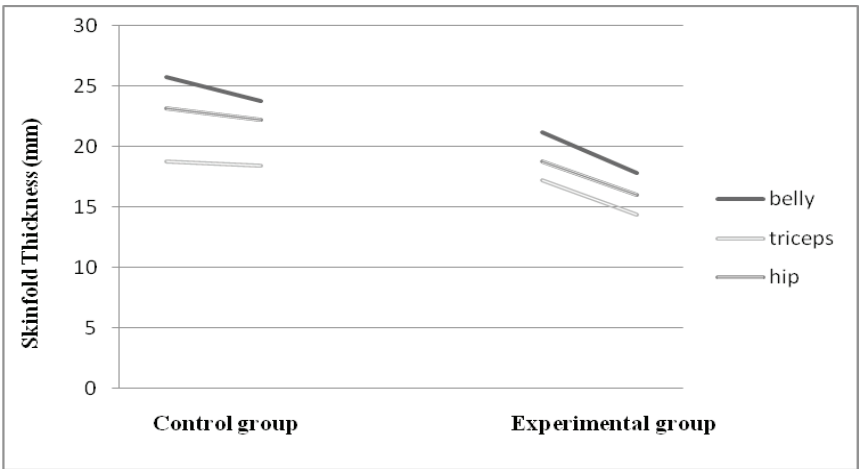

Fig. 1. The evolution of fat area in the first phase of the research

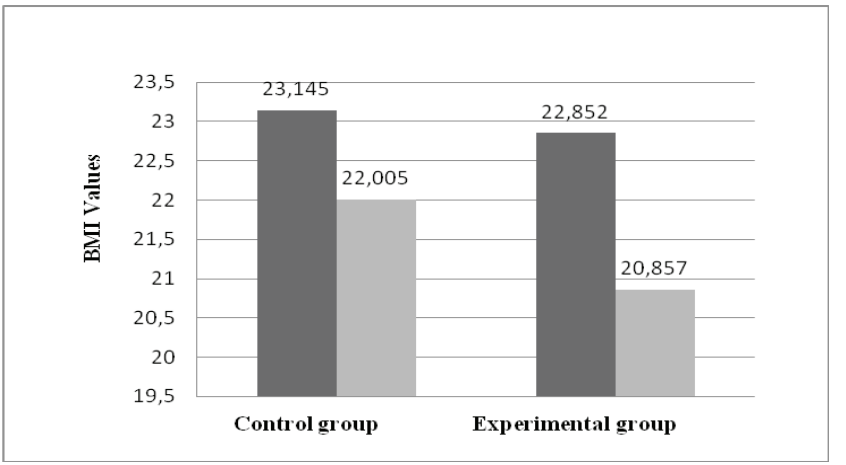

Fig.2 The evolution of the BMI average in the first phase of the research

From the data contained in charts 3 and 4 it is noticeable that, the volunteer subjects in the two research groups have a greater quantity of adipose tissue in relation to the subjects in the first research phase, a fact mirrored by the BMI which is characteristic for groups such as overweight (BMI=25–29.9)[8] in relation to category (untrained), age (29-30 y) and sex (men and women): $M_{BMI(C.GR,IT)}$=27.34 şi $M_{BMI(E.GR,IT)}$=28.42 (fig.3).

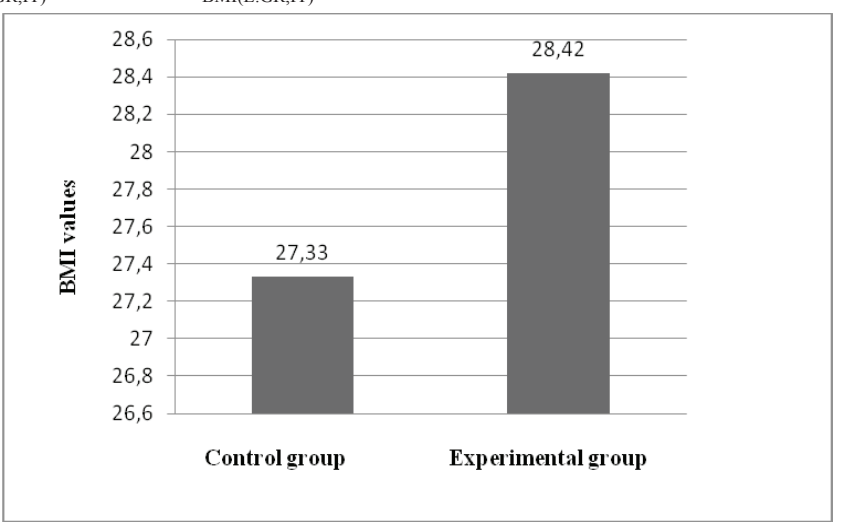

Fig.3 BMI average at IT for subjects from second phase

Basically, it is accepted the idea that, the concerted action of more factors contribute to the amplification of the effects. In the second phase of the research, at E.GR we introduced an additional variable besides the personal trainer method that is the daily water intake (DWI). This is external to the gym; supervision of the diet, generally, is the responsibility of the nutritionist and not the fitness trainer. Though, the supervision of DWI is difficult to track, between the limitations of our research, the results obtained by E.GR in relation to C.GR are better regarding the loss of adipose tissue (fig.4).

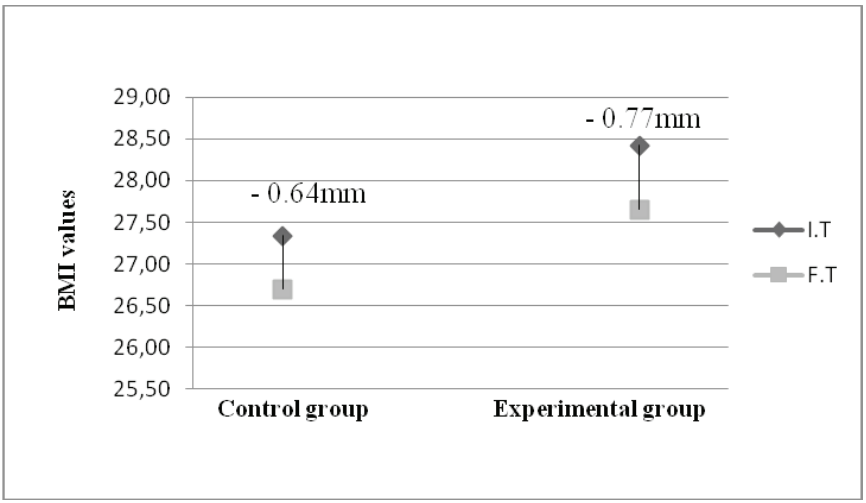

Fig.4 Improvement of BMI average in the second phase of the research

Conclusions

According to our research we can say that, the personal trainer method is more efficient than the classical method both in the case of women as well as men, regardless of the somatic type. Likewise, involving factors external to the gym in the supervision of the adipose tissue – in our case the daily water intake – the fat losses can be even greater. For the improvement of the services provided by the gyms, we recommend the presence of the nutritionist besides the fitness trainer.

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Thoughts about the Theoretical Approach of Recreation, Sport and Tourism

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Abstract
Despite the fact that recreational activities – like many other activities evolving in parallel with the social development of humans – are as old as mankind, recreation, as a topic for academic interpretation and research was justified only at a relatively late date in the history of sciences. Recreation, according to recent terminology used by researchers is the culture of how humans spend their free time; it relates to active recreation, the creation of well-being, the restoration of people's abilities to work, as well as the preservation and improvement of their good health. My study is aimed at elaborating on and rethinking the relationship between recreation, sport and tourism by the help of a desk research. As a result of the investigtion it can be state that recreation needs to be considered a complex phenomenon which is based on a variety of elements taken from various symbolical domains. At the same time it is also evident that recreational activities cannot be simplistically identified by using parameters of one or another symbolical domain. What needs to be considered instead is the complex recreational experience as well as the person, fully engaged in and enjoying the recreational activity in question. Recreation sport and tourism all have a lot of common attributes, moreover, the same activity occasionally might belong to all three entities. They also have a lot to share concerning their origin; they all might be described as cultural phenomena, and, at the same time, they also play a prominent role in economy.

Keywords: *leisure, cultural phenomena, sport, recreation, tourism*

1. Introduction

Recreation, as a topic for academic interpretation and research, was justified only relatively late in the history of sciences in Hungary, although, the term itself, meaning 'rest, holiday making, school break or admiration of something', was used as early as the beginning of the 20th century (Bánhidi, 2012). Initially the term was interpreted within the specific symbolic domains and systems of paradigms of related disciplines including the sociology of leisure and the geography of tourism. The situation is similar in sport science, because sport research was for long exclusively done on the periphery of one or another discipline. The true significance and the justification of sport as an independent area of academic investigations was only recognized by Hungarian researchers at the very beginning of the 21st century (Bognár, 2009). Tourism research, which is based on geographical investigations is thought to have been in a more favourable position, since the precise boundaries of research were identified by geographers as early as the dawn of the 20th century. Since then tourism research has been considered as a branch of social-, and economic geography. The importance of tourism, the growth in the volume of tourism research became only evident at the end of the 20th century with the emergence of mass tourism (Aubert, 2002) (Table 1).

Table 1: Recreation, sport and tourism as an independent topic for academic research in Hungary.

Phenomena	First turnout	First meaning	Independent academic topic	Name of the discipline
Recreation	Beginning of the 20th century	Rest, holiday making, school break, admiration	Beginning of the 21th century	Recreology
Sport	First third of the 19th century	Entertaining pastime	Beginning of the 21th century	Sport Science
Tourism	First third of the 19th century	Hiking, trip, excursions	End of the 20th century	Tourismology

The process, by which research in recreation (recreology, leisure sciences), sport sciences and tourism (tourismology) have become independent areas of study, was the result of a normal development, caused by the acceleration of the differentiation of sciences in the modern era. These areas today are defined as multidisciplinary sciences, that synthesize and integrate both natural and social sciences. The research topics within these scientific areas are clearly describable, and their complex and complicated systems of relations cannot be monopolized by other disciplines. Since multidisciplinary sciences build on the elements of several other symbolic domains, their terminology comprises specific terms, which are used either within their own specific area, or, are taken over from other, related disciplines. At the same time it is also important to see that the attempts to legitimize the new disciplines have always been characterized by heated debates and biased or unanswered questions, including 'What belongs where?' 'Where are the research boundaries?''How to call this area precisely?' Even today these and similar polemical exchanges make our new sciences vulnerable.

The main reason behind this uncertainty is that recreation, sport and tourism have a lot of common attributes. They are similar consi-

dering their aims, task systems and research tools, what is more, there are more similarities than differences between them (Figure 1). This is especially true when considering those areas which are related to one another and can be found on the boundaries of the new sciences. Examples include sport tourism, sport recreation and recreational tourism.

Figure 1. Some common keywords in interpretation of recreation, sport and tourism

Recreation, sport and tourism can be described as cultural phenomena, and, in addition, it is their common feature, too, that they all include voluntarily performed activities, deriving from people's somatic and psychological needs with the aim of renewing and restoring their own physical and intellectual energies and which are typically done in people's free time and which contribute to the development of human personality. Leisure behaviour in all the three cases is closely linked with joy of life experiences, offered by sport, recreation and tourism as well. Sports, recreation and tou-

rism belong to those social activities, which are closely interrelated with natural and social environment, in brief with geographical surroundings in general (Győri, 2014). It is also important to note that all these three areas – through related industrial and service activities – play a significant role in economic growth by providing new jobs, additional income and a growing consumer market. This is one of the reasons why in common thinking these three areas usually stand together and, even specialist literature refers to them as one single sub-discipline (Mitchell and Smith, 1985).

The aim of our theoretical work is to model the relationship between recreation, sport and tourism, to identify their joint areas and to tailor them to formal theories. I also aim to clear up misunderstandings and to contradict some false ideas, which have become stereotypes and which still occur in specialist literature.

Our initial hypothesis is that recreation, sport and tourism need to be interpreted as entities in their own right and, despite their similarities, they do not represent a hierarchical system; they are in a coordinate relationship instead. Their precisely describable sets are shaped by joint (!) aims, tools and methods (Figure 2).

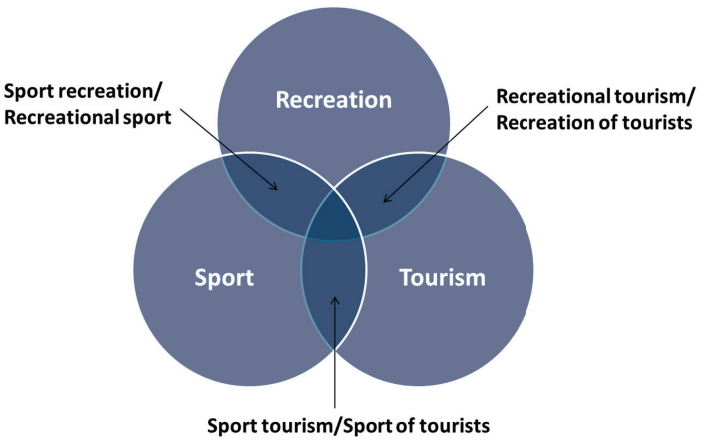

Figure 2: Relationship between sport, recreation and tourism

2. Basic categories

By now the consensus-based definitions of recreation, sport and tourism have become well known both in the specialist literature.

