

Factor structure, validity, and internal consistency of the Body Appreciation Scale for physically active Brazilian men with spinal cord injuries

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ABSTRACT

Objective: The aim of this study was to examine the Body Appreciation Scale and its psychometric properties: specifically, the validity of its construct and its internal consistency, for persons with spinal cord injuries in Brazil. **Method:** A non-probabilistic sample of 70 adult men between 18 and 59 years of age who participated in this study. Partial least squares with path modeling, average variance extracted, squared correlation of the factors, bivariate correlation, variance analysis, Cronbach's alpha test, and a Composite reliability test were conducted to evaluate factor structure, convergent, discriminant, concurrent, and divergent validity and internal consistency, respectively. **Results:** The confirmatory factor analysis confirmed the 2-factor solution model, predicted by theory. Convergent and discriminant evidence of validity was provided. Internal consistency values were satisfactory. Weak evidence of concurrent and divergent validity were generated. **Conclusion:** The Body Appreciation Scale appears to be a valid and reliable scale for researchers, especially in samples of physically active men with spinal cord injury. This new scale could be used to evaluate the impact of physical therapy on body image, as well the impact of sports practice. In this way, it could provide relevant information with which physicians, physical therapists, and physical educators can guide their interventions.

Keywords: Body Image, Spinal Cord Injuries, Psychometrics

RESUMO

Objetivo: Examinar as propriedades psicométricas, a saber, a validade de constructo e consistência interna, da Body Appreciation Scale para pessoas com lesões na medula espinhal no Brasil. **Método:** A amostra não-probabilística de 70 homens adultos entre 18 e 59 anos de idade participaram neste estudo. Mínimos quadrados parciais com modelagem de caminho, variância média extraída, quadrado da correlação dos fatores, correlação bivariada, análise de variância, teste alpha de Cronbach e teste de confiabilidade Composta foram conduzidos para avaliar estrutura fatorial, validade convergente, discriminante, concorrente, divergente e consistência interna, respectivamente. **Resultados:** A análise fatorial confirmatória confirmou o modelo de dois fatores, previsto pela teoria. Foram fornecidas fortes evidências de validade convergente e discriminante. Valores de consistência interna foram satisfatórios. Fraca evidência de validade concorrente e divergente foram geradas. **Conclusão:** A Body Appreciation Scale parece ser uma escala válida e confiável para os investigadores, especialmente em amostras de homens com lesão medular fisicamente ativos. Esta nova escala poderia ser utilizado para avaliar o impacto da terapia física na imagem corporal, bem como o impacto da prática de esportes. Desta forma, poderia fornecer informações relevantes com os quais médicos, fisioterapeutas e educadores físicos podem orientar as suas intervenções.

Palavras-chave: Imagem Corporal, Traumatismos da Medula Espinal, Psicometria

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INTRODUCTION

Spinal cord injury is widely recognized as one of the most devastating injuries that an individual can experience, particularly in face of the resulting changes in body function and appearance, which include health implications, persistent trauma, reclusion, and changes in social life.¹ Body function and appearance are aspects that deeply affect how others react to our body, how we interact with the social world, and how we perceive our own body.²

Body image can be defined as "the picture of our own body which we form in our own mind, that is to say the way the body appears to ourselves."³ It is not only a visual image, like a reflection in a mirror, but a mental representation of the body that encompasses self-perceptions and attitudes regarding one's bodily appearance and function.⁴ Social, physiological, and psychological variables are also integrated into the perception of the body as a whole.³ Many authors recognize two main dimensions of body image: the perceptual and the attitudinal. The former refers to how accurately an individual perceives his or her own body⁵ and the latter refers to beliefs and feelings regarding the body, behaviors, and body dissatisfaction.⁶

Body image can be considered a structure as well as process,⁷ since the mental representation of the body forms the foundation of a sense of self and it is continuously updated in accordance with the body experiences.^{3,7} Thus, body image is the dynamically and developmentally evolving mental representation of the body self.⁸ For persons with spinal cord injury, the reconfiguration of the concept of 'who I am,' which continues for many years after the injury, is an explicit example of the dynamism of the body image. The changes that occur to body image after a neurological injury are often due to the impairment itself, but they are also a result of new bodily experiences inherent in the new condition. These vary according to each person's personal story and the circumstances in which the trauma occurred. Considering these arguments, body image changes could thus be viewed as a central issue in the adjustment process faced by individuals with an acquired disability.⁹

