


# Does active ageing contribute to life satisfaction for older people? Testing a new model of active ageing

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**Abstract** Several debates have emerged across the literature about the conceptualisation of active ageing. The aim of this study is to develop a model of the construct that is focused on the individual, including different elements of people's lives that have the potential to be modified by intervention programs. Moreover, the paper examines the contributions of active ageing to life satisfaction, as well as the possible predictive role of coping styles on active ageing. For this purpose, a representative sample of 404 Galician (Spain) community-dwelling older adults (aged  $\geq 60$  years) were interviewed using a structured survey. The results demonstrate that the proposed model composed of two broad categories is valid. The model comprises status variables (related to physical, psychological, and social health) as well as different types of activities, called processual variables. This model is tested using partial least squares (PLS) regression. The findings show that active ageing is a fourth-order, formative construct. In addition, PLS analyses indicate that active ageing has a moderate and positive path on life satisfaction and that coping styles may predict active ageing. The discussion highlights the potential of active ageing as a relevant concept for people's lives, drawing out policy implications and suggestions for further research.

**Keywords** Active ageing · Satisfaction with life · Coping · Status variables · Processual variables

## Introduction

Over the last decades, social gerontologists have introduced varying perspectives ranging from the early activity theory (Havighurst 1961) to the current paradigm of active ageing. Successful ageing—one of the leading theories to emerge (Rowe and Kahn 1987)—is also known as *productive ageing*, *healthy ageing*, or *active ageing* (Walker 2002). Some authors use these terms interchangeably (Fernández-Ballesteros 2008), while others distinguish between the different meanings (Walker 2002). All three concepts share certain features, such as their use of gerontological knowledge to build a positive conception of ageing (Foster and Walker 2015). Nonetheless, the construct of *active ageing* was formulated to transmit a broader concept than healthy ageing and productive ageing (Foster and Walker 2013; World Health Organisation [WHO] 2002). It includes a multidimensional view of health as measured by physical, mental, and social well-being (Peel et al. 2004), as well as the productivity of older adults to society (Bass et al. 1993). Moreover, activity is viewed as a broad domain, represented by participation in social, economic, cultural, physical, and routine activities (WHO 2002). Thus, all significant activities that improve the well-being of individuals and families, local communities, and society are part of “active ageing” (Foster and Walker 2015; Walker 2002).

The concept of active ageing has an increasingly important role not only in research, but in policy and society as well, due largely to the WHO's (2002) multi-dimensional model. The European Commission (EC) has

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recently adopted the paradigm to face the challenge of the ageing population (Boudiny 2013). Both organisations address active ageing mainly at the population level; this means they are based on the global count of older people and promote potential contextual elements to increase opportunities to age actively. However, while the WHO's active ageing policy considers healthy lifestyles in its conceptualisation, the EC fosters older people's contribution to society in terms of productive activity, working longer, lifelong learning, and remaining active after retirement (Oxley 2009).

Several debates have emerged in the research on active ageing. The first reflects the lack of agreement on its definition (Boudiny 2013) and confusion about its components and determinants (Paúl et al. 2012; Tareque et al. 2013). For instance, sometimes terms of definition and determinants are blended together in the same study, conflating the definition of active ageing with its determinants (Paúl et al. 2012; Tareque et al. 2013). Moreover, some variables such as social support, life satisfaction, or coping styles (referring to the way people face difficult situations) are used in different studies as components, determinants, or even results of active ageing (Blanco 2010; Fernández-Ballesteros 2008; Perales et al. 2014). Though currently the majority of academics stress a multidimensional conception of well-being, it is not clear what variables should reflect it. Some authors define it through status variables such as physical health and functionality, cognitive state, positive affect, and/or social relationships, as perceived by older people (Caprara et al. 2013; Fernández-Ballesteros 2008; Bowling 2008; Stenner et al. 2011). Others refer to more processual variables when defining active ageing, considering continuous participation in different activities from labour force participation to engaging in social activities and daily life routines (Fernández-Mayoralas et al. 2015; Stenner et al. 2011).

A second debate concerns the inclusion of leisure activities in the concept of active ageing. Mainstream research considers only productive activities, both paid and unpaid work, that create social worth (Rowe and Kahn 1997). These activities seem to be important not only from the perspective of researchers and policy-makers but also subjectively by older people themselves (Stenner et al. 2011). However, an exclusive focus on productive activities has several shortcomings, namely reverting to the precursor concept of *productive ageing*, and neglecting alternative pathways of ageing actively (Boudiny and Mortelmans 2011). To address these drawbacks, various authors emphasise the incorporation of leisure activities for several reasons. First, formal productive engagement does not suit everyone (Stenner et al. 2011). When released from the responsibilities of middle age, for some older adults leisure is a way to re-engage with life (Clarke and Warren

2007). Second, different patterns of leisure activities can enhance or impede participation in productive activities, such as volunteering (Dury et al. 2015), raising the possibility that high participation in leisure can be incompatible with social participation. Third, leisure is subjectively important for older adults, who point to its multiple beneficial effects (Bowling 2008). These include improved cognitive and physical states, and compensation for social losses such as death of one's life partner (Boudiny and Mortelmans 2011; Silverstein and Parker 2002).

The third debate revolves around the frequently occurring dichotomy between active and passive activities (Boudiny and Mortelmans 2011). Typically, because of their proven benefits, only active leisure activities are considered important for active ageing, such as hobbies, sports, travelling, and creative activities (Avramov and Maskova 2003; Colcombe and Kramer 2003). This focus on active participation is partly confirmed by older people's own perceptions; they contrast *being active* with *being passive* as a rationale for an agentive attitude (Stenner et al. 2011; Litwin and Shiovitz-Ezra 2006). However, this means enhancing mainly young-old preferences (Boudiny and Mortelmans 2011). Nonetheless, many older people consider that "ordinary" activities usually classified as passive, such as crossword puzzles, are more representative of their involvement with life (Clarke and Warren 2007). Moreover, much older people spend more time in home-based and family-related leisure, showing a certain change in people's activities as they age, perhaps due to alterations in preferences and constraints (Boudiny 2013).