Recreation, according to recent terminology used by researchers is the culture of how humans spend their free time; it relates to active recreation, the creation of well-being, the restoration of people's abilities to work, as well as the preservation and improvement of their good state of health. Recreation comprises forms of positive behaviour aimed at satisfying individual and social interests which are entwined with the creation of people's good somatic, psychological and social well-being (Pigram, 1983; Cushman and Laidler 1990; Szabó, 2002; Kovács, 2002; Bánhidi, 2012). This elaborate definition underlines the fact that recreation goes back to people's natural needs, relates to free time, is culture-oriented; in addition, it brings joy and satisfaction to them and, as a consequence, people's physical, psychological and intellectual performance improves. In Gáldi's opinion (2011) recreation has got three streams: outdoor, health care, search experience. Sometimes recreational activities do not have an organizational framework at all, happen with the members of the family, friends or individually (Kiss, 2009).

Sport, by the definition of the European Sport Charter (1997) 'is types of physical activities, which casually, or, in an organized form, serve the development of people's physical and mental abilities and skills, with the aim of establishing social relationships or achieving certain results at different levels in competitions.' Sport presupposes adequate psychomotor abilities, it is based on regulated, purposeful competition or struggle and, to be engaged in it it is absoutely necessary to be determined, to take risks, to be good or playful. It is also interesting to note that the word 'sport' was brought from England to Hungary by Count István Széchenyi and at that time it used to mean an 'entertaining pastime(!)' (Takács, 2009).

Tourism means the free movement of people (excluding travel between work and home), as well as the services related to needs

deriving from the above. Free time activities, when pursued away from home are voluntarily chosen with the aim of doing something different and enjoy it. Several tourist motivations, models and styles are known (Kollarik, 1991; Fejős, 1998). Tourism has a considerable socio-cultural impact, which is manifested in increased social and regional mobility, as well as in the appreciation of local and national assets.

3. Sport recreation or recreational sport?

The joint areas between recreation and sport are the most critical and the most debated of all borderline areas and they might be in the background of most uncertainties. The first and most obvious problem one encounters is how to call those activities which carry the attributes of both areas, of sport and recreation as well. Is it sport recreation or, alternatively, recreational sport?

Early sport literature prefers the term *sport recreation* and uses it as a synonym for leisure sports (Blagajac, 1979; Kozmanovics, 1989; Dobozy and Jakabházy, 1992; Szabó, 2002), emphasizing the community nature and the joyfulness of sport as well as its favourable physiological effects. Kovács (2002, p. 50) calls those systematic exercises, which are performed with the aim of improving or restoring people's performance, state of health and abilities to work sport recreation, although, he adds that the term *recreational sport* is also possible in this case. In his opinion this latter term is capable of expressing the idea that sport is a tool to achieve an aim.

It is common to try to clarify the difference between sport and recreation. These attempts seems to lead to quite a subjective and unproductive argumentation ('Sport is a partially ordered set of recreation'?). It is rejected the use of the term of sport recreation, and classified sport activities performed with the aim of recreation as part of recreation in motion, a larger set of activities. In this opinion it is the voluntarily performed free time activities that belong to this category.

The use of the term 'recreation in motion' might seem reasonable when discussing physical activities of recreational nature, but it does not mean that no term exists to denote the joint area between recreation and sport, which is sport done in people's 'free time for the enjoyment or f it'. Since, in our opinion sport and recreation represent two *separate entities*, actually there are two terms and both of them are proper.

One of these two terms is the phrase 'recreational sport', suggested by Kovács (2002), and used quite frequently by international researchers. This term is unambiguous because it clearly suggests the *recreational motivation* of people to do sports. Consequently, recreational sport is a kind of sport, that requires physical and mental efforts; it can either focus on achievements, or it can be of competitive nature. Its main aim is to bring joy and achieve the state of well-being. In this sense there is no sharp boundary between recreational sport, hobby sport and amateur competitive sports. First class sport can be distinguished by its professionalism meaning, that its aims do not include recreation or the preservation of health. The recreational aspect of sport play a very important role from the economical point of view (Table 2).

Table 2: Types of sport from economical point of view (Dénes and Misovicz, 1994)

Type of sport	Trading function	Income for the sportsman/woman	Main target
Professional	Event as a show	Determining	Promotion
Recreational competitive	Sport facilities and equipments	Negligible	Promotion and leisure
Recreational social	Sport facilities and equipments	Nothing	Leisure and health

In the light of the above it is to be noted that when interpreting the relationship between recreation and sport in our opinion it is a serious methodological mistake to interpret their relationship in a

linear way meaning, that the differences between recreational sport and first class sport are determined only by physical parametres (e.g. frequency and intensity of training, or pulse rate). These indicators are suitable to evaluate only one cross section of sport, i.e. its impact on people's physiology and health, but in this case the recreational impact of sport remains undetected. The most essential feature of the recreational function of sport is the achievement of the formerly mentioned good psychological condition, as well as fitness, good physical, emotional and mental health. This condition can only be partially described by the number of weekly training sessions or the frequency of heartbeat. The major category to describe the above qualities is called 'flow', meaning the total immersion in sport (Jackson and Csíkszentmihályi, 2001; Kovács, 2002).

The 'flow' can be experienced by all those people who would want to have something positive in exchange for their efforts whatever the background – motivation -of those are. The adaptational process, which is induced by the training programs – even if their aim is recreational – creates increasingly favourable psychophysical conditions for the individual to achieve increasingly better results. Sport becomes a true experience only under physical strain. At the given training level different types of training programs – including competititons - are needed. A significant momentum of recreational sport is that each individual is capable of finding those challenges which suit them the best; thus, sport may become an autotelic experience.

According to Balogh and Domokos (2013) the presence of 'flow' is not only in traditional leisure or recreational sports but in elite sports too. For instance the results of the examination of 'flow' within two very different sports, Hip-Hop Dance and Handball, showed it clearly. There isn't any significantly different the level of 'flow'. Summary, both of physical movement can improve positive emotions. Furthermore, people in different cultures consider diffferent values and traditions important and follow them even in sports (Balogh, 2012). It occures sometimes that in one country there is a sport which has an intense impact on the economy and

attracts millions of competitors (e.g. baseball in the USA) while in an other country the same sport has other aims and operates on a much smaller scale.

The point in recreational sport is that the reward is the sports activity itself; with other words the motivation is in the activity itself. Sportspersons are not only consumers, but they are also the creators of joyful experiences (Jackson and Csíkszentmihályi, 2001, p. 160). The desire to improve health or to lose weight may serve as external motivations, and they might make people do exercises. But, if the sport activity or, the work completed, do not make people happy, the recreational character of the given sport activity is questionable. Those people, who do sports because they are depressed, desperate or bitter, sooner or later will give it up. This is why well-trained sports and recreational experts are needed who are able to develop optimal and personalized training plans and training programs for the individuals. It is important to evolve the pleasure of doing physical activities, the habits of doing recreational sport in particular at young ages (Ardelean, 2013).

In relation to recreational sports another favourable psychological impact needs to be emphasized: it improves creative thinking. Gondola and Tuckman (1985) experienced the improvement of flexibility and originality as a result of running training programs, while other researchers described growth in fluency and flexibility (Steinberg et al., 1997). According to the most recent incvestigations those people, who devote more time to recreational sport score outstandingly high in the elaboration sections of creativity tests (Cavallera and Boari, 2011).

Compared with other physical activities it is sport that has the most beneficial impact on the state of health. In studies, carried out by involving secondary school learners it was found that extracurricular sport activity, including regular competitions and training programs, done with growing intensity, was the most beneficial to battle obesity and overweight (Drake et al., 2013). The combination of various recreational activities increases people's efficiency, while endurance sports, including swimming, running, cycling have a positive impact on the state of cardiovascular organs.

Ballgames and fighting sports have a beneficial impact on bone health (Carmont, 2012).

The list of benefits related to recreational sports could be continued but now it is needed to return to the problems of the usage of the term 'sport recreation'. Considering the logic of the term a recreational activity can be called sport recreation, if the main motivation is sport. But very soon it becomes clear that with this definition we are back to square one. The only difference we can detect is that with this definition only sport symbols have been abandoned, and recreational symbols have been adopted. The players, the activities, the tools and the methods are the same, and the only difference is that these factors are now examined from a different point of view. Although, there is one notable difference, namely, that in addition to active sportspeople, now the passive participants of sporting events (onlookers, supporters) are also included in the conceptual sphere of sport recreation. Some investigators state that spectators' and supporters' strongest motivation are the good spirit and positive feeling of the sport event (Gaálné et al., 2012).

4. Sport tourism or the sport of tourists?

The category of sport tourism and free time activities, including travel, is very broad. Sport tourism activities can vary from the discovery of attractive nature spots to visiting events organized in man-made environments. Activities may also range from the passive watching of sporting events to active participation in them. Sport and tourism are interrelated and this feature is caused by temporal and spatial changes in the social behavior of human societies. This process is closely related to the quality of life, the state of health and the social, intelllectual and emotional background of individuals, who make up societies.

It has been proven by several empirical investigations that, due to people's growing leisure time consciousness, as well as owing to the changes in their leasure time activities, the idea of 'doing sports every time and everywhere' was gaining significance increasing the number of those who do sport. This is how sport tourism, a new

and growing economic branch with enormous business potentials and an enormous consumer market has been established (Turco et al., 2002; Hsu, 2013). Sport tourism is a new trend in spending free time, a significant indicator of modern lifestyle, and, at the same time, an important factor in global development (Giddens, 2001); in addition, sport tourism has an enourmous growth potential in it. Sport tourism stakeholders have got a responsibility to ensure that all persons have equitable opportunities to experience sport tourism services, that such services are morally and ethically delivered, and that sport tourism assets are of appropriate sustainability standards (Turco, 2012, p. 55)

Various sporting events, as well as the many opportunities to do sports attract thousands and tens of thousands of tourists to certain areas or geographical regions, and these visits launch and sustain the development of sport and tourism industry. Not accidentally sport tourism is considered one of the most promising branches of 21st century economy and it is a significant component of regional and local development, which can contribute to the production of local and national income, the creation of new jobs, tax revenue increase, and the development of other economic activities and branches. The share of sport tourism from global tourism industry is more than 10%, meaning, that sport economics and tourism economics are closely interrelated. Consequently, academics all over the world follow with marked attention the development of the relationship between sport and tourism. It can be attested by the fact that the International Olympic Committee (IOC) and the WTO 2000 have regularly been organizing joint conferences on this topic (Hsu, 2013, p. 475).

Gammon and Robinson (1997) have stated that sport tourism includes all those trips and activities which

a) are related to active participation in a given competitive sporting event either as a competitor (an organizer), or as a spectator (supporter) (hard Sport Tourism);

b) are primarily aimed at actively participating in a recreational sporting event (soft Sport Tourism);

c) although, are not primarily aimed at doing sports, but as complementary activities, make use of the available sport tourism possibilities (hard Tourism Sports);

d) minor form of sport or leisure: visitors participation is purely incidental (soft Tourism Sports)

If the purpose of a trip is to actively participate in a sporting event, competition, or training camp, it is called hard sport tourism. If the purpose of a trip is to go to an event as a spectator or supporter, it is called soft sport tourism. (a-b). Whereas, the sport of tourists serves the needs of tourists who travel for purposes other than sport (c-d).

On the demand side of sport tourism there are the active sportspeople, sport managers, coaches, supporters, spectators, and those, who only occasionally do some sport activity. On the supply side of sport tourism there are the active sportspeople (e.g. elements of the show, competitors), active participants (e.g. managers, promoters), travel agents, producers, distributors, lenders of sporting goods and representatives of the businesses on the periphery of sport tourism, including hoteliers, caterers. Infrastructure, including sport facilities, transport and information agencies, as well as various other social and natural resources also play a significant role in sport tourism (Turco et. al., 2002).

5. Recreational tourism or the recreation of tourists?

In recreational specialist literature it is a common mistake to interpret as recreation each phenomenon (e.g. tourism) that manifests one or another kind of recreational function. When doing so it means the lack of proper perspective, since recreation and tourism represent two symbolic systems belonging to two separate entities, which may have common components, but which do not function in a hierarchical order.

At the same time it is evident, that recreation is one of the main aims in tourism. Due to increasing social welfare, longer paid holidays, the development of productive forces and transport as well as the increased purchasing power of people, tourism has become a mass phenomenon (Kollarik, 1991). The driving forces of recreational tourism are active recreation, the creation of well-being,

happiness and joy, the restoration of people's abilities to work, the preservation and improvement of their health. Many activities might fit this description from visiting faraway places and health resorts to seaside vacations and participation in cultural programs and different types of entertainment. Consequently, it can be stated that there is an intensive border area with wellness tourism and health tourism.

Recreational tourism is considered active tourism if the trip is aimed at actively participating in a recreational activity; it can be considered passive if the trip is aimed at visiting a recreational event (e.g. a theatre night). The recreation of tourists means the recreational activities – given by the natural or social environment – of those tourists who travel for purposes other than recreation (e.g. hotel services).