Following a spinal cord injury, the patient must readapt all of his or her self-concepts and self-beliefs in order to be able to live with their remaining abilities and new limitations. In this way, during the rehabilitation process, health professionals are faced with a twofold

challenge: restoring the individual, to the greatest degree possible, to his or her previous level of functioning and helping them reconcile their previous self-representation with their altered bodily representation after the disability is acquired.⁹ Individuals with spinal cord injury, in turn, have their own twofold challenge: restoring bodily function and appearance, and accepting the unavoidable losses resulting from the injury.^{1,3}

It is important that health professionals, especially those working with body movements, such as physical therapists, occupational therapists, and physical educators, understand the impact of their interventions on their patients' body image. To obtain this information, they must have appropriate tools to collect information regarding how their interventions affect the patients' body image. To date, however, researchers have not used psychometrically evaluated scales to properly evaluate body image traits for persons with spinal cord injury.¹⁰ One of the most common body image scales used is the Adult Body Dissatisfaction Scale.^{11,12} However, the psychometric properties of this scale in persons with spinal cord injury have thus far not been verified. We should also be aware that the scale's psychometric findings for a specific population cannot be directly applied to a different sample.¹³ Therefore, a psychometric study of a body image scale for persons with spinal cord injuries is an important need in this area.

Aims of the study

The Body Appreciation Scale (BAS)¹⁴ appears particularly advantageous for the evaluation of body image in individuals with spinal cord injury. Its theoretical background relies on positive psychology, and its main focus is on the disclosure of body image traits related to positive body image; in this case, these are primarily linked to how the individual accepts and likes himself or herself, despite his or her flaws. Because its focus is not on pathologizing adjustments to body image, the BAS can be a useful tool in following the progress of the rehabilitation process in the body image of patients with spinal cord injuries.

In Brazil, the BAS has already been cross-culturally adapted and validated for young Brazilian adults of both sexes with no associated clinical conditions.¹⁵ The cross-cultural adaptation process in this study was rigorous and followed the five-step guideline for the cross-cultural adaptation of health-related measures supported by the American

Academy of Orthopedic Surgeons/Institute for Work and Health. The adaptation resulted in a semantically, idiomatically, culturally, and conceptually equivalent scale in Brazilian Portuguese.¹⁵

OBJECTIVE

The aim of this study was to examine the psychometric properties of the BAS - factor structure, construct, concurrent, and divergent validity as well as internal consistency - for physically active Brazilian men with spinal cord injuries, using the previously cross-culturally adapted Brazilian Portuguese version.

METHODS

We certify that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during the course of this research. Ethical approval was obtained from the ethics committee of the University of Campinas (protocol: 0421.0.146.000-0).

A non-random sample of 70 male participants was recruited at a sporting event (the 9th Brazilian Wheelchair Rugby Championship), including players-the majority of the participants, 92.8%-and the public. Of the total number of people invited, four declined to participate. It is worth mentioning that the sample size is sufficient to use the measurement models PLS-PM. Using recommended parameters, accepted for the type of technique (effect size = 0.15 and power = 0.80)¹⁶ for sample size calculation, a minimum of 55 participants would be sufficient to detect the desired effect in this technique.

All participants declared themselves as physically active (practicing physical activity at least 3 times per week, 30 minutes in duration, at a moderate intensity). The ages of the participants ranged from 18 to 59 years ($M = 33.25$; $SD = 9.07$). The mean time that the participants had lived with the spinal cord injury was 9.32 years ($SD = 7.63$), with 38.5% having had the injury between 1 and 5 years, 30% between 6 and 10 years, 15.7% between 11 and 15 years, 4.3% between 16 to 20 years, and 11.4% for more than 21 years. The majority of the participants, 65.5%, were in a romantic relationship - either married or dating someone - and reported feeling pain (51.1%). As for occupational status, 22.9% were employed, 22.9% were unemployed, and 52.9%

were retired. Most of the participants had an incomplete injury (65.7%), while 32.9% had a complete injury, and 1.4% declared the extent of their injury as unknown. Regarding the third item, for this research, a complete injury was considered as that in which neither afferent nor efferent impulses travel through the spinal cord, due to a complete section of the spinal cord.¹⁷

Two scales were used for data collection in this study:

