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Validation of the Lubben-6 Scale to measure social support networks among older adults in Chile

Validación de la Escala Lubben-6 para medir la red de apoyo social en adultos mayores en Chile

Validação da Escala Lubben-6 para medir a rede de apoio social em idosos no Chile

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ABSTRACT

Introduction. Assessing social support networks requires reliable and valid instruments, which are apparently nonexistent for older adults in Chile. The objective here is to adapt and further validate the Argentine version of the Lubben-6 Social Support Network Scale for Chile, an instrument of Anglo-American origin, with Spanish versions in Argentina and Puerto Rico. **Methodology.** Psychometric study, with a sample of 346 older adults (76.8% women) from four cities in northern, central, and southern Chile, selected based on availability and convenience, who answered a survey (November 2023 to March 2024) including sociodemographic items, the Lubben-6, plus a happiness scale, a self-assessment health scale, and items to measure social connection and disengagement, and satisfaction in different areas. **Results.** The Lubben-6 obtained adequate Cronbach's alpha reliability of 0.766, with 0.71 for the family dimension and 0.76 for the friends dimension. Confirmatory factor analysis reproduced its original two-dimensional structure ($\chi^2 = 46.23$, $df = 8$, $p < 0.001$), with adequate fit values, reaffirming its construct validity. Supporting criterion validity were significant positive correlations with happiness (0.214**) and its subdimensions, and significant negative correlations with items of social disengagement, as

Autor Contributions

EMD. *Conceptualization: formulation and design of the study and contribution to obtain funding. Methodology: development of the research protocol and methodological design. Formal analysis: data analysis and synthesis. Investigation: guidance on sample selection procedures and data collection. Writing: drafting of original, final, and revised manuscript. Supervision: project leadership. Funding acquisition: obtaining financial resources.* ***MEJC, CMOM,*** *and* ***CEG.*** *Investigation: sample selection and survey administration. Revision of manuscript drafts. Resources: data collection and submission from each city.*

well as partial invariance between sexes. **Discussion.** The psychometric properties of the scale are adequate and consistent with those reported internationally. **Conclusions.** The current version of the Lubben-6 can be used reliably and validly in the elderly population in Chile.

Keywords:
Social Networking; Aged; Social Support; Psychometrics; Sex; Family; Friends; Chile.

RESUMEN

Introducción. Evaluar redes de apoyo social requiere instrumentos confiables y válidos, aparentemente inexistentes para adultos mayores en Chile. El objetivo aquí es adaptar y avanzar en la validación de la versión argentina de la Escala de Red de Apoyo Social Lubben-6 para Chile, instrumento de origen angloamericano, cons versiones castellanas argentina y portorriqueña. **Metodología.** Estudio psicométrico, con muestra de 346 adultos mayores (76.8% mujeres), de cuatro ciudades del norte, centro y sur de Chile, seleccionada por disponibilidad y conveniencia, quienes respondieron una encuesta (11/2023 a 03/2024) incluyendo ítems sociodemográficos, la Lubben-6, más una escala de felicidad, otra de autoevaluación de salud, e ítems para medir vinculación y desvinculación social, y satisfacción en diferentes ámbitos. **Resultados.** La Lubben-6 obtuvo una Confiablidad Alfa de Cronbach adecuada, de 0.766, con 0.71 para la dimensión familia y 0.76 para la dimensión amigos. El análisis factorial confirmatorio reproduce su estructura original bidimensional ($\chi2 = 46.23$, df = 8, $p<0.001$), con valores de ajuste adecuados, reafirmando su validez de construcción. Apoyando la validez de criterio se encontró correlaciones positivas significativas con felicidad (0.214**), y sus subdimensiones, y correlaciones negativas significativas con ítems de desvinculación social, y prueba de invarianza parcial entre sexos. **Discusión.** Las propiedades psicométricas de la escala son adecuadas y consistentes con las reportadas internacionalmente. **Conclusiones.** La presente versión de la Lubben-6 puede ser usada confiable y válidamente en población de personas mayores en Chile.

Palabras clave:
Red social; Anciano; Apoyo Social; Psicometría; Sexo; Familia; Amigos; Chile.