In defining activities, lifelong learning and the use of Information and Communication Technologies (ICT) have received special attention from researchers and policy-makers (EC 2008). Lifelong learning has been found to be an effective way to age actively (Tam 2011). Due to its beneficial role in promoting well-being (Walker 2002) through developing social contacts and postponing the onset of mental problems associated with ageing (Phillipson and Ogg 2010), it can be included in the definitions of active ageing as an independent component. Furthermore, the use of ICT is important as it enables older people to stay connected to society and to their social networks (Zaidi et al. 2013), providing them with enhanced cognitive opportunities and compensating for age-related losses (Boudiny and Mortelmans 2011).

### Conceptualising active ageing

There are relatively few studies that have measured active ageing in its broad and inclusive conception, following the criteria and principles established in its creation (Marsillas 2016). This is due to the partial operationalisation of the

variable, which include only discrete aspects such as employment, social participation, and, less frequently, leisure activities. Moreover, in some studies, active ageing is represented by a dichotomous variable created through compliance with a list of criteria of health-related variables (Fernández-Ballesteros et al. 2006). Yet, this measurement is too narrow since it generally limits active ageing to a few people, excluding the frail and people with disabilities from the definition and thus failing to fulfil the principles of active ageing (Walker 2002).

Studies that adopt a more multidimensional definition of active ageing include objective and subjective perceptions of health, functionality, cognitive, affective, and social status (Fernández-Ballesteros et al. 2006; Perales et al. 2014), thus referring to the health concept in a multidimensional and broad manner. It has also been defined by different participation variables such as leisure (Fernández-Mayoralas et al. 2015), social participation (Perales et al. 2014), and lifelong learning (Tam 2011). However, even though the use of ICT is mainly considered as a predictor of active ageing (Gjevjon et al. 2014), in this study it is proposed as a component since it improves older people's well-being and increases their engagement with life (Boudiny and Mortelmans 2011).

## Measuring active ageing

In the past few years, some instruments have been developed to measure active ageing. From the population perspective, the Active Ageing Index (Zaidi et al. 2013) was created with the collaboration of the EC and the United Nations Economic Commission for Europe (UNECE). This index targets policy-makers and aims to measure the amount of active ageing at a country level based on 22 indicators organised in four domains: (1) employment; (2) participation in society; (3) independent, healthy, and secure living; and (4) capacity and enabling environment for active ageing. Information for each indicator comes from secondary data sources for 28 European countries, such as the European Social Survey. The index sheds light on the effectiveness of existing strategies and points out the environmental elements that can be improved to increase opportunities to age actively. However, it cannot be used to measure active ageing on an individual level, since its indicators aim for macro-level measurements such as healthy life expectancy, and the result provided is a construct based on the aggregate number of older people that meet different indicators.

Other authors have developed measurement tools to capture the individual perspective, such as Tareque et al. (2013). Their index is based on the WHO's model, using

the three determinants of active ageing: health (referring to physical health and absence of disabilities, as well as physical activities), participation (participation with family, workforce, and in clubs/groups), and security (physical and financial security). The shortcomings of this index include the restricted scope of *health*, almost completely focusing on the physical dimension and excluding some important variables such as cognitive, affective, and social health. Furthermore, the authors stress that this index measures the *determinants* of active ageing, even though it is called an active ageing index and is supposed to measure the active ageing concept.

Three main research gaps emerge from this literature review. First, there is a lack of models that account for active ageing in its multidimensional and inclusive conception. Existing measurements are focused either on health variables or on productive participation, which are not fully representative of older people's ways of engagement. Second, the possible effect of active ageing on life satisfaction has not received sufficient attention from policy-makers and researchers (Walker 2002). Though the relationship of some activities to life satisfaction has been studied (Neugarten et al. 1961) and is partly related to the socio-gerontological literature of the 1950s which argues for a positive correlation between active lifestyles and life satisfaction (Boudiny and Mortelmans 2011), it remains unclear how active ageing relates to this outcome. Finally, even though some authors mention coping styles (Fernández-Ballesteros 2008) and these have been theoretically included in active ageing models as predictors, they are rarely studied empirically in this field.

## Aim

The aim of this paper is threefold. First, it seeks to develop a new measurement tool based on a model of active ageing focused at the individual level, constructed by using two broad categories of variables: processual and status variables, which group together the most important dimensions found in the scientific literature. In so doing, a recurrent problem in the literature will be overcome, namely the partial study of the concept of active ageing. Second, this paper explores the relationship of active ageing to satisfaction with life. Finally, we explore the possible predictive role effect of coping strategies related to active ageing.

To arrive at these goals, the paper tests the following hypotheses: (1) active ageing can be defined as a higher-order construct, composed of two broad categories of variables (status and processual), (2) active ageing has a positive path on life satisfaction, and (3) coping styles have a predictive role in active ageing.

## Method

### Design and sampling

The study methodology was based on a survey of a representative sample of community-dwelling residents aged 60 and over in Galicia, Spain (804,403 inhabitants, 29.2% of the total population). Structured interviews were conducted by experienced psychologists using a questionnaire. The sampling selection was made through the county register, and a two-stage sampling was chosen: *conglomerates* for the selection of the first-level units (municipalities) and *quotas* according to the habitat (urban/semi-urban vs. rural/semi-rural), gender, and age group (60–74 years vs. 75 or older) for the selection of the second-level units (individuals). No personal data were requested, guaranteeing anonymity and confidentiality of the answers. Participation in the study was voluntary, and a 6% of the participants who initially accepted to be part of the study did not finish the interview.