Body Appreciation Scale (BAS):¹⁴ The BAS is a one-dimensional, 13-item measure of positive body image that covers four characteristics: (1) favorable opinion regarding one's own body; (2) body acceptance in spite of imperfections and body shape; (3) body respect, by tending to the body's needs and adopting healthy behaviors; and (4) protection against unrealistic body ideals portrayed in the media. Items are rated on a five-point scale (1 = Never, 5 = Always), and the BAS has a minimum score of 13 and a maximum score of 65. Higher scores indicate higher levels of body appreciation. The BAS has already been translated for use in Germany,¹⁸ Malaysia,¹⁹ and Brazil,¹⁵ and the factor structure of the BAS in these different cultural settings has shown certain variations. In the case of Germany and Brazil, a two-factor solution emerged, while the Malay and original versions of the BAS were unidimensional. Despite these differences, all versions have thus far demonstrated evidence of discriminant, construct, and incremental validities.

Demographics: Participants self-reported their demographic information, such as age, age when the spinal cord injury occurred, occupational and relationship status, and type and extension of the spinal cord injury. For physical activity habits, participants self-reported their physical activity practices in terms of frequency (4 = >6 times per week, 1 = < once a month), intensity (4 = High intensity activities, 1 = Light aerobic exercise) and duration (4 => 30 minutes per session, 1 =< 10 minutes per session). A direct question about dissatisfaction with appearance (*I do not feel good with my body appearance*) were included, in a scale from 1 (like myself a lot) to 4 (don't like myself at all).

Regarding the procedures, data were collected by one of the study's researchers during the 9th Brazilian Wheelchair Rugby Championship. The participants were verbally invited to participate in the study on a voluntary basis. After they had read and signed the consent form, each participant completed the anonymous, paper-and-pencil Portuguese

Brazilian version of the scale. Each participant took approximately 15 minutes to answer the BAS and the demographic questionnaire.

Descriptive statistics (means, standard deviation) were used to describe the items and factor scores. Confirmatory factor analysis was the multivariate statistical technique chosen for this study. The BAS factorial structure has already been explored in previous works and a theoretical background of positive body image in men also established,^{14,15,18-24} but not for men with spinal cord injuries. For these reasons, we chose an approach that could contribute towards prediction and theory development, the partial least square (PLS), with path modeling (PM) method. The adequacy of the measurement model was evaluated through the analysis of the following items: factorial loadings ($\lambda \geq 0.50$ - acceptable; $\lambda \geq 0.70$ - ideal),²⁵ average variance extracted (AVE ≥ 0.50),²⁵ Cronbach alpha test ($\alpha \geq 0.70$),²⁶ and Composite reliability (CR ≥ 0.70).²⁵ The adequacy of the structural model was evaluated by analyzing the Pearson determinant coefficient ($r^2 \geq 26\%$ indicates a substantial effect),¹⁶ the path coefficients (Γ ; $t \geq 1.96$),²⁵ and the Goodness of fit indicator (GoF > 0.36 is adequate), where the GoF is the geometric median of mean R^2 and mean AVE.²⁷

Finally, only for the chosen final model, we calculated the Cohen indicator and the Stone-Geisser indicator, which are closely related with model quality. The Cohen indicator (values of 0.02, 0.15, and 0.35 are considered small, medium, and large)¹⁶ is used to evaluate how each factor is "useful" for the adjustment of the model.²⁵ The Stone-Geisser indicator ($Q^2 > 0$ to indicate model accuracy) evaluates the accuracy of the adjusted model.²⁵

Additionally, correlation and variance analyses were conducted as additional tests in order to generate more information. SPSS 15 and Smart PLS 2.0 were used for statistical analysis and a confidence interval of 95% was adopted for all tests.

As we already pointed out, this study includes theoretic model testing. The BAS was created as an unifactorial measure of positive body image¹⁴ and this model was already tested and proved to be adequate with other samples and cultures.^{18,21} Based on these previous indications of the adequacy of the unidimensional factor structure, we tested the unidimensional model, called model 1, in this research.