6. Conclusions

Our paper is aimed at elaborating on and rethinking the relationship between recreation, sport and tourism. Sport is a physical activity which casually, or, in an organised form, serves the development of people's physical and mental abilities and skills. Tourism means the free movement of people (excluding travel between work and home) as well as the services related to the needs deriving from the above. When well-defined, recreation demonstrates the fact that a recreational activity responsible for the physical, intellectual, and emotional regeneration of people, needs to be interpreted as an entity in its own right. In addition, recreation needs to be considered a complex phenomenon which is based on a variety of elements taken from various symbolical domains. At the same time it is also evident that recreational activities cannot be simplistically identified by using parameters of one or another symbolical domain. What needs to be considered instead is the complex recreational experience as well as the person, fully engaged in and enjoying the recreational activity in question. Recreation, sport and tourism have a lot of common attributes, moreover, the same activity occasionally might belong to all three entities. These three

disciplines also have a lot to share concerning their origin; they all might be described as cultural phenomena, and, at the same time, they also play a prominent role in economy.

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The Dimensions of Adolescent Personality in Relation to Belonging to Collective or Individual Sports

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Abstract
In the total sample of 128 adolescent boys and adolescent girls, of the average age of 18.75 years, a survey was conducted by using a standardized questionnaire for assessing the dimensions of personality – the questionnaire Big Five Plus Two (Smederevac, Mitrović, Čolović, 2009). The main objective of this study was to investigate the psychological characteristics of adolescents, the candidates for admission to the Faculty of Sport and Physical Education and the specific objective was to determine the differences in psychological characteristics of the candidates according to the type of sport - individual or collective (the Faculty of Sport and Physical Education, the University of Novi Sad). The results of t-test for independent samples, showed that there are significant differences between the respondents in scores on the dimensions. There was a statistically significant difference in the scores on the dimensions of Openness, Conscientiousness and Neuroticism ($p \leq 0,05$). The respondents engaged in individual sports had a higher score on Conscientiousness and Openness, while the respondents engaged in collective sports, had a higher score on the dimension of Neuroticism.

Keywords: adolescents, personality dimensions, sport

Introduction

Adolescence is a chronological period between 10 and 24 years of age, prior to reaching the physiological, psychological, social and economic maturity (Kapor-Stanulović, 1988; Tubić, Đorđić, Poček, 2012). The developmental tasks of adolescents are often turbulent since they mean simultaneous adaptation to different emerging physiological and anatomical changes and the integration of a mature sexuality into the personal model of behaviour, then, the establishment of personal identity and the formation of appropriate social roles. In addition to these tasks, the period of adolescence is characterized by the development of skills for the professional activities and gradual selecting of free activities that are of benefit to the individual and the community. Some previous studies have examined the role of practicing sports on the principle of maturation in young persons. Through participation in sport, children and adolescents were subjected to the concepts applicable to adults, such as organization, discipline, fair play, sportsmanship and teamwork, which had a very positive effect on the maturation process. Personality traits, which are more common in adults who were active in sport during their maturation, are as follows: a lower level of neuroticism, high level of compliance and conscientiousness (Allen, Geenless, John 2013). Also, previous studies confirmed that the population of active athletes is significantly different from the population of non-athletes, in particular in traits such as emotional stability, confidence, perseverance, responsibility et al. (Tubić, 2010 according to Tubić, Đorđić, Poček, 2012). According to Ostojić (2006), sport represents a „highly structured" physical activity that has a precise goal and that in itself includes elements of commitment and overcoming of oneself or opponents. Sports can be individual or team sports. Team sports are performed in groups and these are usually sports games (basketball, football,

handball...), while in individual sports, individual person stands alone for sporting achievement and success. In the basis of every sport lies a desire for success, for reaching the top score. An athlete is a person with above-average level of physical fitness and it can be said that the pursuit of better personal results lies in the very basis of this concept, but also the pursuit of reward (Ostojić, 2006). Some broader research that dealt with studies of personality types within the „sports population", emphasize the importance of distinguishing personality types in particular in the context of the basic motive of practising sport. The persons who find competitive sport crucial, show greater extraversion, while those taking health as the basic motive, have a more pronounced trait of conscientiousness. The authors note that it would be necessary to conduct further studies in order to confirm the role of conscientiousness, extraversion and neuroticism in distinguishing between the people who exercise, the participants in sports and those who do not participate in sport at all (Rhodes & Smith, 2006).

Athletes belonging to individual sports and those who belong to the collective or team sports, have different personality traits (Weinberg & Gould, 2003). The fact that relates to the choice of sport was taken into account, while reflecting on what influences the formation of personality in athletes. Some researchers have wondered what else contributes to differences in personality - whether the fact that a particular person is attracted to certain sports; a certain kind of sport and the environment in which the person resides in early childhood, or the impact of „the atmosphere" of individual or collective sport - according to these authors, this is still not clear (Eagleton, McKlevie & De Man, 2007).

With the aim to determine the personality traits on a sample of adolescent athletes, this study used a seven-factor model of personality, which is methodologically based on the Lexical Hypothesis, according to which all socially relevant terms and the terms relevant to the description of the personality, are contained and coded in the spoken language (Čolović, Mitrović and Smederevac, 2005).

The Model Big Five Plus Two is a model derived from the continuation of the psycho-lexical study of Serbian language, according to which the five factor model dimensions are retained - neuroticism, extraversion, openness to experience, agreeableness and conscientiousness, with two more factors of self-assessment - positive and negative valence of seven-factor model (Smederevac, 2000) attached to those. The five-factor model was dominant in personality psychology at the end of the twentieth century, and has been successfully proven in a number of cross-cultural research studies (McCrae et al., 1999, according to Čolović et al., 2005).

The main objective of this study was to investigate the psychological traits of adolescents, candidates for admission to the Faculty of Sport and Physical Education of the University of Novi Sad, while the specific objective was to determine the differences in psychological traits of candidates according to the type of sport - individual or collective.

Method

The sample of respondents: The total number of the respondents included in this study consisted of 128 adolescent boys (n = 91) and adolescent girls (n = 37), of mean age 18.75 ± years. By means of inspection of completion of the questionnaires, of the total number of respondents, it was found that 120 (93.8%) were involved in sports of and 4 (3.1%) were not, while 4 (3.1%) of the respondents did not answer this question. When asked whether they belong to an individual or team sport, it was found that 33 respondents (25.8%) belonged to individual sports, 85 (66.4%) to a collective sports and no response was given by 10 adolescents (7.8%). A total of 12 respondents were engaged in sports (9.4%) for the period up to 3 years; 5 respondents were engaged in sports for the period up to 5 years (3.9%), while 109 participants (85.2%) were engaged in sports for more than 5 years. No answer to this question was given by 2 respondents (1.6%).

The Procedure. The testing was conducted as a part of regular preparations for the entrance examination of the Faculty of Sport and Physical Education, University of Novi Sad, in June, 2012. The preparations for the entrance examination, last for one month. During that time, the applicants go through various forms of physical and theoretical preparation, with the aim of better understanding the concepts represented in sport and physical education. On one of the theoretical lessons, psychological testing was conducted with the respondents divided into two equal groups in relation to the number. The testing per group lasted for 60 minutes and was conducted under the expert supervision of psychologists and organizational assistance professor and coordinators of the official preparations for the entrance examination of the Faculty of Sport and Physical Education of the University of Novi Sad. The study applied a questionnaire by using a standardized questionnaire for assessing the dimensions of personality - the questionnaire Big Five Plus Two (Smederevac, Mitrović, Čolović, 2010).

The questionnaire Big Five Plus Two (Smederevac, Mitrović, Čolović, 2009) consists of 184 claims and offered answers in the form of 5-point Likert scales. It represents the operationalization of the combination of the five-factor and seven-factor models. It consists of 7 scales: Neuroticism, Extraversion, Conscientiousness, Aggressiveness, Openness to Experience, Negative and Positive Valence Valence. Each subscale has specific subscales intended for the assessment of subdimensions. All scales and subscales are of high reliability. The best metric characteristics belong to Neuroticism scale, and weakest ones to the Negative valence (Smederevac, Mitrović, Čolović, 2009).

The final results of the questionnaire BF + 2 are obtained by means of converting raw scores into T values. It is a special form of the standard score and it is calculated by using the formula T=10*Z+50, where Z = (raw score - arithmetic mean)/standard deviation..

When it comes to T scores, the arithmetic mean is always 50 and the standard deviation 10, so that any two recent scores are comparable. Raw scores for each scale of the questionnaire are calculated by adding up the answers to these items. In the patterns of the questionnaire, it is indicated which items belong to which scale, so only those answers are being summed up. High T values are the scores 55-65, while the low values are the scores below 35. The values ranging between 45 - 55 represent scores in the domain of the average.

The Neuroticism Scale consists of 35 items and includes three subscales: Anxiety, Depression, Negative Affect, through which the level of reactivity to potentially threatening stimuli is assessed. High scores on this scale indicate a chronic negative affect, pessimism, reduced capacity for enduring stressful situations. Extremely low score indicates excessive sangfroid, lack of guilt or caring for others.

Extraversion Scale represents the dimension of individual differences in the degree of responsiveness to the external environment, has 24 items, and includes three subscales: Warmth, Sociability and Positive Affect. A high score indicates excessive reactivity, warmth, compassion, optimism, energy and cheerfulness. Low scores are related to social isolation, distant behavior in social contacts, the lack of joy and ability to enjoy life.

Conscientiousness Scale operationalizes the attitude towards obligations and consists of a total of 24 items. It includes the following subscales: Negligence, Self-discipline and Observance of the Rules. Unlike other dimensions, this scale has pronounced volitional component, so it can also be called the „Will Power". The maximum score corresponds to excessive activity, characteristic for workaholics, while low scores are related to the lazy, inert, passive people.

Aggressiveness Scale is the scale of 28 items, contains three subscales, which are designated as Anger, Peacefulness and Difficult Personality. High scores on the Aggressiveness Scale are reached

by people who are deficient in impulse control, are elevatedly intrusive, with difficult personaliy, while low scores refer to the people who are calm and tolerant and avoid conflicts with others.

Openness-to-Experience Scale operationalizes striving for progress and development, intellectual curiosity and is largely determined by cultural factors; it contains 20 items and two subscales: Intellect and Novelty Seeking. A high score corresponds to an active process of structuring their free time, the tendency to search for (for them) interesting information, embracing of changes and new technologies. Low scores are related to the possibility of carelessness towards engaging in new experiences that can lead to health and physical integrity related risks, the appearance of rigidity, being overcome by fear while facing new content.

Negative Valence Scale consists of 22 items and two subscales relating to Manipulativeness and Negative Self-image. High scores on this dimension are found with intrusive and boastful persons, with expressed negative self-evaluation, which is a consequence of the experience of their own incompetence. Low scores are typical of very gullible and naive people.

Positive Valence Scale contains 25 items and two subscales that measure a Sense of Superiority and Positive Self-image. The high scores are achieved by the people who have overrated ideas about their own importance, high self-esteem and a positive attitude on their abilities, talents and virtues. Such people can easily turn into egotism and narcissism. The negative consequences of this behavior can be the rejection by other people. Low scores indicate low self-esteem, condescension, self-deprecation and then social maladjustment.

Statistical analysis of the data. To display the indicators of personality traits of adolescent boys and adolescent girls, depending on the type of sports, basic descriptive statistics were applied. To determine the difference between the respondents engaged in individual or collective sports, we used the t-test.

Results and Discutions

Table 1. Descriptive statistics for the dimensions BF + 2

Scale - dimension	AM	SD	Min	Max
BF+2				
1. Neuroticism	74,60	17,89	38,00	114,95
2. Extraversion	100,48	9,14	77,00	118,00
3. Conscientiousness	108,53	12,74	77,00	135,00
4. Aggressiveness	77,98	13,59	46,00	112,00
5. Openness	76,91	9,14	57,00	100,00
6. Positive Valence	87,16	11,54	58,00	122,00
7. Negative Valence	38,55	9,16	22,00	65,00

Legend: AM - arithmetic mean Min - minimum value
SD - standard deviation Max - the maximum value of results

In order to enable comparison between the scales according to the scores, the transformation of the results of the survey into the T-values was performed.

Based on the results shown in Chart 1 and Chart 2, it can be seen that the highest values of T-scores of adolescents were recorded in the area of Extroversion, the lowest values in the domains of Neuroticism and Negative Valence, while in the other four dimensions, the results were very consistent. While analyzing the results of adolescent girls, it can be seen that the highest values were recorded in the two domains - Extraversion (as well as adolescent boys), but also in the domain of Conscientiousness. Just like with adolescent boys, the lowest values were observed in the domains of Neuroticism and Negative Valence, while in the other three domains they were fairly uniform. When comparing the results of T-scores between the genders, fairly consistent values in all scales are observed, except in the domain of Conscientiousness, which is significantly higher among adolescent girls.

Average profiles for each gender are presented graphically.

