

## REVIEW

## Definitions of successful ageing: A brief review of a multidimensional concept

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**Summary.** Successful ageing has become an important concept to describe the quality of ageing. It is a multidimensional concept, and the main focus is how to expand functional years in a later life span. The concept has developed from a biomedical approach to a wider understanding of social and psychological adaptation processes in later life. However, a standard definition of successful ageing remains unclear and various operational definitions of concept have been used in various studies. In this review we will describe some definitions and operational indicators of successful ageing with a multidimensional approach. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** healthy ageing, quality of life, functionality

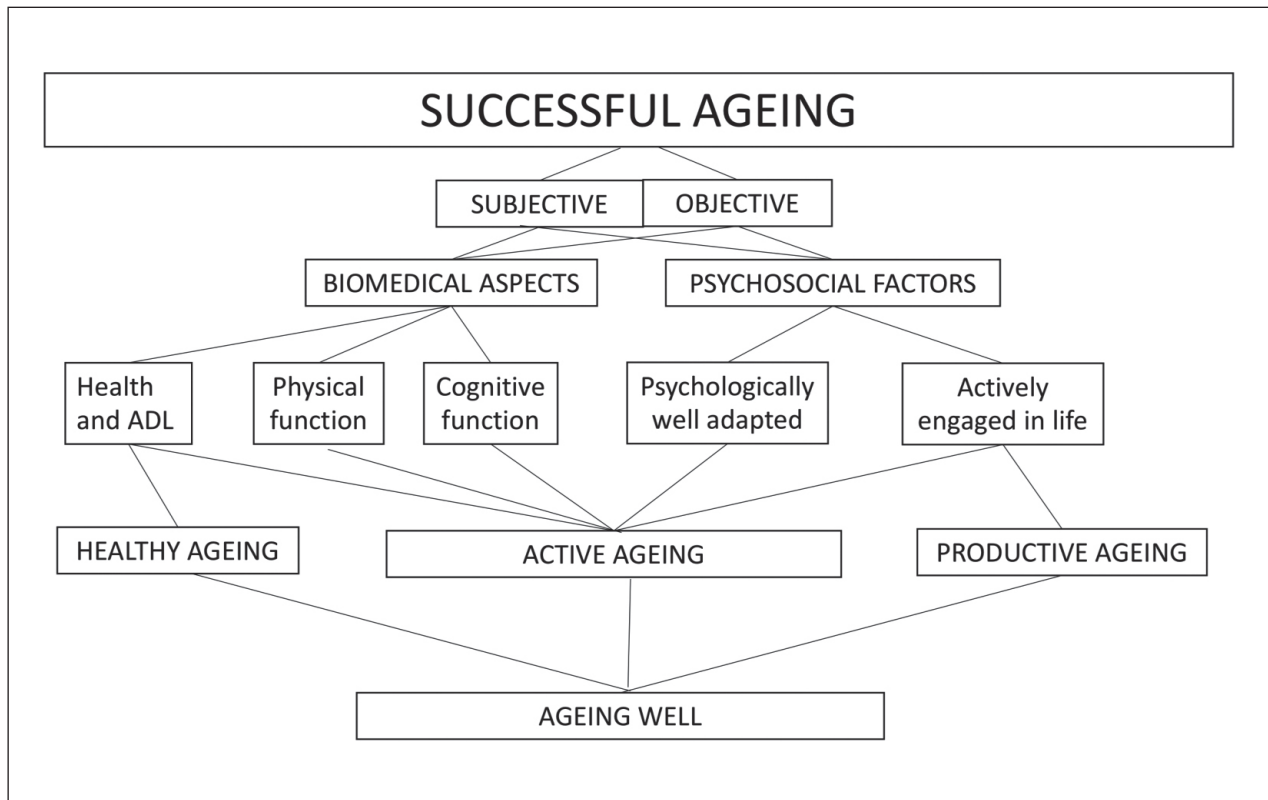
### Introduction

In recent years, the concept of successful ageing has induced much debate (1-3), and various definitions of the concept have been introduced in various studies (4). According to the classic concept of Rowe and Kahn, successful ageing is defined as high physical, psychological, and social functioning in old age without major diseases (5, 6). In this brief review we use the classic name, although several terms of this concept, such as healthy ageing, active ageing, productive ageing, and ageing well, etc. have been used in the field (7). The relationship of these terms, and the dimensions of successful ageing are presented in the Figure 1.

