

## CHAPTER 7

# Longitudinal Research on Subjective Aging, Health, and Longevity

## *Current Evidence and New Directions for Research*

Gerben J. Westerhof and Susanne Wurm

### ABSTRACT

In this chapter, we carry out a narrative review of the longitudinal impact of subjective aging on health and survival. We have a specific focus on the different pathways which can explain the relation of subjective aging to health and survival. We focus on the three most common conceptualizations of subjective age: (a) age identity, (b) self-perceptions of aging, and (c) self-perceptions of age-related growth and decline. For each concept, we present the theoretical background, the empirical studies on the effects on health and survival, and conclude with the pathways which might explain these effects. The chapter ends with a heuristic model that synthesizes the theories and findings in describing how subjective aging is related to different psychological resources, which are in turn related to health and survival. Last, we provide some possible directions for further research in this area.

### INTRODUCTION

Over the past several decades, life expectancy has increased substantially. Given the fact that old age is nowadays a phase in life that is attainable for most people, the concept of subjective aging, that is, the way in which individuals think about

their own aging process, may be more important than ever before. Although life expectancy has increased, people also tend to live longer with more chronic diseases. How adults perceive and experience their own aging may contribute to how individuals try to prevent and cope with illness in later life. In this chapter, we will review evidence of the longitudinal impact of subjective aging on health and longevity. Furthermore, we will develop a heuristic model that may be useful in guiding future empirical research on how subjective aging contributes to health and survival in adulthood and old age.

One of the particularities of human beings is that they are able to reflect on themselves as persons and thereby also on their own process of growing older. People attribute meaning to the intricate mix of changes and events in biological, social, and psychological functioning, which happen as they grow older. In this process, they develop cognitive representations of their own aging process. Researchers have used different concepts to describe these cognitive representations, such as subjective age, age identity, aging self, attitudes toward one's own aging, self-perceptions of aging, or satisfaction with aging (Diehl et al., 2014). In this chapter, we will use the concept of subjective aging as an overarching term that describes different aspects of these cognitive representations.

Subjective aging is related to the physical and psychological functioning of aging individuals. Numerous studies have shown that feeling younger and having more positive representations of one's own aging process are associated with better physical health and subjective well-being (Barak & Stern, 1986; Barrett, 2003; Peters, 1971; Steverink, Westerhof, Bode, & Dittmann-Kohli, 2001; Westerhof, Whitbourne, & Freeman, 2012). Because of their cross-sectional and correlational design, these studies, however, have not permitted the determination of the directionality of effects, that is, the examination of whether subjective aging affected psychophysical functioning or whether the effects were the other way around. Thus, it is possible to argue both ways. Subjective aging may be shaped by several individual and sociocultural factors. On the individual level, one might think of personality traits, personal values, individual role models of aging (e.g., one's grandparents), individual stereotypes about older persons in general, as well as personal experiences with growing older, such as a person's own declining health. On the sociocultural level, social interactions, messages in the mass media, cultural values, social policies, social structures, and societal institutions provide a framework of aging which contributes to subjective aging (see also Chapters 2 and 9 in this volume).

Although being shaped by individual and sociocultural factors, subjective aging might also contribute to further life span development and aging processes. How people understand and attribute meaning to their own aging processes might influence how they grow old(er) themselves. For example, a person who

believes that symptoms of rheumatism are part of the aging process might not seek adequate help and thus contribute to a further worsening of the symptoms (Bode, Taal, Westerhof, van Gessel, & Van der Laar, 2012; Leventhal & Prohaska, 1986). Fortunately, during the last decade or so, evidence has also been accumulating from longitudinal studies which analyzed the effects of subjective aging on health and survival. In a recent meta-analysis, we found a small but significant effect of subjective aging on health and survival (Westerhof et al., in press). In this chapter, we will add to this meta-analysis by (a) synthesizing the evidence on the psychological pathways through which subjective aging might affect health and longevity and (b) developing a heuristic model based on empirical evidence and theoretical reasoning which may guide further empirical research on how subjective aging may contribute to health and survival.

In this chapter, we carry out a narrative review of longitudinal studies. We did a similar search as in the meta-analysis, using different databases (PsycInfo, Web of Science, PubMed, and Scopus) and different search terms for subjective aging (“subjective aging,” “age identity,” “subjective age,” “felt age,” “perceived age,” “self-perceptions of aging,” “satisfaction with aging,” “view on aging,” and “aging-related cognitions”) and longitudinal studies (“longitudinal,” “panel,” “prospective”). We did not add search terms for outcomes or pathways but included all longitudinal studies which assessed the effects of subjective aging on physical and psychological functioning later in time. The present chapter thus uses more studies than the meta-analysis because that study focused on health and longevity as outcomes.