Chart 1. Average values of T scores for the dimensions BF + 2 by gender

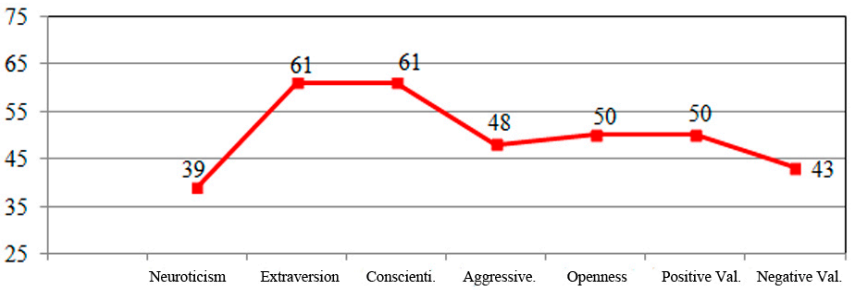

Chart 1. Female gender average profile

Chart 2. Average values of T scores for the dimensions BF + 2 by gender

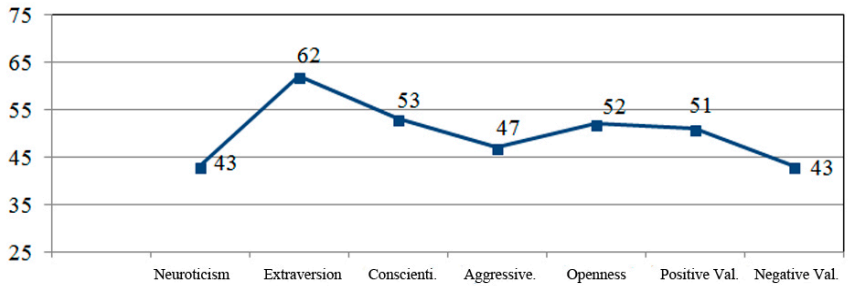

Chart 2. Male gender average profile

T-test for independent samples was applied for determining the differences between the respondents in scores on personality dimensions depending on the sport they were engaged in (individual or collective). There was a significant difference at a less severe level of statistical inference in scores on the dimensions of Openness (t=2,43, p=0,02), Conscientiousness (t=2,11, p=0,04) and Neuroticism (t=-1,95, p=0,05). The respondents who were engaged in individual sports had a higher score on Conscientiousness and Openness, while the respondents who were engaged in team sports had a higher score on the dimension of Neuroticism.

Table 2. The results of T-test for differences in scores BF + 2 according to the type of sport (individual N = 33 and collective N = 85)

Scale - dimension	sport	AM	SD	t	p
BF+2					
1. Neuroticism	individual	69,37	20,22	**-1,95**	**0,05**
	collective	76,40	16,44		
2 Extraversion	individual	100,97	9,18	0,12	0,91
	collective	100,75	9,19		
3. Conscientiousness	individual	112,74	12,37	**2,11**	**0,04**
	collective	107,29	12,63		
4. Aggressiveness	individual	77,83	16,62	0,06	0,95
	collective	77,65	12,45		
5. Openness	individual	80,36	9,37	**2,43**	**0,02**
	collective	75,94	8,69		
6. Positive Valence	individual	88,18	11,21	0,48	0,64
	collective	87,05	11,68		
7. Negative Valence	individual	36,67	8,51	-1,13	0,26
	collective	38,67	8,69		

Conclusions

Based on all results obtained, it can be said that both for men and women **Extraversion** and **Conscientiousness** are in the area of high values, while **Neuroticism and Negative Valence** are low; the other three properties are average. As already mentioned, previous research studies confirmed that the population of athletes is characterized by high level of extroversion in comparison to those who do not engage in any sport; the population of athletes is characterized by a higher level of emotional stability and is more open for acceptance of new experiences (Hughes, Case, Stuempfle, & Evans, 2003).

The female respondents, had higher T - scores on Conscientiousness, while on other subscales their scores were pretty even. The results of some previous studies (Allen, Geenles and John, 2013) show that, compared to men, women show higher levels of neuroticism, extraversion, consent and conscientiousness. Some of the results obtained, suggest that women who play sports often exhibit greater closeness, when compared to men and women who are not involved in sports. Although studies have not directly dealt with this hypothesis, numerous studies compare the results of personality tests of men and women who participate in organized sports activities. In one study involving adolescent athletes, it was observed that the girls involved in sports are a lot more extrovert and that they exhibit a much higher level of emotional instability compared to boys (Newcombe & Boyle, 1995). A recent study which included a wider the scope of personality dimensions, indicates that, compared to men, women demonstrate higher levels of neuroticism, conscientiousness and compliance (Allen et al., 2011).

Individual athletes in this study showed higher scores on the personality dimensions of Conscientiousness and Openness. Since the Conscientiousness is operationalized through the attitudes towards obligations and includes subscales of Negligence, Self-discipline and Observance of the Rules, it can be said that the members of individual sports showed more tendencies to observe the rules, showed disciplined behavior and greater accountability to the commitments. Unlike other dimensions, this scale has a more pronounced volitional component, so it can be assumed, that these people were more inclined to hard work, with more noticeable volitional component than the members of the collective sports. Similar results were obtained in previous research studies, which showed that the athletes who are engaged in team sports show higher levels of extraversion and lower levels of conscientiousness, compared with athletes who are engaged in individual sports (Allen et al., 2011)

It can be said that the members of the individual sports of this sample, showed a greater tendency to Openness to Experience, which is manifested as a tendency towards progress and develop-

ment, intellectual curiosity and is largely determined by cultural factors; it contains two subscales: Intellect and Novelty Seeking. Such a high score would correspond to the traits related to the pronounced ability of individual athletes, towards a better structuring of their free time, the search for new information, embracing of changes and new experiences. Since lower scores on the Neuroticism dimension were observed, it is also true to say that the individual athletes showed therefore greater emotional stability. An explanation of these results may lie in the fact that the members of individual sports are often in situations of making independent decision, they bear the responsibility for success or failure on their own and are going through different situations in which everything depends solely on them. If we are talking about regular attendance of the training sessions - this requires a strong will, and for the achievement of results, one needs personal hard work and commitment, in order to enhance personal abilities. In individual modern sport, new technologies and knowledges appear almost on daily basis. A person in an individual sport is being self-motivated and it can be assumed that this is the origin of the higher scores on Openness and Conscientiousness; the person is being self-controlled and therefore the scores on the Neuroticism scale are smaller. Stambulova (2006) found similar data; on a sample of Russian athletes, she concluded that the individual athletes are more introverted, with more individual targets, and are more independent. She concluded that, in comparison to the members of the team sports, the situation of being compared with the competition, is completely different and more frequent; she also concluded that these athletes, due to their acquired specific experience, have a higher ability to control themselves, they are less neurotic, and are more independent when it comes to bearing the responsibility in relation to achievement of the results (Franck, 2009).

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Cardiac Adaptation of Hungarian Motocross Athletes

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Abstract
The aim of this study is to examine the Hungarian A- level motocross athletes' physiological condition during a standardized treadmill stress test. Furthermore, we would like to prove with comparisons to other study results that motocross is a physiologically demanding sport apart from the mental-concentrative and psycho-emotional stress factors. **Methods:** 6 Hungarian A-level motocross (MX) athletes (age 20.5 s=3,4) took part in our 8 stage treadmill stress test. Before the test we measured EDD, ESD, IVS, PW with an echo and calculated the LVMass(g) = 0,8[1,04[(IVS + PW + EDD)^3 -EDD^3] - 13,6] + 0,6 and LVMass/ BSA (g/m^2). During the test we did EKG. **Results(n=6):** mean EDD= 53mm (s=2,5); mean ESD= 33mm (s=1,7); mean IVS= 11,8mm (s=1,2); mean PW= 11mm (s=0,6). MX atletes' mean LVmass is 233,5g (s= 41,2) and the mean LVmass/ BSA is 123,6 g/m^2 (s=16,1), while rowers' LVmass/ BSA= 121,7 g/m^2, t(5)= 0,299, p=0,777; and swimmers' LVMass/ BSA= 125,1 g/m^2, t(5)= -0,218, p=0,836 (Vencunas et al.). Resting mean HR was 50,2 min^{-1} (s=6,7). At the final stage they reached 91% (s=2,2) of their HRmax. HR recovery after 1 min was 78,5% (s=3,8) and after 2 min was 66% of the mean HRmax (r=0,973, p=0,01). **Conclusion:** The EKG data refers to a well-trained athlete. A-level MX athletes have the same cardiac adaptation to training as a professional or Olympic athlete of the highly dynamic sports.

Key words: motorsports, cardiovascular endurance

Introduction

Earlier researches and publications of the exercise intensity and cardiovascular load in motocross (MX) racing have revealed that the A- level athletes are able to perform the whole motos – which are about 30 minutes – in the maximal heart rate zone. Thus the mean heart rate is 95% of the maximum. (Augustin, 2011; Konttinen et al., 2007; Nagy, 2011)

This performance is done on a motorbike of 100 kg, 30- 40 bhp, dressed in complete protective gear while jumping huge obstacles fighting against 39 other athletes for one goal to cross the finish line first and win the race. The possibility of a crash and injury is a constant factor of a race as well as the alternation of the conditions like speed, the opponents' position, the surface and quality of the racetrack. All these components make the athlete taking decisions continuously in every moment of the competition.

Motorsports and motor car racing cause high mental-concentrative and psycho-emotional stress (Schwaberger, 1987.). During racing hardly possible setting apart physiological and psychological stress as none of the above- mentioned researches report this. Thus the pure physiological strain of motocross and the athletes' long-term cardiopulmonary adaptation is still unknown.

According to the classification of sports those whose maximal oxygen consumption – which is the dynamic aspect of the 2 dimensional classification – during competition reach higher than 70% are classified to "high" at the dynamic component. This category contains e.g. boxing, canoeing, kayaking, cycling and triathlon (Mitchell, et al., 2005.). On the basis of Konttinen et al. motocross should be classified as a highly dynamic sport as the athletes reach 71% of their maximal oxygen consumption during a race.

The cardiovascular and pulmonary system as the human body adapt to regular sport activity. A kind of regulative adaptation is responsible for the athletic bradycardia, which could be detected as lower resting heart rate. There are, furthermore, structural adaptations of the athlete's heart, which are cardiomegaly and cardiac

hypetrophy. These mainly depend on personal genomics, the type, intensity and amount of training. The greatest cardiac hypertrophy occurs at endurance sports where the regular intensity is high enough, features aerobic strain and the session are in-between 10-90 minutes (Dickhut, 2005).

The Hungarian Motorcycle Sport Federation (MAMS) issued 32 A- level licenses in 2014. Fifteen out of these are international licenses. According to the operative motocross regulation of MAMS 2014 a National Championship race day has to has one free practice (25 min) to get acquainted with the track. This is followed by a qualifying race (10 min +2 laps) for the start positions, and two motos (25 min +2 laps) where the athlete who gets the most points wins the raceday. The rest time among the two motos is at least 1 hour (MAMS, 2014).

We designed this present study to examine the Hungarian A-level motocross athletes' physiological condition – without any psychological stress factors – during a standardized treadmill stress test. Furthermore, we would like to prove by an echocardiogram with the athletes' cardiac adaptation that motocross is a physiologically demanding sport apart from the mental-concentrative and psycho-emotional stress factors.

Methods

Six Hungarian A- level athletes volunteered to partake, and have accepted the terms and offered their results anonymously for the study. Their age was 20,5 (s=3,4). They have been A- level athletes at least for four years, they have at least three training sessions and one race a week respectively. They all participate in either MX1 or MX2 of the Hungarian National Motocross Championship.

First of all the anamnesis was recorded, which was followed by a resting EKG and an echocardiogram. During these test we monitored the signs of any adaptation – data which is not pathologically differs from reference ranges – to physical activity. These data were: the left ventricular end-diastolic diameter (EDD), left

ventricular end-systolic diameter (ESD), the interventricular septal thickness (IVS) and posterior wall thickness (PW). We calculated the mass of the left ventrical by the convention of the American Society of Echocardiography (ASE). LVMass(g) = 0,8[1,04[(IVS + PW + EDD)^3 -EDD^3] - 13,6] + 0,6 (Nagy, 2001.). Eliminating the individual physiological differences we did the calculation by body surface area (BSA) as well: LVMass/ BSA (g/m^2).

Insofar as the athlete had been proved to be healthy and competent he could take part in the treadmill stress test. The tests were done on a h/p/ cosmos treadmill. All the data were collected and processed by Cosmed Quark software. The test protocol contains eleven stages. The first eight has an increasing speed and angle and three deducting stages. The stages are the following respectively: stage 1: 2 min, 2,7 km/h, slope:10%; stage 2: 5 min, 4 km/h, slope:12%; stage 3: 2 min, 5,5 km/h, slope:14%; stage 4: 2 min, 6,8 km/h, slope:16%; stage 5: 2 min, 8 km/h, slope:18%; stage 6: 2 min, 8,9 km/h, slope:20%; stage 7: 2 min, 9,7 km/h, slope:22%; stage 8: 8 min., 11 km/h, slope:21%. The test stops any time when the athlete is exhausted or he reaches stage 8 and the heart rate becomes constant.

The three deducing stages are the following respectively: stage 9: 1 min., 5 km/h, slope: 10%; stage 10: 4 min., 3,5 km/h, slope: 10%; stage 11: 5 km/h, slope: 0%.

We calculated the HRmax by the basic formula HRmax=220 – age. We divided the athletes' HR of each stage-end by the HRmax to get comparable values. The LVmass was divided by BSA for the same reason as above to avoid the anthropometric difference. A Polish- American team studied Olympic and professional athletes' echocardiogram (Venckunas, et al., 2008). Their study has not calculated the % of LVmass/ BSA but all the requisite data is available so by the reason of objective comparison to the MX athletes we calculated them. Therefore it was possible to compare the adaptation to training of LV in MX to the sports in the same dynamic category. As in the introduction – we expected that MX cause the same adaptation to exercise as other sports in the same dynamic category like basketball, long-distance running, rowing, cycling, swimming.