The main focus in the concept of successful ageing is how to expand healthy and functional years in the life span (8, 9). The phenomenon of successful ageing can be viewed from a population or an individual perspective (7). At the population level, definition includes determinants of health and participation for the purpose of promoting policies, whereas at the individ-

ual level it is defined by outcomes of health, physical, and cognitive function, and life involvement (7). Because, successful ageing is a multidimensional concept encompassing domains of physical, functional, social, and psychological health, all of these dimensions should be taken into account, both with objective and subjective conditions, when studying the phenomenon (4, 8, 10, 11).

Kim and Park (12) conducted a meta-analysis of the correlates of successful ageing and they identified that four domains describing successful ageing were; avoiding disease and disability, having high cognitive, mental and physical function, being actively engaged in life, and being psychologically well adapted in later life. Similarly, in the model of "Ageing well" by Fernandez-Ballesteros et al. (13, 14), successful ageing is defined by the domains of health and activities of daily living (ADL), physical and cognitive functioning, social participation and engagement, and also positive affect and control, when the definition by Baltes et colleagues (15, 16) is also considered. Kok et al. (18) found in



**Figure 1.** The dimensions of successful ageing. Modified from Fernandez-Ballesteros 2019, (7).

their study that many older adults were ageing relatively successfully, but there was a variation between indicators of characters of successful ageing, and the combinations of successful indicators varied also between individuals.

Most definitions of successful ageing include also outcomes which can be described as the operational definitions of the concept (7). The operational definitions are generally based on objective measurements of health and functionality and do not necessarily take into account individual's perceptions of their own health and wellbeing which would give more comprehensive view of ageing (4). Kleinedam and colleagues (19) have suggested that well-constructed operationalisation of successful ageing includes measurements of physiological health, well-being and social engagement, with subjective and objective aspects.

The aim of this brief review is to describe and discuss about conceptual and operational definitions of successful ageing with the multidimensional approach.

## Biomedical aspects

### *Physiological function*

Over the last decades, life expectancy has increased substantially. The increasing number of individuals reach over 80 years of age which has led to growing prone of multimorbidity, frailty and disability in older population (20). The cohort studies have shown that morbidity and functional limitations are associated with lower quality of life in old age (21, 22). Recent study showed that a good SRH and low levels of cardiovascular risk factors in midlife are associated with active and healthy ageing (23).

The concept of successful and healthy ageing has been generally associated with longevity, and the absence of disease and disability, which is based on the definition of successful ageing by Rowe and Kahn (5, 6).

Many studies have focused on longevity research to define successful ageing, highlighting the impor-

tance of having lived a very long and healthy life (10). The study of Andersen-Ranberg and colleagues suggested that “healthy centenarians do not exist, but autonomous centenarians do,” which shows that longevity may have a price (10, 24). In addition, very few of the centenarians would be classified as “successful” according to Rowe and Kahn’s criteria (10).

Avoiding disease and disability is common criterion also in the studies of successful ageing (12). However, recent studies have suggested that absence of disease and disability is not the most important element in the concept of successful ageing, and people with chronic disease can also age successfully (15, 25, 26). Young and colleagues’ model of successful ageing (17), and also the model of selective optimisation with compensation proposed by Baltes and Baltes (15, 16), takes into account adaptive psychological and social mechanisms which can compensate limitations of physiological health. Manierre (27) has demonstrated that Young and colleagues’ model provides a holistic perspective of successful ageing among people with chronic diseases.

