

EFFECTS OF A SINGLE SESSION OF PHYSICAL EXERCISE ON BODY STATE IMAGE*

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ABSTRACT

Despite the fact that athletes and physically active persons are generally more satisfied with their bodies than sedentary people, physical activity seems to exert both negative and positive influences on body image. The aim of this study was to investigate the effect of a single session of exercise in state body image modification. In particular, we observed if a single session of sport or fitness activity could have a positive influence on state body image, considered as an episodic, evaluative and affective perception of the own physical appearance. Results showed an increase of the mean state body image rate (assessed with the Body Image States Scales, BISS) after a one-hour session of sport or fitness activities in a sample of 295 individuals. Intensity and fun seemed to be key-factors in state body image enhancement. These findings could have significant implications in the treatment of BI disturbances and in their prevention.

KEY WORDS: *body image; fun; intensity; physical activity; sport.*

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INTRODUCTION

The concept of *body image* (BI) represents a complex multifaceted construction which has been elaborated with contributions from different fields: neurology, psychoanalysis, philosophy and psychology. It refers to the picture of the body built by the individual (FISHER, 1990). Currently, BI can be considered as a multidimensional construction about perceptions and attitudes that individuals refer to their body and in particular to their appearance (CASH, 2002).

A widespread belief is that athletes with 'perfect' and well-trained bodies, and more generally active people, are mostly satisfied with their bodies, but different studies underline how sport and physical activity may have both negative and positive effects on BI (CASH; PRUZINSKY, 2002). The BI distress of some gymnasts and ballet dancers (RAVALDI et al., 2003) and the muscle dysmorphia of some bodybuilders (OLIVARDIA, 2001) are well known examples of negative influences. Otherwise, it is well recognized that athletes and physically active persons are generally more satisfied with their bodies in comparison to sedentary, inactive people. Moreover, it is interesting to note that, when physical exercise focusing on appearance, it generally influences negatively BI, while recreational and playful physical activities usually influence positively BI (DAVIS, 2002). It has also been proved that physical exercise may positively influence BI through improvements in body conditioning (endurance, strength and flexibility) and in body composition, through skills learning and by the perception of wellbeing and self-efficacy (MARTIN ; LICHTENBERGER, 2002).

The influences exerted by physical activities on BI seem to depend on more than one variable, such as the kind of activities, the gender of participants, the degree of commitment and individual psychological features (DAVIS, 2002). The nature of the relationships between physical activity and BI has not been completely explained yet (MARTIN ; LICHTENBERGER, 2002) and there is only a limited number of studies on this topic (e.g., CRISSEY; HONEA, 2006; JANKAUSKIENE; KARDELIS; PAJAUJIENE, 2005). As Cash and Pruzinsky (2002) said: "a more precise understanding of the complex effects of physical activity is essential" (p. 515).

Despite improvements of BI after a period of exercise and physical training have been reported in several studies (e.g., HUANG et al. 2007; WILLIAMS; CASH, 2001), at the best of our know ledges, with the exception of the analysis of social environmental factors and the influences of instructor behaviors (RAEDEKE et al. 2007; FOCHT; HAUSENBLAS, 2003), no previous study have analyzed the effects of acute exercise (a single session) on BI.

The aim of the present study was to investigate the role exerted by physical exercise in short term BI modification. In particular, we observed if a single session

of sport or of different fitness activities could have a positive influence on state BI, considered as an episodic, evaluative and affective perception of physical appearance. A second aim was to explore the role exerted by gender, age, body mass index (BMI), type of physical activity, reasons to practice, perceived intensity and fun in state BI modification.

METHODS

PARTICIPANTS

Participants were 295 persons, 169 women (57.3%) and 126 men (42.7%) aged between 14 and 78 years ($M = 38.86$; $SD = 17.28$) that voluntarily participated in the study. The study was conducted in the Veneto region, Italy. Written informed consent was obtained from all participants.

