

# Successful aging: how does physical activity influence engagement with life?

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**Abstract** With the increasing number of individuals over the age of 65 years worldwide, it is critical for society to recognize the importance of helping seniors maintain their health, physical, and cognitive functioning as well as their engagement with life. These three dimensions provide the foundation for successful aging (SA). The positive role of engagement with life has been understated to date in the literature. This review highlights the components of SA with particular emphasis on engagement and how physical activity positively impacts engagement which in turn positively influences health and physical function.

**Keywords** Aging · Successful aging · Engagement · Physical activity

## Dimensions of successful aging

The report prepared by the United Nations for their World Assembly on Ageing in 2002 noted that current aging trends worldwide are unprecedented in human history. Canada, for example, has a rapidly increasing number of individuals over the age of 65 years. This demographic accounted for 11.5 % of the total Canadian population in 2006 [32] and is expected to rise to 20 % by 2026 [13]. As “baby boomers” (i.e., those born between 1946 and 1964) reach the age of

65 years, the aging population is expected to continue to grow, resulting in an increase in the elderly dependency ratio, or a higher ratio of older adults to younger adults [3]. The impact of an aging society can be felt in many sectors from the funding of pensions, to healthcare, to increased spending on disability [23]. Therefore, it is imperative for society as a whole to recognize the importance of helping seniors maintain their health, physical and cognitive functioning, and their engagement with life. These three dimensions provide the foundation for successful aging (SA) [26].

SA has mainly been defined in two different ways. The first reflects a continuous adaptation to age-related changes where aging presents unavoidable declines in performance as well as function; and an individual must learn how to productively live with these deteriorations [2]. The second, and more common approach, defines SA as a state of being that may be objectively measured at a particular moment in any stage of life. These measures include variables such as disease and disability [12], cognitive performance [29], physical functioning [30, 33], as well as life satisfaction [24]. Over the past few decades, both of these views of SA have been incorporated into many different models and frameworks, all of which include various factors and criteria [8].

Rowe and Khan's [26] model of SA has been the most commonly used and widely accepted in research [1, 26]. They reported that most aging research focuses on “losses”; leading many geriatricians to believe that decreases in cognitive and physical function are simply a product of aging, even when disease and pathology are absent. [26]. Rowe and Kahn suggested that the aging process is more nuanced and that “normal” aging can be divided into two categories: usual aging and successful aging. Usual aging is defined as typical non-pathological age-related cognitive and physical

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losses [26]. While these older individuals are fortunate to be disease free, decreases in cognitive and physical function are still present which puts them at risk for illness/disability. Successful agers, on the other hand, are individuals who exhibit minimal or no cognitive and physical losses when compared to their younger selves. They are at low risk for disease and are generally high functioning adults [27]. One important contribution from Rowe and Kahn [28] is the power to which lifestyle-related factors such as diet, smoking, and exercise can influence the aging process. They suggest that when lifestyle factors are managed and "... people realize their potential benefits, we can finally make the move from a gerontology of inevitable decline to one of sustained success" [28, p.54].

Rowe and Khan [27] describe SA as containing three main components. The first is a low probability of disease and disease-related disability. This not only includes the absence of disease but also the absence of risk factors for disease. Common risks for disease include abdominal fat, changes in systolic blood pressure, or decreases in organ and immune function [5, 11, 31]. The second component of the model is high mental and physical functioning. This includes the *potential for* function and activity, as it is more important to know what an individual is capable of doing, not simply what they are doing. The final component is active engagement with life. This component of Rowe and Khan's model primarily focuses on interpersonal relations and productive activity. Interpersonal relations are classified as contact with others (i.e., emotional support), whereas productive activities must create societal value, such as through paid or volunteer work. All of Rowe and Khan's components work together as a hierarchy to create successful aging. When disease/disability is absent mental and physical function are easier to maintain. In turn the maintenance of function helps individuals stay engaged with their lives [28].