We made statistical analyses with IBM SPSS Statistics 22. software. Beside the mean data we give standard deviation as s=x. We compared data to reference values with one sample t-test with $p<0,05$ and $p<0,01$ significance level. The relationship between different variables were examined by Pearson's correlation with $p<0,01$ significance level.

Results

The mean heights of the sample (n=6) was 177cm (s=6,5), mean weight of 75kg (s=12,3), mean BSA was 1,91 m^2 (s=0,18). During the resting EKG the mean HR was 50,2 min^{-1} (s=6,7) which is significantly lower than non- trained males' reference values 70 min^{-1} (Gyetvai et al., 2008.) t(5)= -7,245, p=0,001 ($p<0,05$).

The results of the echocardiograms are the following: mean EDD= 53mm (s=2,5); mean ESD= 33mm (s=1,7); mean IVS= 11,8mm (s=1,2); mean PW= 11mm (s=0,6). The mean IVS and PW values were significantly higher than the high-end of the 10mm reference values (Lengyel and Asbót, 2012.). IVS t(5)= 3,841, p=0,012 és PW t(5)= 3,873, p=0,012; ($p<0,01$).

The above mentioned LV values (n=6) the MX atletes' mean LVmass is 233,5g (s= 41,2) and the mean LVmass/ BSA is 123,6 g/m^2 (s=16,1). In the comparison to Vencunas et al. study results did not show significant difference among MX athletes' LVmass/ BSA and basketball players, long-distance runners, rowers, cyclists or swimmers at the significance level of $p<0,01$. The closest values to MX athletes' are the rowers' LVmass/ BSA= 121,7 g/m^2, t(5)= 0,299, p=0,777; and swimmers' LVMass/ BSA= 125,1 g/m^2, t(5)= -0,218, p=0,836.

During the treadmill stress test all six athlete reached the 7^{th} stage then two of them were not allowed to start the 8^{th} stage because of safety reasons. The mean duration of the stress test was 18,8 minutes (s=2,42) without the three deducing stages. The stage-end HR of the HRmax values shown by table 1.

The mean HR recovery 1 minute after the last stage (7th or 8th) was dropped by 12,5% (s=4,1) so the sample's HR was 78,5% (s=3,8) of their mean HRmax. The 2-minutes recovery drop was 25% (s=3,5) which means 66% of the mean HRmax. These two recovery values examined by Pearson's correlation coefficient correlates strongly r=0,973, p=0,01. The mean HR after one's last stage (7th or 8th) was 91% (s=2,2). Thus there is a significant difference from the HRmax of a motocross race which is 95,5% (Nagy, 2011) t(5)= -5,031, p=0,004.

Discussion

According to the resting EKG results we found that MX athletes have significantly lower resting HR than non- trained males (Gyetvai at al., 2008.). This refers to a well-trained athlete.

The echocardiography proves that the sample's IVS and PW values are significantly higher ($p<0,01$) than the reference values of non-trained men (Lengyel and Asbót, 2012).

The mean LVmass divided by the mean BSA does not differ significantly ($p<0,01$) from the highly dynamic sports like basketball, long-distance running, paddling, cycling and swimming. We found that swimmers and rowers (Venckunas at al., 2008.) has the closest kind of cardiac adaption to exercise like MX athletes. The difference among the sample's and rowers' mean LVmass/ BSA is 1,97 g/m^2 and differs from swimmers' LVmass/ BSA -1,43 g/ m^2. Thus with Konttinen et al. it is proven that MX belongs to the highly dynamic class in the classification of sports (Mitchell, et al., 2005.).

We paid great attention to the reached highest HR at the end of the last stage of the treadmill stress test and to the recovery HR values. The HRmax of the stress test is significantly lower ($p<0,05$) than the HRmax of a MX race (Nagy, 2011). This 4,5% difference could be the indicator of the mental-concentrative and psycho-emotional stress during a MX race. The verification of this theory needs bigger sample and a circumstantial psychological study.

According to the one minute and two minutes HR recovery data which correlates (p=0,01) and reduces to 66% of the HRmax implies that a MX athlete is in the lower range of the target HR zone (American Heart Association, 2013.)

In conclusion, we can say that an A-level MX athlete has the same cardiac adaptation to training as a professional or Olympic athlete of the highly dynamic sports, hence their HR recovery is outstanding.

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Evaluation of BMI Related to Flexibility and Strength of not Trained for Women

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Abstract
The aim of this study was to examine the BMI comparing the results with a test of strength and flexibility. Established itself as a *methodological proposal* a case study, participated 39 female women (n:39), aged between 18 and 50 years (average de 32.25±8.33), students of Pedagogy College of the City of Santo André - SP, Brazil, not physically active. According to the *results*, the group presents it with normal BMI index value of 24.60 (±5.69), combined with flexibility values of 26.6 cm (±8.18) and strength of manual pressure on 31.18 Kg/f (±5.04). *We conclude* that the reference by BMI, the group showed good results of manual pressure, and were classified as excellent in physical flexibility and there was no correlation between these physical abilities in not trained women.

Keywords: Body Mass Index; Force; Flexibility.

Introduction

Are currently the evaluation of physical capacity levels related to body condition of individuals has been a constant premised on the detection of cardiovascular disease, and in search of a better quality of life and active living standards.

The Body Mass Index (BMI) is an indicator used to suggest the ratio of height (meters) and weight (kg.)[1], and thus enabling us to classify individuals at levels ranging from below the levels of obesity weight.

From the age of 20-increased BMI is greater than 10%, associating it with increasing age, low social level, for women, low level of health perception, and physical inactivity among others[2].

Therefore, it could be said a healthy nourishment is to have better quality of life and ensure control and maintenance of body weight. This and other hypotheses are always questioned and lead the subject to take an active way of life and a balanced diet can complement this framework.

So we must take human in general, to practice physical activity in search of quality of life, and the area of Physical Education presents the possibility of assessment relating aspects relating to physical activity and the population's quality of life, and thus identify the level of physical activity and anthropometric offers us a profile of individuals regarding their situation current front of possible coronary heart disease[3].

Several terms have been used in articles to define people with physical activity levels below current recommendations, such as physical inactivity, low physical activity, physical inactivity, insufficient physical activity[4].

In general, that regular physical activity contributes to health, aiding in maintaining an independent lifestyle, increased functional capacity and improved quality of life[5].

To reverse the inactivity frame, we suggest the implementation of municipal policies, state and national prevention and combating

sedentary lifestyles, emphasizing the dissemination of its benefits and creating devices and public spaces for physical activity in the community[6].

Some risk factors for physical inactivity have been consistently identified as the female and the lowest socioeconomic level[7].

Thus, the aim of this study was to evaluate the BMI, and physical capabilities of flexibility and manual pressing force sedentary women, and correlate the variables with each other.

Method

As methodological approach we adopted the Case Study[8] that we measure the BMI of 39 women aged between 18 and 50 years (n: 39, mean age of 32.25 ±8.33), students of a pedagogy college course of Santo André City – São Paulo, Brazil.

The criteria for choosing the subjects of the research was that the participants should be female and did not practice physical activity for at least six months. To measure BMI use a digital scale and a tape measure attached to the wall and the flexibility test use of the Sit and Reach test protocol, and the strength test of the upper limbs manual pressure protocol[9]. All care research ethics were taken by signing the consent form and clear, making it the subject was voluntary, and had the free will to leave at any time of the study.

Statistical treatment was applied calculating the mean, standard deviation, and average difference between the Mann-Whitney, test "*U",* was used. Correlations were made following the *Spearman* correlation "*s*" $p \leq 0.05$), using SPSS for Windows, version 18.0.

Results and Discussion

The results showed that the study group is at your ideal weight, so despite not practicing physical activity are within the proposed value of the BMI (see Table 01).

Table 01: Average and Standard Deviation Referring to Female Total Data.

Sex	*Age* (Years)	*Weight* (Kg.)	*Height* (Meters)	*BMI* (Kg./m²)	*Flexibility* (cm.)	*Strength* (Kg/f.)
Average	32.25	64.82	1.62	24.6	26.6	31.18
Standard d.	*±8,33*	*±14,24*	*±0,06*	*±5,69*	*±8,18*	*±5,04*

Considering the BMI, we found that this group is less likely to pose risks of diseases related to the cardiovascular context, but still would take other exams as well as raising a family history to assert this hypothesis, and as one limitation of this study we should adopt other data collection sources to assess the percentage of fat

Comparing the results with a study done with thirty women aged between 30 and 60 physically active of the city of Votuporanga, São Paulo, where most of the women studied showed body weight „above the ideal" or „obesity" and with great risk of developing cardiovascular disease[10], the subjects involved in this study are within the weight standards, though not without developing possible health problems such as hypertension and diabetes by the lack of physical activity.

Women's BMI increased until the age of 50 years due to an increase in fat mass, once the lean body mass remained practically unchanged[11].

With the participation of 120 women with a mean age of 41.1 years, BMI was much like our study with a value of 24.70, and concluded that BMI and Waist Hip relationship each other can be considered risk factors for cardiovascular diseases[12].

The flexibility, regarding the data we observe that women are classified as excellent, compared to the results proposed by McArdle et al.[13], that for women aged less than or equal to 35 years of excellent reference is results above 17.9 cm and women ages 36

to 49, excellent are those with higher or equal to 17.4 centimeters, thus correlating the results of BMI and comparing the levels of flexibility can measure the women in this case study show good results, since classification is in excellent.

Establishing the correlation between strength and flexibility, we find that the result was negative, weak and not significant (s= -0.130, p=0.20), i.e. when the physical capacity increases the flexibility decreases the strength, but the hypothesis was refuted (see Figure 01).

Correlating BMI and strength the result was the same (s= -0.258, p=0.113), i.e., weak, negative and not significant, and correlating BMI with The flexibility the result was weak, positive and not significant (s=0.057, p=0.729) so no significant correlation was seen between the data.

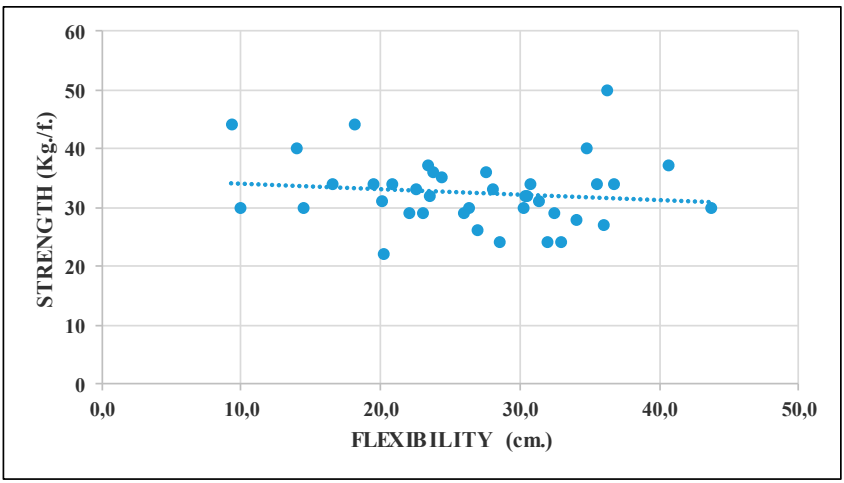

Figure 01: Correlation between Strength and Flexibility

Table 02: Handgrip comparison righties and lefties

Strength	*Right-handed*	*Left-handed*	*Total*	*Teste "U"*
N	35	04	39	
Handgrip (average)	32.86 (Kg/f.)	29.50 (Kg/f.)	31.18 (Kg/f.)	*0.296*
Standard Deviation	*±5,89*	*±4,12*	*±5,04*	

Significance p≤ 0,05

Separating the group in normal weight and overweight according to BMI, there was no significant difference in handgrip strength (p=0.340); the handgrip strength of normal weight was 32.24Kg/f., and the overweight was exactly 33.00Kg/f. In the same way, the comparing the flexibility of overweight women and the ideal weight, the difference was not significant (p=0.416); the flexibility average of overweight was 26.23cm, and the normal weight obtained 26.81cm. A moderate correlation found in this study was between height and handgrip strength (s=0.522, p=0.09, see Figure 02); between flexibility and height the correlation is weak and not significant (s=0.03, p=0.558).

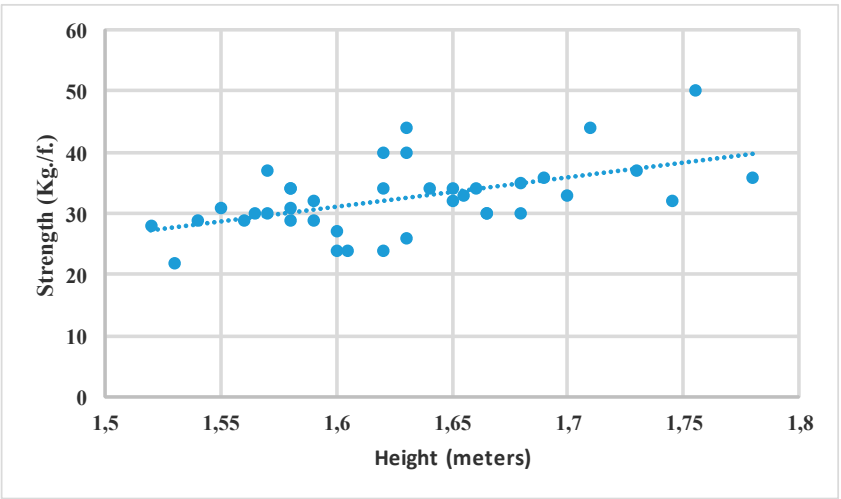

Figure 02: Correlation between Strength and Height

Within the context of handgrip measures we can see that the right dominant member of women are not stronger than the left dominant member, the result shown by Man Whitney test (p=0.296). It would be interesting to get individuals to have an active life and related to this issue Kraemer and Hakkinen[14] emphasize that most of the gains during the early weeks of strength training in untrained men and women is because of the adaptations in the neural pathways enabling and / or inhibitors acting at various levels of the nervous system.

