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How Self-Control Affects our Training and Nutrition Goals: A Comparison Between Overweight Women and Bodybuilders

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Research Article

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ABSTRACT

The psychological and dedication in bodybuilding has a significant impact in these athlete's lives, supporting self-control and individual's social realization. Moreover, their motivation is an important key during the pre-competition period, when high levels of self-control contribute to achieving goals and performing under pressure.

Purpose: The aim of this research is to study the differences between the locus of control of overweight women and bodybuilding athletes.

Methods: The current study was designed to compare two groups (n=18); female bodybuilders (n=10) and overweight women (n=8). Data were collected by survey monkey URL link, composed of 12 questions involving nutrition and training lifestyle, each with 3 possible columns with answers: relying on reward/relying on others/relying on me. Participants were requested to answer by classifying how the sources of control affect each item with ratings from 1 to 5. The average result of each question and column was calculated with comparison purposes.

Results: The column "relying on me" had the same average rating 4.9/5 rating for bodybuilders and overweight women. For "relying on others" the athletes' average rating was 1.2/5 and for non-athletes 1.4/5. The major difference was regarding "relying on a reward" with an average rating of 2.7/5 for the group of bodybuilders and 1.9/5 for non-athletes.

Conclusion: We concluded that a source of reward is much more significant to athletes, which can refer to either intrinsic or extrinsic motivation.

INTRODUCTION

Diet plans and nutritional programs are known by their several benefits; encouraging safe and sustainable weight loss, preventing obesity, reducing cardiovascular disease risk and improving life quality are some of the benefits that are clearly supported by evidence [1-4]. Although the demand and the intention to follow a diet plan are very intense, according to the International Food Information Council (IFIC), only 36% of people in the US complete a nutritional program [5]. The World Health Organization (WHO, mentioned that 75% of patients who receive medical recommendations related to lifestyle changes, such as dietary restrictions, do not follow what was recommended, and 95% of obese individuals who start a weight-loss diet fail to maintain it When we analyze the behavior of high-level athletes, their diet plans, in most cases, are not an obstacle for accomplishing their goal of a better performance in exercises, strength/muscle mass increase and body fat loss [6]. For this specific group, eating the right thing tends to be a duty or we may even call it a culture [7].

For many, bodybuilding is considered more than a sport- it is art and culture. The athletes are judged on appearance, rather than only athletic ability on competition. During a season, bodybuilders have to face different stages: muscle-gaining phase (off-season), dieting for competition (contest preparation) and the competition itself. Due to a very strict diet plan with regard to food selection, meal frequency, nutrition timing and supplementation, these athletes are not only required to have a strong physique, but a strong mind to follow step by step a rigorous training and nutrition routine.

During the off-season phase, the goal is to increase muscle mass without gaining unnecessary body fat: carbohydrates are the most important macronutrient (45%-65% of calories), followed by proteins (20%-30%) and fats (15%-30%) [8]. In the pre-contest stage, we have the opposite that is when the athletes are close to the competition day, and they have to reduce the calorie intake; carbs (20%-45%), fats (20%-35%) and proteins (20%-40%) [9]. Perhaps, it is undeniable that athletes competing in bodybuilding need to maintain a consistent self-control and discipline to achieve career goals. Self-control and self-motivation seem to be crucial for success in this particular sport. One of the most widely explored concepts across multiple areas of psychology is the locus of control concept introduced based on social learning theory [10]. He defined locus of control as follows: “When a reinforcement perceived by the subject as not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control”.

Locus of control is conceived as a belief that a response will, or will not, influence the attainment of reinforcement and it seems to influence the particular goal expectancy in any given specific situation depending upon the novelty and the ambiguity of the setting, as well as the degree of reinforcement that the individual has directly experienced in that setting [11].

Motivation and locus of control

Motivation is a word derived from “motive” and it is defined as the desire to perform an action in pursuit of a goal. It is a key element in our interaction with the world and with each other. All individuals and animals share

motivation to obtain their basic needs, including food, water, intercourse and social interaction [12]. That motivation is associated with locus of control. In this context, internal locus of control would be positively associated with the sub-dimensions of motivational persistence, namely external academic locus of control would be negatively correlated with the sub-dimensions of motivational persistence. They found significant correlations between dimensions of motivational persistence and academic locus of control. Internal academic locus of control was related in a positive way to long-term purposes pursuing, current purposes pursuing, recurrence of unattained purposes and total motivational persistence, respectively (r= 0.51; 0.49; 0.54; 52). On the other hand, long-term purposes pursuing (r= -0.36, p<0.01), current purposes pursuing (r= -0.31, p<0.01), recurrence of unattained purposes (r= -0.39, p<0.01), and total motivational persistence (r= -0.41, p<0.01) were found adversely associated with external academic locus of control. Significant correlations were also found between dimensions of motivational persistence [13].