### Alternative models of successful aging

Despite its comprehensive nature, and Rowe and Kahn's desire to impress upon the aging population that they could control many individual factors that contribute to aging, other researchers have been critical of Rowe and Kahn's model, suggesting that it is too restrictive [26, 37]. As a result, there is no universal definition of SA [8]. To be considered a successful ager on Rowe and Khan's terms, a person must not only have high physical and mental functioning and be actively engaged but they *must* also exhibit an absence of any disease/disability. In order to identify older adults as aging successfully researchers have handled Rowe and Kahn's model in a number of different ways. The first was to modify the original definition on the absence of

disease/disability to *minimal* disease/disability being present [34]. This small change in the definition increased the number of individuals described as successfully aging in a study of 867 seniors from 20.0 % to approximately 33.0 % [34]. This change was thought to more accurately reflect the health status of the majority of aging adults, providing a truer picture of the nature of SA. While Rowe and Kahn's model was intended to identify a unique group of older adults, there seems to be some reluctance to identify those who are not aging successfully, which may also contribute to the criticism leveled against their model.

Second, it has been suggested that models of SA need to be more flexible and allow for success to occur between different components of the model, rather than globally across the entire model as per Rowe and Kahn [28]. As proposed by Young et al. [37], this would suggest that rather than a strict dichotomous model (i.e., aging successfully or not), a graded or continuous approach might be beneficial to rating the level of SA for older persons. Baker, Meisner, Logan, Kungl, and Weir's [1] study of Canadian seniors adopted a similar method based on Rowe and Kahn's model, whereby a graded approach was used to define different levels of SA. Those who met criteria in all components were defined as SA, while those who met criteria in two were defined as moderately successful. It was this category that constituted the largest membership across their sample, with 77.6 % being moderately successful in their aging process.

Still another approach to SA takes into account the perspective of the older persons being examined. Despite not meeting "success" in all components of the original model, these individuals remain engaged with life, live independently, and possess a high sense of well-being. In other words, aging individuals who can compensate for their physical- and health-related declines could still view themselves as aging successfully. Montross et al. [21] noted that 92 % of participants rated themselves as successfully aging. Many of the participants even met criteria included in research defined SA such as independent living, mastery/growth, life-satisfaction/emotional well-being, positive adaptation, and engagement with life. However, only 15 % met the criteria for absence of physical illness and only 28 % reported an absence of physical limitations, suggesting that levels of self-rated SA are higher than those obtained through more objective measures. Subjective ratings of SA were also related to having more friends, greater resilience, and better everyday functioning and health-related quality of life. This study showcases the perspective that many older adults have on SA, despite the objective criteria that many researchers have defined.

Strawbridge et al. [34] directly compared objective and subjective measures of SA. They noted that when older individuals are asked to self-report their level of SA, 50.3 % rate themselves as successful agers, as compared to

18.8 % when assessed objectively. The differences in results between these two studies [21, 34] can be attributed to their measures of SA. Montross et al. [21] had their participants subjectively rate SA on a scale ranging from 1 to 10 (1=least successful, 10=most successful). Participants who rated themselves 7 or higher were considered to believe themselves as successfully aging. However, Strawbridge et al. [34] asked their participants to respond to the question “I am aging successfully (or aging well) with either agree strongly, agree somewhat, disagree somewhat, or disagree strongly”. Strawbridge et al. [34] only chose to classify those who responded with agree strongly as successfully aging, while the other three responses were classified as not aging successfully. Thus, the variation in subjective measures of SA is related to how SA was quantified. Regardless, subjective measures identify a higher percentage of individuals who are aging successfully than objective measures.

When asked about their perceptions of SA, older individuals tended to see SA as a balance between self-acceptance/self-contentedness/adjustment, engagement with life and self-growth continuing in later life [10, 14, 25]. They also report that health and keeping fit and active were intimately related to their personal definitions of SA [14, 35]. With the emphasis on engagement, health, and activity, these results run parallel with the third component of Rowe and Khan's SA model. Despite the importance placed on engagement by older individuals, a recent review of researcher definitions of SA indicated it was included only 28 % of the time [8].

### Engagement with life

Literature focusing on engagement with life has categorized active engagement, social participation, interpersonal relationships, productive activities, leisure activities, social activities, and fitness activities all under the term social engagement [18]. While this umbrella term expands the focus of engagement beyond productive activities, it is useful to consider the positive impact of all forms of engagement on the maintenance of function in aging.

