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Validity and reliability of a physical activity social support assessment scale

ABSTRACT

OBJECTIVE: To assess the validity and reliability of the Brazilian version of the physical activity social support scale for adults.

METHODS: The scale was applied in conjunction with a face-to-face multi-dimensional questionnaire in 1,461 individuals aged between 18 and 79 years, living in Curitiba, Southeastern Brazil, between April and July 2009. The questionnaire was submitted to validity (factorial and construct) and reliability testing (internal consistency and reproducibility). Reliability was observed with the use of internal consistency, Cronbach's alpha, test-retest procedure with a one-week interval (n = 74) and intraclass correlation coefficient.

RESULTS: Factorial analysis resulted in four factors with eigenvalues between 4.29 and 1.39, which explained 82.8% of the total variance. Factors 1 and 2 included questions about social support from friends for moderate to vigorous physical activities and walking, respectively. Factors 3 and 4 were comprised of groups of social support from the family for moderate to vigorous physical activities and walking, respectively. Reproducibility showed an intraclass correlation coefficient between 0.63 and 0.80 and alpha internal consistency between 0.87 and 0.91. Construct validity was observed from the significant association (p < 0.005) between scores of social support for walking and moderate to vigorous physical activities.

CONCLUSIONS: The instrument tested showed psychometric characteristics that were adequate for use in adult Brazilians.

DESCRIPTORS: Motor Activity. Social Support. Evaluation. Validity of Tests. Reproducibility of Results.

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INTRODUCTION

Social support has been the object of study of researchers from different fields, because it represents an important factor of influence in several health aspects.[24] Social support can be defined as the "help or care received in personal relations and interpersonal exchanges".[10] Its use in studies of the area of physical activity includes different types: emotional (expression of empathy, love, trust and generosity); instrumental (tangible help and services); informative (advice, information and suggestions) and evaluative (useful information for self-assessment);[10] and sources of support (family and friends).[5]

Despite the positive effects of regular physical activity practice for health,[26,a] the prevalence of insufficient levels of this practice is still high in the Brazilian

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[a] Physical activity guidelines advisory committee. Report 2008. Washington, DC:US department of health and human services; 2008.

population[b] and there is evidence that it will continue to be high.[13] Interventions that use social support as one of their aspects are effective to promote physical activity in different groups, which justifies understanding the types and sources of social support.[16]

Although the association between social support and engagement in physical activities is well established in the literature,[5] the evidences originate from populations of other countries, especially the United States.[3,6] In the Brazilian population, a study conducted with 884 adults living in the city of Pelotas, Southern Brazil, revealed a strong association between social support and leisure-time physical activities.[2] A recent study with elderly individuals living in São Paulo, Southeastern Brazil, showed that men who were invited by friends to practice leisure-time physical activities were four times more likely to be active in this domain.[21] The apparent lack of studies on this theme with the Brazilian population can be associated with insufficient instruments, especially for adults. Reis & Sallis[19] analyzed the validity and reliability of the translated and adapted version of the social support scale for physical activity among adolescents, which was used in other investigations with Brazilian adolescents.[18] However, until this moment, there are no studies, available in the literature, showing an instrument to assess physical activity social support in Brazilian adults. The availability of an instrument with this goal enables the relationship between social support and physical activity practice in the Brazilian population to be further clarified, which can help to design interventions and thus promote a physically active lifestyle.

The scale used to assess social support is frequently used in studies with adults of English-speaking countries,[20] because it is easily understood and applied. It includes questions about social support from family and friends to perform physical activities. The results of the psychometric evaluation show that the scale has adequate validity and reliability to assess physical activity social support.[20] This instrument, however, was developed and is applied without considering the types and intensities of physical activities, which are associated with different sources of social support.[5] For example, someone who receives support to walk may not receive the same encouragement for higher intensity or complexity activities. Thus, the present study aimed to assess the validity and reliability of the Brazilian version of the Escala de Apoio Social para a prática de Atividades Físicas (EASAF – Physical Activity Social Support Scale) in adults.