Conclusion

It can be argued that the case study is presented in a group of normal weight, represented with BMI in the ideal, although observing the standard deviation for more we see possible disturbances in BMI and weight.

On the physical capacity of the flexibility, the group presents itself in the excellent result in different age groups, and in the power, capacity also presented results competing at good levels, noting that the study group is sedentary, classified as non-physical activity practitioner in however no correlation between data was observed in physical capacities strength, flexibility and BMI. Concluding that regardless of BMI, women have the same force.

Therefore, it would be recommended that it go to change their lifestyle habits including in the dairy some sort of physical activity and seek an improved quality of life and well-being of women in this group.

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Strategies and Technologies Used in Teaching the Front Crawl Stroke

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Abstract
Purpose. Sometimes the initiation phase into swimming is neglected in favor of the learning phase, which constitutes a methodical error. During the learning phases swimming trainers and instructors rely on a series of exercises. These can be completely different from one another. **Methods.** We have exercises that are extensive in nature and exercises that are repetitive in nature, used even during the perfecting phase and test exercises (be it test or control). **Results**. Thus, by structuring the exercises and methodical means used in teaching swimming, I have achieved an important didactic work aimed at helping swimming coaches and instructors as well as students from the faculty of physical education.

Key words: means, systematization, efficiency, succession, model.

Introduction

In order to achieve notable results in performance swimming, I thought that it would be useful to systematize the most efficient means of initiation, learning and improving related to the technique of front crawl swimming.

The paper aims to:

- collect and systematize the main means of learning front crawl in different phases or stages of the instruction process;
- offer theoretical and experimental research methods regarding the very important role played by the ways through which swimming is taught during the initiation phase for children aged 5 to 7.

Increasing the efficiency of training, of the instructional and educational process requires the establishing of precise end goals, of a well thought out action plan as well as the choosing of the most efficient means and resources of action (Carla, 1999: 42).

Choosing training methods as well as the judicious usage of the most efficient methods (specific or otherwise) related to swimming must lead to:

- A proper acquirement of basic swimming skills (floating, gliding, breathing) and front crawl specific elements.
- Improvement of motric abilities
- Proving the validity of the methods and tests used in order to quantify the qualitative development of motric abilities.

Applying a system of specialized algorithms for the duration of 3 months, which are meant to facilitate the acquiring and consolidation of basic swimming skills and front crawl specific techniques (Bitang, 2009: 25) an important improvement has been noticed in the training of the subjects.

The preparation of the most appropriate exercises requires a preliminary study of modern techniques, of the biomechanics related to movement, of age group biological and psychological par-

ticularities and especially of the methodological particularities of teaching swimming to children (Maglisho E., 1990: 31).

Methods

This paper aims to:

- research the history and development of front crawl
- research the biomechanical, biological and psychological particularities of children involved in practicing swimming
- develop the knowledge base and research the technical aspects of front crawl
- collect and systematize dedicated exercises and to group them according to the stages involved in learning how to swim.

The experiment consisted in applying certain methods and means of teaching swimming and consolidating basic elements of technique pertaining to both swimming in general and front crawl in particular. In order to ensure the conditions for a proper experiment I have introduced 3 sets of tests:

- the initial testing: 1 week after starting the activity
- the intermediary testing – one and a half month after starting the activity
- the final testing: after the end of a three months period

During these testing stages I have graded the children`s evolution with marks from 1 to 10, corresponding to the appropriation level of basic swimming techniques and front crawl style. At the end of the 3 month training period I have tested their skills in covering a distance of 25 meters using front crawl.

The experiment was conducted on 25 children. The courses took place 5 times a week. The subjects were between 5 and 7 years of age.

Each child has been subjected to the following tests (Cretulescu, Jivan, Carla, 1992: 41):

- horizontal floating with apnea

- chest floating
- aquatic breathing
- leg movement in front crawl
- arm movement in front crawl
- coordination between arm and leg movement in front crawl
- coordination between breathing and arm movement
- coordination of arm, leg and breathing
- front crawl swimming dive start

Results

In order to process and render the data, I have used the following statistical indicators: arithmetic mean, amplitude, medium deviance, standard deviance and the coefficient of variation.

Table nr. 1 The dynamics of experimental performance

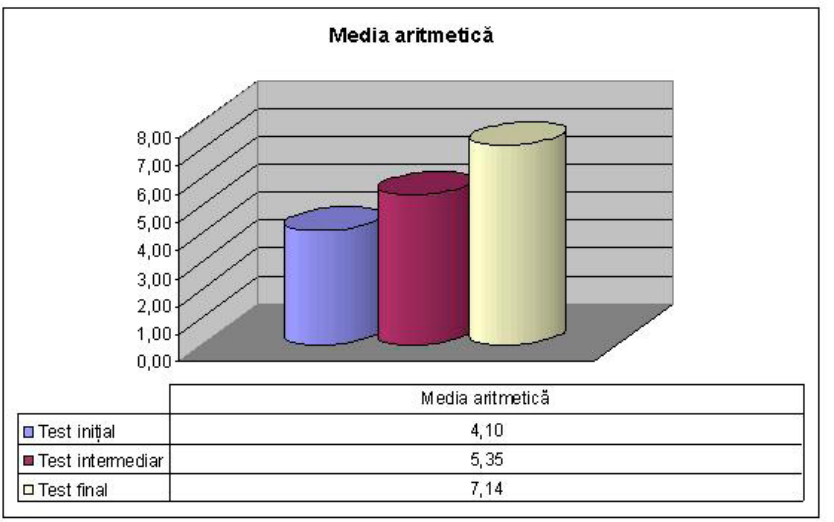
	Statistical parameters	Initial test	Intermediary test	Final Test	Difference between Initial/ Final Test
Arithmetic mean	**X**	4,10	5,35	7,14	**3,04**
Amplitude	**W**	2,70	2,35	2,10	**0,60**
Medium deviance	**Am**	0,70	0,65	0,55	**0,15**
Standard deviance	**S**	0,80	0,64	0,60	**0,20**
Coefficient of variation	**Cv**	19,48	12,00	9,02	**10,46**

Following the evolution of the **arithmetic mean** from table 1 and graph 1, we can conclude the following: the arithmetic mean of the included sample group totaled 4.10 points during the initial testing, which subsequently increased to 5.35 points during the intermediary testing phase. Therefore we have a 1.25 point increase.

During the final testing the average rose to 7.14 points which signifies an increase of 3.04 points from the initial testing. Observing the entire period of testing it becomes obvious that the greatest increase in performance occurred between the second and third stages of testing.

This fact can be interpreted as follows:

- After correctly learning the basic swimming skills, subjects can appropriate and consolidate the technical elements pertaining to front crawl.
- The means used for the technical training part have been chosen and used judiciously.



	Media aritmetică
Test inițial	4,10
Test intermediar	5,35
Test final	7,14

Graph nr. 1 Arithmetic mean

Following the evolution of the simplest statistical indicator, **amplitude** (W), we can conclude the following: if at the beginning of the experiment the difference in the grades totaled 2.70 points, this result decreases to 2.35 points during the initial phase, is further reduced to 2.35 points during the intermediary testing and finally drops to 2.10 points. These results show that value differences

between subjects are becoming increasingly marginal because they (i.e. the subjects) were able to acquire both basic swimming techniques and front crawl specific procedures in a unitary manner.

In the case of the **medium deviance** we can observe the same homogenization of results as registered in the case of amplitude. During the final evaluation this statistical indicator is modified by only 0.15 points.

The same applies for the **standard deviance**, in this case the variance being of 0.20 points.

The **coefficient of variance** displays a homogenization of subject values from the perspective of the registered performance. Therefore, even if statically the sample group is very homogenous between 0 and 10 %, with the exception of the first and second testing phase, the results registered fall within these boundaries. Between the first and the second testing phase there is a 10% decrease in the rate of distribution.

Standardizing the experimental sample group, based on the analysis of the other statistical indicators used in this paper, is specific to collectives trained through a well-conducted, instructive-educational process.

The analysis of the distribution indicators shows the homogenization of the experimental sample group through the quality of the motric act related to swimming. There is an obvious progress regarding the acquiring of swimming techniques.

Because the means used during the training sessions are considered as effects there is an obvious improvement in the evolution of the subjects as well as in the quality of the swimming technique.

This fact is perfectly explainable if we consider the fact that technical training is highly important for acquiring a basic skill set in swimming.

Finally, we can assert that after analyzing the collected data, the research hypothesis is confirmed: the differences between the control sample group (considered as such during the initial testing) and the experimental one (considered as such during the final testing) are significant. The fact is further proved by the fact that

the time allocated for the research is rather short, allowing only for insignificant changes in the metabolism of the children included in the test.

The research of the methodical aspects of teaching and perfecting front crawl lead to the conclusion that swimming trainers and instructors rely on a series of exercises. Each exercise group has well determined objectives, which means that they are applied in a certain succession. At the same time certain exercises have an extensive character, allowing for an easy transition from one group to the other, while other exercises are used regularly for correcting or improve certain technical details.

Conclusions

After statistically analyzing the collected data, the following can be said:

1. The results obtained after each test have shown a continuous improvement, the progress being obvious. The other statistical indicators considered have registered values specific to well trained and formed collectives. The evaluation of technical skills, although much more difficult to quantify based on a rigorous algorithm, have shown an improvement of the basic skillset, which in itself is tributary to an ingenious choice of the independent variables.

I do believe that an emphasis on the technical part of training, especially for this age group when the psychophysiological traits of the subjects allow for motric development and an increased receptivity, is highly important. The plasticity of the nervous system plays an equally significant role, fact that becomes obvious when considering the ascending learning curve of the basic skill appropriation level for both regular and 25m front crawl swimming.

Of course, a rigorous quantification of the influence played by technique in sport performance is hard to achieve but, in accord with the field related literature, I believe that for this age group the efficiency of the methods used in learning basic swimming skills as well as front crawl must take precedence over physical, tacti-

cal and psychological training. The results achieved in both motric ability and technical accuracy confirm the statistically expressed hypothesis.

I believe that the methods used during the initiation phase and during the technical training phase of teaching front crawl have reached their goal.

2. Generally speaking, teaching swimming is a gradual process that involves certain stages that each start and end in different periods, according to the talent, motivation and interest shown by children who either learn how to swim or are selected for performance swimming. Some of these are:

- the initiation phase
- the learning stage
- the developmental stage
- the individual development stage

3. One of the most important stages of teaching swimming is the children`s initiation phase which must begin as early as possible and must end before they reach 6 or 7 years of age.

The main objectives pertaining to the initiation phase are aimed at acquiring the following: getting used to water, floating, submerging both body and head underwater, breathing and gliding.

These elements are the first means for evaluating children with an innate talent for swimming. Those who will get accustomed to water more quickly are promoted to the advanced group, fact that conditions the swimming learning phase itself.

The methodical means used in this stage are usually neglected in practice. For this reason many "talents" are lost from the very beginning. A sudden promotion to the second stage, i.e. that of learning a swimming technique, proves to become a psychological stress factor for many children and results in: fear of water, refusal to enter the water and learning how to swim.

4. Considering the formative stages of developing a habit for swimming, of improving the front crawl stroke as well as the specific character of the swimming lessons aimed at children, I have reached to the conclusion that the exercises used in teaching swimming can be divided into 12 groups:

- preparatory exercises on land
- water accommodation exercises
- underwater accommodation with apnea
- exercises for developing aquatic breathing
- exercises for learning horizontal floating
- exercises for learning gliding
- exercises for learning leg movement
- exercises for learning arm movement
- exercises for learning and perfecting the front crawl – movement coordination
- exercises for learning and perfecting the swimming dive start
- exercises for learning and perfecting the return
- exercises for perfecting the front crawl

5. Each exercise group has a well determined aim in accord with the progress achieved by the practitioners or with the stages of instruction. The order in which these exercise groups are applied is related to aforementioned factors.

6. The exercises for learning and perfecting the swimming start and turn are learned gradually after the participants are able to cover easily various lengths by swimming.