RESUMO

Introdução. A avaliação das redes de apoio social requer instrumentos confiáveis e válidos, aparentemente inexistentes para idosos no Chile. O objetivo aqui é adaptar e avançar na validação da versão argentina da Escala de Rede de Apoio Social Lubben-6 para o Chile, instrumento de origem anglo-americana, com versões em espanhol argentino e porto-riquenho. **Metodologia.** Estudo psicométrico, com uma amostra de 346 idosos (76.8% mulheres), de quatro cidades do norte, centro e sul do Chile, selecionados por disponibilidade e conveniência, que responderam a uma pesquisa (11/2023 a 03/2024) incluindo itens sociodemográficos: a Lubben-6, além de uma escala de felicidade, outra de autoavaliação de saúde e itens para medir a vinculação e a desvinculação social, e a satisfação em diferentes âmbitos. **Resultados.** A Lubben-6 obteve uma confiabilidade alfa de Cronbach adequada, de 0.766, com 0.71 para a dimensão família e 0.76 para a dimensão amigos. A análise fatorial confirmatória reproduz sua estrutura bidimensional original ($\chi2 = 46.23$, df = 8, $p<0.001$) com índices de ajuste adequados, o que reafirma sua validade de construção. Em apoio à validade de critério, foram encontradas correlações positivas significativas com a felicidade (0.214**) e suas subdimensões, e correlações negativas significativas com itens de desvinculação social, além do teste de invariância parcial entre os sexos. **Discussão.** As propriedades psicométricas da escala são adequadas e consistentes com as relatadas internacionalmente. **Conclusões.** A presente versão da Lubben-6 pode ser utilizada de forma confiável e válida na população idosa do Chile.

Palavras-chave:
Rede social; Idoso; Apoio social; Psicometria; Sexo; Família; Amigos; Chile.

Introduction

There is evidence of the positive effects of participation and social support among older adults (OA) in groups and organizations beyond the family on their health, well-being, and quality of life (1–4). Social participation (SP) influences differences in life expectancy and healthy life years among OA in Chile and other countries (5). Those who belong to older adult clubs show better health and well-being, with differences by sex (4). According to Fernández et al. (6), social support from family, friends, and community participation promotes healthy and active aging. Social participation, a polysemic concept, includes multiple social behaviors and is defined as "involvement

in activities that provide interaction with others in society or community" (7 p2148).

Systematic reviews on the effects of SP on health (1) show that, with variations depending on the activity type, all forms yield physical and mental benefits, delaying deterioration in OA. SP is associated with lower physical and cognitive decline, better health and daily functioning, lower mortality, and higher quality of life. Fu et al. (2) found that SP increases physical activity and protects against the effects of frailty. SP and social support, along with instrumental activity, frailty, and loneliness, have been central research topics regarding OA during the last five years (2). Having instruments that adequately measure social support networks in OA is of high diagnostic relevance because it allows predicting risks of unwanted loneliness—different from voluntary disengagement—and its consequences, including distress and health risks.

A brief scale with adequate psychometric properties and widely used internationally, according to Granero et al. (8), is the Lubben Social Network Scale (LSNS-6), by Lubben et al. (9). Its original 18 items have been reduced to 6 in Japan (10), several European cities (9), Portugal (11), Korea (12), Mongolia (13), China (14), Argentina (8), and Puerto Rico (15), consistently confirming its bidimensionality, reliability, and validity. Nunnally (16) recommends reliability values of 0.70 or higher – but not much higher than 0.80 – for basic research. The Japanese version (10) reported Cronbach's alpha of 0.82, test-retest of 0.92 ($p < .001$), and scale scores increased with the number of family members and decreased among OA at suicide risk. The Chinese version (14), applied to adults aged 60–90 (mean 70.8), reported Cronbach's alpha of 0.83, with 0.90 for the Family dimension and 0.95 for Friends, explaining 86.8% of variance. High Lubben-6 scores and Family subscale scores were associated with lower suicide risk (ORs < 1, $p < .05$). In Mongolia, among 650 adults aged 55–75+, Myagmarjav et al. (13) reported Cronbach's alpha of 0.86 (0.82 Family; 0.87 Friends), and test-retest of 0.91. Lubben-6 correlated negatively with social disengagement ($r = –0.52$, $p < .001$), perceived isolation ($r = –0.54$, $p < 0.001$), and depression ($r = –0.27$, $p<0.001$).

Among residents of elder-care facilities in three European cities (9)—Hamburg (n=1964), Solothurn (n=2870), and London (n=2598)—with a mean age of 74, internal consistency was 0.73, 0.74, and 0.74 respectively. In Portugal, among 207 residents aged 65–96 (mean 77.2), with up to 4 years of schooling (89%), Cronbach's alpha was 0.798 (0.756 Family; 0.732 Friends). Two factors explained 67.8% of variance. No sex differences were found for Family; men scored higher on Friends. Comparing age groups (65–74, 75–84, 85+), older adults scored lower on Friends.