METHODS

The present study was based on secondary data from the project entitled "Nível de Atividade Física em Adultos: Associações com Ambiente Percebido e Suporte Social" (Physical Activity Level in Adults: Associations with the Perceived Environment and Social Support). This project was designed to assess health aspects, lifestyle and leisure habits of individuals living around parks and squares of the city of Curitiba, Southern Brazil, between April and July 2009. Parks and squares were selected according to socioeconomic conditions and environmental quality for physical activity practice of the districts in which they were situated. Individuals aged between 18 and 65 years, living around parks and squares, and who had been in the same homes for at least one year on the date of collection were considered eligible. Individuals aged less than 18 years, who did not live in the household selected (housemaid and visitors at the time of interview, for example), those with a certain severe physical limitation to physical activity, or those with a certain cognitive limitation to understand the questionnaire were not included.

All 1,899 street segments in a 500 m radius of squares and parks selected were visited. The total number of households in each segment was identified by counting and identifying the types of homes to establish sample representativeness of residents. Segments were considered eligible for research when they had at least one home (n=1,538). Maps counting and identifying homes in each segment and sequence of random numbers generated by the EpiInfo software were used to randomly select one household of each segment. Eligible residents were organized per age in a decreasing order and selected according to the number of eligible residents, following a table with random numbers.[12]

A theoretical/practical training course of 30 hours was held to inform about questionnaire application, completion and codification. A total of 25 women, aged between 18 and 60 years and with a complete secondary education level, participated. Interviews were conducted in 95% (n = 1,461) of eligible segments for research (n = 1,538). Refusal rate was 7.9% (n = 121). Quality control was performed by field supervisors, who repeated the interviews in 12.5% of the sample (n = 74).

Reliability was tested through new interviews in a systematic random sample among participants of the first collection stage. To achieve this, one person in every five initial interviews was invited to participate in the second stage until at least 80 individuals were contacted. This number was established according to

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similar studies[22] and the refusal rate observed in the survey. In the end, of all 80 individuals recruited, 74 accepted to participate. The second interview occurred in an interval between seven and ten days and supervisors conducted it by telephone.

A total of two professionals experienced in typing were hired to perform double data entry. To achieve this, the Epidata software was used, enabling control and correction of typing errors with the "validate duplicated files" function. The divergences found were checked and corrected.

Physical activity was assessed with the leisure section of the long version of the International Physical Activity Questionnaire – IPAQ.[14] Questions were about the duration and weekly frequency with which an individual performed at least ten minutes of walking and moderate to vigorous physical activities (MVPA) in their leisure time. For the purpose of analysis, MVPA were analyzed separately from walking during leisure time. Participants were categorized into active (> 150 min/week) or not (< 150 min/week) when performing walks or MVPA during leisure time, according to the most recent recommendations.[a]

EASAF was administered with three to 13 items of the original scale[20] that showed greater clarity of content, according to the pilot study on the understanding and context of social support for physical activities performed by adults. Items that showed little relevance for adults walking or performing MVPA (for example, someone pays for you to perform physical activities) were disregarded. Items were translated to Portuguese in a preliminary study,[19] following procedures recommended in the literature[25] and consisting in two sets of questions about social support from family and friends to perform physical activities, totaling six questions. Finally, six questions were duplicated so that they formed two blocks with six questions each, the first being associated with walking, while the second was associated with MVPA during leisure time. In each block, respondents reported the frequency with which family and friends "performed together", "invited" or "encouraged" walks and MVPA in the previous three months. For better understanding, family was defined as the "people who sleep and have meals in the same home" and friends as "anyone who does not live in one's home, even if they are one's relative". The response scale has three response options: (0) never, (1) sometimes and (2) always. Social support scores are determined by the sum of responses of each block, which varies from 0 to 6 points for higher or lower support for walking or MVPA. Adaptations were made, aiming to obtain a short scale that could be used in population surveys or large-scale studies, enabling

the assessment of different forms of social support and physical activities (Attachment).

