



3093

REPRINT

Koen Decancq and Alexander Michiels

Measuring successful aging with
respect for preferences of older persons

Journal of Gerontology: Social Sciences, 74(2), 364-372, 2019



CORE

Voie du Roman Pays 34, L1.03.01

B-1348 Louvain-la-Neuve

Tel (32 10) 47 43 04

Email: lidam-library@uclouvain.be

[https://uclouvain.be/en/research-institutes/
lidam/core/reprints.html](https://uclouvain.be/en/research-institutes/lidam/core/reprints.html)

Original Article

Measuring Successful Aging With Respect for Preferences of Older Persons

Koen Decancq^{1–4} and Alexander Michiels¹

¹Centre for Social Policy, University of Antwerp, Belgium. ²Centre for Philosophy of Natural and Social Science, London School of Economics, UK. ³CORE, Université catholique de Louvain, Belgium. ⁴Department of Economics, University of Leuven, Belgium.

Correspondence should be addressed to: Koen Decancq, Centre for Social Policy, University of Antwerp, Sint-Jacobsstraat 2, 2000 Antwerp, Belgium. E-mail: koen.decancq@uantwerp.be

Received: November 17, 2016; Editorial Decision Date: April 21, 2017

Decision Editor: Deborah Carr, PhD

Abstract

Objectives: This paper explores how to measure successful aging in a manner consistent with the preferences of older persons about what matters in their lives.

Method: To overcome the fact that existing objective and subjective measures of successful aging may not reflect the preferences of older persons about what matters in their lives, a new preference-based measure of successful aging is proposed. To implement the measure, the preferences of older persons are estimated using a statistical life satisfaction model, which is estimated with data from 11 European countries from the Survey of Health, Ageing and Retirement in Europe (SHARE).

Results: The proposed measure is found to yield different results compared to objective and subjective measures in terms of how successful aging has evolved between 2007 and 2013 and how countries are ranked for successful aging. Successful aging measured by a subjective measure is highest in 2011 compared to 2007 and 2013, for instance, whereas the ranking is reversed for the objective- and preference-based measures.

Discussion: The findings highlight the relevance of the degree of importance we attribute to the preferences of older persons in the measurement of successful aging, methodologically as well as empirically.

Keywords: Successful Aging—Preferences—SHARE—Europe

The rapid aging of our societies poses formidable policy challenges in areas such as pensions, housing, and social security (WHO, 2015). To evaluate the effectiveness of these policies, policy makers and researchers need an operational yardstick to measure the degree of “successful” aging (Havighurst, 1961). For more than five decades, social scientists—and gerontologists in particular—have tried to harness the elusive concept of successful aging into an appealing and operational measure. However, recent surveys observe a wide diversity of measures and approaches with divergent implications and empirical findings (e.g., Cosco et al., 2013 and Martin et al., 2015).

Against this background, an interesting question has come to the fore (Phelan and Larson, 2002; Glass, 2003; Bowling and Dieppe, 2005): Who should define successful aging? Is this a matter for researchers and policy makers? Or should it be left to older persons themselves to assess whether or not they are aging successfully? Depending on possible answers to these questions, we distinguish between objective and subjective measures of successful aging. We define *objective* measures as all measures reflecting what the researcher or policy maker regards to be successful aging. The influential work of Rowe and Kahn (1987, 1997) is an example of the objective approach. *Subjective* measures, on

the other hand, rely on direct judgments of the older persons about how successfully they are aging. Here, we take as a leading example the approach proposed by Havighurst (1961), whereby successful aging is measured on the basis of self-reported life satisfaction.

In this paper, we first discuss the extent to which objective and subjective measures are consistent with the preferences of older persons with regard to what matters in their lives. To this end, we propose two litmus tests of respect for preferences. Surprisingly, perhaps, we find that the objective approach fails the first test and that both approaches fail the second test. Therefore, we propose an alternative and novel preference-based approach for measuring successful aging. This approach reflects the idea that “a definition of successful aging needs to include elements that matter to elderly people” (Bowling and Dieppe, 2005: 1548).

In the empirical section of the paper, we start from the work of McLaughlin and colleagues (2010) and Hank (2011) on the measurement of successful aging and demonstrate how the preference-based approach can be implemented using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) between 2007 and 2013. To estimate the preferences of the older persons, we use a statistical model that relates self-reported life satisfaction to the objective circumstances of the respondents. Finally, we show that the objective, subjective, and preference-based approaches yield very different results in terms of how successful aging has evolved between 2007 and 2013 and how countries rank in this respect.

Methods

Measuring Successful Aging

Let us first consider the objective and subjective approaches to the measurement of successful aging. Both approaches take into account the multidimensional nature of the notion of successful aging and address the question of how to combine these different dimensions into a single measure.

The following notation is used to define and compare the two approaches. Let $x_i = (x_i^1, x_i^2, \dots, x_i^m)$ be a vector describing the circumstances or multidimensional life situation of older person i in the m different dimensions of life. For example, Rowe and Kahn (1997) measure successful aging relying on five dimensions: absence of disease and disability, cognitive and physical functional capacity, and engagement with life. Other researchers have considered broader sets of dimensions (Depp and Jeste, 2006, provide a survey). Research by Phelan and colleagues (2004), Cosco and colleagues (2013), and Huijg and colleagues (2017) confirms that older persons, too, adopt a multidimensional perspective when considering how successfully they are aging. A measure of successful aging, denoted hereafter as $SA(\cdot)$, takes the life situation vector x_i as input and then returns a 1 or a 0, indicating whether the life situation is considered to be successful or not. This way, the measure incorporates a value judgment on the relative importance

of the dimensions considered, thereby echoing the classical philosophical problem as to what constitutes a “good life”.