In Hispanic America, the Puerto Rican version (15), applied to 154 OA aged 60–96 (mean 73.8, 61.7% women), reported Cronbach's alpha of 0.74; Family 0.82; Friends 0.67. Low scores correlated significantly and moderately with loneliness ($r = –0.33$ $p < 0.001$), and a larger friend network was associated with better self-rated health. The Argentine version (8), in 150 OA (mean 76.3; 54% men), showed satisfactory composite reliability for both factors (0.83 and 0.91), with extracted mean variance of 0.62 and 0.75. Factor analysis confirmed a bifactorial model with adequate fit values (RMSEA 0.085, NFI 0.97), with standardized loadings above 0.6 or 0.7. The Pearson correlation between Lubben-6 and social-health worker evaluation was 0.665 ($p < 0.001$).

The objective of this study is to adapt and advance validation of the Argentine Lubben-6 Scale (8) for Chile, considering its psychometric strength and linguistic, cultural, and geographic proximity.

Methodology

Design: Cross-sectional psychometric study with urban samples of OA from four Chilean cities: one in the north, two in the center, and one in the south. Data collection occurred between November 2023 and March 2024.

Sample: Convenience sample of men aged 65+ and women aged 60+, totaling 346 participants (76.8% women), from Antofagasta (north), Rancagua and Talca (center), and Punta Arenas (south). Mean age was 71.7 (SD=6.85) (Table 1). Exclusion criteria: illiteracy or inability to independently understand and answer the survey. Ethics approval was granted by the Scientific Ethics Committee of the University of Talca (Folio 03-2023).

Table 1. Descriptive characteristics of the sample of older people.

	N	%
Sex		
Men	80	23.2
Women	265	76.8
Age	71.7	(6.8*)
Marital Status		
Married	171	51.7
Single	52	15.7
Divorced	33	10
Widow/er	75	22.7
Do you currently have a job or paid activity?		
Yes	80	24
No	254	76
Do you have people who depend on you (e.g., children, relatives, or others)?		
Yes	121	35.1
No	223	64.6
Could you say that, in general, your health is...? (1 Poor / 5 Excellent) *	2.66	.83*

*Standard deviation
Source: Prepared by the authors

Measures: Survey including: (i) Lubben-6 Social Network Scale. (ii) Hennessy self-rated health scale (17). (iii) EFPA happiness scale (18). (iv) 14 items on social engagement / disengagement, autonomy, sexual satisfaction, family and friend satisfaction, leisure, work, fear of death, sense of peace, and happiness sources

Procedure: Local coinvestigators recruited participants and administered surveys. Analyses included descriptives, reliability, confirmatory factor analysis, and multigroup invariance testing. Reliability threshold: .70–.90.

Data Analysis: Descriptives and confirmatory factor analysis for 1- and 2-factor models. Fit indices: Chi-square, CFI ≥ .90, TLI ≥ .90, RMSEA < .08, NFI ≥ .90. Criterion validity: correlations with engagement, disengagement, and EFPA. Software: SPSS v25, AMOS v23.

Results

Table 2 shows the mean, standard deviation, skewness, kurtosis, and mode values obtained for the items of the Lubben-6 scale. All items meet the normality criteria for skewness and kurtosis, which range between -2 and 2 (21).

Analysis of the psychometric properties of the Lubben-6 scale

Table 2. Means, standard deviations, skewness, kurtosis, mode, for the Lubben-6 items.

	Mean	SD	Skewness	Kurtosis	Mode
1. How many family members do you have personal or telephone contact with at least once a month?	3.6	1.07	-0.64	0.27	4
2. How many family members do you feel comfortable talking to easily about private matters that concern you?	2.4	1.25	0.01	-0.71	3
3. How many family members do you feel close enough to call if you needed help?	2.7	1.13	0.08	-0.44	3
4. With how many friends (people with some connection, but NOT relatives) do you have personal or telephone contact at least once a month?	2.7	1.60	-0.18	-1.07	3
5. How many friends do you feel comfortable talking to easily about private matters that concern you?	1.7	1.29	0.23	-0.93	1
6. How many friends do you feel close enough to call if you needed help?	1.7	1.35	0.40	-0.71	1

Source: Prepared by the authors

Cronbach's alpha for the total Lubben-6 scale is 0.766, broken down into 0.710 for the Family dimension and 0.776 for Friends. The corresponding Omega values are 0.776 (total scale), 0.716 (family dimension), and 0.781 (friends' dimension) (Table 3).