Subjective aging has been conceptualized in several different ways in longitudinal studies. As a first step in the analysis of possible pathways, we focus on the three most common conceptualizations which were used in the studies we found in our search: (a) age identity, (b) self-perceptions of aging, and (c) self-perceptions of age-related growth and decline. Age identity refers to the difference between one’s subjective (i.e., felt or perceived) and one’s chronological age. Self-perceptions of aging refer to general evaluations of one’s own aging process and are also referred to as satisfaction with aging. Self-perceptions of age-related growth and decline refer to perceptions of gains and losses in different domains of functioning.

In the following text, we will describe how each of these concepts stems from a somewhat different theoretical background and focuses on a different facet of subjective aging. Consequently, the pathways that are proposed in explaining the effects of subjective aging on health and survival are also different for different concepts. For each concept, we will first present the theoretical background and then the empirical studies on the effects on health and survival. We conclude with discussing the pathways which might explain these effects.

## AGE IDENTITY, HEALTH, AND LONGEVITY

### Conceptualization

The first conceptualization of subjective aging that has been used in longitudinal studies is *age identity*. Drawing on the cultural maxim that “one is only as old as one feels,” this has mainly been studied using a single item on *subjective age*: “What age do you feel?” (Barak & Stern, 1986; Peters, 1971). Age identity is then operationalized as the difference between the person’s subjective and chronological age (Westerhof, Barrett, & Steverink, 2003)—a difference that is nowadays often defined in terms of the percentage which the person feels younger than his or her chronological age (Rubin & Berntsen, 2006). In terms of a variation of this approach, Uotinen, Rantanen, and Suutama (2005) asked whether older adults felt mentally and physically younger, the same, or older than their calendar age. Other operationalizations refer to age identity in terms of identifying with a specific age group, such as middle-aged or older persons, or to cognitive age (i.e., feel-age, look-age, do-age, and interest-age; Kastenbaum, Derbin, Sabatini, & Artt, 1972). However, these operationalizations have not been used in longitudinal studies.

Subjective age was first conceived as an indicator of age that might be related stronger to a person’s level of functioning than chronological age (Havighurst & Albrecht, 1953). Nowadays, theories about age identity have anchored the concept more strongly in theories about self and identity (Westerhof et al., 2012). Building on the classical work of William James (1890/1981) and Erik Erikson (1997), these theories describe different motivated processes of the self, including the need for self-consistency and self-enhancement, which underlie a person’s age identity. Self-consistency refers to the motive of remaining the same stable person over time and is advocated most strongly in self-verification theory (Swann, Rentfrow, & Guinn, 2003). Self-enhancement refers to maintaining or promoting a positive self-image and mainly draws on research on self-esteem as a positive illusion (Taylor & Brown, 1988). Both processes of self-consistency and self-enhancement may be at work in shaping age identities (Keyes & Westerhof, 2012; Westerhof et al., 2012). Individuals are able to maintain consistency by assimilating new experiences into their existing self-concepts and thereby identifying with the younger age they used to be. In a culture that devalues old age, identifying with younger ages and age groups allows older adults to also enhance their self-esteem and well-being (Weiss & Lang, 2009, 2012).

### Empirical Evidence

Several studies found that age identity is related to health and survival. Most of these studies controlled for sociodemographic indicators, such as age, gender, and education, as well as psychological factors such as control beliefs or loneliness, which are known causes of health and longevity. Studying middle-aged

and older adults, Spuling, Miche, Wurm, and Wahl (2013) found evidence of 6-year prospective relations of younger age identities with better subjective health and less physical illnesses in the German Aging Survey. In a study on cancer patients in Germany, Boehmer (2006, 2007) asked for subjective age one month and six months after surgery for malignant tumors. She found that feeling younger and remaining to feel younger across time were related to more positive self-reported health outcomes, such as health-related quality of life, perceived disability, and recovery satisfaction. Other studies examined survival in older adults. An American study on adults aged 60 years and older found a significant association between a younger age identity and a higher chance of survival over a 4-year period (Markides & Pappas, 1982). The Finnish Evergreen Project found a significant effect on longevity of a younger physical but not a younger mental age identity in 65- to 84-year-olds (Uotinen et al., 2005). The Berlin Aging Study did find support for the relation between a younger age identity and survival in adults aged 70 years and older (Kotter-Grühn, Kleinspehn-Ammerlahn, Gerstorf, & Smith, 2009). However, Lim et al. (2013) did not find evidence that age identities were related to survival in cancer patients who were treated with chemotherapy. The authors acknowledged that their study might have been somewhat underpowered, but the study also differed from previous studies in that it focused on a patient population which was somewhat younger than previous population studies.