To keep the discussion of the objective approach tractable, we take the measure proposed by Rowe and Kahn (1997) as a *pars pro toto* for the objective approach in general. Rowe and Kahn (1997) distinguish successful aging from usual aging and define an older person as aging successfully if her life situation scores better than a threshold value in *all* the dimensions considered. In general, we write $\bar{x} = (\bar{x}^1, \bar{x}^2, \dots, \bar{x}^m)$ to denote the vector containing these m threshold values. An objective measure of successful aging derived from Rowe and Kahn (1997) is defined as follows.

DEFINITION 1 (Objective).

$SA_{obj}(x_i) = 1$ if $x_i^1 \geq \bar{x}^1$ and ... and $x_i^m \geq \bar{x}^m$; and

$SA_{obj}(x_i) = 0$ otherwise.

To implement the objective approach empirically, different authors have considered different lists of dimensions and threshold values. The more dimensions are incorporated, the fewer older persons are considered to be aging successfully.

The top panel of Figure 1 provides a graphical representation of the objective approach when there are two relevant dimensions ($m = 2$). We see that the older person in situation x_i scores better on the first dimension, but the older person in situation x_j scores better on the second dimension. The dashed lines in the figure reflect the threshold value in each dimension. The life situations which score above the threshold in both dimensions are considered instances of successful aging (the gray shaded area in the top panel of Figure 1), whereas all other situations are cases where the older person is considered not to be aging successfully. Hence, the older person in situation x_j is aging successfully, whereas the individual in situation x_i scores below the threshold value in dimension 2 and is therefore not aging successfully.

A measure of successful aging with the structure of Definition 1 embeds specific value judgments about trade-offs and the substitution between the dimensions. Since a life situation is considered successful only if it is above the threshold in *all* dimensions, the measure does not allow substitution between the dimensions. Failing to reach the threshold in one dimension cannot be compensated for by a good performance in another dimension. As is clear from the top panel of Figure 1, the setting of the threshold values is essential to determine which older persons are aging successfully. This choice is made by the analyst and may or may not coincide with the perception of the older persons in question. Recently, various researchers have expressed concern about what they regard as the paternalistic nature of the objective approach (Phelan and Larson, 2002: 1306; Glass, 2003: 382; and Bowling and Dieppe, 2005: 1548–1550, for instance). The subjective (or self-reported) approach to the measurement of successful aging offers an alternative.

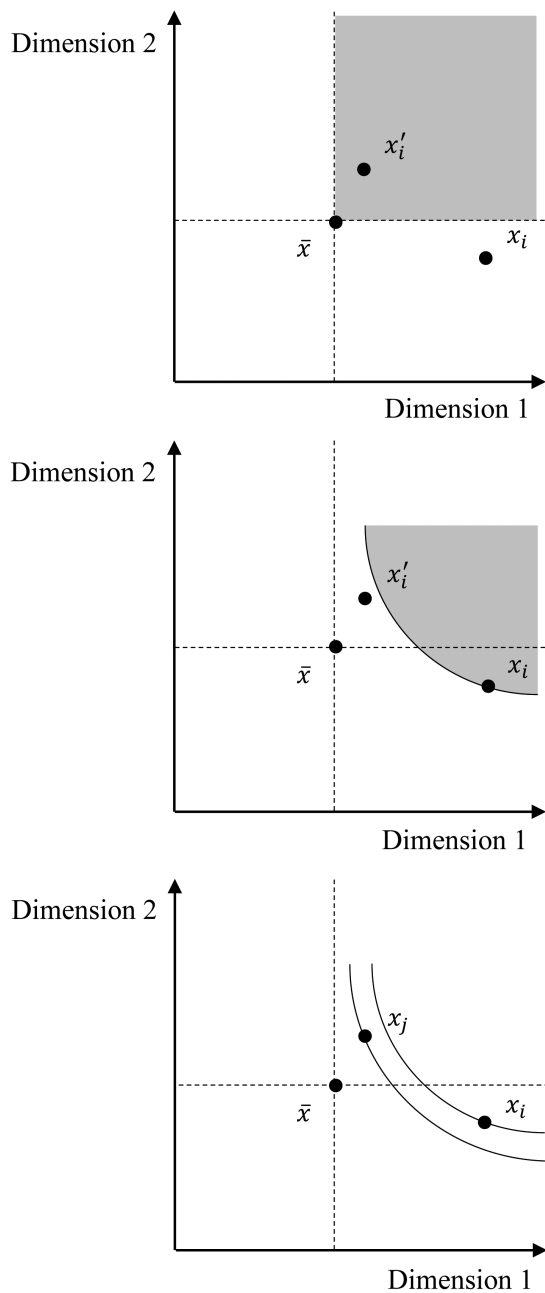


Figure 1. Measuring successful aging.