On the other hand, some variations of the unidimensional factor structure were also verified in previous research^{15,19} indicating that is acceptable to consider that

the BAS can vary in different cultural settings. Theoretically, the positive body image has four common characteristics: (1) favorable opinion about the body; (2) body acceptance, despite the body weight and size; (3) Body respect, with regard to the body needs and the adoption of healthy behaviors; and (4) protection against media-borne messages/images of "perfect bodies."¹⁴ Adding these to the definition of positive body image,²⁷ the first two characteristics proposed by Avalos, Tytka, and Wood-Barcalow¹⁴ could be understood in a more simple way: as "self-body appreciation" - items 2, 3, 4, 5, 8, 10, and 13, which includes liking, accepting, and giving self-value as a person. The two latter characteristics could be operationalized in a factor called "body care" - items 1, 6, 7, 9, 11, and 12, which would include the adoption of health behavior and protective attitudes toward the body. This conceptual model, called model 2, was also tested in this research.

Additionally, as part of construct validation using a nomological network approach, it is hypothesized that:

1. The BAS will be positively correlated with variables related to physical exercise. This hypothesis is based on the assumption that physical exercise has an impact on the body image of persons with spinal cord injury,²⁸ although it is not clear how different levels of intensity, frequency, and length influence body image.²⁹
2. The BAS will differentiate groups according to marital status. A change in marital status is a factor that could impact well-being outcomes. For example, being or becoming married has been shown to be advantageous in terms of maintaining a positive attitude.^{30,31}
3. The BAS will differentiate groups according to the extent of the spinal cord injury. Incomplete injuries could produce less impairment and more body functions can be preserved, allowing the person with such a spinal cord injury more independence, which could impact body image.³²
4. The BAS will differentiate groups in accordance with the time of the injury. With time, most individuals develop roles and settings in which they are most comfortable with their new condition, including a better perception of their limitations and capabilities.²⁰

RESULTS

Statistical analyses started by adjusting the model. Prior to any analysis, items 9 and 12 had their scores reversed, in accordance with previous recommendations.¹⁵

Model 1 was run, finding the factor loading of items 9, 12, and 13 to be very low ($\lambda < 0.30$), hence, these items were eliminated. In a second run, all factor loadings were adequate ($\lambda > 0.50$), with only three items having factor loadings under 0.70: items 7, ($\lambda = 0.63$), 8 ($\lambda = 0.52$), and 11 ($\lambda = 0.55$). Since this first quality criterion of adjustment - item model adherence - was fulfilled, it was decided to stop adjusting the model, keeping as many items as possible, in order to assure the content validity as well.

Model 2 was run next, and once again, items 9 ($\lambda = 0.14$), 12 ($\lambda = 0.04$), and 13 ($\lambda = 0.13$) had low factor loadings, indicating low adherence to the model, hence, they were eliminated. In the second run, all factor loadings were high, with the lowest values being for items 8 ($\lambda = 0.55$) and 11 ($\lambda = 0.64$), indicating that all remaining items were adherent to the model. All factor loadings are reported in Table 1. After these initial adjustments, the AVE, composite reliability, R^2 , and Cronbach alpha of the models were evaluated (Table 1).

Satisfactory evidence of convergent (AVE > 0.50) and discriminant validity ($R^2 < \sqrt{AVE}$), along with internal consistency (α and CR > 0.70) were found for model 2. In the case of model 1, because of its low AVE value, the

evidence of convergent value generated with this data is weak. Also, no form of discriminant validity could be generated, since model 1, being unidimensional, was unable to meet the Fornell and Lacker criteria.

Regarding structural model, the R^2 was analyzed again, but this time the value itself was observed, since it is an indicator of the model adjustment. Once again, this information was only valid for model 2, and the value of the indicator ($R^2 = 0.40$) indicated a strong effect of the variance of endogenous variables explained by the structural model.³¹ Next, the path coefficients (Γ) were evaluated in order to assure that each correlation between the latent variable and the observed variable was significant and whether the relationship between the latent variables was also significant. We ran the bootstrapping module in PLS and the values are displayed in Table 2. In all cases, for both models, it was clear that all regression coefficients were significant.

The GoF of model 2 was evaluated - however, evaluating the indicator for model 1 was not possible, since the model is unidimensional. The value of GoF for model 2 was 0.48, indicating that the model achieved a satisfactory adjustment.

Given the facts that model 2 had stronger indications of discriminant and convergent validity than model 1, and that all the structural evidence supported model 2, we chose it as the best model for the data of this research. All the further analyses were made based solely on model 2 (Figure 1).