MEASURES AND INSTRUMENTS

The Body Image States Scale (BISS) was used. BISS is a six-item questionnaire with a 9-point response format for each item. The measure of state BI is obtained by the composite mean of the six items. Higher scores reflect more positive BI states. An Italian version of the questionnaire was realized by means of back-translation of the original English version (developed by Cash, Fleming, Alindogan, Steadman and Whitehead in 2002). In the present study the BISS was administered three times, Cronbach's alpha was .78 in the first administration, .81 in the second, .79 in the third. Pearson correlations over the three times showed a coefficient of .87 and .63 ($p < .01$) for times 2 and 3 compared to time 1, respectively. Pearson correlations between the BISS and BMI at times 1, 2 and 3 had a coefficient of -.25, -.23 and -.22 ($p < .001$), respectively.

Together with the BISS, we collected data on individual characteristics of participants (gender, age, BMI), type of exercise practiced, perceived intensity of the activity, reasons to practice and perceived fun. Intensity and fun were assessed with a 9 point scale (intensity: 1 = extremely light and 9 = extremely intense; fun: 1 = extremely boring and 9 = extremely fun). Reasons to practice was evaluated with the opened question "Why do you practice this activity?", answers were then summarized into five categories: fun, passion, wellbeing, aesthetics and competitiveness. An open question was added at the end of the third administration of the BISS: "Compared with before to exercise now I feel...". In addition, a description of each one-hour session of physical activity or sport was obtained.

PROCEDURE

The BISS was filled by each participant three times: one hour before the activity, immediately before the beginning and few minutes after the end of the activity. Participants were asked not practice any physical activities between the first and the second measurements.

From the whole sample, 108 participants (36.6%) practiced individual or team sports (i.e. athletics, swimming, gymnastics, volleyball, basketball and soccer), 74 (25.1%) postural gymnastics, 81 (27.5%) bodybuilding and 32 (10.8%) group fitness activities.

STATISTICAL ANALYSIS

Paired-samples t test was conducted to evaluate the impact of a single exercise session on state BI scores. An independent-samples t-test was conducted to compare the baseline BISS scores for males and females. Analysis of variance (one-way between groups Anova) and repeated measures (GLM Ancova) with a post-hoc test (Bonferroni) was conducted to examine, respectively, the impact of personal and PA-related variables on baseline state BI and during the three BISS administrations.

RESULTS

Means and standard deviations of the BISS at the three points of completion, divided into groups according to personal variables (gender, age, BMI) and exercise-related variables (type of exercise, reason to practice, perceived intensity, fun) and Ancova results (*F* and *p*-value) are presented in Table 1.

Table 1 - Individual and physical activity related variables

		BISS 1	BISS 2	BISS 3	ANCOVA	
		M (SD)	M (SD)	M (SD)	<i>F</i> (<i>df</i>)	<i>p</i>
Whole sample	(N = 295)	5.53 (1.09)	5.55 (1.09)	5.97* (1.13)		
Gender	Men (n = 126)	5.79 (1.05)	5.84 (1.18)	6.22* (1.15)	35.06 (1, 292)	<.001
	Women (n = 169)	5.33 (1.09)	5.33 (1.09)	5.79* (1.08)		