In the subjective approach, older persons are presented with evaluative questions about their lives. These may be simple questions, or more complex batteries of questions requiring respondents to evaluate particular aspects of their lives. A popular subjective approach is based on a variant of the single evaluative life satisfaction question “On a scale from 0 to 10, where 0 means completely dissatisfied and 10 means completely satisfied, how satisfied are you with your life?”. In what follows, the approach whereby successful aging is measured by a single life satisfaction question is taken as a *pars pro toto* for the subjective approach. The argument presented in this paper applies to other subjective approaches as well. The measurement of successful

aging based on life satisfaction has a long pedigree in gerontological studies, going back to the pioneering work of Havighurst (1961).

We can model the mental process of an older person i who responds to a life satisfaction question as follows (see Schwarz and Strack, 1999 and Fleurbaey and Blanchet, 2013, chapter 5). First, she reflects about her life situation x_i with its good and bad aspects. Then, she compares this life situation to some reference values based on her past experiences, her aspirations and expectations, the life situations of her friends and peers, and so on. Finally, after having compared her life situation with these reference values, she provides her answer to the question on the desired scale. We denote the response to the question as $s_i(x_i)$. We use $s_i(\cdot)$ to denote the personal satisfaction function that the older person i is using to aggregate all the information about her life with the relevant reference values. Different older persons may have different satisfaction functions, so that they can be more satisfied or less satisfied in objectively identical situations.

In the subjective approach, the response $s_i(x_i)$ is interpreted as a direct measure of successful aging. Depending on the formulation of the question, it may be measured on a categorical or numerical scale. In the latter case, the analyst can select a particular threshold value $\bar{s}$ to identify older persons who are aging successfully.

DEFINITION 2 (Subjective).

$$SA_{subj}(x_i) = 1 \text{ if } s_i(x_i) \geq \bar{s}; \text{ and } SA_{subj}(x_i) = 0 \text{ otherwise.}$$

Strawbridge and colleagues (2002) show that the objective and subjective approaches do not necessarily yield identical results. Indeed, returning to the example of the top panel of Figure 1, we see that it is possible that the older person in situation x_i scores her life satisfaction higher than the person in situation x'_i (she may care more about dimension 1, or just be a more optimistic person, for instance).

Taking Into Account What Matters to Older Persons

We first examine whether objective and subjective measures of successful aging take into account what matters to older persons, using two litmus tests. The first (intrapersonal) test ascertains whether a successful aging measure is consistent with an individual older person's preferences regarding different life situations. The second (interpersonal) test scrutinizes whether measures of successful aging are consistent with unanimously held preferences when two older persons compare their life situations. We conclude this section by proposing a new approach to the measurement of successful aging that passes both tests.

First, though, we devise a way of representing the preferences of older persons. When an older person compares between different life situations, we write $x_i \succsim x'_i$ to denote that individual i prefers the life situation described by x_i to the one described by x'_i . Different older persons may

obviously disagree about what is important in life. Hence, these preferences are individual-specific and need not coincide. Phelan and Larson (2002) discuss how preferences may change over the life span and how they may differ across cultures, for instance. The middle panel of Figure 1 graphically represents the preference of older person i . The life situations in the shaded area are those which she prefers to her current situation x_i , whereas the life situations in the unshaded area she considers to be worse. She considers there to be no difference between her current life situation x_i and all other life situations on the black curve.

The first test checks the consistency between a measure of successful aging and the preferences of an older person in intrapersonal comparisons. If an older person prefers life situation x_i to life situation x'_i (as in the middle panel of Figure 1), the test checks whether the measure is consistent with that opinion so that $SA(x_i) \geq SA(x'_i)$.

TEST 1: Intrapersonal respect for preferences. If $x_i \succsim x'_i$, then $SA(x_i) \geq SA(x'_i)$.

This test expresses and formalizes the desire to respect preferences when measuring successful aging. It embodies the non-paternalistic value judgment that the evaluation of the life situation of person i should be based on her own views on what matters in life. It captures the intuition of Bowling and Dieppe (2005: 1550) that “there is little point in developing policy goals if older people do not regard them as relevant.”

We can use the middle panel of Figure 1 to assess whether the objective approach passes TEST 1. Consider an older person who prefers x_i to x'_i with preferences as represented in the middle panel of Figure 1. When we compare both life situations with the threshold values represented by the dashed lines, we notice that situation x'_i is a successful one, whereas situation x_i is not. This case provides an example of a situation in which an objective measure is not consistent with the preferences of the older person in question.

This brings us to the question of whether the subjective approach passes TEST 1. To give the subjective approach the greatest possible benefit of the doubt, we assume respondents to answer these questions in a manner that is consistent with their own preferences. Respondents are assumed to attribute a higher score to life situations they prefer. This assumption is implicit in all approaches that use subjective questions to elicit what matters to older persons. Although this is reasonable, it is also hard to test or reject empirically. Respondents may make mistakes, or have been reflecting about other things than their overall life situations when answering subjective questions. Under this consistency assumption, any subjective aging measure that is defined according to Definition 2 will evaluate the successful aging in the preferred life situation x_i as greater than or equal to the nonpreferred situation x'_i , so that TEST 1 is satisfied.