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Characterization and Comparison of the Participant's Perception about the Quality of the Fitness Group Exercise Instructor, Considering the Practiced Activity

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Abstract
The studies developed by Franco et al. (2004) and Alves et al. (2013) indicate that the practiced activity could influence the perceived quality of the group exercise fitness participants. By that, the aim of this study is to characterize and compare the participant's perception about the quality categories and dimensions of the fitness group exercise instructor, defined by Campos (2015), considering the practiced activity (Aerobics, Aquarobics, Hip Hop, Resistance Training, Step). The questionnaire QIF-AG were applied to 745 fitness participants (35,41±13,41 years old). Was analyzed the mean values in general e and per activity, for characterization, and the results of the one-way ANOVA test (and the Tukey HSD post hoc test) for

comparison. The categories with highest mean values are ethics (*M*=6,45), cordiality (*M*=6,45), sympathy (*M*=6,44) (Relational Quality dimension), assiduity (*M*=6,51), dedication (*M*=6,47) and technical execution (*M*=6,46) (Technical-pedagogical Quality dimension). The results shows that are significant differences in the Relational Quality dimension (*p*=0,029) and in the categories: communication (*p*=0.000), availability (*p*=0,016), gaiety (*p*=0,010), honesty (*p*=0,001), sympathy (*p*=0,030), from Relational Quality; suitability (*p*=0,035), technical training (*p*=0,003), planning (*p*=0,017), punctuality (*p*=0,001), innovation (*p*=0,011) and assiduity (*p*=0,021), from Technical-pedagogical Quality. It is important for all the intervenient in the fitness area (owners, general managers, technical managers, trainers and instructors) the analysis of the obtained results, understanding the participant's perceived quality, allowing the instructor to adapt its intervention, trying to satisfy the participants, keeping them with high motivation levels and loyalty intention.

Keywords: Fitness; Instructor; Practiced Activity; Quality.

Introduction

Quality, satisfaction and loyalty are related concepts in general and in the fitness area (Fernández, Carrión, & Ruiz, 2012; Murray & Howat, 2002; Nuviala, Pérez-Ordas, Osuna, Grao-Cruces, Nuviala & Jurado, 2012; Papadimitriou & Karteroliotis, 2000). Don't like the fitness instructor (Franco, Pereira, & Simões, 2008) is one of the reasons, among others, to exercise dropout. The group exercise fitness instructors should and must be considered for the service improving, by the influence they have in the perceived quality and participant's satisfaction (Fernández et al, 2012; Murray & Howat, 2002; Nuviala et al., 2012). To solve the problems associated with poor quality the gyms must develop strategies to increase customer satisfaction and loyalty. Hiring qualified fitness instructors (Franco et al., 2008; Franco, Rodrigues, & Balcells 2008), that in general have the ability to motivate the participants (Hoffman & Jones, 2002), could be one of that strategies.

The quality of the group exercise fitness instructor can be assessed by 2 (two) dimensions and 25 (twenty five) categories [gaiety, cordiality, availability, empathy, ethics, image, communication, humility, motivation, honesty, and sympathy (Relational Quality); suitability, assiduity, fitness level, knowledge, dedication, energetic, musical skills, technical execution, experience, technical training, innovation, instruction, planning, and punctuality (Technical-pedagogical Quality)], by the questionnaire "Quality of the Fitness Instructor - Group Exercise" (QIF-AG) (Campos, 2015).

Franco, Cordeiro and Cabeçeiras (2004) made a study about the preferences of the group exercise fitness participants, considering an ideal of fitness instructor. They concluded that are significant differences according to the practiced activity. In another study, which analyzes the behavior of the group exercise fitness instructor (kinesics communication) according to the practiced activity, the results also show that are significant differences in some of the categories (Alves, Rodrigues, Balcells, Foguet, Richheimer, Carvalhinho, Simões, & Franco, 2013). These results (Alves et al., 2013), as the obtained in the study of Franco et al. (2004), indicate

that the perceived quality of the fitness participants could be statistical different considering their practiced activity.

By that, the aim of this study is to characterize and compare the participant's perception about the quality categories and the dimensions of the fitness group exercise instructor [defined by Campos (2015)], considering the practiced activity (Aerobics, Aquarobics, Hip Hop, Resistance Training, Step). The characterization is performed in general (total participants regardless of the practiced activity) and then in particular (by the practiced activity). What are the quality indicators with the highest values? In another perspective, what are the quality indicators with the lowest values? Are there significant differences, for example, between the Hip Hop and Aquarobics participants? These questions, among others, support the underlying problem of the study, and the answers will allow to the group exercise fitness instructor, either in general or particular, the adaptation of his intervention, in accordance with the activity in which it operates, always in order to increase the perceived quality, the satisfaction and the loyalty of the fitness participants.

Methods

Participants

The questionnaire QIF-AG (Campos, 2015) was applied to 754 participants of different practiced activities (Aerobics, Aquarobics, Hip Hop, Resistance Training, Step) (table 1).

Table 1. *Participant's characterization*

	n	**Age (*M*±*SD*)**
Aerobics	224	28,33±12,32
Aquarobics	164	50,91±16,76
Hip Hop	76	33,01±10,64
Resistance Training	129	34,19±15,33
Step	161	29,62±11,99
	754	35,41 ±13,41

Instrument

To know the meaning of a particular construct (quality of the group exercise fitness instructor), in a scientific perspective, there are 3 ways to collect data that can be used as an information source in a qualitative research: observation, documentary analysis or survey [oral (interview) or writing (questionnaire)] (Tuckman, 2005). In this study is used the writing survey as information source, more specifically the QIF-AG developed by Campos (2015).

This questionnaire measures the quality of the group exercise fitness instructor, according to the participant's perception. The questions are answered through a scale of agreement (7 points) from 1 (*strongly disagree*) to 7 (*strongly agree*). In the table 2 are presented the items, the respective categories and dimensions of the QIF-AG.

Table 2. *Items, categories and dimensions of the questionnaire QIF-AG*

Item	Category	Dimension
1. Speaks clearly.	Communication	Relational Quality
2. Shows availability to listen any problems that may arise.	Availability	
7. It is a funny person.	Gaiety	
8. Shows to be an honest person.	Honesty	
9. Shows capacity to accept criticism.	Humility	
10. It is a sympathetic person.	Sympathy	
12. Have a "healthy" relation with the participants.	Ethics	
14. Shows to be careful with his image.	Image	
16. It is a person with "good manners".	Cordiality	
20. Encourage the participants during the practice.	Motivation	
23. Have a "proximity" relation with the participants.	Empathy	

Item	Category	Dimension
3. When something unexpected happens, has the ability to tailor the session.	Suitability	Technical-pedagogical Quality
4. It is aware of the participant's performance when doing an exercise.	Instruction	
5. Shows to have specific trainer in fitness area.	Technical Training	
6. Shows to have a well planned session.	Planning	
11. Shows to have a good fitness performance.	Fitness Level	
13. Shows already working in the fitness area for some time.	Experience	
15. Come to class on time.	Punctuality	
17. Shows to have general knowledge in sports area.	Knowledge	
18. Follows the musical rhythm.	Musical Skills	
19. It is original in the presented sessions.	Innovation	
21. Shows dedication in everything he does.	Dedication	
22. Don't miss the scheduled sessions.	Assiduity	
24. Performs well the exercises, in a technical way.	Technical Execution	
25. It is energetic in his intervention.	Energetic	

All the organizations where data was collected were contacted through a cooperation request and, after their authorization, all the instructors and participants were contacted. They were informed about the subject and research object, the importance of their cooperation, what is intended to do (questionnaire application), the deadlines, and the anonymity in the use and dissemination of the collected information (Almeida & Freire, 2003).

Analysis of Data

In the first analysis is intended to characterize the participant's perception (regardless of practiced activity) per category and dimension. With the presentation of the most and less valorized quality indicators, the fitness instructors could understand which ones need improvement. In the second analysis is intended to characterize and compare the participant's perception, according to the practiced activity, confirming if there are statistically significant differences in each one of the 25 categories and the 2 dimensions of the questionnaire QIF-AG.

In the first analysis are presented the minimum, maximum, mean, standard deviation, skewness and kurtosis values. In the second, beyond the mean and standard deviation for characterization purpose, are presented the results of the one-way ANOVA test application. This is a parametric test used for comparison of the means of two or more groups from independent random samples (Maroco, 2010; Pestana & Gageiro, 2008). If there are significant differences between the studied groups is important to know their provenance. For that, is recommended the application of the Tukey HSD post hoc test (Maroco, 2007) because, in larger samples, is more robust to deviations of variance normality and homogeneity. For samples larger than 30, by the central limit theorem, is assumed the normality existence (Laureano, 2011; Maroco & Bishop, 2003; Pedrosa & Gama, 2004). Statistical analysis was performed using the SPSS software, for a 5% significance level.

Results and Discussion

The results and discussion presentation started with the minimums, maximums, means, standard deviations, skewness and kurtosis values for each one of the items (table 3), considering all the participants (n=754). It is possible to verify which quality indicators could be improved, based on the mean value, increasing with that the participants satisfaction and loyalty intention.

Table 3. *Minimum, maximum, mean, standard deviation, skewness and kurtosis values by item*

Item	Category	Dimension		Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis
1	Communication	Relational	Quality	2	7	6,35	0,82	-1,281	1,692
2	Availability			2	7	6,33	0,87	-1,319	1,566
7	Gaiety			2	7	6,37	0,89	-1,546	2,386
8	Honesty			2	7	6,29	0,93	-1,305	1,305
9	Humility			1	7	6,11	1,03	-1,118	0,937
10	Sympathy			1	7	6,44	0,86	-1,722	3,244
12	Ethics			3	7	6,45	0,78	-1,395	1,669
14	Image			1	7	6,31	0,89	-1,553	3,672
16	Cordiality			3	7	6,45	0,77	-1,307	1,176
20	Motivation			2	7	6,43	0,79	-1,548	3,038
23	Empathy			1	7	6,25	0,95	-1,389	2,114
3	Suitability	Technical-pedagogical	Quality	2	7	6,30	0,82	-1,173	1,561
4	Instruction			2	7	6,29	0,84	-1,224	1,933
5	Technical Training			3	7	6,44	0,75	-1,244	1,018
6	Planning			1	7	6,38	0,81	-1,489	3,323
11	Fitness Level			2	7	6,45	0,78	-1,455	2,211
13	Experience			2	7	6,25	0,91	-1,111	0,776
15	Punctuality			1	7	6,40	0,81	-1,511	3,208
17	Knowledge			2	7	6,38	0,85	-1,415	1,986
18	Musical Skills			1	7	6,39	0,89	-1,647	2,971
19	Innovation			3	7	6,28	0,84	-1,019	0,401
21	Dedication			2	7	6,47	0,74	-1,402	2,074
22	Assiduity			2	7	6,51	0,82	-2,184	6,313
24	Technical Execution			2	7	6,46	0,79	-1,576	2,635
25	Energetic			2	7	6,38	0,84	-1,497	2,411

In the Relational Quality, the categories with highest mean values are: ethics (*M*=6,45), cordiality (*M*=6,45) and sympathy (*M*=6,44). Comparing the results with the literature, these indica-

tors are shown as associated to the quality fitness instructor in Karteroliotis and Papadimitriou (2000) (ethics and cordiality) and Batista, Graça, and Matos (2008) (sympathy). In the other side, in the Technical-pedagogical Quality, the categories with highest mean values are: assiduity (*M*=6,51), dedication (*M*=6,47) and technical execution (*M*=6,46). These indicators are shown as associated with to the quality fitness instructor in Batista et al. (2008) (assiduity and dedication) and Cloes, Laraki, Zatta, and Piéron (2001) (technical execution).

Regardless of the high obtained values for all items, with mean values above 6 (on a scale of 1 to 7), is possible to verify which are the indicators that could be improved, for presenting less mean values when compared to the others. In the Relational Quality the items with lower mean values are: humility (*M*=6,11), empathy (*M*=6,25) and honesty (*M*=6,29). In the Technical-pedagogical Quality the items with lower obtained values are: experience (*M*=6,25), innovation (*M*=6,28) and instruction (*M*=6,29). Of these, innovation is referred in the literature by González, Erquicia, and González (2005) and instruction by Wininger (2002). The humility, empathy, honesty (Relational Quality) and experience (Technical-pedagogical Quality) were not referred in the literature.

In table 4 are presented the mean and standard deviation answer values in each of the items and dimensions, considering the different practiced activity. Also is presented the mean and standard deviation answer values for each one of the different activities. Through the table 4 is possible to understand the specificity of each one of the different practiced activity.