Intrinsic motivation

Intrinsic motivation is defined as the engagement in an activity that is inherently satisfying or enjoyable, rather than an engagement resulted from some external factor [14]. An intrinsically motivated individual does not require any external source of motivation and is moved by fun or challenge entailed and by the internal enjoyment of the activity, internal motivation is not about perceiving external rewards, products or pressures. Therefore, intrinsically motivated individuals freely engage in activities because the source of motivation lies inside the task, this motivation is associated with various benefits, such as enjoyment, persistence and psychological well-being, and it enables people to feel competent and self-determining, eg., a teacher that holds classes for no other reason than the innate satisfaction of teaching [15]. Intrinsically motivated behavior normally results in creativity, flexibility and spontaneity [16].

Extrinsic motivation

In contrast with intrinsic motivation, extrinsic motivation has been described as the performance of an activity motivated by a prize or some reward, which is external to the task or an action performed in order to avoid negative consequences, the individual experiences an obligation to behave in a specific way [17]. It is a performance guided by an outcome, eg., someone studying to get an “A” score in a test so they can win a competition and receive a medal [18].

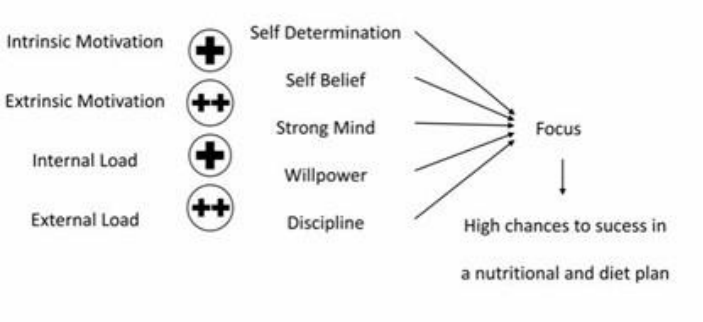
Internal and external load

Physical activities induce stress and various psychophysiological responses, triggering the capacity of adjustment to the sport practice. In the scope of athletic training, the training load is the variable that, when manipulated, generates the desired training response. Two types of training load are described: the external and the internal, which refers to measurable aspects occurring inside or outside an individual. External load is defined as the works completed by the athlete, measured without taking into account his or her internal characteristics [19]. For instance, the distance covered, or the time a runner spent running or the load lifted in resistance training. On the other hand, all internal psychophysiological responses that occurred during the execution of an exercise comprise the internal load.

While external load is important to understand capabilities and capacities of the athlete, the internal load, or the relative physiological and psychological stress imposed is also critical in determining the training load and subsequent adaptation of this athlete and the relationship between external and internal loads will bring the comprehension of the professional performance of sport players [20].

In bodybuilding, the internal load certainly is a significant factor, and experiencing high levels of autonomous motivation and self-control competencies, athlete's pursuit their goals successfully (Figure 1). However, the excessive load may also be harmful and stimulate a burnout, which is defined as a multidimensional psychological syndrome, consisting of emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation [21].

Figure 1. Arrangement of how motivation and load may influence in our study.



Hypothesis

According to the evidences about performance, levels of discipline, self-control and persistence of athletes, we believe that behavioral differences between high-performance athletes and normal individuals could be based on their locus of control and motivation, and it may also be one of the key aspects keeping these athletes performing and behaving in a different manner facing a rigorous nutritional and exercise program.

Despite the lack of published studies, our hypothesis is that the internal locus of control and motivation could be crucial when we refer to reaching a specific goal in sports and in life. Similarly, the adherence to a diet and exercise program, regardless of a specific goal, is not a simple and easy task, and most of the times it requires psychological approach and a high level of control and internal motivation by the individual, in addition to an external locus of control. That is the reason why so many people are not able to maintain it for a long period of time.

Taking into consideration that by identifying and obtaining a better understanding of the locus of control of these athletes could bring us applicable responses to other groups, in terms of compliance with an nutrition and exercise plan, we adapted the locus of control scale in order to compare two different groups: a group of ranked bodybuilding athletes and a group of overweight women from a Nutritional and Exercise Program of a Brazilian University.

Locus of control scale

The Locus of Control Scale proposed by Rotters 10 (Appendix 1) is a 29-item forced-choice test including six filler items intended to make the purpose of the test somewhat more ambiguous, is the most widely used and cited measurement of Locus of Control (LOC). Additionally, Rotter reported that this scale correlates well with other methods used to assess locus of control such as questionnaire, Likert scale, interview assessments, and ratings from a story-completion technique. In summary, the Internal-External locus of control scale shows excellent psychometric properties supporting its reliability and effectiveness [22].