However, most policy-relevant comparisons of successful aging are not about intrapersonal, but interpersonal comparisons. When identifying good practices in aging policies, or when contemplating compensation for the worst-off, e.g., policy makers need to compare different

people in order to determine who is aging more successfully. Our second test therefore deals with these interpersonal comparisons. The test considers the case where two older persons hold unanimous preferences and rank all life situations in exactly the same way. TEST 2 checks whether a measure of successful aging is at least consistent with the preferences of older persons in this special case.

TEST 2: Interpersonal respect for preferences. If $\succsim_i = \succsim_j = \succsim$ and $x_i \succ x_j$, then $SA(x_i) \geq SA(x_j)$.

The test is illustrated in the bottom panel of Figure 1, where individual i in life situation x_i and individual j in life situation x_j have the same preferences. We see that these two older persons agree that life situation x_i is preferable to life situation x_j . TEST 2 then requires that the level of successful aging in situation x_i should be larger than or equal to the level of successful aging in situation x_j , so that we have that $SA(x_i) \geq SA(x_j)$.

The objective approach does not pass TEST 2. As we have seen for TEST 1, the objective measure of successful aging introduced in the previous section considers life situation x_j to be successful and situation x_i to be unsuccessful (i.e., $SA(x_i) < SA(x_j)$). This ranking contradicts the unanimously held opinions of both older persons. This result corroborates the concerns of paternalism that have been raised against the objective approach in the intrapersonal case.

Does the subjective approach pass TEST 2? To address this question, let's again consider the bottom panel of Figure 1. We see that both individuals prefer life situation x_i over x_j . Granting the subjective approach maximal chances to pass the test, we assume that both individuals attribute indeed a higher life satisfaction score to life situation x_i than to x_j . However, when we compare the scores that both individuals give to their own life situations, i.e., when we compare the score of person i (who is in life situation x_i) and person j (who is in life situation x_j), it is not at all certain that individual j would assign a *higher* score to life situation x_j than individual i attributes to life situation x_i . In other words, the subjective approach fails TEST 2. Underlying this—perhaps surprising—observation is the fact that individuals i and j have used the response scales of the subjective question in a different way. This may be because person j is more optimistic or applies lower reference values, even though the two respondents agree that the life situation of person j is worse than that of person i . The scores of the individual-specific satisfaction functions $s_i(\cdot)$ and $s_j(\cdot)$ can therefore not be compared across individuals. Given the policy relevance of the interpersonal TEST 2, this is an unfortunate result for any policy maker intending to apply a nonpaternalistic measure of successful aging.

We therefore propose a novel preference-based measure of successful aging that is consistent with both tests. In the preference-based measure, older persons use their own preferences to compare their life situation to a vector of thresholds $\bar{x}$. If they consider themselves to be better off than this threshold vector, they are considered to be aging successfully.

DEFINITION 3 (Preference-based).

$SA_{pref}(x_i) = 1$ if $x_i \geq \bar{x}$; and $SA_{pref}(x_i) = 0$ otherwise.

Individual preferences play a central role in the definition of the proposed measure. Preference-based measures will therefore pass both tests. A more formal proof of this intuitive result is provided in the online Supplementary Appendix.

Implementation With SHARE

We now turn our attention to the empirical implementation and comparison of the objective, subjective, and preference-based measures of successful aging. We use data from the SHARE, a rich data set containing information about respondents aged 50 or older from various European countries. We use Waves 2, 4, and 5 of SHARE, which were collected in 2007, 2011, and 2013, respectively (more details on the data set can be found in Börsch-Supan et al., (2013)). We restrict the sample to the 11 European countries participating in all three waves of the SHARE survey. These countries are Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, the Netherlands, Spain, Switzerland, and Sweden. In these countries, we restrict the sample to respondents aged 60 or older for whom we possess all the necessary information to be able to compute the three measures of successful aging and who are not proxy respondents. This leaves us with a total sample of 50,120 respondents.

We focus here on the implementation of the newly proposed preference-based measure. Therefore, we remain as close as possible to existing studies for the other two measures. In particular, we follow the study by Hank (2011) for the objective measure who focusses on five dimensions of successful aging: absence of disease and absence of disability, cognitive and physical functional capacity, and engagement with life. Table 1 presents the precise description, scaling and threshold value for each of the five dimensions in our data set. Each respondent in the sample obtains a score on the five dimensions. To see whether the older person is aging successfully, the scores are compared to the corresponding threshold values, which are given in the last column of the table.

For the subjective approach, we use the life satisfaction question, which respondents answer on a 0–10 scale. We identify all individuals as aging successfully who report 9 or 10 on this question. A similar procedure is used by Strawbridge and colleagues (2002). The choice for the cut-off value $\bar{s} = 9$ is clearly arbitrary, but leads to comparable figures as reported by Strawbridge and coauthors. A different cutoff value would affect the quantitative results presented in this paper, but not its main point.

The main empirical challenge for the preference-based approach is to obtain information about older person's preferences. At least two methods can be used to obtain such information. A first method is to ask respondents directly about how important various aspects of life are for them (e.g., Bowling and Dieppe, 2005 and Bowling and Iliffe, 2006). However, this method would remain silent about the question how multidimensional life situations are compared and, moreover, the SHARE data set does not contain such questions. Therefore, we follow a second—more indirect—method, based on a life satisfaction regression.