Sex, age, socioeconomic level and perception of health were variables also included in the questionnaire. Socioeconomic level was estimated and classified according to the Brazilian economic classification criteria[c] and classes were grouped as follows: A (A1+A2), B (B1+B2), C (C1+C2) and D/E (D+E). Perception of health was assessed with the question, "How do you rate your health?", and the response options were a scale with four points (poor, fair, good, very good). Positive perception of health included "good" and "very good" as responses.[b]

The structure of the scale was evaluated with exploratory factorial analysis and Varimax rotation was applied. KMO (Kaiser-Meyer-Olkin) statistics was used to estimate the adequacy of the sample to the procedure. Eigenvalues above 1.0 were accepted and items with a load higher than 0.4 were considered to determine the resulting factors.[17]

Internal consistency and temporal stability were used to assess reliability. Internal consistency of the scales was analyzed with Cronbach's alpha and alpha values ≥ 0.70 were considered adequate. Temporal stability or reproducibility was analyzed according to the intraclass correlation coefficient (ICC) between scores of scales obtained from both applications. Reproducibility was considered adequate when ICC ≥ 0.70.[15]

As evidence of construct, the scores obtained from the sum of values extracted from the factorial analysis were compared with minutes of walking and MVPA performed per week. To achieve this, Spearman's rank correlation coefficient was used. Greater social support values are associated with longer physical activity time per week and this relationship is specific for each type of activity (such as support for walks *versus* minutes of walking). A level of significance of 5% was adopted and the SPSS software for Windows, version 11.0., was used.

This study was approved the Research Ethics Committee of the Escola Superior de Educação Física da Universidade Federal de Pelotas on December 17th, 2008 (process 005/2008). Research procedures were duly informed and individuals accepted to participate in a voluntary way.

RESULTS

A total of 1,461 individuals aged between 18 and 79 years participated in this study. The majority of participants had an average socioeconomic level and positive perception of health. No individuals were classified in class D. Approximately one in every five interviewees

[c] Associação brasileira de estudos populacionais. Dados com base no levantamento sócio econômico 2006 e 2007 - IBOPE: Associação brasileira de empresas de pesquisa; 2009.

met the recommendations for physical activities, considering walks or MVPA (Table 1).

Factorial analysis (Table 2) resulted in four factors with eigenvalues > 1.3, corresponding to 82.8% of total variance. Factors 1 and 2 gathered the questions about social support from friends for the practice of MVPA

Table 1.Characteristics of study participants. Curitiba, Southern Brazil, 2009.

Variable	Factorial analysis and validity (%) (n=1,461)	Analysis of reliability (%) (n=74)
Men	36.3	29.7
Age (in years)		
18 a 39	41.5	42.9
40 a 59	45.8	51.4
≥ 60	12.7	5.6
Socioeconomic level[a]		
A	12.6	14.9
B	49.4	51.4
C	38.0	33.6
Positive perception of health[b]	71.0	63.5
Walking (≥ 150 min/week)	18.6	14.9
MVPA (≥ 150 min/week)	18.5	17.6

[a] No participants were classified in socioeconomic class D.
[b] Positive perception of health included the sum of "good" and "very good" responses.
MVPA: moderate to vigorous physical activities

(factor 1) and walking (factor 2). Social support from the family for MVPA and walking were grouped in factors 3 and 4, respectively. Item 6 of the scale (a friend walked with you) showed the lowest contribution load (0.84), a value which was higher than that adopted as the minimum one. The results of the KMO test (0.74; p < 0.001) showed that the sample size was adequate for the factorial analysis to be made.

Cronbach's alpha values varied between 0.87 and 0.91, which confirmed the adequate consistency in all factors obtained from the factorial analysis, i.e., the four sub-scales can be used separately (Table 2). Reproducibility scores varied from ICC = 0.63 to ICC = 0.80. One factor showed a value lower than what was considered adequate.