MATERIALS AND METHODS

This study was approved by ethical committee at the Physical Education and Sport School number 1.093.208 shown in Figure 2. A validated Locus of Control Scale of twelve sentences was selected from a Brazilian study that investigated the relationship between locus and the impact of training at work shown in Table 1. For each question, this scale considers three factors representing sources of control: relying on luck/relying on others/relying on me, and for each one of these factors the answer goes from very little to very much [23].

Figure 2. Example of the instrument items of locus of control.

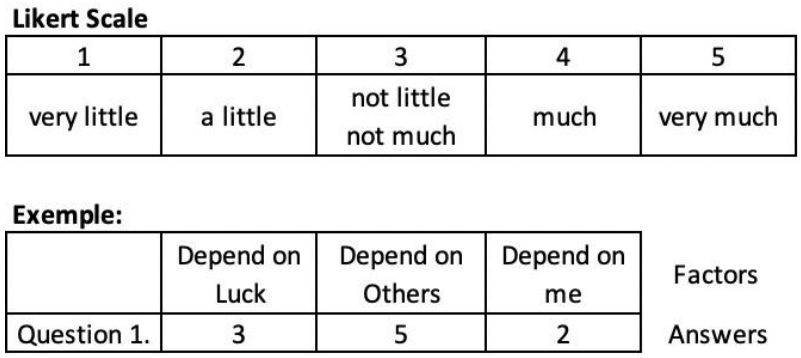


Table 1. Locus of Control Scale translated, Abbad and Meneses (2004).

Itens	Depends on luck	Depends the others	Depends on myself
1. Accomplishing my plans	3	1.2	5
2. Getting a good job	1.7	1.4	3
3. My future	1	1.1	4.8
4. Great opportunities in life	1.1	1.6	4.6
5. Working on more prestigious jobs	1.3	1.3	6
6. Improving my life conditions	1.2	2	6
7. Reaching my goals	1.4	2.1	4.7
8. Defending my point of view in a conflict of interest	5	1.1	4.4
9. Having good friends	5.1	1.3	4.9
10. Earning the desire wage	1	1.6	4.9
11. Earning a lot of money	1.6	1.4	4.9
12. Being a successful professional	7	5	2

We have adapted the locus of control scale, rewriting the 12 sentences in the perspective of nutrition and physical activity. In addition, the sources of control were adjusted, considering reward as a factor, instead of fate. The locus of control scale was uploaded into the survey monkey site to be distributed through a URL link to all athletes and overweight women participating in this study shown in Table 2.

Table 2. Locus of Control Scale adapted.

Question	Depends on others	Depends on a reward	Depends on myself
1. Eating healthy and regularly	1.6	1.8	3.9
2. Following a specific diet plan	2.5	2.5	5.8

3. Training working out regularly	1	2.2	5
4. Changing a lifestyle (opposite of yours).	1.6	1.6	5.9
5. Looking for a better physique	1.2	2.2	5
6. Training routine in your daily basis after reaching your goals	2	1.5	5
7. Eating health foods in your daily basis after reaching your goals	2.1	1.6	4.6
8. Absent a social event due to a restricted diet	3.1	23	4.8
9. Absent a social event due to a training program	1.3	3	6
10. Feeling motivated to push forward despite the lack of results	1.7	2.4	4
11. Keeping your training and nutritional routine while travelling	1.4	1.8	4.8
12. Adapt your daily basis routine according the new life style	1.8	1.7	4.7

We selected twenty women to participate in this study, of which ten bodybuilding athletes and ten overweight women from a university program of nutrition and exercises to answer the online locus of control scale. Eighteen women completed the questions in accordance to the instructions, 10 bodybuilders and 08 overweight women. The data were collected by survey monkey link and their average answers were calculated in Microsoft Excel for comparison. The data were organized in charts and the statistical analysis was carried out with mean and standard deviation, followed by Student's t-test.

RESULTS

According to the protocol, the factor "relying on myself" had the same average rating 4.9/5 for bodybuilders and overweight women; for "relying on others" the athletes average rating was 1.2/5 and for non-athletes 1.4/5. The major difference was regarding "relying on a reward" with an average rating of 2.7/5 for the bodybuilders group and 1.9/5 for non-athletes (Table 3).

Table 3. Average of results.