The regression-based approach is discussed by Clark and Oswald (2002) in the context of individuals' preferences regarding nonmarket life aspects such as health and employment. More recently, Decancq and colleagues (2015) and Decancq and Schokkaert (2016) have explored it to implement preference-based well-being measures. The central idea behind this method is to estimate a statistical model that explains the observed life satisfaction scores based on the five dimensions of successful aging. In this model, we control for observable factors that capture the reference frames and expectations used by the respondents when answering the life satisfaction question.

The online Supplementary Appendix provides a precise description of the statistical life satisfaction model. In practice, the model is implemented using an ordered logit regression that is available in standard statistical software. The dependent variable is the reported life satisfaction of each respondent. The explanatory variables are the five dimensions together with some control variables such as age, education, and country of residence. To allow for different preferences for different sociodemographic groups, we include interactions between the dimensions and several

Table 1. Dimensions, Scales, and Thresholds for the Objective Approach

Dimension	Description	Scale	Threshold
Absence of disease	Number of a list of chronic diseases and depression that the respondent does not suffer from.	0–6	6
Absence of disability	Number of activities of daily living that the respondent can perform without difficulties.	0–6	6
Cognitive functioning	Cognitive functioning index proposed by Dewey and Prince (2005).	0–29	13
Physical functioning	Number of activities that the respondent can perform without difficulties.	0–6	5
Active engagement	Minimum of: (1) sum of indicators whether respondent has done paid work, voluntary work, or having provided grandchild care (2) sum of indicators whether respondent is living with a partner, having provided help to family and friends, or having gone to a sport, social, or other kind of club.	0–3	1

sociodemographic indicators. These indicators are dummies indicating sex, age (being older than 73 or not), and citizenship of four country groups: the reference group consists of Belgium, the Czech Republic, France, Germany, and the Netherlands; a second group consists of Denmark and Sweden; a third group of Italy and Spain; and a final group of Switzerland and Austria.

The relevant estimation results are summarized in Table 2. The first row of the table shows the direct effect, which is the coefficient in the life satisfaction regression given to each dimension by a female person aged between 65 and 73 who is living in the reference group of countries. In the table, we see that the coefficient of “absence of disease” is 8.07. The interaction terms with male are given in the row below, so that the coefficient of the dimension “absence of disease” for a man of the same age in the same group of countries is $(8.07 - 1.42 = 6.65)$ and so on. We find that men care less about the absence of disease than women, for instance. The consecutive rows show the interaction effects for age and various country groups. We see that several interaction terms are significant, which is indicative of preference heterogeneity. All coefficients stand to reason, although we note that a cognitive functioning is attributed a negative weight in the Scandinavian countries (indeed, $2.73 - 5.36 = -2.63$). It is unclear whether a similar result would be obtained using other data sources or whether this is a statistical artefact driven by outliers or measurement error in the SHARE data.

In a final step, the statistical model can be used to predict for each person in the sample whether her life satisfaction for the threshold vector $\bar{x}$ would be higher or lower compared to the current situation. Under the consistency assumption that life satisfaction scores track preferences, this is equivalent to performing a test whether she prefers the threshold vector over her own life situation or not, precisely as Definition 3 prescribes.

Results

We compare the three different approaches to measuring successful aging. We first look at the level and evolution of successful aging in Europe and then we compare country rankings according to the three measures.

Figure 2 presents the share of people who are aging successfully in Europe taking sample weights into account. We see that the level of successful aging according to the subjective- and preference-based approaches is higher than it is according to the objective approach. The finding that subjective measures lead to more successful aging compared to objective measures is well-documented (e.g., Strawbridge et al., 2002 and Cosco et al., 2013). Yet, as we have discussed before, the level of successful aging according to the subjective approach is driven by the arbitrary choice of the cutoff value $\bar{s}$.

Next, we look at the evolution of successful aging over the period considered. For the objective- and preference-based approaches, the year 2011 (Wave 4) yields the lowest level of successful aging. On the contrary, with the subjective approach the level of successful aging is the highest in 2011. Without further research, it is hard to interpret these results conclusively. Yet, possibly as a consequence of the great recession, the objective life situations of the older persons were worst in 2011. At the same time, however, older persons may also have adjusted their reference frames and expectations downwardly, to the extent that their self-reported life satisfaction scores were actually *higher*, as reflected in a higher measurement of subjective aging. That is not to say that the older persons preferred their situation in 2011 to that in 2007, however, as documented by the preference-based measure in the figure.

How do the different countries rank according to the three measures? Policy makers, media, public opinion, and international institutions like to compare the performance of the different countries in league tables (for an example, see WHO 2015). In Figure 3, we show the share of people who

Table 2. Regression Coefficients of the Dimensions of Successful Aging for Different Sociodemographic Groups

	Absence of disease	Absence of disability	Cognitive function	Physical function	Active engagement
Direct effect	8.07*** (0.45)	11.16*** (1.60)	2.73** (0.84)	5.44*** (0.45)	11.21*** (2.76)
Interaction with Male	-1.42** (0.45)	-3.89* (1.72)	1.24 (0.84)	0.65 (0.47)	0.40 (2.90)
Old	-0.93* (0.43)	0.96 (1.27)	0.92 (0.74)	-0.55 (0.44)	1.04 (2.89)
Denmark and Sweden	-0.24 (0.72)	7.93* (3.12)	-5.36*** (1.41)	0.49 (0.79)	5.57 (4.06)
Italy and Spain	0.82 (0.58)	2.04 (1.97)	4.31*** (1.10)	-0.93+ (0.55)	8.84* (4.39)
Switzerland and Austria	1.74* (0.70)	1.93 (2.87)	0.42 (1.43)	2.53*** (0.73)	-2.64 (4.32)

Note: Pooled regression coefficients from SHARE Waves 2, 4, and 5, estimated with an ordered logit model. The standard errors in parentheses are clustered at the individual level. Coefficients and standard errors are multiplied with 100 to improve readability. SHARE = Survey of Health, Ageing and Retirement in Europe.