Table 3. Cronbach's Alpha coefficients for the Lubben-6 Scale and its subscales

	Cronbach's alpha		
	Deleting item	Subscales	Total
1.- With how many family members do you have personal or telephone contact at least once a month?	.633		
2.- How many family members do you feel comfortable talking to easily about private matters that concern you?	.685	710	
3. How many family members do you feel close enough to call if you needed help?	.538		
4.- With how many friends (people with some connection, but NOT relatives) do you have personal or telephone contact at least once a month?	.687		.766
5.- How many friends do you feel comfortable talking to easily about private matters that concern you?	.656	.776	
6. How many friends do you feel close enough to call if you needed help?	.742		

Source: Prepared by the authors

The model diagram and factor loadings for each Lubben-6 item are presented below (Figure 1).

Construct validity. The confirmatory factor analysis (22) for the Lubben-6 reproduced its original two-dimensional structure (χ^2 = 46.23, df = 8, p < .001, RMSEA = .118, CFI = .934, TLI = .876, NFI = .922). A one-factor model showed a poor fit (χ^2 = 166.69, df = 9, p < .001, RMSEA = .225, CFI = .727, TLI = .546, NFI = .719).

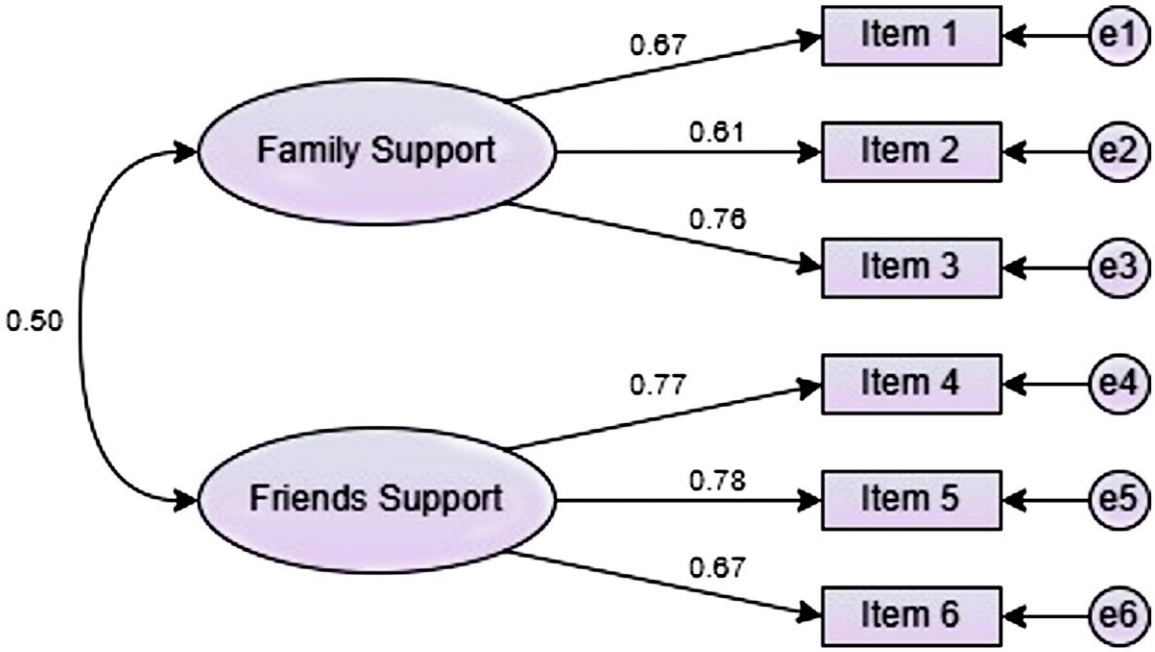

Figure 1: Model for the Lubben-6 Red Social Support Scale and factor loadings per item.
Source: Prepared by the authors

To test the measurement invariance of the Lubben-6 for the male and female subgroups, a multi-group confirmatory factor analysis was performed. The metric or weak invariance test, where factor loadings (λ) are restricted so that they are equal between sex groups, showed a good fit according to the criteria established by Cheung et al. (22). When comparing M1 with M2, no significant changes were observed in the CFI, RMSEA, or χ^2 indices. For the scalar invariance model, where factor loadings (λ) and intercepts (τ) are restricted, the CFI and RMSEA indices are within tolerable ranges, but the χ^2 index shows differences in the measures between sex groups, indicating a partial fit (Table 4).