### *Cognitive function*

Maintaining cognitive abilities and preventing memory disorders are key aims in old age (28). Hartley et al. (28) have suggested that successful cognitive functioning should be a central component of successful ageing. Cognitive development in old age differs individually (28). Longitudinal studies have shown that midlife is a critical period for the beginning of the pathology of cognitive disorders, although indicators of the disease process remain still poorly understood (29). A compensation for age-related changes, a reliance on memory, and a cognitive reserve are themes that might explain higher cognitive functioning in old age among some individuals (28). According to this, relatively higher function may reflect relatively more successful ageing (28).

The cognitive functioning comprises perception, attention, memory, and higher functions, but indicators of successful cognitive functioning are often chosen to tap particular dimensions of functioning (28). Depp and Jeste (11) found that 13 of 29 operational definitions of successful ageing consisted indicators of

cognitive functioning, and eight of those used a clinical assessment tool as an indicator. They also found that standards for successful cognitive ageing have large differences in studies (11, 28). Hartley and colleagues suggest that the clinical cognitive measurements may not be optimal for reflecting of current thinking in cognitive psychology (28).

### *Physical function*

The furthest developed domain of successful ageing is physical functioning (30). Maintaining physical function is an important component of successful ageing (31). Regular physical activity during the life span is a strong predictor of healthy ageing (30–33). Decrease of muscle mass and muscle strength are related to ageing processes, but also to chronic diseases and lifestyle (nutrition, physical inactivity) (31). Sarcopenia is characterised by low muscle strength and low muscle mass and quantity, and it is associated with the development of functional disability (34). Sarcopenia is also a component of frailty, which is a syndrome that refers to vulnerability to stressors, loss of reserves, and an increased risk to functional disability and mortality (31).

The indicators of mobility performance and physical function are well known, and there is a consensus of measures and evaluation, for example, walking speed is an excellent marker of overall health and predicts the maintenance of physical function (30). The indicators of mobility performance and physical function can include both objective and subjective measures, for example ability to perform ADL and physical performance tests (30, 31). Chronic pain is a common condition in older adults and contributes to functional decline and limitation of activity (35).

### **Psychosocial factors**

Psychosocial conditions contribute to ageing processes (15). Baltes and Baltes (15) have proposed the model of selective optimisation with compensation (SOC) which explains adaptation to deficits of ageing with successful psychological and behavioural processes. The SOC model consists both objective and sub-

jective criteria and reflects people's capacity to make choices that suit best to individual resources. In addition, Young and colleagues have proposed an alternative model which captures the possibility to compensate physiological limitations with psychological and social dimensions (17). According to the study of Kim and Park (12), older adults can age successfully, if they are socially active and psychologically well adapted, even though they encounter decline of physical and cognitive function.

#### *Actively engaged in life*

Good social functioning is often determined as an important factor in successful ageing, especially by older adults themselves (36). It reflects a wish to retain a role in society and being involved with people (36). Social functioning includes indicators of loneliness, social activity, and emotional and instrumental support given to others. For example, the participants could be defined as being actively engaged, if they have reported involvement in voluntary work, or participating in a sport, social or other kind of club (36).

#### *Psychologically well adapted in later life*

Recent studies have shown that life satisfaction, purpose in life, and perception of the ageing process contributed to ageing successfully, and therefore psychological domain of adaptation in later life is an important part of successful ageing (9). Emotional functioning could be assessed by depressive symptoms and satisfaction with life (15), and subjective feeling could be assessed with questions, e.g. "describe how successfully you have aged" (21).

### Conclusions

Definition of successful ageing has shifted from biomedical to more holistic view, and towards more subjective aspects of the ageing process (1). The multidimensional approach of successful ageing could be more informative than focus on single health outcomes, such as chronic diseases or functioning (1), and therefore it can be used for understanding and pro-

moting the concept in the populations of ageing societies. There still remains need for universal description and consensus of successful ageing which incorporate broad scientific evidence, and also need for operational definitions of indicators for this phenomenon.