To make sure that model 2 was the better option, two more quality indicators were calculated for its structure: the Cohen indicator and that of Stone-Geisser. The Cohen indicator values were 0.36 and 0.41 for the Self Care and Self-appreciation factors, respectively. Therefore, it can be said that these two factors are of great importance for the model. The Stone Geisser indicator showed the following values for the Self Care and Self-appreciation factors: 0.222 and 0.414, respectively, indicating a level of theoretical accuracy for the model.

Secondly, we verified the correlation between the BAS factors and physical exercise characteristics. Negative associations were found between the body appearance dissatisfaction question and factors 1 ($r = -0.71$) and 2 ($r = -0.50$), $p < 0.001$. Also, significant and positive associations were found among factor 2 and length ($r = 0.33$) and frequency of exercise ($r = 0.34$) (Table 3).

Variations in the BAS scores regarding demographics and injury variables were analyzed next. Data were examined using the Kolmogorov-Smirnov test of normality to ensure that the variables' distributions were in accordance with the statistical assumptions of normality. No violations in the normal distribution were observed, and the data were therefore treated with parametric tests. Group differences regarding sex and physical activity habits were not investigated, since all participants were men and physically active. The scores for each factor for single/divorced/widower and romantically involved participants (those that are married or dating) were compared. The t -tests showed no significant differences in the participants' relationship status for Factor 1, $t(68) = 0.14$, $p = 0.89$, $d = 0.03$, and neither for Factor 2, $t(68) = -0.34$, $p = 0.73$, $d = 0.08$.

Regarding the extent of the spinal cord injury, no significant differences were found for Factor 1, $t(67) = -0.10$, $p = 0.91$, $d = 0.02$, nor for Factor 2, $t(67) = 1.87$, $p = 0.06$, $d = 0.48$.

Considering now the time that the participants had lived with their spinal cord injuries, we compared groups in a interval of 5 years of injury. The one-way ANOVA showed no effect of time of injury on body self-appreciation, $F(4, 65) = 0.52$, $p = 0.71$, $\omega^2 = 0.03$, nor for body self-care, $F(4, 65) = 0.59$, $p = 0.67$, $\omega^2 = 0.02$.

Table 1. Indicators of model measurement adjustment

Model	Factor	Items	Factor loadings	AVE (VAVE)	Composite Reliability	R^2	α					
1	-	1	0.74	0.48 (.6)	0.90	-	0.88					
		2	0.75									
		3	0.72									
		4	0.76									
		5	0.76									
		6	0.72									
		7	0.63									
		8	0.5									
		10	0.76									
		11	0.55									
		2	Self appreciation					2	.80	.58 (.76)	.89	.40
3	.80											
4	.81											
5	.78											
8	.55											
10	.80											
Self care	1			.88	.61 (.78)	.86		.78				

DISCUSSION

Faced with all the statistical results, it is clear that the theoretical factor structure proposed for this work, based on previous psychometric works and research about body appreciation in men, was the

Table 2. *t* – test values for model 1 and 2

Model	Factor	Items	<i>t</i> - test value
1	-	1	13.55
		2	14.04
		3	12.43
		4	11.04
		5	12.81
		6	13.20
		7	7.67
		8	7.05
		10	16.88
		11	5.15
		2	Self appreciation
3	16.44		
4	14.38		
5	14.69		
8	7.23		
10	20.15		
1	25.01		
6	16.82		
7	11.21		
11	6.34		
	Self care		

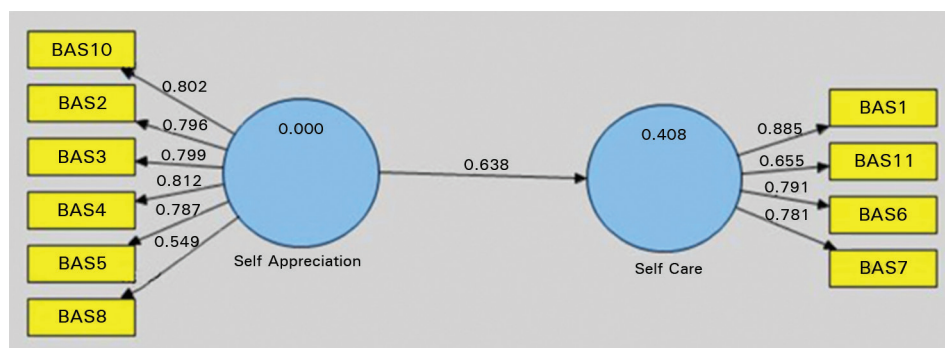


Figure 1. Analyses were made based solely on model 2

Table 3. Pearson correlations (*r*) for BAS factor and demographic continuous data