Table 4. *Mean (M) and standard deviation (SD) by category and dimension*

Item	Category	Dimension	Aerobics		Aquarobics		Hip Hop		Resistance Training		Step			
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	Communication	Relational Quality	6,47	0,68	6,38	0,81	5,97	1,03	6,28	0,85	6,40	0,74	6,31	0,86
2	Availability		6,39	0,83	6,43	0,78	6,04	0,89	6,24	0,99	6,29	0,81		
7	Gaiety		6,32	0,85	6,51	0,86	6,08	0,99	6,31	0,99	6,43	0,79		
8	Honesty		6,33	0,89	6,39	0,80	5,84	1,02	6,24	0,97	6,30	0,88		
9	Humility		6,13	1,03	6,19	0,96	5,79	1,01	6,05	1,09	6,23	0,89		
10	Sympathy		6,42	0,86	6,59	0,68	6,22	0,89	6,35	0,94	6,42	0,85		
12	Ethics		6,44	0,74	6,48	0,71	6,29	0,82	6,49	0,80	6,41	0,76		
14	Image		6,25	0,90	6,32	0,86	6,30	0,75	6,39	0,84	6,28	0,87		
16	Cordiality		6,46	0,72	6,47	0,74	6,26	0,87	6,42	0,77	6,42	0,76		
20	Motivation		6,43	0,72	6,52	0,75	6,25	0,77	6,40	0,84	6,41	0,73		
23	Empathy		6,26	0,89	6,33	0,95	6,11	1,00	6,14	1,01	6,22	0,92		
3	Suitability	Technical-pedagogical Quality	6,40	0,75	6,29	0,82	6,05	0,85	6,33	0,71	6,35	0,78	6,38	0,79
4	Instruction		6,24	0,81	6,40	0,74	6,21	0,75	6,33	0,84	6,30	0,82		
5	Technical Training		6,60	0,61	6,37	0,78	6,24	0,69	6,43	0,77	6,45	0,76		
6	Planning		6,47	0,69	6,49	0,73	6,16	0,82	6,36	0,77	6,38	0,77		
11	Fitness Level		6,39	0,77	6,39	0,82	6,33	0,72	6,49	0,79	6,48	0,73		
13	Experience		6,31	0,87	6,25	0,93	6,07	0,85	6,26	0,94	6,31	0,88		
15	Punctuality		6,38	0,82	6,58	0,69	6,33	0,79	6,44	0,76	6,20	0,91		
17	Knowledge		6,42	0,81	6,37	0,82	6,33	0,77	6,31	0,97	6,37	0,84		
18	Musical Skills		6,46	0,85	6,38	0,92	6,36	0,78	6,30	0,98	6,43	0,80		
19	Innovation		6,40	0,70	6,35	0,83	6,13	0,82	6,25	0,88	6,34	0,78		
21	Dedication		6,51	0,65	6,38	0,75	6,38	0,82	6,56	0,72	6,47	0,69		
22	Assiduity		6,50	0,73	6,68	0,68	6,49	0,74	6,45	0,78	6,55	0,70		
24	Technical Execution		6,49	0,83	6,46	0,69	6,36	0,81	6,50	0,73	6,48	0,74		
25	Energetic		6,36	0,81	6,36	0,94	6,41	0,75	6,40	0,80	6,36	0,86		
			6,39	0,79	6,41	0,80	6,20	0,84	6,35	0,86	6,37	0,80		

Trough the analysis of table 4 is possible to emphasized (positively or negatively) the following quality indicators: (1) communication (*M*=6,47) and humility (*M*=6,13) from Relational Quality, technical training (*M*=6,60) and instruction (*M*=6,24) from Technical-pedagogical Quality - Aerobics; (2) sympathy (*M*=6,59) and humility (*M*=6,19) from Relational Quality, assiduity (*M*=6,68) and experience (*M*=6,25) from Technical-pedagogical Quality - Aquarobics; (3) image (*M*=6,30) and humility (*M*=5,79) from Relational Quality, assiduity (*M*=6,49) and suitability (*M*=6,05) from Technical-pedagogical Quality - Hip Hop; (4) ethics (*M*=6,49) and humility (*M*=6,05) from Relational Quality, dedication (*M*=6,56) and innovation (*M*=6,25) from Technical-pedagogical Quality - Resistance Training; (5) gaiety (*M*=6,43) and empathy (*M*=6,22) from Relational Quality, assiduity (*M*=6,55) and punctuality (*M*=6,20) from the Technical-pedagogical Quality - Step. By dimension, is possible to verify that the Technical-pedagogical Quality have a mean value (*M*=6,38) higher than the Relational Quality (*M*=6,31).

By the analysis of the mean values per activity, is possible to understand which are the activities with the highest [Aquarobics (*M*=6,41)], lowest [Hip Hop (*M*=6,20)] and intermediate values [Aerobics (*M*=6,39), Step (*M*=6,37) and Resistance Training (*M*=6,35)]. This result raises some underlying questions. Why the perceived quality is higher in Aquarobics and lower in Hip Hop? Do the Aquarobics instructors have higher quality than the instructors from the other activities, or are the specific characteristics of each activity that makes that some quality indicators are more positively emphasized? Are the participant's characteristics (gender, educational level or practice reasons, for example) that influence the perception in accordance to the practiced activity? These questions, among others, could and should be considerers in future researches.

To compare the participant's perception, in accordance to the practiced activity, are presented the obtained results of the one-way ANOVA test (table 5). The statistical significant differences are assumed for a significance level of less than 0,050 (p<0,050).

Table 5. *Significance level considering the application of the one-way ANOVA test*

Item	Category	*p value*	Dimension	*p value*
1	Communication	0,000*	Relational Quality	0,029*
2	Availability	0,016*		
7	Gaiety	0,010*		
8	Honesty	0,001*		
9	Humility	0,061		
10	Sympathy	0,030*		
12	Ethics	0,572		
14	Image	0,706		
16	Cordiality	0,274		
20	Motivation	0,308		
23	Empathy	0,343		
3	Suitability	0,035*	Technical-pedagogical Quality	0,617
4	Instruction	0,464		
5	Technical Training	0,003*		
6	Planning	0,017*		
11	Fitness Level	0,171		
13	Experience	0,369		
15	Punctuality	0,001*		
17	Knowledge	0,878		
18	Musical Skills	0,659		
19	Innovation	0,011*		
21	Dedication	0,322		
22	Assiduity	0,021*		
24	Technical Execution	0,852		
25	Energetic	0,984		
*significance level for $p<0,050$				

The results shows that are statistical significant differences in the Relational Quality dimension (p=0,029). In the Technical-pedagogical Quality dimension the differences are not statistically significant (p=0,617). There are also statistical significant differences in the following categories: communication (p=0.000), availability (p=0,016), gaiety (p=0,010), honesty (p=0,001), sympathy (p=0,030), from Relational Quality; suitability (p=0,035), technical training (p=0,003), planning (p=0,017), punctuality (p=0,001), innovation (p=0,011) and assiduity (p=0,021), from Technical-pedagogical Quality. It is possible to conclude that 11 of the 25 quality indicators are differently understood by the participants. The result of this study, although with a different aim, confirms the result of the investigations of Alves et al. (2013) and Franco et al. (2004), which indicates that the practiced activity may affect the group exercise participants perception. In order to verify the origin of the statistically significant differences were presented, to the dimension and categories previous indicated, the results of the post hoc Tukey HSD test and the mean difference (table 6).

Table 6. *Post hoc Tukey HSD test and mean difference, by category and dimension*

Dimension			Activity (A)	Activity (B)	Mean Difference (A-B)	Standard Deviation	*p* value
Relational Quality			Aerobics	Aquarobics	-0,692	0,763	0,945
				Hip Hop	2,726	0,986	0,064
				Resistance Training	0,600	0,821	0,978
				Step	0,066	0,768	1,000
			Aquarobics	Hip Hop	3,419	1,031	0,012*
				Resistance Training	1,293	0,874	0,678
				Step	0,758	0,824	0,941
			Hip Hop	Resistance Training	-2,125	1,074	0,356
				Step	-2,660	1,034	0,105
			Resistance Training	Step	-0,534	0,878	0,990
Category							
	Communication	Relational Quality	Hip Hop	Aerobics	-0,500	0,108	0,000*
				Aquarobics	-0,404	0,113	0,005*
				Step	-0,430	0,114	0,002*
	Availability		Hip Hop	Aerobics	-0,349	0,116	0,031*
				Aquarobics	-0,387	0,121	0,017*
	Gaiety		Hip Hop	Aquarobics	-0,433	0,124	0,006*
				Step	-0,356	0,124	0,048*
	Honesty		Hip Hop	Aerobics	-0,484	0,122	0,001*
	Sympathy		Hip Hop	Aquarobics	-0,368	0,120	0,027*
	Suitability		Hip Hop	Aerobics	-0,349	0,109	0,017*
	Technical Training	Technical-pedagogical Quality	Aerobics	Aquarobics	0,232	0,077	0,032*
				Hip Hop	0,361	0,100	0,004*
	Planning		Hip Hop	Aerobics	-0,311	0,107	0,044*
				Aquarobics	-0,330	0,112	0,039*
	Punctuality		Aquarobics	Step	0,381	0,090	0,000*

*significance level for p≤0,050

In the Relational Quality dimension, the significant differences result exclusively from the Hip Hop and Aquarobics participants (p=0,012). By the analysis of the mean differences is possible to verify that: the mean response of Aquarobics participants is higher than all other activities (which allows understanding that the quality is higher); the mean response of Hip Hop participants is the lowest (which indicates that the quality is lower). In the categories, like in the Relational Quality dimension, the significance differences occur mainly among Hip Hop and Aquarobics activities (communication, availability, gaiety and sympathy, from Relational Quality; and planning, from Technical-pedagogical Quality). Through the analysis of mean differences is possible to conclude that the answer values of Aquarobics participants are higher in all categories, compared with the mean answer of the Hip Hop participants. Like in the previous analysis, these results raise some questions. Why in communication category (Relational Quality) are there significant differences between Hip Hop and other three activities (Aerobics, Aquarobics and Step)? Does the Hip Hop instructors have a peculiar way of talking that defines and distinguishes them from the instructors of others group activities? Why are there differences in technical training category (Technical-pedagogical Quality) between Aerobics and two other activities (Aquarobics and Hip Hop)? Do the Aerobics instructors have more technical training than Aquarobics or Step instructors or, such specific technical training is not necessary because Aerobics is the "base" of others fitness group activities, and that specific characteristic will makes the participants perceived quality higher?

Conclusions

By the assumption that quality perception influences satisfaction (Fernández et al., 2012; Murray & Howat 2002; Nuviala et al. 2012; Papadimitriou & Karteroliotis 2000) and participants loyalty (Hoffman & Jones, 2002) is possible to conclude that a correct relation (ethics), "good manners" (cordiality), being a sympathetic

person (sympathy) - Relational Quality - don't miss the classes (assiduity), shows commitment in everything is done (dedication) and have a well-done technical execution (technical execution) - Technical-pedagogical Quality - are the quality indicators that have the highest influence in the satisfaction and participants loyalty.

In another perspective, the lower values items [humility, empathy, honesty (Relational Quality), experience, innovation and instruction (Technical-pedagogical Quality)] deserve to be considered by the fitness instructors in order to adjust their professional intervention and, thereby, improve perceived quality, satisfaction and loyalty intention. The fitness instructor must have the ability to accept criticism (humility), have a proximity relation with the participants (empathy), be a honest person (honesty) - Relational Quality - work in the fitness area for some time (experience), be original and creative (innovation) and be aware of participants performance, intervening if it is necessary (instruction) - Technical-pedagogical Quality. Being these indicators the lowest, it is recommended to improve them and, by that, avoid dissatisfaction and dropout intention.

In each practiced activity, there are more or less emphasized quality categories. In the Relational Quality: the highest mean values appear on communication (Aerobics), motivation (Aquarobics and Resistance Training), gaiety (Aquarobics and Step) and image (Hip Hop); the lowest mean values appears on image (Aerobics, Aquarobics and Step) and communication (Hip Hop). In the Technical-pedagogical Quality: the highest mean values appear on technical training (Aerobics), punctuality (Aquarobics), planning (Aquarobics), fitness level (Resistance Training and Step) and energetic (Hip Hop); with lowest mean values appear suitability (Aquarobics and Hip Hop), energetic (Aerobics), musical skills (Resistance Training) and punctuality (Step).

There are statistically significant differences in the Relational Quality dimension, originated from the Hip Hop and Aquarobics activities. In the categories, the differences occur mainly among Hip Hop and Aquarobics (communication, availability, gaiety, and sympathy - Relational Quality; and planning - Technical-pedagogi-

cal Quality). These results confirm the concluded by Franco et al. (2004), that found significant differences considering the practiced activity (relative to a group exercise participants preference - Aerobics - for some behaviors of an ideal instructor), and Alves et al. (2013), that conclude the existence of significant differences in the instructor behavior (kinesis communication) also in accordance to the practiced activity (Resistance Training, Indoor Cycling, Aquarobics and Step). By the mean differences analysis is possible to conclude that the mean answer of Aquarobics participants is higher than Hip Hop participants

To understand why the perception values are lower in some categories or dimensions, according to the practiced activity, there are some questions that should be studied in future investigations:

1) Why the perceived quality is lower in Hip Hop and higher in Aquarobics? It is because the Aquarobics instructors have more quality (assiduity, punctuality, sympathy) when compared with the instructors from other activities? Are there specific characteristics for each activity (material, fitness intensity of the class, type of performed exercises, for example) that makes the perceived quality higher in some categories? The specific participant's characteristics of each activity (age, gender, reasons for practice, for example) make the perceived quality different? The Aquarobics instructors are more assiduous and punctual? The fact of the Aquarobics participants are older makes them a less demanding understanding of the fitness instructor quality?

2) Why are there statistical significant differences only in the Relational Quality dimension, and no differences in the Technical-pedagogical Quality dimension? Why are there differences just in a few categories and not in all of them? The relational component of the fitness instructor must be specific and differentiated according to the practiced activity? The communication (Relational Quality) of the Hip Hop instructors is really different? The instructors of the activities that have been developed from Aerobics (Resistance Training, Aquarobics, Hip Hop or Step) require a specific technical training (Technical-pedagogical Quality)?

Regardless of these questions, it is important for all the intervenient in the fitness area (owners, general managers, technical managers, trainers and instructors) the results analysis, understanding with that the participant's perceived quality. By that, the instructor could adapt its intervention, trying to satisfy its participants, keeping them with high motivation levels and loyalty intention. In a future research, it is important to study also the participant's preferences and, crossing the perception with the preferences, effectively understand the satisfaction levels of the participants.

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