* $p < .10$, ** $p < .05$, *** $p < .01$, **** $p < .001$.

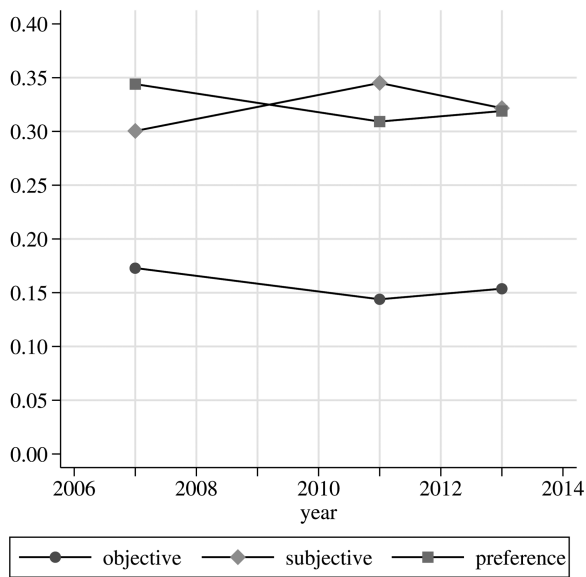


Figure 2. Percentage of older persons who are aging successfully in Europe.

are aging successfully in each country in 2007 (left-hand panel) and 2013 (right-hand panel). The countries are ranked from top to bottom according to their objective successful aging scores. According to the objective scores, we can distinguish a frontrunner group consisting of Switzerland, the Netherlands, Denmark, and Sweden; an intermediate group with Germany, Belgium, Austria, and France; and a bottom group containing Spain, Italy, and the Czech Republic. When comparing the results obtained with the objective measure across both panels, we see that countries stay within their group over time, but may switch places.

The countries categorized in the bottom group seem quite robust for the use of the measure, whereas the frontrunner group seems more prone to change. The Netherlands falls from the frontrunner group to the intermediate (or bottom) group when considering the subjective approach; similarly, France may be categorized among the lowest rather than the intermediate performers. The Scandinavian countries score worse with the preference-based measure compared to the other measures.

Finally, when considering the Pearson correlation coefficient between the share of people who are aging successfully in each country according to the different measures in each wave, we see that consistently the correlation is lowest between the subjective successful aging measure and the preference-based measure (0.53 and 0.36, respectively) and highest between the objective successful aging measure and the preference-based measure (0.67 and 0.83, respectively).

Discussion

At the end of their authoritative survey article, Peter Martin and colleagues (2015: 22) identify four open questions for the next generations of gerontologists to consider. Their third question is: “How important are individual perceptions in the measurement of successful aging?” We believe

that these individual perceptions (or preferences in the jargon of this paper) are crucially important when measuring levels of successful aging.

We have studied, methodologically and empirically, how the measurement of successful aging can incorporate these preferences. First, we set out to ascertain whether existing—objective or subjective—measures of successful aging are consistent with the preferences of older persons using two explicit litmus tests. We found the objective and subjective measures to be structurally inconsistent with preferences of the older persons, even when they are held unanimously. Next, we proposed a novel preference-based approach and demonstrated how it can be implemented using an existing data set. Our empirical investigations have shown that different measures offer a different perspective on successful aging in Europe in terms of its evolution over time and country rankings. Successful aging measured by a subjective measure is highest in 2011 compared to 2007 and 2013, for instance, whereas the ranking is reversed for the objective- and preference-based measures. The position of some countries, such as the Netherlands and France, in a league table of successful aging differs dramatically depending on the measure used. These findings highlight the empirical relevance of the open question formulated by Martin and colleagues (2015).

The preference-based approach is still in its infancy: much work remains to be done. As an alternative to the regression-based approach used in this paper, a more direct approach to elicit preferences might be developed, for instance. To this end, a tailored and specific survey instrument would need to be designed that asks older persons directly to compare their own life situations with the threshold vector. Moreover, pressing theoretical questions relating to the preference-based approach remain unanswered, including that of the identification of the relevant preferences of older persons suffering dementia and cognitive decline.

Given the interest of policy makers in the notion of successful aging (WHO, 2015, for instance), the choice for a particular measure of successful aging has clear policy implications when it comes to the identification of best practices in cross-country comparisons, recommendations for desirable policies, the choice of priorities in care provision and treatment for health care professionals, and so on. The main message of this paper is that policy makers who want to be nonpaternalistic when measuring successful aging should not use an objective or subjective measure, but rather a preference-based one. Other criteria, however, may favor non-preference-based measures. It is an open question, for instance, how well a preference-based measured tracks population health and, hence, what the medical and clinical implications are of using a nonpaternalistic preference-based measure of successful aging. These questions are left for further research.