Social support sub-scale scores for walking and MVPA showed a positive and significant association (Table 3) with the respective activities. No correlations were found among social support scores for walking with minutes of MVPA or among MVPA scores with minutes of walking per week.

DISCUSSION

Questions were grouped in the factorial analysis according to social support sources (factors 1 and 2: friends; factors 3 and 4: family) and to intensity of physical activities (factors 1 and 3: MVPA; factors 2 and 4: walking). Eigenvalues varied between 4.29 and 1.39, explaining 82.8% of total variance. Temporal

Table 2. Exploratory factorial analysis and coefficient of reproducibility of the physical activity social support scale. Curitiba, Southern Brazil, 2009.

Items of the physical activity social support scale	Factor load			
	Factor 1	Factor 2	Factor 3	Factor 4
1 Invited to perform moderate to vigorous physical activities (friend)	**0.94**	0.16	0.09	0.05
2 Encouraged to perform moderate to vigorous physical activity (friend)	**0.92**	0.18	0.12	0.06
3 Performed moderate to vigorous physical activities with you (friend)	**0.87**	0.09	0.09	0.00
4 Invited you to walk (friend)	0.12	**0.92**	0.05	0.09
5 Encouraged you to walk (friend)	0.15	**0.90**	0.06	0.10
6 Walked with you (friend)	0.14	**0.84**	0.06	0.11
7 Invited to perform moderate to vigorous physical activities (family)	0.10	0.08	**0.91**	0.19
8 Encouraged to perform moderate to vigorous physical activity (family)	0.16	0.08	**0.87**	0.22
9 Performed moderate to vigorous physical activities with you (family)	0.06	0.02	**0.87**	0.13
10 Invited you to walk (family)	0.05	0.07	0.17	**0.91**
11 Encouraged you to walk (family)	0.04	0.15	0.19	**0.86**
12 Walked with you (family)	0.01	0.09	0.15	**0.85**
Eigenvalue	4,29	2.43	1.86	1.34
% Variance	35,80	20.26	15.49	11.20
Cronbach's Alpha	0,91	0.89	0.89	0.87
Intraclass Correlation Coefficient* (n = 74)	0,80	0.80	0.63	0.80

* p < 0.001.

Table 3. Spearman's rank correlation coefficient values among the physical activity social support scale, time of walk (min/week) and time of moderate to vigorous physical activities (n = 1,461). Curitiba, Southern Brazil, 2009.

Activity	Domain	Walking	AFMV(min/sem)
Social support for walking	Friends	0.20*	0.07
	Family	0.23*	0.12
Social support for MVPA	Friends	0.05	0.30*
	Family	0.05	0.28*

MVPA: moderate to vigorous physical activities
*p < 0.005.

stability showed an ICC between 0.63 and 0.80 and internal consistency showed an alpha value between 0.87 and 0.91. The significant association (p < 0.005) between social support scores for walking and MVPA revealed construct validity.

There are no reliable instruments with this purpose for the Brazilian population. The literature review conducted in the present study showed that the items included in the version applied in this study are those most frequently reported in the adult population. Although originally developed in a foreign population, the results confirmed the validity and reliability of the scale to be used in Brazilian adults. Data from the present study can promote investigations on the sources and types of social support that influence this population. In addition, the availability and dissemination of this information help the development and effectiveness of interventions that promote physical activity.

The majority of individuals interviewed were women and those aged between 40 and 59 years. In the present study, the proportion of individuals who meet the recommendations for walking and MVPA during leisure time was small (18%) and similar to the results shown by the Vigitel study for the population of the city of Curitiba (16.1%).[b] A total of two studies were conducted in Brazil, aiming to observe the practice of physical activities during leisure time and using the same instrument of the present study, one with 1,318 adults of the city of São Paulo, SP,[9] and another with 972 adults of the city of Pelotas, RS.[2] In these studies, higher proportions of individuals meeting the current recommendations were found: 22.5% and 30.2%, respectively.