Despite of the variety of definitions and measurement techniques of social engagement, Maier and Klumb [16] incorporated these ideas into a theoretical model. The model is comprised of two categories of social engagement activities: regenerative activities and discretionary activities. Regenerative activities are those that are physiologically necessary for surviving, such as eating, while discretionary activities are those that are completed by choice [16]. Discretionary activities are then further divided into productive and consumptive. Productive activities are those that are carried out for the purpose of an outcome; for example, an older adult goes shopping to buy the groceries so they can feed themselves. On the other hand, consumptive activities

are completed simply for their own sake, (e.g., watching television). A positive aspect of this model is that it adds clarity and depth to the types of engagement in which older adults participate. The term productive activity has been presented consistently across the literature; however, there has been great variability when trying to define consumptive activity. It includes social as well as leisure activities that have been referred to as high-demand leisure (e.g., swimming and walking) [9], low-demand leisure (e.g., sewing and listening to music) [9], active-leisure (e.g., swimming and walking) [7], and social leisure (e.g., visits to theater and visiting with friends) [19]. This wide range of terminology has made it difficult to compare results across the various studies.

Of all the components in Rowe and Khan's model of SA, active engagement has received the least amount of attention in research and literature. However, Rowe and Khan [28] believed that being part of a social network of friends and family is one of the most obvious factors leading to longevity. This socio-emotional support is so vital to SA because it reinforces individual's beliefs that they are valued some way in society. It can be actions as simple as helping with chores, transportation, physical, or financial needs [28]. The level of intimacy occurring throughout social engagement plays an important role in well-being with greater intimacy connections leading to greater life satisfaction [15].

In Mendes De Leon et al's [19] study of social engagement and its influences on well-being, they examined participation in social and productive activity and its association with a reduced risk of disability in adults over 65 years of age. Eleven types of social and productive activities were included in their data collection: visits to the theater, sporting events, shopping, gardening, meal preparation, cards, game playing, trips, community work, fitness activities, and church attendance. They found that adults who were more socially engaged reported less disability. In turn, prevention of disability due to active engagement allowed older individuals to continue to be social. Active engagement might also help modify age-related effects by providing individuals with a sense of purpose and control over their lives [19].

A similar study done by Menec [20] measured activity levels of Canadian seniors at the beginning of the study and then examined function, well-being, and mortality in the sample 6 years later. A specific focus was the relationship between specific types of activities and their individual influence on well-being, function, and mortality. Level of well-being was measured based on happiness and life satisfaction, while function was defined using a measure which combined physical as well as cognitive functioning. Participants indicated the types of activities they participated in throughout the past week via a 21-item checklist and these activities were divided into three different categories; social

activities (i.e., visiting family), solitary activities (i.e., collecting hobbies), and productive activities (i.e., housework or volunteering). Results showed that individuals participated in eight activities on average. Social activities were the most common, with 93.1 % indicating that they visited or phoned a friend/family member; reading was the most common solitary activity, and light housework/gardening was the most prevalent productive activity.

Menec [20] found that several of the activities were related to happiness, including activities such as participating in social groups, sports, or games; solitary activities like handiwork hobbies, music/art/theater, and reading; and productive activities such as light housework and gardening. However, the only activity that significantly contributed to life satisfaction was participating in sport or games. There were also a number of activities that contributed to maintained function and reduced mortality. Individuals who attended church, and performed housework/gardening were less likely to die within the next 6 years. Mass activities (e.g., Bingo) and church attendance predicted better function over the 6 years studied. Of the solitary activities, only music/art/theater was positively correlated with maintained function.

### **The relationship between physical activity and successful aging**

It is widely known that participation in physical activity has significant positive effects on improving and maintaining mental health, preventing and minimizing effects of chronic diseases, as well as enhancing physical health and function in older adults [22]. However, regardless of the benefits, Canada's National Advisory Council on Aging graded Canadian seniors with a letter "C". In 2005, it was recorded that 62 % of seniors in Canada were inactive despite knowing that physical activity increased their odds of achieving SA, and decreased their risk of cardiovascular disease, cancer, and chronic pulmonary disease. The National Advisory Council on Aging [22] attributed the low grade of the report card to the fact that physical activity is not incorporated into individuals' daily living because of ageist issues and negative stereotypes that are directed to the elderly.

While the majority of studies to date have focused on passive leisure, social, and productive activities, it is also important to consider the contribution of active leisure (e.g., participation in sport or physical activity) to overall engagement. Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure [6]. In daily life, it can be categorized into occupational, sports, conditioning, or other activities that utilize strength, power, endurance, speed, flexibility, or range of motion [6]. Although Menec [20] found sports or games were significant

predictors of life satisfaction, it is unclear how these variables were defined as they were included as a social activity. Everard, Lach, Fisher, and Baum [9] examined the relationship between performing leisure, social, physical, productive, and instrumental activities, as measured by an activity checklist, and functioning in community-dwelling older adults. Functioning was measured using the SF-12 Health Survey, which assessed the effects of both physical and mental health on functioning [36]. When older individuals remained involved in high-demand leisure activities (i.e., swimming, walking, and gardening) higher physical function scores were maintained. It was further noted that low demand leisure activities were associated with better mental health and contributed to the maintenance of function. This association is important because as an individual experiences age-related changes in health they may have to give up more physically demanding activities for these lower intensity leisure activities [9]. This is consistent with Bauman's [4] post-modern description of identify, where the goal is to remain flexible and open in terms of adapting to changing roles and activities.