Selecting a measure of successful aging is inherently a matter of value judgments about the meaning of *successful* and who should define it. Inevitably, different researchers,

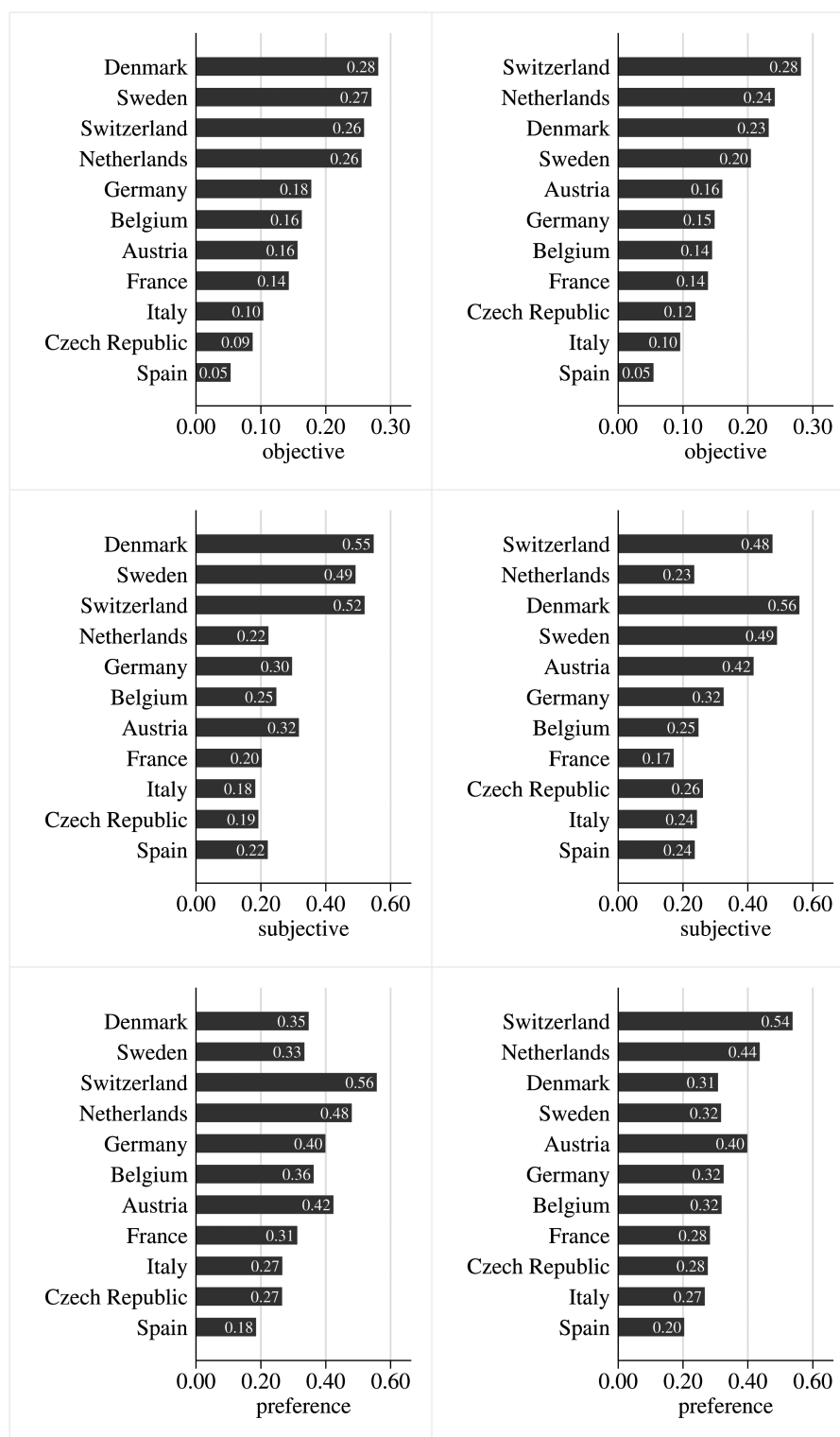


Figure 3. Percentage of older persons who are aging successfully in Europe in 2007 (left) and 2013 (right).

policy makers, and older persons will disagree on those issues. We therefore believe that the diversity of successful aging measures in the current literature is a blessing rather than a curse.

Supplementary Material

Supplementary material are available at *The Journals of Gerontology Series B: Psychological and Social Sciences* online.

Funding

This work was supported by the Flemish Research Council (FWO) (grant number G021013N).

Acknowledgment

We are grateful to Karsten Hank for sharing his STATA programming code with us. We thank Marc Fleurbaey, Tim Goedemé, Karsten Hank, Javier Olivera, Annemie Nys, Karel Van den Bosch, and participants in seminars at the University of Antwerp, University of Leuven, Fondation Maison Des Sciences De L'homme (Paris), and Princeton University for helpful comments. K. Decancq thanks the Center for Health and Wellbeing at Princeton University for the generous hospitality during the academic year 2015–2016. This paper uses data from SHARE Waves 2, 4, and 5 (DOIs: 10.6103/SHARE.w2.260, 10.6103/SHARE.w4.111, 10.6103/SHARE.w5.100, for additional information, see <http://www.share-project.org>).