The final sample was composed of 404 individuals (176 men and 228 women; mean age = 72.6 range = 60–94), recruited directly by interviewers in different community facilities, regarding those venues where people of different profiles usually attended. In this sense, we included social centres, which are oriented to older people to meet in order to have a coffee, do exercise, read newspapers, or arranging issues related to the municipality, as well as clinics, around the hospitals or markets. Regarding the habitat, 59.2% are residents of a rural/semi-rural area, whereas 40.8% are from urban/semi-urban area. Thirty per cent of respondents did not complete primary studies, 32.9% completed primary education, 21.0% secondary education, and 16.1% tertiary studies. In terms of marital status, 9.2% were single, 58.1% were married, 3.0% were divorced, and 29.7% were widowed.

### Variables and measures

The variables included in the questionnaire were chosen based on a literature review (Marsillas 2016) and assessed the ten broad dimensions of: (1) health (objective and subjective health), (2) functionality (basic and instrumental daily activities), (3) cognitive status, (4) affective status, (5) social status (social and family perceived support, frequency of outdoor social contact), (6) ICT use, (7) lifelong learning, (8) employment, (9) social participation, (10) leisure activities, as well as coping styles (active and external), life satisfaction, and socio-demographic variables (age, gender, habitat, marital status, education, income).

The dimensions of active ageing were measured using different scales. *Functionality* was evaluated by Barthel

Index (Cronbach's alpha = 0.83) (Mahoney and Barthel 1965) and Lawton and Brody Scale (Cronbach's alpha = 0.92) (Lawton and Brody 1969); *cognitive status* was measured by the Mini-Examen Cognoscitivo, the Spanish version of Minimental State Examination (Cronbach's alpha = 0.73) (Lobo et al. 1999); *affective status* was measured by the positive affect scale of the Affective Balance Scale (Cronbach's alpha = 0.76) (Godoy-Izquierdo et al. 2008); different *leisure activities* were measured using items from Scarmeas et al. (2003) and by adding two more items; *social participation* and *employment* were assessed with several items from the Active Ageing Index (Zaidi et al. 2013). *Coping styles* were measured by seven items chosen from the Spanish version of the Brief COPE Inventory (Vargas-Manzanares et al. 2010); *life satisfaction* was measured by the Satisfaction with Life Scale (Cronbach's alpha = 0.76) (Diener et al. 1985). *Health* was assessed through seven items created for this study, *ICT use* was measured by three items including one from Zaidi et al. (2013), and *social status* was evaluated by a scale created for this study (Cronbach's alpha = 0.83) by combining selected items from Zaidi et al. (2013), the Spanish version of Duke-UNC-11 scale (Bellón et al. 1996a), and modified items from the Spanish version of family APGAR (Bellón et al. 1996b). Specific items are shown in Table 1.

### Statistical analysis

First, multicollinearity was analysed and rejected by checking intercorrelations between variables ( $r < 0.5$ ) and the variance inflation factor (VIF) for formative factors below the recommended value of 3.3 (Lowry and Gaskin 2014). Moreover, common method biases were analysed with Harman's single-factor test, obtaining 21 distinct factors of which the highest one accounted for 14.33% of the variance of the model. This result combined with examining the correlation matrix of constructs ensured that the data did not suffer from these biases.

The three hypotheses were tested with partial least squares (PLS) regression. The PLS algorithm was performed due to its suitability for the exploratory analysis required for theory-building (Lowry and Gaskin 2014). A molar model was specified with twenty first-order constructs: one was formative (social participation) and the others reflective, ten second-order constructs, two third-order constructs, and one fourth-order construct. Following the suggestions of Lowry and Gaskin (2014), after deleting items that did not meet the statistical requirements in the measurement model, construct and convergent validity of reflective constructs were checked by analysing the significant loadings on each theoretical construct through the bootstrapping of 500 resamples. Discriminant validity was

**Table 1** Constructs and items

Construct	Abbreviation	Measure source	No. of items	Items	Measure options
Active ageing	AA			Fourth-order construct	
Processual variables	PV			Third-order construct	
Social participation	SP	Zaidi et al. (2013)	4	1. How often are you involved in caring for your children, grandchildren? 2. How often are you involved in caring for older people or disabled relatives? 3. How often did you do unpaid voluntary work through the following organisations in the last 12 months? 4. Over the last 12 months, have you participated in political actions like attending political meetings, protests or demonstrations or contacting a politician or public official?	0: No 1: Yes
Employment	E	Zaidi et al. (2013)	1	1. Did you do any paid work in the last week?	0: No/1: Yes
ICT use	ICT	Developed scale	3	1. How often did you use the mobile phone in the last months? 2. How often did you use a computer in the last months? 3. How often did you use the Internet in the last months?	1: Never; 2: Sporadically; 3: At least once/month; 4: At least once/week; 5: Everyday or almost
Lifelong learning	LL	Developed scale	3	1. How often did you go to lectures in the last six months? 2. How often did you attend to courses, seminars, private classes to learn something new within/outside the regular education system in the last six months? 3. How often did you read books, magazines or newspapers in the last six months?	1: Never; 2: Occasionally; 3: Generally
Leisure activities				Second-order construct	
Art activities	Art	Items from Scarmeas et al. (2003)	2	1. How often did you sing/play a musical instrument in the last six months? 2. How often did you do arts and crafts for hobbies in the last six months?	1: Never; 2: Occasionally; 3: Generally
Physical activities	Phy	Items from Scarmeas et al. (2003)	2	1. How often did you go for walks or rides in the last six months? 2. How often did you take part in sports/dancing/exercise in the last six months?	1: Never; 2: Occasionally; 3: Generally