	1	2	3	4	5	6	7	8
(1) BAS Factor1	1							
(2) BAS Factor2	.61**	1						
(3) Years with SCI	.01	.02	1					
(4) Age when SCI occurred	.07	.11	-.34**	1				
(5) PE intensity	-.03	.03	-.25*	-.18	1			
(6) PE length	-.01	.34**	-.20	-.16	.43**	1		
(7) PE frequency	.03	.34**	-.19	-.19	.51**	.86**	1	
(8) Appearance dissatisfaction	-.71**	-.50**	.02	.06	-.01	-.15	-.19	1

M: mean; SD: standard deviation; BAS: Body Appreciation Scale; SCI: Spinal Cord Injury; PE: Physical Exercise. ** correlation significant at .01 level; * correlation significant at .05 level

best one for the present data. The two-factor model fulfilled the quality criteria for a confirmatory factor analysis, both in structural and measurement model parameters. Satisfactory proof of construct validity - convergent and discriminant - and evidence of internal consistency were generated for model 2. Moreover, regarding model adjustment, the theoretical model was confirmed by the observed data, which was assured by the adequacy of R^2 , Γ , and GoF. Hence, the two-factor solution for the BAS appears to be a valid and reliable scale for the investigation of positive body image in physically active Brazilian men with spinal cord injuries.

Regarding our first hypothesis for the nomological approach for this research, significant correlations with physical exercise variables were seen only regarding length and frequency of exercise for factor 2, body self-care. This result was probably influenced by the limited variation of exercise habits of our sample, since the vast majority of the participants were wheelchair rugby athletes - training with similar intensity, length, and frequency. In spite of this characteristic of the present sample, one must take into account that the absence of correlations of psychosocial variables with physical exercise data in this kind of sample is not unusual,^{11,12} and thus does not compromise the study. Moreover, it is unclear how the type, frequency, intensity, and length of physical exercise impact body image in non-clinical and clinical samples and so far research has produced divergent results.²⁹ Thus, the results found here could be interpreted as evidence of the complexity of the impact of physical activity on body image. One must consider that physical exercise could have an ambiguous role within the structure of the identity. It can be used as a source of body sensations and as a privileged moment for body perception, which could improve the knowledge of body limits and potentials.³³ On the other hand, repetitive and abusive physical exercise can be used as a defense against the anguish of all the changes that occur in the body after a spinal cord injury.³⁴

Concerning the second and third hypotheses, again, no significant differences were found in the groups regarding marital status and extent of injury. We were expecting differences between single people and those romantically involved because previous research has suggested that body image satisfaction is lower among single disabled persons than among disabled persons who are dating or in a relationship.²⁹ However, previous evidence showed that a change in marital status had an impact on well-being

outcomes,³⁰ and the question here was in regards to current marital status, not whether it had changed since the injury. One should also consider that this result appears to indicate that relationship status does not impact positive attitudes towards the body, perhaps because of the inherent importance of the body in the Brazilian context. This is a reality that crosses all kinds of relationships; and it is also true for single people.³⁵ Further research on this topic is necessary and should explore the quality and length of the relationship or sexual activity for a better understanding of the differences and similarities between single disabled men and those in relationships. In addition, future research should investigate the possibility that a change in marital status will impact body image, as mentioned before.

Regarding the lack of difference in body image between participants with complete injuries (where no nerve impulses travel through the spinal cord) and incomplete injuries, the present results go against previous evidence.³² A future analysis using cross-groups made by the combination of the extent and the level of the spinal injury could shed more light on this issue.

The fourth hypothesis was about body image differences as a function of time of injury. In fact, it is quite logical that a more structured identity could be achieved with time considering all the changes that occur with the spinal cord injury²⁰ and as for the present results, further exploration of this topic is recommended. A future study should address this issue with more refinement.