Unfortunately, few researchers have looked at physical activity when examining the role that social engagement plays in SA. Mendes de Leon et al. [19] reported that greater amounts of involvement in fitness activities heightened levels of social engagement as well as productive activity participation. Additionally, Meisner et al. [17] proposed that physical activity promotes community integration, which enhances social engagement leading to a reduction in sedentary behavior, a higher sense of belonging, and increased volunteer activity. One can see the positive benefits of physical activity on the maintenance of active engagement, physical functioning, and finally SA.

Additionally, few studies have examined relationships between physical activity and engagement with life and how it influences SA. Being actively engaged with life has been positively correlated with physical activity; older individuals who are active are more likely to be socially engaged. However, as Baker and colleagues [1] point out, little is known about physical activity's role when it comes to promoting SA in older adults. They believe having this information would be of great importance for informing public health messaging targeting interventions to the elders most in need. Using data from the Canadian Community Health Survey, Baker et al. conceptually defined the components of successful aging, and reported that older adults who were physically active, as measured by energy expenditure, were two times more likely to be aging successfully than those who were not physically active. Extending this work, Meisner et al. [17], revealed that participants classified as inactive had greater than two times the odds of having a functional limitation compared to a chronic condition or being socially disengaged with life. Again, this suggests a strong relationship between physical activity and social engagement.

## Directions for future research

The three studies mentioned above have made an effort to examine the relationship between active engagement with life and regular physical activity. Unfortunately, it is still unclear whether these factors are strongly correlated. There has been some research supporting the notion that regular involvement in physical activity is related to improved mental and psychological functioning [34]; however, not all individuals who are physically active are more engaged with their lives than sedentary individuals. The relationship between being physically active and being engaged with life is important for future research since physical activity is a readily modifiable lifestyle factor that can impact all components of Rowe and Khan's model of SA. Future research might also make a point to consider the independent and interactive effects of different types of engagement on psychosocial health and physical function. Additionally, variables such as social support, quality, and quantity of social interactions, and social "health" should be examined for a more comprehensive assessment of engagement with life [1]. The relationship between physical activity and social engagement is also important for the development of age appropriate interventions in the broader community in order to prevent disability, functional loss, and to ultimately enhance SA.