**Table 1** continued

Construct	Abbreviation	Measure source	No. of items	Items	Measure options
Outdoors activities	Out	Items from Scarmeas et al. (2003)	3	1. How often did you go to theatre or movies in the last six months? 2. How often did you travel or go on tours in the last six months? 3. How often did you participate as a member of a club/organisation in the last six months?	1: Never; 2: Occasionally; 3: Generally
Productive activities	Prod	Items from Scarmeas et al. (2003)	2	1. How often did you do gardening in the last six months? 2. How often did you cook or prepare food as a hobby in the last six months?	1: Never; 2: Occasionally; 3: Generally
Recreational activities	Recr	Items from Scarmeas et al. (2003)	2	1. How often did you watch television/listen to the radio in the last six months? 2. How often did you do crosswords, Sudoku, etc., in the last six months?	1: Never; 2: Occasionally; 3: Generally
Social activities	SA	Items from Scarmeas et al. (2003)	3	1. How often did you play cards/other games with other people in the last six months? 2. How often did you visit/were visited by friends/relative/neighbours in the last six months? 3. How often did you attend to the church/participate in religious activities in the last six months?	1: Never; 2: Occasionally; 3: Generally
Solitary activities	Sol	Items from Scarmeas et al. (2003)	2	1. How often did you spend time being alone in the last six months? 2. How often did you collect things as a hobby in the last six months?	1: Never; 2: Occasionally; 3: Generally
Status variables	SV			Third-order construct	
Health	H			Second-order construct	
Objective health	OH	Developed scale	3	1. Median of symptoms in last two weeks 2. Have you got any chronic condition/disease? 3. Had you got any acute disease/psychological stress situation in the last three months?	0: No; 1: Yes

**Table 1** continued

Construct	Abbreviation	Measure source	No. of items	Items	Measure options
Subjective health	SH	Developed scale	3	<ol style="list-style-type: none"> <li>1. What extent do your current health limit the performance of your daily activities?</li> <li>2. What extent does your memory or attention affect you in your daily life?</li> <li>3. Compared to your peers, how would you describe your health?</li> </ol>	1: Totally; 2: A lot; 3: Quite; 4: Little; 5: Nothing 1: Totally; 2: A lot; 3: Quite; 4: Little; 5: Nothing 1: Much worse; 2: Worse; 3: Equal; 4: Better; 5: Much better
Functionality	F	Mahoney and Barthel (1965) Lawton and Brody (1969)	2	Independence in Basic Activities of Daily Life Independence in Instrumental Activities of Daily Life	1: Total dependence; 2: Grave; 3: Moderated; 4: Mild dependence–independence; 5: Independence
Cognitive EBA + Situation in life	Cog EBA SL	Lobo et al. (1999) Items from Godoy and Godoy-Izquierdo et al. (2008)	1 4	Score in MEC-30. Second-order construct <ol style="list-style-type: none"> <li>1. Have you felt that things were going the way you wanted last week?</li> <li>2. Have you felt happy to have people you can count on or do something last week?</li> <li>3. Have you felt full of energy last week?</li> <li>4. Have you felt confident about the future last week?</li> </ol>	Total score: 0–30 1: Never/Little; 2: Sometimes; 3: A lot/Generally
Goals	G	Items from Godoy and Godoy-Izquierdo et al. (2008)	2	<ol style="list-style-type: none"> <li>1. Have you felt particularly stimulated or interest in anything last week?</li> <li>2. Have you felt happy or satisfied for achieving something?</li> </ol>	1: Never/Little; 2: Sometimes; 3: A lot/Generally
Emotions	Emo	Items from Godoy and Godoy-Izquierdo et al. (2008)	3	<ol style="list-style-type: none"> <li>1. Have you felt that you were was having so much fun last week?</li> <li>2. Have you felt cheerful or happy last week?</li> <li>3. Have you felt euphoric (very happy, fortunate) last week?</li> </ol>	1: Never/Little; 2: Sometimes; 3: A lot/Generally
Social	Soc	Developed Scale Items from Zaidi et al. (2013), Duke-UNC-11 (Bellón, et al. 1996a) and modified items from the Spanish version of Family APGAR (Bellón et al. 1996b).		<ol style="list-style-type: none"> <li>1 How often do you use to meet to your friends, relatives or (ex) colleagues?</li> <li>2. What extent do you receive visits of your friends and relatives?</li> <li>3. What extent do you count on people who care of what happens to you?</li> <li>4. What extent do you have the chance to talk to someone about your personal/family problems?</li> <li>5. What extent do you receive invitations to entertain or to go out with other people?</li> </ol>	1: Never; 2: Occasionally; 3: At least once/month; 4: At least once/week; 5: Everyday or almost 1: Much less than what I want; 2. Quite less; 3. Somewhat less; 4. Little less; 5. As much as I want

**Table 1** continued

Construct	Abbreviation	Measure source	No. of items	Items	Measure options
Satisfaction with life	SWL	Diener et al. (1985)	5	6. What extent do you receive help when you are ill in bed? 7. What extent do you receive love and affect? 8. What extent do you feel that you family loves you? 1. In most aspects, my life is closed to my ideal 2. The conditions of my life are excellent 3. I am completely satisfied with my life 4. Up to now, I have got the important things I want in my life 5. If I could live my life again, I would not change anything	1. Strongly disagree; 2. Disagree; 3. Slightly disagree; 4. Neither agree nor disagree; 5. Slightly agree; 6. Agree; 7. Strongly agree
Active coping	AC	Vargas-Manzanares et al. (2010)	4	How often do you use the following ways of dealing with your problems? 1. Do your best to change or improve the situation 2. Think a lot about what steps should you follow to solve your problems 3. Try to be positive and learn from the difficult situations 4. Take the difficult situation with humour	1. Never; 2. Sometimes; 3. Almost always; 4. Always
External coping	EC	Vargas-Manzanares et al. (2010)	3	1. Seek emotional support and affect from someone 2. Seek help and advice from others 3. Say what you feel and express your feelings or dislike for any situation	1. Never; 2. Sometimes; 3. Almost always; 4. Always