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Age (years)	≤30 (n = 144)	5.66 (1.02)	5.68 (1.03)	6.13* (1.21)	32.05 (1, 291)	<.001
	30>and≤50 (n = 75)	5.56 (1.21)	5.58 (1.19)	5.94*** (1.02)		
	>50 (n = 76)	5.26 (1.09)	5.26 (1.08)	5.71* (1.05)		
BMI(kg/m ²)	Underweight (n = 51)	5.81 (.97)	5.79 (.87)	6.05 (1.2)	21.19 (1, 291)	<.001
	Normal weight (n = 183)	5.58 (1.07)	5.59 (1.05)	6.08* (1.08)		
	Overweight (n = 61)	5.14 (1.17)	5.21 (1.34)	5.58** (1.18)		
Type of exercise	Sports (n = 108)	5.62 (.96)	5.65 (.96)	5.99* (1.23)	34.83 (1, 290)	<.001
	Postural gym (n = 74)	5.2 (.95)	5.16 (.88)	5.65* (.87)		
	Bodybuilding (n = 81)	5.62 (1.3)	5.69 (1.35)	6.1** (1.2)		
	Group fitness (n = 32)	5.73 (1.17)	5.74 (1.1)	6.34* (1.04)		
Reasons to practice	Fun (n = 54)	5.8 (.96)	5.82 (.97)	6.13*** (1.29)	12.0 (1, 289) ⁹	<.001
	Passion (n = 47)	5.6 (.98)	5.62 (.93)	6.16* (1.21)		
	Wellbeing (n = 118)	5.38 (.97)	5.36 (.96)	5.79* (.98)		
	Aesthetics (n = 67)	5.46 (1.41)	5.57 (1.42)	6.06** (1.21)		
	Competition (n = 9)	5.91 (1.15)	5.92 (1.25)	5.89 (.96)		
Perceived intensity	Low (n = 5)	6.2 (.54)	6.13 (.97)	6.66 (1.14)	(1, 291)=5.99	<.005
	Moderate (n = 90)	5.24 (1.07)	5.25 (.99)	5.7* (1.05)		
	High (n = 200)	5.64 (1.09)	5.67 (1.11)	6.08* (1.15)		

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Fun	Negative (n = 16)	5.41 (1.5)	5.49 (1.67)	5.66 (1.56)	10.27 (1, 291)	<.001
	Neutral (n = 134)	5.23 (.96)	5.22 (.94)	5.66* (.94)		
	Positive (n = 145)	5.82 (1.09)	5.86 (1.07)	6.29* (1.16)		

Dados pessoais tratados pelo SPSS 17.

Note: paired-samples t test *p <.001, **p<.005 and *** p<.05 by comparison of BISS3 (BI at the end of the PA or sport session, third questionnaire) with BISS1 (baseline BI, first questionnaire) e BISS2 (BI at the beginning of the PA or sport session, second questionnaire).

In the whole sample the composite mean of the first BISS administration was 5.53 (SD = 1.09), the second was not significantly different (M = 5.55; SD = 1.09), whereas the third was significantly higher in comparison with both the previous scores (M = 5.97; SD = 1.13; p < .001).

The differences concerning the baseline state BI between the groups were the following: (a) men scored higher than women (p < .001; Cohen's d = .43); (b) individuals aged between 30 and 50 years scored significantly differently compared to under 30s and over 50s (p < .05); (c) the overweight group (BMI > 25) scored lower than both the normal weight (20 > BMI < 25) and the underweight (BMI < 20) groups, while the underweight group scored higher than the normal weight group (p < .05).

There were no significant differences in baseline BISS scores based on the type of exercise and on the reason to practice.

A positive effect of the different exercise sessions was found in all subgroups, with the exception of underweight people, competitive oriented persons, low perceived intensity and negative enjoyment, which did not show any modification in BISS score.

Ancova with Bonferroni test revealed several differences between groups. Particularly, 'postural gymnastics' participants reported a less positive experience than the other type of physical activity groups (p < .05); 'high perceived intensity' and 'high fun' groups reported a more positive experience than 'moderate intensity' (p = .005) and 'neutral enjoyment' groups (p < .001). No differences were found based on the different reasons to practice.

The answers to the open question proposed at the end of the third administration of the questionnaire revealed that the majority of respondents (71.9%) experienced positive feelings (*I feel generally better, physically better, psychologically better, more relaxed, more active*), 7.8% of participants felt more tired, 6.4% felt

the same, 1.7% felt worse than before. The 12.2% of participants did not answer to the question (Figure 1).