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## References

- Baker J, Meisner BA, Logan JA, Kungl A, Weir P (2009) Physical activity and successful aging in Canadian older adults. *J Aging Phys Activ* 17:223–235
- Baltes PB, Baltes M (1990) Psychological perspectives on successful aging: the model of selective optimization with compensation. In: Baltes PB, Baltes MM (eds) *Successful aging: perspectives from the behavioral sciences*. Cambridge University Press, Cambridge, UK, pp 1–36
- Batini N, Callen T, McKibbin W (2006) *The global impact of demographic change*. International Monetary Fund, Washington DC
- Bauman Z (1995) *Life in fragments: essays in postmodern morality*. Blackwell, Oxford
- Beaufère B, Morio B (2000) Fat and protein redistribution with aging: metabolic considerations. *Eur J Clin Nutr* 54:48–53
- Caspersen CJ, Powell KE, Christenson GM (1985) Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Publ Health Rep* 100:126–131
- Dallosso HM, Morgan K, Bassey EJ, Ebrahim SBJ, Fentem PH, Darie TH (1998) Levels of customary physical activity among the old and the very old living at home. *J Epidemiol Community Health* 42:121–127
- Depp CA, Jeste DV (2009) Definitions and predictors of successful aging: a comprehensive review of larger quantitative studies. *Am J Geriatr Psychiatry* 14:6–20
- Everard KM, Lach HW, Fisher EB, Baum MC (2000) Relationship of activity and social support to the functional health of older adults. *J Gerontol Soc Sci* 55B:S208–S212
- Fisher BJ (1995) Successful aging: life satisfaction and generativity in later life. *Int J Aging Hum Dev* 41:239–250
- Franklin S, Larson M, Khan S, Wong N, Leip E, Kennel W, Levy D (2001) Does the relation of blood pressure to coronary heart disease risk change with aging?: the Framingham Heart Study. *Circulation* 103:1245–1249
- Fries FJ (1980) Aging, natural death, and the compression of morbidity. *N Engl J Med* 303:130–135
- Health Canada, Division of Aging and Seniors (2002) *Canada's Aging Population*. Minister of Public Works and Government Services. [Ottawa]: Author.
- Knight T, Ricciardelli LA (2003) Successful aging: perceptions of adults aged between 70 and 101 years. *Int J Aging Hum Dev* 56:223–245
- Lemon BW, Begtson VL, Peterson JA (1972) An exploration of the activity theory of aging: activity types and life satisfaction among in-movers to a retirement community. *J Gerontol* 27:511–523
- Maier H, Klumb PL (2005) Social participation and survival at older ages: is the effect driven by activity content or context? *Eur J Ageing* 2:31–39
- Meisner BA, Dogra S, Logan JA, Baker J, Weir PL (2010) Do or decline?: comparing the effects of physical inactivity on biopsychosocial components of successful aging. *J Heal Psychol* 15:688–696
- Mendes de Leon CF (2005) Social engagement and successful aging. *Eur J Ageing* 2:64–66
- Mendes de Leon CF, Glass TA, Berkman LF (2003) Social engagement and disability in a community population of older adults: the new haven EPSE. *Am J Epidemiol* 157(7):633–642
- Menec VH (2003) The relation between everyday activities and successful aging: a 6-year longitudinal study. *J Gerontol* 58B:S74–S82
- Montross LP, Depp C, Daly J, Reichstadt J, Golshan S, Moore D, Sitzer D, Jeste DV (2006) Correlates of self-rated successful aging among community dwelling older adults. *Am J Geriatr Psychiatry* 14:43–51
- National Advisory Council on Aging (2006) *Seniors in Canada: 2006 Report Card*. National Advisory Council on Aging, Ottawa, Ontario (Cat.HP301/2006E)
- Palacios R (2002) The future of global ageing. *Int J Epidemiol* 31:786–791
- Palmore E (1979) Predictors of successful aging. *Gerontologist* 19:427–431
- Reichstadt J, Sengupta G, Depp CA, Palinkas LA, Jeste DV (2010) Older adults perspectives on successful aging: qualitative interviews. *Am J Geriatr Psychiatry* 18:567–569
- Rowe JW, Khan RL (1987) Human aging: usual and successful aging. *Science* 237(4811):143–149
- Rowe JW, Khan RL (1997) Successful aging. *Gerontologist* 37:433–440
- Rowe JW, Kahn RL (1998) *Successful aging: the MacArthur Foundation Study*. Dell Publishing, New York
- Salthouse TA (1991) Cognitive facets of aging well. *Generations* 15:35–38
- Shulz R, Curnow C (1988) Peak performance and age among superathletes: track and field, swimming, baseball, tennis, and golf. *J Gerontol Psychol Sci* 43:113–120
- Srinivasan V, Maestroni G, Cardinali D, Esquifino A, Perumal S, Miller S (2005) Melatonin, immune function and aging. *Immun Ageing* 2:17

32. Statistics Canada (2006) A portrait of seniors in Canada: demographic trends and the geography of aging. National Advisory Council on Aging, Minister of Public Works and Government Services
33. Strawbridge WJ, Cohen RD, Shema SJ, Kaplan GK (1996) Successful aging: predictors and associated activities. *Am J Epidemiol* 144:135–141
34. Strawbridge WJ, Wallhagen MI, Cohen RD (2002) Successful aging and wellbeing: self-rated compared with Rowe and Khan. *Gerontologist* 42:727–733
35. Tate RB, Leedine L, Cuddy TE (2003) Definition of successful aging by elderly Canadian males: the Manitoba follow-up study. *Gerontologist* 43:735–744
36. Ware JE, Kosinski M, Keller SD (1995) SF-12: how to score the SF-12 physical and mental health summary scales, 2nd edn. Health Institute, New England Medical Center, Boston
37. Young Y, Frick KD, Phelan EA (2008) Can successful aging and chronic illness coexist in the same individual? A multidimensional concept of successful aging. *J Am Med Dir Assoc* 11:87–92