Table 4. Results of metric, scalar and strict invariance analysis, by sex, for the Lubben-6.

	χ2(gl)	χ2/gl	CFI	RMSEA	Comparison	Δχ2	ΔCFI	ΔRMSEA
					Criterion*	P>.05	≤.01	≤.015
M1. Configuration invariance (Base model)	48.785 (16)	3049	.944	.077				
M2. Metric or weak invariance (restricted λ)	51.999 (20)	2600	.945	.068	M2 vs M1	3.214 (4) p=.52	.001	-.009
M3 Scalar or strong invariance (restricted λ and τ)	73.023 (26)	2.809	.919	.073	M3 vs M2	21.024 (6) p=.002	-.026	.005
M4. Strict invariance (restricted λ, τ and ɵ)	84.036 (35)	2.401	0,916	0,064	M4 vs M3	11.013 (9) p=.275	-0,003	-0,009

Source: Prepared by the authors

Criterion validity. Four procedures were used to analyze and establish this type of validity. First, bivariate correlations—expected to be positive—were performed between the Lubben-6, its dimensions, the total EFPA, and the dimensions of the EFPA (Table 5).

Table 5. Spearman bivariate correlations between the Lubben-6, EFPA scales and their respective dimensions (n=346).

	EFPA Success Friends	EFPA Harmony	EFPA Family	Happyness Total	Lubben Family	Lubben Friends	Total Lubben
EFPA Success Friends	1	0.333**	0.581**	0.711**	0.122*	0.154**	0.172**
EFPA Harmony	1	0.249**	0.802**	0.041	0.235**	0.185**	10.87
EFPA Family			1	0.683**	0.237**	0.088	0.187**
Happyness Total				1	0.153**	0.232**	0.246**
Lubben Family					1	0.394**	0.773**
Lubben Friends						1	0.874**
Total Lubben							1

**Correlation is significant at the 0.001 level. * Correlation is significant at the 0.005 level.
Source: Prepared by the authors

A positive and significant correlation was confirmed between the Lubben-6 and the EFPA happiness scale (.246**). The Family Support dimension of the Lubben-6 and the Family Happiness dimension of the EFPA also correlated positively and significantly (.237**). The Friends Support dimension, in addition to correlating positively and significantly with the total EFPA scale (.232**), also correlated with its Balance and Harmony dimension (.235**). Furthermore, the Friends Support dimension of the Lubben-6 correlated positively with the EFPA's Achievement-Optimism Happiness dimension, which includes individual and collective achievements (.154*).

Secondly, the Friends factor of the Lubben-6 was correlated with the 14 survey items related to the decision to have more or less of a social life, to seek and have more friends, and the level of satisfaction with them—items 46 (I decided to seek and have more social life or friends) and 53 (I feel satisfied or happy with my friends)—and, as expected, a positive and significant correlation was found with these two items ($r = .193$, $p = .001$; $r = .346$, $p = .001$, respectively). The Family Support subscale, however, was not correlated with any of these items (with item 46, $r = .066$, $p = .223$ and $r = .073$, $p = .177$, respectively).

Third, the Lubben-6 was correlated with the survey items related to social disengagement—items 43, 44, and 45—and, as expected, significant negative correlations were found ($r = -.177$, $p = .001$; $r = -.127$, $p = .028$; $r = -.237$, $p = .001$, respectively).

Fourth, no significant differences in mean scores were observed by sex for the total Lubben-6 scale (M men = 2.34, SD = .91 and M women = 2.56, SD = .87, $t = -1.93$, $p = .054$). Nor for the Family Support subscale ($t = -.31$, $p = .75$), while for the Friends Support subscale statistically significant differences are reported (M.men = 1.75, SD = 1.26 and M.women = 2.15, SD = 1.15, $t = -2.63$, $p = .001$), in favor of the latter.