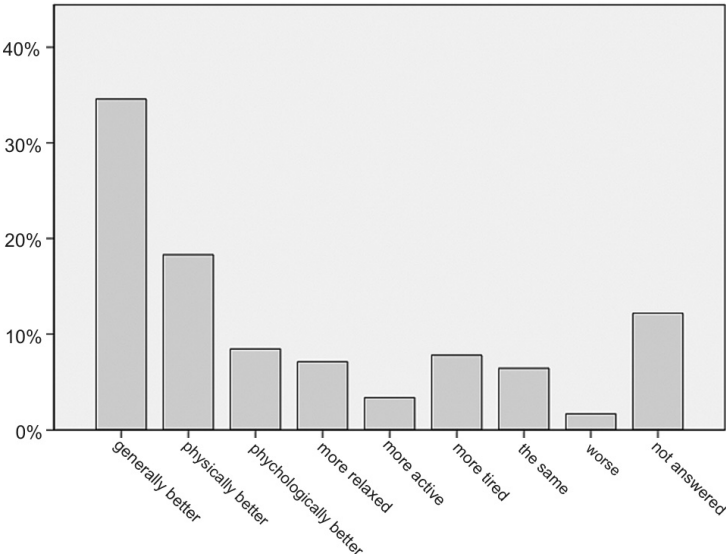


Figure 1: Self-perception after a single session of physical activity

DISCUSSION

The BISS questionnaire was completed three times in this study, the first time one hour before, the second time at the beginning and the third time at the end of a one-hour session of sport or different fitness activities. Comparisons between the three administrations were made for each participant. In the whole sample the mean value of BISS rates showed a significant increase only in the third survey, showing that a single session of physical activity or sport had a positive influence on state BI. This seems to confirm the validity of the BI state construct, as momentary experience changing with time and in different contexts (RUDIGER et al. 2007). A general positive effect of physical exercise experience emerged also from the answers participants gave to the open question (Compared with before to train now I feel...), with 71.9% of participants reported positive feelings, it is important to note that most of participants reported to feel both physically and psychologically better after the session of physical activity or sport.

Gender differences we found at baseline were in the line of previous research (CASH et al., 2002), showed a more positive state BI in men compared to women.

Despite this different starting level, exercise seems to have the same effects for both men and women.

It appears unclear the fact that underweight participants did not change their BI after the intervention, but it is important to note that the BISS mean of this group at baseline was higher than those of normal weight and overweight groups and that the score remained high positive after the exercise session.

The fact that there were no differences of baseline state BI, based on the type of exercise, and that all the different sports and physical activities practiced by participants induced an enhancement of state BI, seems to suggest the existence of a physical activity-intrinsic factor which positively influences BI in the short time. In the present study, all the subgroups created according to the reasons that lead to the practice (fun, passion, wellbeing, aesthetics, competition) showed a significant increase at the BISS after a session of exercise, with the exception of the group 'competitiveness' (which was also the smallest one, $n = 9$). Ancova with Bonferroni test did not reveal group differences based on the reason to practice, while 'postural gymnastics' had a less intense positive effect in comparison with the other types of activity groups. This fact could be linked to at least two factors: the possible greater number of paramorphisms or back pain disturbances in this group (BENDIXEN et al., 2007) and the use of mirrors during postural activity (RAEDEKE et al., 2007).

Bodybuilders had a positive baseline mean BI and the acute effects of exercise showed a further increase. These findings seem partially in contrast with other studies, in which a group of bodybuilders showed a high degree of body uneasiness (RAVALDI et al., 2003). On the other hand, it was also proved that strength training may produce an improvement in BI through important changes in body shape, such as muscle definition and muscular tone enhancement (ZABINSKI et al., 2001). Probably it would be necessary to make some distinction between bodybuilders, in order to individualize and understand the attitudes and behaviors of a population described in different studies as "at risk". Not all bodybuilders suffer from body dysmorphic disorders and the sport of bodybuilding should not be pathologized (OLIVARDIA, 2002).

The results of intensity and fun effects seemed to confirm data from literature: all the groups had an increase of BI scores after the exercise session with the exception of 'low intensity' and 'negative enjoyment' ones. These data were confirmed by the analysis with repeated measures and Bonferroni post hoc test,

showing that more positive effects in BI were obtained by higher intensity and fun levels.