A number of further limitations in the present study should be noted. First, the sample consists solely of physically active men. Because of the characteristics of this sample, the BAS should preferably be used to assess positive body image in physically active male samples, which would mostly be found in physical rehabilitation programs. In the future, it would be interesting to obtain psychometric evidence for the BAS in a sedentary sample. The extent of the relationship and association between positive body image and other relevant body image traits, such as social physique anxiety, self-esteem, drive for muscularity, drive for thinness, media internalization, and physical attraction should be examined in future studies. Similarly, demographically untested variables such as socioeconomic status, sexual function, barriers for inclusion, and social reclusion should be investigated in the future because the relevance of these factors to body image has already been indicated in

qualitative studies.^{31,32,36} Finally, because of the specificities of body image adjustments following a spinal cord injury,³² researchers should consider developing a specific positive body image scale for persons with spinal cord injuries in order to develop a more theoretically sensitive scale.

CONCLUSION

In conclusion, the present study provides evidence for the psychometric properties of the Brazilian Portuguese version of the BAS for physically active men with spinal cord injuries. Considering the lack of research on body image traits in persons with spinal cord injuries in Brazil and the relatively poor state of quantitative research on the body image of persons with spinal cord injuries with specific body image instruments, one would hope that the availability of the BAS will allow for more systematic investigations of body image in this population in Brazil, thus providing an opportunity to conduct systematic cross-cultural research in the near future.

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REFERENCES

1. Trieschmann R. Spinal cord injury: psychological, social, and vocational rehabilitation. New York: Demos; 1988.
2. Cash TF. The Body Image workbook: an 8-step program for learning to like your looks. New York: Guilford; 2000.
3. Schilder P. The image and appearance of the human body. New York: International; 1978.
4. Cash T. Cognitive – behavioral perspectives on body image. In: Cash T, Smolak L. Body image: a handbook of science, practice and prevention. New York: Guilford; 2011. p. 39-47.
5. Gardner RM, Boice R. A computer program for measuring body size distortion and body dissatisfaction. Behav Res Methods Instrum Comput. 2004;36(1):89-95. DOI: <http://dx.doi.org/10.3758/BF03195553>
6. Pruzinsky T, Cash T. Understanding body images: historical and contemporary perspectives. In: Cash T, Pruzinsky T. Body image: a handbook of theory, research and clinical practice. New York: Guilford; 2004. p. 03-12. DOI: [http://dx.doi.org/10.1016/S1740-1445\(03\)00010-X](http://dx.doi.org/10.1016/S1740-1445(03)00010-X)
7. Shontz FC. Perceptual and cognitive aspects of body experience. New York: Academic; 1969.
8. Krueger DW. Psychodynamic perspectives on body image. In: Cash T, Pruzinsky T. Body image: a handbook of theory, research and clinical practice. New York: Guilford; 2004. p. 30-7.