checked by analysing cross-loadings between indicators and first-order constructs as well as by comparing the correlations between the square root of the average variance extracted and other latent variables. Reliability was tested by a composite reliability indicator. Validity of the formative construct was tested by ensuring that weights were roughly equal and had significant *t* values. A fourth-order factor analysis was performed using the several-steps approach to achieve the fourth-order formative construct called active ageing. Afterwards, the predictive power of the model was tested by analysing the path coefficients of the model. The validity and suitability of the model were checked by calculating the significance of each path using a *t* test through a bootstrapping of 500 resamples. Analyses

of the model were performed in SmartPLS 2.0. The level of significance used was 0.05.

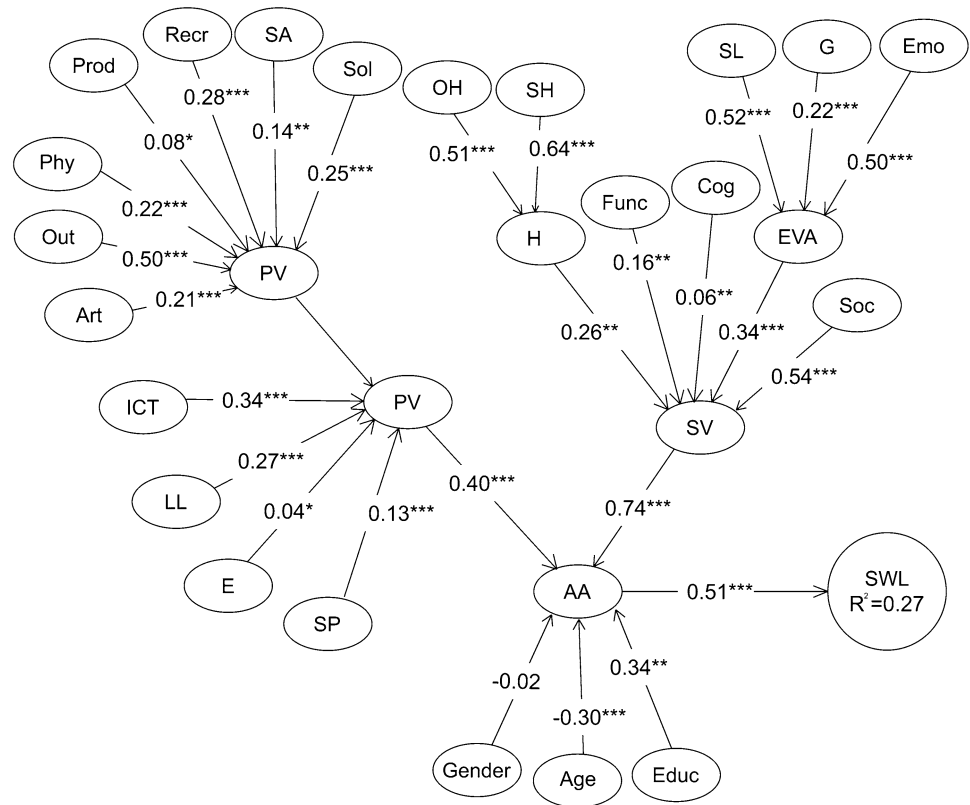
## Results

### Measurement instrument of active ageing: validity

Figure 1 shows both the measurement and the structural model of the PLS analysis. Regarding the measurement model, twenty first-order constructs were created. In this first step, two items were removed from the model because they were not significant, indicated by italics values in Table 2: attending church as a social leisure activity and



**Fig. 1** Measurement and structural model



AA: Active Ageing  
 PV: Processual Variables  
 SP: Social Participation  
 E: Employment  
 LL: Lifelong Learning  
 ICT: ICT Use  
 L: Leisure Activities  
 Art: Art Activities  
 Out: Outdoors Activities  
 Phy: Physical Activities  
 Prod: Productive Activities  
 Recr: Recreational Activities  
 SA: Social Activities  
 Sol: Solitary Activities

SV: Status Variables  
 H: Health  
 OH: Objective Health  
 SH: Subjective Health  
 Func: Functionality  
 Cog: Cognitive  
 EVA: Affective Balance Scale  
 SL: Situation in Life  
 G: Goals  
 Emo: Emotions  
 Soc: Social  
 SWL: Satisfaction with life  
 Educ: Educational level

caring for older people as social participation. After that, factorial analysis was conducted again to obtain the significances and the psychometric properties of items are shown in Table 2. All factor loadings achieved the minimum threshold of 0.5 and showed adequate convergent validity by achieving a significant *t* statistic value. Then, higher-order factor constructs were created by higher-order factorial analysis with the step strategies, beginning with the second-order constructs and continuing with third- and fourth-order constructs. The active ageing construct is composed of two broad categories of variables. Processual variables capture the activity meaning of active ageing, while status variables relate more to the concept of health. Each is composed of five second-order constructs.