CONCLUSION AND IMPLICATIONS

The purpose of the present study was to test if a single session of sport or physical activity could have a positive influence on state BI and to verify the role played by gender, age, BMI, type of activity, reason to practice, perceived intensity of the activity and fun on state BI modification. Results show that a sport or a physical activity session was effective in increasing BI perception, highlighting how physical exercise exerts a positive effect on attitudinal state BI. Quantitative data was confirmed by qualitative one. In fact, the answers to the open question revealed that mostly of the participants reported an improvement of their self-perception. After the movement session they declared to feel better, from a general, physical and psychological point of view. Another noteworthy result is that perceived intensity of the activity and fun seem to represent key factors in state BI enhancement.

In conclusion, we can state that the major findings of this research was to show how state BI can be improved in acute through physical activity practice. These findings could have significant implications in the field of BI disturbances treatment and prevention, suggesting to take into consideration the positive acute effect of exercise on state BI when planning interventions to cope with these problems. At least two facts should be considered in promoting physical activities programs: (a) the intensity of activities should range from moderate to high (only, of course, if there are no concomitant problems of excessive underweight, such as in anorexic patients); (b) the central role of fun, as a factor to increase the positive effects of physical exercise on state BI.

In a future perspective, it would be interesting to compare the acute and long term effects of exercise on BI, in order to understand if the acute increase of BI is part of a wider process of positive self-building or the symptom of exercise dependence, which could establish a vicious circle, especially in the population affected by eating disorders and BI disturbances.

Efeitos de uma sessão de exercícios físicos na imagem corporal

RESUMO: Em que pese o fato de que atletas e pessoas fisicamente ativas estarem geralmente mais satisfeitos com seu corpo que indivíduos sedentários, a atividade física parece ser responsável por influências tanto positivas quanto negativas em relação à imagem corporal. O objetivo deste estudo foi investigar o efeito de uma sessão de exercícios na modificação da imagem corporal. Especificamente, observamos se uma sessão de prática esportiva ou de atividade em academia poderia exercer influência positiva na imagem corporal, considerada como uma percepção episódica, avaliativa e afetiva a respeito da própria aparência. Os resultados mostram um incremento da autoimagem corporal (segundo a Escala de Estados de Imagem Corporal, BISS) depois de uma hora de atividade em academia ou prática esportiva em uma amostra composta por 295 sujeitos. Intensidade e divertimento associados às atividades foram, ao que parece, fatores-chave para a elevação de escores em relação à imagem corporal. Os resultados da pesquisa podem oferecer importantes implicações para o tratamento e prevenção de distúrbio de autoimagem.

PALAVRAS-CHAVE: Imagem corporal; diversão; intensidade; atividade física; esporte.

Efectos de una sección de ejercicios físicos en la imagen corporal

RESUMEN: Aunque atletas y personas físicamente activas estén generalmente más satisfechos con sus cuerpos, cuando comparados a individuos sedentarios, la actividad física parece ser responsable por influenciar de manera positiva así como negativa el imagen corporal. El objetivo del estudio fue investigar el efecto de una sección de ejercicios en la modificación de la imagen corporal. En específico, observamos si una sección de practica deportiva o de actividad en un gimnasio podría ejercer influencia positiva en la imagen corporal – vista como una percepción puntual, evaluadora y efectiva en respecto de la propia apariencia. Los resultados muestran un incremento de la auto-imagen corporal (según la Escala de Estados de la Imagen Corporal, BISS) después de una hora de actividad en un gimnasio o de practica deportiva en una amuestra compuesta por 295 sujetos. Intensidad y divertimento asociados a las actividades parecen haber sido factores claves para la elevación de los escores relacionados a la imagen corporal. Los resultados de la investigación pueden ofrecer importantes insumos para el tratamiento y prevención de los disturbios de la auto-imagen.

PALABRAS CLAVES: Imagen corporal; diversión; intensidad; actividad física; deporte.

REFERENCES

BENDIXEN, A.; SØRESEN, T.I.A.; HØRDER, K.; SVENDSEN, A.J.; LEBOEUF-YDE, C.; STEFFENSEN, I.A.; KYVIK, K.O. The importance of physical activity and body mass index for body satisfaction. *Ugeskr Laeger*, v. 169, p. 3966-3970, 2007.