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### Reference

1. Calasanti T. Combating ageism: How successful is successful aging? *The Gerontologist*. 2016; 56: 1093–1101. doi:10.1093/geront/gnv076.
2. Katz S, Calasanti T. Critical perspectives on successful aging: Does it 'appeal more than it illuminates'? *The Gerontologist* 2015; 55: 26–33. doi:10.1093/geront/gnu027.
3. Bülow MH, Söderqvist T. Successful ageing: A historical overview and critical analysis of a successful concept. *Journal of Aging Studies* 2014; 31: 139–149. <http://dx.doi.org/10.1016/j.jaging.2014.08.009> 0890–4065.
4. Cosco TD, Prina AM, Perales J, Stephan BC, Brayne C. Operational definitions of successful aging: A systematic review. *International Psychogeriatrics* 2014; 26: 373–381. doi:10.1017/S1041610213002287.
5. Rowe JW, Kahn RL. *Human aging: usual and successful*. Science (New York, NY) 1987; 237: 143–149.
6. Rowe JW, Kahn RL. Successful aging. *The Gerontologist* 1997; 37: 433–440.
7. Fernandez-Ballesteros R. The Concept of successful aging and related terms. In Fernandez-Ballesteros R, Benetos A, Robine J-M (Eds.). *The Cambridge handbook of successful aging*. (pp. 6–22). Cambridge University Press 2019.
8. Fries JF. Aging, natural death, and the compression of morbidity. *New England Journal of Medicine* 1980; 303: 130–135.
9. Kivimäki M, Ferrie JE. Epidemiology of healthy aging and the idea of more refined outcome measures. *International Journal of Epidemiology* 2011; 40: 845–847.
10. Martin P, Kelly N, Kahana B, et al. Defining successful aging: A tangible or elusive concept? *The Gerontologist* 2014; 55(1): 14–25. doi:10.1093/geront/gnu044
11. Depp CA & Jeste DV. Definitions and predictors of successful aging: A comprehensive review of larger quantitative studies. *The American Journal of Geriatric Psychiatry* 2006; 14: 6–20. doi:10.1097/01.JGP.0000192501.03069.bc.
12. Kim S-H, Park S. A Meta-analysis of the correlates of successful aging in older adults. *Research on Aging* 2016; 39(5): 657–677. doi: 10.1177/0164027516656040.