9. Harcourt D, Rumsey N. Body image and biomedical interventions for disfiguring conditions. In: Cash T, Smolak L. Body Image: a handbook of science, practice and prevention. New York: Guilford; 2011. p. 404-14.
10. Campana ANNB, Tavares MCGCF. Avaliação da imagem corporal: instrumentos e diretrizes para pesquisa. São Paulo: Phorte; 2009.
11. Bassett RL, Martin Ginis KA. More than looking good: impact on quality of life moderates the relationship between functional body image and physical activity in men with SCI. Spinal Cord. 2009;47(3):252-6. DOI: <http://dx.doi.org/10.1038/sc.2008.114>
12. Bassett RL, Martin Ginis KA, Buchholz AC, SHAPE SCI Research Group. A pilot study examining correlates of body image among women living with SCI. Spinal Cord. 2009;47(6):496-8. DOI: <http://dx.doi.org/10.1038/sc.2008.174>
13. Menzel JE, Krawczyk R, Thompson J. Menzel, JE, Krawczyk R, Thompson J. Attitudinal assessment of body image for adolescents and adults. In: Cash T, Smolak L. Body Image: a handbook of science, practice and prevention. New York: Guilford; 2011. p. 154-72.
14. Avalos L, Tylka TL, Wood-Barcalow N. The Body Appreciation Scale: development and psychometric evaluation. Body Image. 2005;2(3):285-97. DOI: <http://dx.doi.org/10.1016/j.bodyim.2005.06.002>
15. Swami V, Campana AN, Ferreira L, Barrett S, Harris AS, Tavares MC. The Acceptance of Cosmetic Surgery Scale: initial examination of its factor structure and correlates among Brazilian adults. Body Image. 2011;8(2):179-85. DOI: <http://dx.doi.org/10.1016/j.bodyim.2011.01.001>
16. Cohen J. Statistical power analysis for the behavioral sciences. New York: Psychology Press; 1988.
17. Guttmann L. Spinal cord injuries: comprehensive management and research. Melbourne: Blackwell; 1973.
18. Swami V, Stieger S, Haubner T, Voracek M. German translation and psychometric evaluation of the Body Appreciation Scale. Body Image. 2008;5(1):122-7. DOI: <http://dx.doi.org/10.1016/j.bodyim.2007.10.002>
19. Swami V, Chamorro-Premuzic T. Factor structure of the Body Appreciation Scale among Malaysian women. Body Image. 2008;5(4):409-13. DOI: <http://dx.doi.org/10.1016/j.bodyim.2008.04.005>
20. Behel JM, Rybarczyk RB. Physical disability and body image in adults. In: Cash T. Encyclopedia of body image. London: Elsevier; 2012. p. 644-9.
21. Swami V, Hadji-Michael M, Furnham A. Personality and individual difference correlates of positive body image. Body Image. 2008;5(3):322-5. DOI: <http://dx.doi.org/10.1016/j.bodyim.2008.03.007>
22. Moe B. Understanding the causes of negative body image. New York: Rosen; 1999.
23. Hausenblas HA, Downs DS. Comparison of body image between athletes and nonathletes: a meta-analytic review. J Appl Sport Psychol. 2008;5(3):322-5.
24. MacKinnon DP, Goldberg L, Cheong JW, Eliot D, Clarke G, Moe E. Male body esteem, and physical measurements: do leaner, or stronger, high school football players have a more positive body image? J Sport Exercise Psy. 2003; 25 (3):307-22.
25. Hair J, Hult GTM, Ringle C, Sarstedt MA. Primer on partial least squares structural equation modeling (PLS-SEM). Los Angeles: SAGE; 2014. DOI: <http://dx.doi.org/10.1016/j.jfbs.2014.01.002>
26. Nunnally JC. Psychometric theory. New York: McGraw Hill; 1967.

27. Campana ANNB. Relações entre as dimensões da imagem corporal: um estudo em homens brasileiros [tese]. Campinas: Universidade Estadual de Campinas; 2011.
28. Semerjian T, Montague S, Dominguez J, Davidian A, Leon R. Enhancement of quality of life and body satisfaction through the use of adapted exercise devices for individuals with spinal cord injuries. *Top Spinal Cord Inj Rehabil.* 2005;11(2):95-108. DOI: <http://dx.doi.org/10.1310/BXE2-MTKU-YL15-429A>
29. Campbell A, Hausenblas HA. Effects of exercise interventions on body image: a meta-analysis. *J Health Psychol.* 2009;14(6):780-93. DOI: <http://dx.doi.org/10.1177/1359105309338977>
30. Kalpakjian CZ, Houlihan B, Meade MA, Karana-Zebari D, Heinemann AW, Dijkers MP, et al. Marital status, marital transitions, well-being, and spinal cord injury: an examination of the effects of sex and time. *Arch Phys Med Rehabil.* 2011;92(3):433-40. DOI: <http://dx.doi.org/10.1016/j.apmr.2010.07.239>
31. Taleporos G, McCabe MP. Body image and physical disability - personal perspectives. *Soc Sci Med.* 2002;54(6):971-80. DOI: [http://dx.doi.org/10.1016/S0277-9536\(01\)00069-7](http://dx.doi.org/10.1016/S0277-9536(01)00069-7)
32. Sheldon AP, Renwick R, Yoshida KK. Exploring body image and self-concept of men with acquired spinal cord injuries. *Am J Mens Health.* 2011;5(4):306-17. DOI: <http://dx.doi.org/10.1177/1557988310375714>
33. Tavares MCGCF. Imagem corporal: conceito e desenvolvimento. Barueri: Manole; 2003.
34. Gonçalves CO, Campana ANNB, Tavares MCGCF. A influencia da atividade física na imagem corporal: uma revisão bibliográfica. *Motricidade.* 2012;8(2):70-82.
35. Goldenberg M, Ramos MS. Nu & vestido: dez antropólogos revelam a cultura do corpo carioca. Rio de Janeiro: Record; 2007.
36. Nazli A. "I'm healthy": construction of health in disability. *Disabil Health J.* 2012;5(4):233-40. DOI: <http://dx.doi.org/10.1016/j.dhjo.2012.06.001>