Discussion

The reliability of the Lubben-6 is 0.766 for Cronbach's Alpha and Omega coefficients, and those for each of its two dimensions are acceptable, with values greater than .70 for both. These values are very similar to those obtained in the samples from the three Central European cities, Portugal, and Latin America, compared to those reported for Puerto Rico. Furthermore, a good fit of the items to the bidimensionality of the Lubben-6 is observed. Although the RMSEA fit index does not exceed the cutoff point proposed by the literature, most fit indices indicate adequate construct validity of the instrument. The literature has shown that the RMSEA fit index tends to show erroneous values toward an increase when the models are complex and have few degrees of freedom, which could be affecting this instrument (23). Even so, the results replicate those of previous validation processes, where the instrument's two-factor structure shows a much better fit than a one-factor structure (8). Additionally, the correlation between its two dimensions is .39, demonstrating that they are two distinct factors, with the one related to Friends appearing as a greater influence or predictor of social bonding than the one related to Family.

At a descriptive level, the trends related to having close friends are minimal (1), which is consistent with recent

national data, and broader age ranges, showing the risk of loneliness for Chileans aged 18 and over, where 15% report not having a close friend (while in the USA the percentage was only 8%) (24).

Although the structure of this instrument remains invariant according to sex, this is only partially true, given that the requirements for scalar or strict invariance are not fully met (25). However, the specialized literature has concluded that strict invariance models are excessively restrictive (26). Thus, the results indicate that the instrument scores can be compared between the tested groups of different sexes.

Finally, very clear support for criterion validity is obtained, in line with what has been reported in previous studies, with adequate correlations in both direction and statistical significance. The Lubben-6 correlates positively with the happiness of older adults. Correlations between specific variables also show the expected positive direction, as is the case with the Family dimension of both instruments (Lubben-6 and EFPA), and measures of perceived family support. Positive correlations were also found between older adults' decisions to increase their social life and the Friends dimension, and negative correlations with decisions regarding Social Disengagement.

Among the weaknesses of this study is the unequal number of participants by sex in the sample. Although this adequately represents the typical distribution of men and women in older adult clubs, church groups, and similar settings in the country, it hinders certain statistical analyses and their results, e.g., the invariance analysis. While this analysis could be performed, its results would be more significant with a more balanced sample. Also, although the sample size meets the minimum requirements for a validation study, a larger number of participants would be desirable. Finally, although unlikely, it is possible that some Spanish terms used in the adapted Argentinian version used here may not be exactly the same as their usage in Chile.

Conclusions

The Lubben-6 shows adequate psychometric indices in samples of the Chilean population. Its Cronbach's alpha and omega reliability are 0.766, and by factor, it reaches a Cronbach's alpha of 0.71 for family (0.716 omega) and a Cronbach's alpha of 0.776 for friends (0.781 omega). Its two-factor structural and criterion validity is confirmed by positive associations with measures of social integration and well-being, and negative associations with social disengagement.

Thus, the Lubben-6 Social Support Network scale can be used reliably and validly in the Chilean elderly population.

Conflicts of interest

The authors declare that they have no conflicts of interest

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Ethical considerations

The study was approved by the Scientific Ethics Committee of the University of Talca (Chile) CEC, under Folio No. 03-2023.

Confidentiality: Informed consent was obtained, and the information obtained is anonymous and remains stored and protected according to the corresponding protocol.

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Appendix 1. Items to measure social engagement/disengagement, sexual satisfaction, family life, partner relationships, friendships, leisure and work life, autonomy in decisions regarding one's own assets, fear of death, sense of peace, and sources of happiness. Choose by marking an X in the box of your choice, ranging from 1 = Strongly Disagree to 5 = Strongly Agree

ÍTEM	1	2	3	4	5
43 Since I retired (or became a widower) I have fewer and fewer social relationships (friends, neighbors, memberships or belonging to or participating in groups).					
44 I decided to have less of a social life or to stop belonging to some groups.					
45 My aging has been characterized by an increasing social disengagement.					
46 I decided to seek and have more social life or friends.					
47 I feel satisfied or happy with my family or partner.					
48 I have a satisfactory sex life.					
49 I have decided not to work (if he/she does not work) or to work (if he/she does).					
50 I decide about my money and possessions in my life up to now.					
51 As I get older, my fear of death increases.					
52 As I get older, I feel more and more at peace.					
53 I feel satisfied or happy with the friends I have.					
54 I feel satisfied or happy with how I use my free time or leisure.					
55 I feel satisfied or happy with my job.					
56 My main source of happiness is (please rank by putting a number from 1 to 5 in the boxes):					
My family	My friends	My work	My leisure	My partner	

Source: prepared by the authors.