### **Pathways**

To our knowledge, there have been no longitudinal studies that directly addressed the pathways through which age identities might be related to health and survival over time. Given that the motives of self-consistency and self-enhancement operate in maintaining younger age identities, a major pathway may operate through the accumulation of subjective well-being, which would result from these motives (Westerhof & Barrett, 2005; Westerhof et al., 2012). Subjective well-being has been defined as the presence of positive affect, the absence of negative affect, and satisfaction with life in general (Diener, Suh, Lucas, & Smith, 1999). Although evidence exists that health is a predictor of subjective well-being, more recent meta-analyses have shown that subjective well-being is related to physical functioning and survival in the general population as well as in patient populations, in particular in older adults (Chida & Steptoe, 2008; Lamers, Bolier, Westerhof, Smit, & Bohlmeijer, 2012; Pressman & Cohen, 2005; Veenhoven, 2008). Subjective well-being might thus be a mediator in the association of age identity with health and survival.

At least indirect support for this assumption comes from two studies which have indeed found that age identity is longitudinally related to indicators of

subjective well-being. Spuling et al. (2013) found younger age identities to be associated with lower depressive symptoms over a 6-year period in participants in the German Aging Survey, whereas depressive symptoms and other health indicators did not predict subjective age over time. Similarly, Mock and Eibach (2011) found associations of younger age identities with better subjective well-being over a period of 10 years in the Midlife Development in the United States (MIDUS) study (participants' age ranged from 25 to 74 years at the first time of assessment).

Based on these findings, we can conclude that there is rather consistent empirical evidence that younger age identities are related to better health and a longer life. Furthermore, some empirical evidence suggests that maintaining younger age identities may contribute to feeling well across time, which, in turn, might result in better health and longevity. However, this pathway has not been examined explicitly in empirical studies.

## GENERAL SELF-PERCEPTIONS OF AGING, HEALTH, AND LONGEVITY

### Conceptualization

Self-perceptions of aging are a second conceptualization of subjective aging that has been used in longitudinal studies. The concept originated from work by Lawton (1975), who saw attitudes toward own aging as a component of morale or subjective well-being. The Attitudes Toward Own Aging Scale is part of his Philadelphia Geriatric Center Morale Scale (Lawton, 1975; Liang & Bollen, 1983) and includes items such as "Things keep getting worse as I get older," "As you get older, you are less useful," or "I am as happy now as I was when I was younger." Some authors who used this scale as an indicator of subjective aging also refer to it as measuring satisfaction with aging (e.g., Maier & Smith, 1999) or self-perceptions of aging (Levy, Slade, & Kasl, 2002). Following Levy, Slade, and Kasl (2002), we will use it as a measure of self-perceptions of aging.

Theoretically, self-perceptions of aging play an important role in Levy's (2009) *stereotype embodiment theory*. Levy mainly drew on the symbolic interactionist theories of Mead (1934) who argued that societal beliefs are internalized in the self-concept and the work of Goffman (1963) who focused on the personal consequences of social stigma. She combined this symbolic interactionist approach with the functionalist perspective of Merton (1957), who coined the concept of self-fulfilling prophecy. The stereotype embodiment theory holds that individuals internalize negative stereotypical beliefs about older persons from a very young age on. When they grow old, individuals start to apply these negative

stereotypes to their own person. They thereby construe negative self-perceptions of their own aging process, which contribute to a self-fulfilling prophecy of age-related decline.