All the latent variables had satisfactory psychometric properties, in terms of internal consistency, by showing values for composite reliability of each reflective latent variable above 0.7. Social participation was a formative scale, with similar weighting for each indicator and significant *t* values. The convergent and discriminant validities of the first-order construct were analysed by the matrix of loading and cross-loadings (this information is available from the authors). The loadings of the items are 0.1 higher for the latent variable to which they theoretically belong than for other variables. Discriminant validity was also examined by comparing the square root of the average variance extracted (AVE), indicated by the bold values placed in the diagonal, to the correlations with other

**Table 2** Descriptive statistics for the scales

Item	Mean	Standard deviation	<i>t</i> values for convergent validity	Composite reliability	Average extracted variance
SP					
SP1	0.23	0.42	3.56	–	–
SP2	0.13	0.34	1.32		
SP3	0.10	0.30	5.94		
SP4	0.05	0.23	6.01		
ICT					
ICT1	3.92	1.65	27.23	0.88	0.72
ICT2	2.11	1.72	94.51		
ICT3	2.01	1.67	89.68		
LL					
LL1	2.53	0.76	17.03	0.77	0.52
LL2	1.55	0.75	32.07		
LL3	1.47	0.83	34.73		
ArtAct					
Art1	1.27	0.64	7.92	0.70	0.52
Art2	1.61	0.87	7.81		
PhyAct					
Phy1	2.60	0.68	9.64	0.74	0.58
Phy2	1.58	0.88	16.80		
OutAct					
Out1	1.28	0.57	13.17	0.75	0.51
Out2	1.90	0.88	28.54		
Out3	1.63	0.92	19.93		
Prod Act					
Prod1	1.84	0.93	2.00	0.70	0.54
Prod2	2.29	0.90	14.85		
RecreAct					
Recr1	2.86	0.40	3.67	0.71	0.54
Recr2	1.69	0.90	19.00		
SocAct					
SA1	1.84	0.92	3.93	0.73	0.59
SA2	2.35	0.81	20.25		
SA3	2.03	0.88	0.47		
SolAct					
Sol1	2.34	0.86	20.67	0.75	0.60
Sol2	1.20	0.58	14.08		
OH					
OH1	0.97	0.17	27.40	0.74	0.50
OH2	0.33	0.47	12.89		
OH3	0.83	0.38	15.04		
SH					
SH1	3.41	1.01	13.96	0.78	0.54
SH2	3.57	0.76	12.02		
SH3	2.59	0.83	12.32		
Func					
Func1	4.84	0.46	39.96	0.90	0.81
Func2	4.67	0.86	38.76		

**Table 2** continued

Item	Mean	Standard deviation	<i>t</i> values for convergent validity	Composite reliability	Average extracted variance
SL					
SL1	2.23	0.78	31.23	0.78	0.50
SL2	2.72	0.57	16.93		
SL3	2.03	0.84	16.73		
SL4	2.17	0.81	16.16		
G					
G1	1.59	0.83	10.70	0.78	0.65
G2	1.71	0.88	40.21		
Emo					
Emo1	1.83	0.87	70.11	0.84	0.64
Emo2	2.43	0.74	44.43		
Emo3	1.33	0.65	30.97		
Soc					
Soc1	4.47	0.86	3.21	0.89	0.51
Soc2	4.47	1.04	8.93		
Soc3	4.72	0.81	7.41		
Soc4	4.72	0.81	7.04		
Soc5	4.56	1.04	6.90		
Soc6	4.71	0.82	6.06		
Soc7	4.72	0.77	8.35		
Soc8	4.78	0.72	4.90		
SWL					
SWL1	5.35	1.85	53.68	0.89	0.62
SWL2	5.73	1.45	37.34		
SWL3	5.96	1.45	59.70		
SWL4	5.92	1.44	26.34		
SWL5	5.07	2.15	10.54		
AC					
AC1	3.43	0.91	42.82	0.85	0.60
AC2	3.10	1.17	18.77		
AC3	3.28	1.08	37.76		
AC4	2.29	1.27	17.57		
EC					
EC1	2.75	1.25	4.76	0.81	0.59
EC2	2.66	1.22	4.81		
EC3	2.50	1.28	4.27		

variables (Table 3). Because diagonal values were higher than other correlations, evidence of discriminant values was revealed.

Regarding the measurement model (Fig. 1), the two broad categories of variables called processual variables (PV) and status variables (SV) are significant third-order constructs, both with high weights over active ageing, the fourth-order construct. The status variables, referring to different elements related to the whole concept of health,

showed a higher value ( $\beta = 0.74$ ) than the processual variables, related to the adjective “active” in the construct ( $\beta = 0.40$ ). All the variables included in the model proved significant; however, variables such as *productive leisure activities*, *employment*, and *cognitive status* showed lower weighting in their respective higher-order constructs. Nonetheless, since all of them were significant, they were maintained in the model. As for the processual variables, *leisure activities*, *ICT use*, and *lifelong learning* showed a

**Table 3** Interconstruct correlations and square roots of AVE of first-order constructs

	Art	Out	Phy	Prod	Recr	SA	Sol	ICT	LL	OH	SH	Func	SL	G	Emo	Soc	SWL	AC	EC
Art	<b>0.72</b>																		
Out	0.30	<b>0.71</b>																	
Phy	0.13	0.34	<b>0.76</b>																
Prod	0.20	0.17	0.16	<b>0.73</b>															
Recr	0.21	0.26	0.11	0.14	<b>0.73</b>														
SA	0.20	0.20	0.15	0.12	0.10	<b>0.77</b>													
Sol	0.13	0.41	0.20	0.07	0.18	-0.02	<b>0.77</b>												
ICT	0.17	0.40	0.19	0.01	0.28	0.04	0.20	<b>0.85</b>											
LL	0.40	0.57	0.31	0.12	0.36	0.14	0.33	0.49	<b>0.72</b>										
OH	0.11	0.10	0.04	0.02	0.04	0.14	-0.06	0.12	0.13	<b>0.71</b>									
SH	0.11	0.34	0.26	0.18	0.14	0.16	0.22	0.25	0.25	0.51	<b>0.73</b>								
Func	0.12	0.32	0.26	0.39	0.20	0.23	0.16	0.33	0.27	0.17	0.46	<b>0.90</b>							
SL	0.10	0.19	0.19	0.02	0.15	0.24	0.10	0.20	0.16	0.19	0.37	0.13	<b>0.71</b>						
G	0.16	0.31	0.18	0.11	0.15	0.04	0.34	0.26	0.34	0.02	0.24	0.19	0.31	<b>0.81</b>					
Emo	0.06	0.17	0.18	0.05	0.14	0.10	0.24	0.09	0.12	0.12	0.31	0.12	0.57	0.38	<b>0.80</b>				
Soc	0.10	0.21	0.15	0.05	0.15	0.25	0.14	0.17	0.17	0.14	0.22	0.19	0.37	0.14	0.26	<b>0.72</b>			
SWL	0.07	0.09	0.12	0.03	0.09	0.22	-0.05	0.10	0.13	0.36	0.43	0.29	0.49	0.06	0.39	0.37	<b>0.79</b>		
AC	0.18	0.19	0.16	0.14	0.13	0.17	0.06	0.21	0.22	0.31	0.33	0.32	0.31	0.11	0.20	0.16	0.34	<b>0.77</b>	
EC	0.07	0.19	0.18	0.18	-0.02	0.01	0.23	0.08	0.06	-0.16	0.05	0.07	0.12	0.24	0.19	0.15	-0.05	0.06	<b>0.76</b>