Question	Depends on others		Depends on a reward		Depends on myself	
	Athletes	Overweight	Athletes	Overweight	Athletes	Overweight
1. Eating healthy and regularly	1.2	1.5	2.8	1.9	5	4.9
2. Following a specific diet plan	1.5	1.3	2.6	2.3	4	4.8
3. Training working out regularly	1.1	1.5	3.3	2.1	4.9	5
4. Changing a lifestyle (opposite of yours).	1.4	1.4	2.4	1.5	4.5	4.9
5. Looking for a better physique	1.2	1.6	2.4	2.1	5	5
6. Training routine in your daily basis after reaching your goals	1	1	2.8	1.4	5	5
7. Eating health foods in your daily basis after reaching your goals	1.1	1.6	2.3	1.5	4.9	4.8
8. Absent a social event due to a restricted diet	1.1	1.3	2.7	2	4.9	4.8
9. Absent a social event due to a training program	1.2	1.4	2.6	2	4.7	5
10. Feeling motivated to push	1.5	1.6	3	2.3	4.9	4

forward despite the lack of results						
11. Keeping your training and nutritional routine while travelling	1.3	1.4	2.8	1.9	4.9	4.6
12. Adapt your daily basis routine according the new life style	1.2	1	2.7	1.6	5	4.9
MEAN	1.2	1.3	2.7	1.9	4.9	4.9
SD	0.15	0.21	0.26	0.29	0.14	0.13
P	0.01		<0.01		0.77	

After the initial results, we submitted to the group another survey question to better understand what they consider a reward. Not all participants answered the survey. The group of athletes defined reward as a desired physique, satisfactory work results, objective achievement and completion of a task. One of the non-athletes described reward as "achieving the desired result", but most of the women described reward as weight loss, beauty and health (Table 4).

Table 4. Definitions of reward provided by female bodybuilders and overweight women groups.

Athletes group	
108.29.153.125	Reward is the merit received for the effort
172.58.169.62	To have the desired physique
179.228.3.25	To feel satisfied with the result after hard work
177.58.243.127	Reward is the merit of act. Is reaching the proposed objective
Overweight group	
177.25.199.185	A health and life quality improvement
177.25.205.158	To receive a benefit, a return from something done
189.120.79.157	To see me thinner, beautiful and healthy
177.32.77.157	Healthy, physical independence, weight loss
179.241.000	Depending no one on developing my own activities
179.242.000	Reaching the desired result

DISCUSSION AND CONCLUSION

The initial hypothesis was based on athletes presenting stronger internal locus of control and intrinsic motivation by assuming that both factors would be key elements for maintenance of a very strict routine of nutrition and exercise training in this group. The first expectation was to find a significant difference between groups, especially in terms of internal control. Surprisingly, we observed that the intrinsic motivation (factor: relying on myself) for both groups are statistically similar (average rating 4.9 of 5.0 for athletes and non-athletes). Regarding the results, athletes and non-athletes presented same level of internal locus of control. The major difference between groups was found in connection with the reward factor, which is based on personal definitions from each group. According to the definitions received, the athletes find rewards to be more related to achieving a task, while the overweight group relates it to a new personal appearance.

Some limitations of this study are the adapted Locus of Control Scale before application with the change of the factor "luck" to "reward", since it is difficult to bring to a conclusion how the groups define reward as a matter of intrinsic (self-satisfaction) or extrinsic motivation (eg., the medal). On more specifically question six "training routine in your daily basis after reaching your goal", the average of athletes' group was two times higher for factor

"relying on a reward", suggesting that a reward may be related to the competition day or athlete's objective in the sport performed and that the control and motivation for diet and exercise in this group could be linked to this. More studies are necessary to understand the difference between behavior and locus of control between athletes and non-athletes. To the extent of our concern, there is no available literature dealing with locus of control in both groups studied in this article. However, we believe that this primary attempt of investigation is a starting point for better understanding the motivated behaviors on the dietary and nutritional patterns on athletes' performance and support other studies in a better comprehension of the role of its behaviors.

According to our research, we concluded that the source of reward is more significant to athletes, suggesting that a reward may be related to the competition day or athlete's objective in the sport performed and that the control and motivation for diet and exercise in this group could be linked to this.

DECLARATIONS

I declare that this research has been composed solely by myself and the corresponding authors and that it has not been submitted, in whole or in part, in any previous application. Except where states otherwise by reference or acknowledgement, the work presented is entirely my own.

FUNDING

Not applicable

CONFLICT OF INTEREST STATEMENT

Not applicable

ETHICS APPROVAL

Yes

CONSENT TO PARTICIPATE

Yes

CONSENT TO PUBLICATION

Yes

AVAILABILITY OF DATA AND MATERIALS

Yes.

CODE AVAILABILITY

Not applicable

AUTHORS' CONTRIBUTION

Yes.

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