Author Contributions

K. Decancq planned the study, supervised the data analysis, and wrote the paper.

A. Michiels helped to perform the statistical analysis and contributed to revising the paper.

Conflict of Interest

There is no conflict of interest.

References

- Bowling, A., & Dieppe, P. (2005). What is successful ageing and who should define it? *BMJ (Clinical Research ed.)*, 331, 1548–1551. doi:10.1136/bmj.331.7531.1548
- Bowling, A., & Iliffe, S. (2006). Which model of successful ageing should be used? Baseline findings from a British longitudinal survey of ageing. *Age and Ageing*, 35, 607–614. doi:10.1093/ageing/af1100
- Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., ... Zuber, S.; SHARE Central Coordination Team. (2013). Data Resource Profile: the Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology*, 42, 992–1001. doi:10.1093/ije/dyt088
- Clark, A. E., & Oswald, A. J. (2002). A simple statistical method for measuring how life events affect happiness. *International Journal of Epidemiology*, 31, 1139–1144; discussion 1144. doi:10.1093/ije/31.6.1139
- Cosco, T. D., Prina, A. M., Perales, J., Stephan, B. C., & Brayne, C. (2013). Lay perspectives of successful ageing: a systematic review and meta-ethnography. *BMJ Open*, 3. doi:10.1136/bmjopen-2013-002710
- Decancq, K., Fleurbaey, M., & Schokkaert, E. (2015). Happiness, equivalent incomes, and respect for individual preferences. *Economica*, 82, 1082–1106. doi:10.1111/ecca.12152
- Decancq, K., & Schokkaert, E. (2016). Beyond GDP: using equivalent incomes to measure well-being in Europe. *Social Indicators Research*, 126, 21–55. doi:10.1007/s11205-015-0885-x
- Depp, C. A., & Jeste, D. V. (2006). Definitions and predictors of successful aging: a comprehensive review of larger quantitative studies. *The American Journal of Geriatric Psychiatry*, 14, 6–20. doi:10.1097/01.JGP.0000192501.03069.bc
- Dewey, M., & Prince, M. (2005). Cognitive function. In H., Jürges, J., Mackenbach, J., Siegrist, G., Weber, A., Börsch-Supan, A., Brugiavini, (Eds.), *Health, ageing and retirement in Europe—First results from SHARE* (pp. 118–125). Mannheim, Germany: MEA.
- Fleurbaey, M., and Blanchet, D. (2013). *Beyond GDP: Measuring Welfare and Assessing Sustainability*. Oxford: Oxford University Press.
- Glass, T. A. (2003). Assessing the success of successful aging. *Annals of Internal Medicine*, 139, 382–383. doi:10.7326/0003-4819-139-5_Part_1-200309020-00015
- Hank, K. (2011). How “successful” do older Europeans age? Findings from SHARE. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 66B, 230–236. doi:10.1093/geronb/gbq089
- Havighurst, R. J. (1961). Successful aging. *The Gerontologist*, 1, 8–13. doi:10.1093/geront/1.1.8
- Huijg, J. M., van Delden, A. L., van der Ouderaa, F. J., Westendorp, R. G., Slaets, J. P., & Lindenberg, J. (2017). Being active, engaged, and healthy: older persons’ plans and wishes to age successfully. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 72, 228–236. doi:10.1093/geronb/gbw107
- Martin, P., Kelly, N., Kahana, B., Kahana, E., Willcox, B. J., Willcox, D. C., & Poon, L. W. (2015). Defining successful aging: a tangible or elusive concept? *The Gerontologist*, 55, 14–25. doi:10.1093/geront/gnu044
- McLaughlin, S. J., Connell, C. M., Heeringa, S. G., Li, L. W., & Roberts, J. S. (2010). Successful aging in the United States: prevalence estimates from a national sample of older adults. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 65B, 216–226. doi:10.1093/geronb/gbp101
- Phelan, E. A., Anderson, L. A., LaCroix, A. Z., & Larson, E. B. (2004). Older adults’ views of “successful aging”—how do they compare with researchers’ definitions? *Journal of the American Geriatrics Society*, 52, 211–216. doi:10.1111/j.1532-5415.2004.52056.x
- Phelan, E. A., & Larson, E. B. (2002). “Successful aging”—where next? *Journal of the American Geriatrics Society*, 50, 1306–1308. doi:10.1046/j.1532-5415.2002.50324.x
- Rowe, J. W., & Kahn, R. L. (1987). Human aging: usual and successful. *Science (New York, N.Y.)*, 237, 143–149. doi:10.1126/science.3299702
- Rowe, J. W., & Kahn, R. L. (1997). Successful aging. *The Gerontologist*, 37, 433–440. doi:10.1093/geront/37.4.433
- Schwarz, N., & Strack, F. (1999). Reports of subjective well-being: judgmental processes and their methodological implications. In D. Kahneman, E. Diener, N. Schwarz (Eds.), *Well-Being: The Foundations of Hedonic Psychology*, 7, 61–84. New York, NY: Russell Sage Foundation.
- Strawbridge, W. J., Wallhagen, M. I., & Cohen, R. D. (2002). Successful aging and well-being: self-rated compared with Rowe and Kahn. *The Gerontologist*, 42, 727–733. doi:10.1093/geront/42.6.727
- WHO. (2015). World report on ageing and health. Retrieved February 22, 2017, from www.who.int