higher weighting and *social support*, *affect*, and *physical health* achieved a higher importance regarding the status variables.

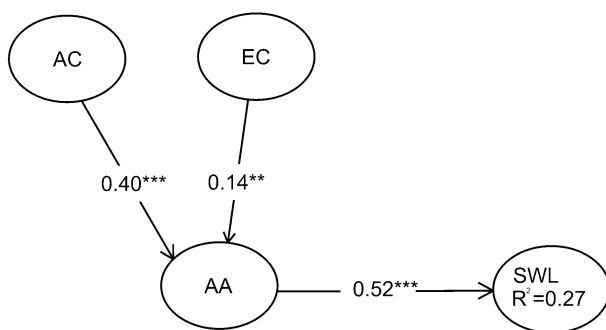
Background variables were also included in the model to explore how active ageing is related to variables such as age, gender, and education. In this case, gender did not achieve a significant path ( $\beta = -0.02$ ), whereas age ( $\beta = -0.30$ ) and education ( $\beta = 0.34$ ) showed a significant relationship. This means that young-old people as well as higher education levels obtained higher levels of active ageing.

### Active ageing and life satisfaction

Figure 1 shows a model of the relationship between active ageing, considered a fourth-order factor construct, and life satisfaction. The path coefficient was quite high and significant ( $\beta = 0.52$ ). The determination coefficient showed a moderated value of  $R^2 = 0.27$ . This means that 27% of the variance of life satisfaction is explained by active ageing, and a rise of one unit of active ageing entails a rise of 0.52 in life satisfaction. Both concepts have a moderated relationship but with high predictive power.

### Coping styles, active ageing, and life satisfaction

Figure 2 shows a model of the relationship between coping styles, active ageing, and life satisfaction. In so doing, the role of coping strategies on active ageing was explored. The path coefficients were both positive and significant. The active coping styles showed a meaningful path coefficient ( $\beta = 0.40$ ), whereas the external coping styles showed a lower path coefficient ( $\beta = 0.14$ ). The determinant coefficient of both styles on active ageing was moderated ( $R^2 = 0.18$ ). Thus, this model has moderated



AC: Active coping  
 EC: External coping  
 AA: Active Ageing  
 SWL: Satisfaction with life

**Fig. 2** Coping, active ageing, and life satisfaction

predictive power. When adding the background variables to the model, the determination coefficient achieved  $R^2 = 0.39$ .

### Discussion

This study was developed to explore the concept of active ageing and its relationship to other concepts commonly used in gerontological research. The paper contributes to the empirical literature on active ageing, proposing an innovative, empirical approach to this construct. The most important contributions of this study are (1) the development of a valid instrument to measure active ageing at an individual level as a higher-order construct composed of two broad categories of multidimensional variables, (2) the finding of a positive and high relationship between active ageing and life satisfaction, and (3) the higher significant relationship of active coping styles compared to external coping styles with active ageing.

As to the first contribution, in this study active ageing is constructed based on previous iterations of the concept (healthy and productive ageing) but also incorporating a broader view of the activities included and encompassing people with disabilities as active agers (Walker 2002). The results demonstrate that active ageing can be measured at an individual level, unifying the components promoted by policy-makers, researchers, and older people's own perspectives on active ageing. Based on our findings, we can assert that active ageing is a higher-order construct, composed of two broad categories of variables: *status* and *processual variables*. *Status variables* include elements related to health as a multidimensional concept, considering physical, psychological, and social variables. These findings are consistent with authors who study active ageing such as Bowling (2008) and Caprara et al. (2013). However, including health in active ageing has been rejected by some scholars due to its frequent restriction to physical components and neglect of other important elements (Boudiny 2013; Davey 2002). In our model, we defined health broadly (physical, mental, cognitive, and social) because of its importance as part of active ageing (Bowling 2005; Fernández-Ballesteros 2008), but we agree that it cannot be the only axis of the concept, since it is neither sufficient nor indispensable to ageing actively (Clarke and Warren 2007; Stenner et al. 2011). Social variables represent the most important status variable, as shown by authors who demonstrate the value of social relationships in later life (Schulz and Heckhausen 1996), especially emotionally close bonds (Berg 2008).

*Processual variables* represent and unify different dimensions of active ageing, including both productive and leisure activities. This is in line with the view of older

people themselves when defining active ageing (Bowling 2008; Stenner et al. 2011) and supports mainstream ideas about productive activities as defended by policy-makers, in terms of employment and social participation (EC 1999) as well as leisure activities, mainly advocated by researchers (Boudiny 2013; Hasmanová 2011). Although both are important, leisure activities contribute the most to processual variables, agreeing with the argument of some authors (Boudiny and Mortelmans 2011; Clarke and Warren 2007). In our model, we included different types of leisure activities, even those traditionally considered rather passive such as TV watching (Avramov and Maskova 2003).