13. Fernández-Ballesteros R, García LF, Abarca D, et al. Lay concept of aging well: Cross-cultural comparisons. *Journal of the American Geriatrics Society* 2008; 56: 950-952. doi:10.1111/j.1532-5415.2008.01654.x.
14. Fernández-Ballesteros R, Robine JM, Walker A, Kalache A. Active Aging: A Global Goal. *Current Gerontology and Geriatrics Research* 2013; Article ID 298012. doi.org/10.1155/2013/298012.
15. Baltes PB, Baltes MM. Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes, M.M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences*. (pp. 1-34). New York: Cambridge University Press 1990.
16. Baltes PB. On the incomplete architecture of human ontogeny. Selection, optimization, and compensation as foundation of developmental theory. *The American Psychologist* 1997; 52: 366-380. doi:10.1037//0003-066X.52.4.366.
17. Young Y, Frick KD, Phelan EA. Can successful aging and chronic illness coexist in the same individual? A multidimensional concept of successful aging. *JAMDA* 2009; 10: 87-92. doi:10.1016/j.jamda.2008.11.003.
18. Kok AA, Aartsen MJ, Deeg DJ, Huisman M. Capturing the diversity of successful aging: An Operational definition based on 16-year trajectories of functioning. *The Gerontologist* 2015; 57(2): 240-251. doi:10.1093/geront/gnv127.
19. Kleinedam L, Thoma M, Maercker A et al. What is successful aging? A Psychometric validation study of different construct definitions. *The Gerontologist* 2018; 20: 1-11. doi:10.1093/geront/gny083.
20. Newman AB, Murabito JM. The epidemiology of longevity and exceptional survival. *Epidemiol Rev* 2013; 35(1): 181-97. doi: 10.1093/epirev/mxs013.
21. Strandberg AY, Strandberg TE, Stenholm S, Salomaa VV, Pitkälä KH, Tilvis RS. Low midlife blood pressure, survival, comorbidity, and health-related quality of life in old age: the Helsinki Businessmen study. *Journal of Hypertension* 2014; 32: 1797-1804. doi:10.1097/HJH.0000000000000265.
22. Davis JC, Bryan S, Best JR, et al. Mobility predicts change in older adults' health-related quality of life: evidence from a Vancouver falls prevention prospective cohort study. *Health Qual Life Outcomes* 2015; 13: 101. doi: 10.1186/s12955-015-0299-0.
23. Urtamo A, Huohvanainen E, Pitkälä KH, Strandberg TE. Midlife predictors of active and healthy aging (AHA) among older businessmen. *Aging Clin Exp Res* 2019; 31: 225. doi.org/10.1007/s40520-018-1100-0.
24. Andersen-Ranberg K, Schroll M, Jeune B. Healthy centenarians do not exist, but autonomous do: A population-based study of morbidity among Danish centenarians. *Journal of the American Geriatrics Society*. 2001; 49: 900-908. doi:10.1046/j.1532-5415.2001.49180.x.
25. Nosraty L, Jylhä M, Raittila T, Lumme-Sandt K. Perceptions by the oldest old of successful aging, Vitality 90+ Study. *Journal of Aging Studies* 2015; 32: 50-58. doi:10.1016/j.jaging.2015.01.002.
26. Pruchno RA, Wilson-Genderson M. A Longitudinal examination of the effects of early influences and midlife characteristics on successful aging. *J Gerontol B Psychol Sci Soc Sci* 2015; 70(6): 850-859. doi:10.1093/geronb/gbu046.
27. Manierre M. Successful present, successful future? Assessment of a nonbinary model of successful aging. *The Gerontologist* 2018; 20: 1-11. doi:10.1093/geront/gnx198.
28. Hartley A, Angel L, Castel A, et al. Successful aging: The role of cognitive gerontology. *Experimental Aging Research* 2018; 44(1): 82-93, doi: 10.1080/0361073X.2017.1398849.
29. Irwin K, Sexton C, Daniel T, Lawlor B, Naci L. Healthy Aging and Dementia: Two Roads Diverging in Midlife? *Front Aging Neurosci* 2018; 10: 275. doi:10.3389/fnagi.2018.00275.
30. Anton SD, Woods AJ, Ashizawa T, et al. Successful aging: Advancing the science of physical independence in older adults. *Ageing Research Reviews* 2015; 24: B304-327. doi.org/10.1016/j.arr.2015.09.005.
31. Strandberg TE. Preventive effects of physical activity in older people. In Fernandez-Ballesteros R, Benetos A, Robine J-M (Eds.). *The Cambridge handbook of successful aging*. (pp. 169-178). Cambridge University Press 2019.
32. WHO. World Report on Ageing and Health. 2015. [https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811_eng.pdf).
33. Sabia S, Singh-Manoux A, Hagger-Johnson G, Cambois EJ, Kivimäki M. Influence of individual and combined healthy behaviours on successful aging. *Canadian Medical Association Journal* 2012; 18: 1985-1992. doi: 10.1503/cmaj.121080.
34. Cruz-Jentoft AJ, Bahat G, Bauer J, et al. Writing Group for the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), and the Extended Group for EWGSOP2. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing* 2019; 48(1): 16-31. doi: 10.1093/ageing/afy169.
35. Karttunen NM, Turunen J, Ahonen R, Hartikainen S. More attention to pain management in community-dwelling older persons with chronic musculoskeletal pain. *Age Ageing* 2014; 43: 845-850.
36. Jopp DS, Wozniak D, Damarin AK, De Feo M, Jung S, Jeswani S. How could lay perspectives on successful aging complement scientific theory? Findings from a U.S. and a German life-span sample. *Gerontologist* 2014; 55(1): 91-106. doi:10.1093/geront/gnu059

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