Factorial analysis shows that the gathering of questions occurred according to source of social support (friends/family) and type of activity (MVPA/walking). The intensity of physical activities and sources of social support are different constructs and these results confirm literature data. Social support from family and friends has been consistently associated with physical activity in adults.[7,23] According to the study conducted with Portuguese and Belgian adults, higher levels of walking during leisure time are associated with greater social support from the family. On the other hand,

higher levels of physical activity are associated with greater social support from friends.[5] Treiber et al[23] also found differences between the source of social support and different types of physical activities. Walking and MVPA show different patterns between sexes. Several studies suggest that men are involved with more intense physical activities than women.[1,4]

The statistical procedure used to verify internal consistency was Cronbach's alpha. The results show that the factors are higher than the adopted criterion[8] and similar to those observed in other studies. In the study conducted by Reis & Sallis,[19] alpha values varied between 0.78 and 0.81. According to Sallis et al,[20] alpha values remained between 0.61 and 0.91. In addition, these results point out that the four sub-scales can be employed separately, thus enabling their use in studies on specific types and intensities of physical activity. According to the literature, ICC coefficients below 0.7 are not sufficient.[15] In the present study, coefficients are acceptable (R = 0.80) for factors 1, 2 and 4. Factor 3 was the only one with an insufficient result (R = 0.63). However, the results of reproducibility of the original instrument (R = 0.55 – 0.86) and that of the Brazilian version for adolescents (R = 0.61 – 0.78) were below those observed in the EASAF.

Social support for walking during leisure time and social support for physical activities were associated with MVPA during leisure time, which validates the instrument construct. There were no correlations among scores of support for walks with minutes of MVPA and among MVPA scores with minutes of walking per week.

Even if the procedures used are known to be adequate for testing the psychometric quality of instruments, the extrapolation of results of the present study is subject to certain limitations. This study did not have a representative design of the population in terms of sex. For this reason, it is possible that a response bias occurred, because a higher response rate is frequently found among women, when compared to men, in population surveys. This characteristic was found in other studies on physical activity in adults living in the city of Curitiba.[11] No interviewees were classified as socioeconomic level "D". Curitiba stands out in the

country because of its high quality of life and socioeconomic level. More than half of the population belongs to socioeconomic classes A and B;[d] in the present study, these classes corresponded to 62% of the sample.

Conclusions about construct validity could be strengthened with the use of direct methods to measure physical activity. Investigations on the psychometric characteristics of the EASAF should be performed in other regions of Brazil to observe the generalization of this instrument to a broader population.

The results of the present study show that the EASAF has a strong psychometric performance. It is an instrument that can be easily employed in large-scale studies, because it shows few easily understandable items. Moreover, the EASAF has a unique characteristic, once it enables the investigation of different sources of social support (friends and family) and physical activity (walking and MVPA).

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ATTACHMENT

Escala de apoio social para atividades físicas (EASAF)

Nos últimos três meses com que freqüência alguém **que mora com você...** (que dorme e faz refeições na mesma casa)

Fez caminhada com você?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **convidou** para caminhar?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **incentivou** a caminhar?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Nos últimos três meses com que freqüência algum **AMIGO...** (qualquer pessoa que **não** more na casa, mesmo que seja parente)

Fez caminhada com você?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **convidou** para caminhar?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **incentivou** a caminhar?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Nos últimos três meses com que freqüência alguém **que mora com você...** (que dorme e faz refeições na mesma casa)

Fez exercícios de intensidade **média** ou **forte** com você?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **convidou** a fazer exercícios de intensidade **média** ou **forte**?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **incentivou** a fazer exercícios de intensidade **média** ou **forte**?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Nos últimos três meses com que freqüência algum **amigo...** (qualquer pessoa que **não** more na casa, mesmo que seja parente)

Fez exercícios de intensidade **média** ou **forte** com você?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **convidou** a fazer exercícios de intensidade **média** ou **forte**?

0[ ] nunca   1[ ] às vezes   2[ ] sempre

Te **incentivou** a fazer exercícios de intensidade **média** ou **forte**?

0[ ] nunca   1[ ] às vezes   2[ ] sempre