The importance of ICT use is also demonstrated as a processual variable and part of the concept of active ageing, coinciding with authors such as Boudiny and Mortelmans (2011). Subsequently, as stated by previous authors who refer to the benefits of the use of ICT (Boudiny and Mortelmans 2011; Small et al. 2009), our results are in line with the current encouragement of their use, thus providing empirical support to its inclusion as a component of the active ageing concept. We found lifelong learning to be another important dimension which influences older people's well-being (Walker 2002). Considering productive activities in terms of social participation, only caring for older people did not seem a satisfactory fit in the model. A possible reason is that long-term care of either ill or dependent older people can affect the psychological well-being (Boudiny 2013) or physical and mental health of their caregivers (Boudiny and Mortelmans 2011; Morrow-Howell 2000).

Regarding the hypothesis about the relationship between active ageing and life satisfaction, we found a positive path of active ageing on life satisfaction. In this sense, a generally high life satisfaction was evident in this sample, similarly to other previous studies including general population of older people (van Beuningen 2012; Vázquez et al. 2013). The reason could be that life satisfaction derives from the cognitive evaluation of one's life, where individual regulative strategies can alter experiences and living conditions into a subjective reality (Ferring et al. 2004; Ferring and Filipp 2000). In addition, when people age, their way of obtaining life satisfaction may change as well, with many older people, for instance, preferring emotionally close relationships to other social activities (Berg 2008). Nonetheless, it was found lower life satisfaction in other samples in specific situations, such as reduced self-care capacity or older caregivers (Borg et al. 2006; Vitaliano et al. 1991). The results of this study adds to a certain extent to the line of research which has demonstrated that the assessment of life satisfaction can be influenced by some factors, such as poor self-reported health, low self-care capacity, or low satisfaction with

social support, modifying its perception and decreasing it (Borg et al. 2006; Good et al. 2011).

Finally, regarding the third hypothesis about the role of coping styles, we can say that active and external coping styles predict an active process of ageing. However, active coping strategies show a higher value as a predictor. These findings are similar to those in the argument for agent capacities and the pro-active coping with obstacles (Ouweland et al. 2007), considered important psychological abilities that improve the way people age.

Despite the findings, our study also has some inherent limitations. First, the cross-sectional nature of the research does not permit the verification of the causal relationship among variables. Each component of active ageing can also act as a predictor (Hasmanová 2011). Given that active ageing is an unobservable construct, it is measured by proxies. Distinguishing between its determinants and components depends on the choice of each author. However, our model is based on the knowledge provided by different agents (policy-makers, researchers, and older people) and as such is a good representation of the diverse components of active ageing presented in the literature.

Second, we wanted to know the influence of active ageing on the cognitive, subjective component of well-being, life satisfaction, but it may not be the best outcome variable for the model of active ageing proposed here. In future research, it would be interesting to include quality of life as an outcome variable (WHO 2002). Third, most of the variables are assessed by self-reporting; thus, subjective perceptions can influence the results (Fernández-Ballesteros 2011). Nevertheless, in our research the validity can be ascertained by comparing it to the objectively measured equivalent variables, such as the specification of the social network in the case of perceived social support. Additionally, we used a culturally homogeneous sample, and therefore, further studies are needed to validate this model in other cultures.

Finally, including more antecedents or predictor variables with a long-term effect covering the multilevel model (Fernández-Ballesteros 2008) as well as studying the socio-demographic differences about the paths of the variables could reveal interesting results. This study, however, was carried out to explore this individual-level approach in a broader, inclusive way and to try to construct a theory based on empirical research. The final aim was to complement the population perspective of active ageing, which traditionally promotes productive activities, focusing on the individual variables likely to be modified by individual-level intervention, such as cognitive stimulation, and promoting interest in intergenerational activities.

Our study's findings can be considered a step forward in clarifying the debates in the literature and unifying different approaches to studying active ageing at the individual level.

The results support the hypothesis of the inclusion of both status and processual variables as components of active ageing, thus encompassing the different spheres of a person's life. In so doing, the duality between scientific and policy fields is somewhat reconciled. We included multi-dimensional variables to try to diminish the restrictive standard as well as to account for the heterogeneity of older people (Boudiny and Mortelmans 2011). To improve the potential of this paradigm, different considerations should be weighed. First, opportunities to age actively and make free decisions should be enhanced, instead of creating subtle forms of obligation (Hasmanová 2011). For this to be achieved, active ageing should be promoted using a twofold approach: intervention in both socio-political and environmental arenas and individual spheres by increasing people's awareness of the benefits of ageing actively. Second, considering active ageing as a concept applicable to the whole lifespan is another important step, by starting the emphasis on the first half of life and continuing with the potential of older people (WHO 2002).

The findings of this study also allow us to say that active ageing is an important concept for people's lives in terms of life satisfaction and that active coping styles are related to higher possibilities of ageing actively. It would be interesting to design an intervention to promote active coping styles and to test the hypothesis of an association between both concepts. In conclusion, the active ageing paradigm is moving in a positive direction. By considering additional components such as those proposed here, it can be of even greater benefit both to individuals and entire societies.

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#### Compliance with ethical standards

**Conflict of interest** Even though Sara Marsillas has received a fellowship from the Fundación Barrié (Spain), the authors declare no competing interests that have influenced the submitted work. The funders have provided financial support but have had no role in data collection, analysis, interpretation of data, or in authoring the manuscript. To this extent, the authors are independent from the funders.

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