CASH, T.F.; FLEMING, E.C.; ALINDOGAN, J.; STEADMAN, L.; WHITEHEAD, A. Beyond body image as trait: The development and validation of the Body Image States Scale. *Eating Disorders: The Journal of Treatment & Prevention*, v. 10, p. 103-113, 2002.

_____; PRUZINSKY, T. Future challenges for body image theory, research, and clinical practice. In: Cash T.F., & Pruzinsky T., (eds.) *Body image: A handbook of theory, research, and clinical practice*. New York, NY: Guilford Press, p. 509-516, 2002.

CRISSEY, S.R.; HONEA, J.C. The relationship between athletic participation and perceptions of body size and weight control in adolescent girls: The role of sport type. *Sociology of Sport Journal*, v. 23, p. 248-272, 2006.

DAVIS, C. Body image and athleticism. In: Cash T.F., & Pruzinsky T. (eds.). *Body image: A handbook of theory, research, and clinical practice*. New York, NY: Guilford Press, p. 219-225, 2002.

FISHER, S. The evolution of psychological concepts about the body. In: CASH T.F. & PRUZINSKY, T. (eds.). *Body images: development, deviance, and change*. New York: Guilford Press, p. 3-20, 1990.

FOCHT, B.C.; HAUSENBLAS, H.A. State anxiety responses to acute exercise in women with high social physique anxiety. *Exercise Psychology*, v. 25, p. 123-144, 2003.

HUANG, J.S.; NORMAN, G.J.; ZABINSKI, M.F.; CALFAS, K.; PATRICK, K. Body image and self-esteem among adolescents undergoing an intervention targeting dietary and physical activity behaviors. *Journal of Adolescent Health*, v. 40, p. 245-251, 2007.

JANKAUSKIENE, R.; KARDELIS, K.; PAJAUJIENE, S. Body weight satisfaction and weight loss attempts in fitness activity involved women. *Journal of Sport Medicine and Physical Fitness*, v. 45, p. 537-546, 2005.

MARTIN, K.A.; LICHTENBERGER, C.M. Fitness enhancement and changes in body image. In: CASH, T.F.; PRUZINSKY, T. (eds.). *Body image: A handbook of theory, research, and clinical practice*. New York, NY: Guilford Press, p. 414-421, 2002.

OLIVARDIA, R. Body image and muscularity. In: CASH, T.F.; PRUZINSKY, T. (eds.). *Body image: A handbook of theory, research, and clinical practice*. New York, NY: Guilford Press, p. 210-218, 2002.

_____. Mirror, mirror on the wall, who's the largest of them all?. *Harvard Review of Psychiatry*, v. 9, p. 254-259, 2001.

RAEDEKE, T.D.; FOCHT, B.C.; SCALES, D. Social environmental factors and psychological responses to acute exercise for socially physique anxious females. *Psychology of Sport and Exercise*, v. 8, p. 463-476, 2007.

RAVALDI, C.; VANNACCI, A.; ZUCCHI, T.; MANNUCCI, E.; CABRAS, P.L.; BOLDRINI, M.; MURCIANO, L.; ROTELLA, C.M.; RICCA, V. Eating disorders and body image disturbances among ballet dancers, gymnasium users and body builders. *Psychopathology*, v. 36, p. 247-254, 2003.

RUDIGER, J.A.; CASH, T.F.; ROEHRIG, M.; Thompson J.K. Day-to-day body-image states: Prospective predictors of intra-individual level and variability. *Body Image: An International Journal of Research*, v. 4, p. 1-9, 2007.

WILLIAMS, P.A.; CASH, T.F. The effects of a circuit weight training program on the body images of college students. *International Journal of Eating Disorders*, v. 30, p. 75-82, 2001.

ZABINSKI, M.F.; CALFAS, K.J.; GEHRMAN, C.A.; WILFLEY, D.E.; SALLIS, J.F. Effects of a physical activity intervention on body image in university seniors: Project GRAD. *Annals of Behavioral Medicine*, v. 23, p. 247-252, 2001.

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