### **Empirical Evidence**

Several studies have addressed the impact of self-perceptions of aging on health and survival, again controlling for sociodemographic and psychological factors which are known causes of health and longevity. The first study on functional health was based on the Ohio Longitudinal Study of Aging and Retirement (OLSAR), focusing on adults aged 50 years and older and using a measure of the ability to perform activities of daily life. Based on this study, Levy, Slade, and Kasl (2002) showed that individuals with more positive self-perceptions of aging were better able to maintain better functional health over a period of 20 years. In the Australian Longitudinal Study of Aging (ALSA; adults aged 65 years and older), Sargent-Cox, Anstey, and Luszcz (2014) used objective physical performance tests on balance, gait, and rising from a chair. They found evidence that more positive self-perceptions of aging had an effect on these measures of physical functioning over a period of 16 years. Moser, Spagnoli, and Santos-Eggimann (2011) used data collected in the Swiss Lausanne Cohort study (adults in the age range of 65–70 years) and found evidence of preventive effects of positive self-perceptions of aging on basic and instrumental activities of daily living, falls, and hospitalizations across a period of 1–3 years. Whereas these studies focused on the general population, Cheng, Yip, Jim, and Hui (2012) focused on a specific group of institutionalized middle-aged and older persons with schizophrenia. They found that more positive self-perceptions of aging were related to less medical events 3 months later.

All studies on survival reported positive effects of more positive self-perceptions of aging on longevity. The included studies which addressed all-cause mortality based on the OLSAR over a period of 23 years (Levy, Slade, Kunkel, & Kasl, 2002), the ALSA over a period of 15 years (Sargent-Cox et al., 2014) and the Berlin Aging Study (Kotter-Gröhn et al., 2009, with a follow-up of 16 years; Maier & Smith, 1999, with a follow-up of 4.5 years). Levy and Myers (2005) also used the OLSAR study with a follow-up of 23 years but focused on survival from a specific class of diseases, namely respiratory diseases.

### **Pathways**

The stereotype embodiment theory proposes three types of pathways from stereotypes through self-perceptions of aging to functioning in later life: psychological, behavioral, and physiological pathways (Levy, 2009). One of the psychological pathways refers to the self-fulfilling prophecy in which self-perceptions of aging

act as expectations about the aging process. The behavioral pathway is mainly illustrated by engagement in health practices, with adults with more positive self-perceptions engaging in more constructive health practices. One possible physiological pathway has been illustrated in experiments, for example, on the influence of subliminal priming with stereotypes of older persons on cardiovascular functioning (Levy, Hausdorff, Hencke, & Wei, 2000). Only psychological and behavioral pathways have been examined in longitudinal studies.

Different psychological and behavioral pathways have been proposed that might explain the effects of self-perceptions of aging on health and survival. The basic idea is that more positive self-perceptions of aging help to accumulate psychological resources and guide behavioral regulation which supports health and longevity. Regarding psychological pathways, Levy, Slade and Kasl (2002) studied whether or not *personal control beliefs* mediate the association between self-perceptions of aging and functional health. Individuals who have more positive self-perceptions of aging may also believe that they have more choice among responses that are effective in achieving desired outcomes, which, in turn, may contribute to physical functioning. This mediating pathway could explain part of the longitudinal relation between self-perceptions and functional health. Another psychological pathway proposed by Levy, Slade, Kunkel and Kasl (2002) involves *will to live* in relation to survival. In particular, will to live partially mediated the relation between self-perceptions of aging and survival. In another article on the OLSAR study, Levy and Myers (2004) proposed a behavioral pathway and analyzed the effects of self-perceptions of aging on preventive health behaviors, including attending a physical examination, taking medications, dieting, exercising, as well as consuming alcohol and smoking tobacco. Although more positive self-perceptions of aging were indeed associated with these health behaviors, the study did not address their mediating role regarding physical functioning or survival.

To conclude, the effects of self-perceptions of aging on health and survival have been consistently documented with samples of adults in different Western countries, using self-reports of activities of daily living as well as objective measures of physical functioning and survival. Possible pathways include the accumulation of psychological and behavioral resources which may prevent negative self-perceptions of aging from becoming a self-fulfilling prophecy.

## SELF-PERCEPTIONS OF AGE-RELATED GROWTH AND DECLINE, HEALTH, AND LONGEVITY

### Conceptualization

The first longitudinal findings on the impact of self-perceptions of aging on health and longevity by Levy and colleagues (Levy, Slade, & Kasl, 2002; Levy,



Slade, Kunkel, et al., 2002b) encouraged several additional studies on this topic. As we have seen, some of these studies were also based on the previously described unidimensional scale on self-perceptions of aging. In this section, we will describe studies which have used multidimensional, domain-specific scales to assess adults' perceptions of their own aging. The multidimensional perspective on subjective aging derives from theories on life span development that emphasize the multidimensionality and multidirectionality of adult development and aging. In particular, life span developmental theorizing emphasizes that human development can be characterized by a life-long pattern of both gains and losses, even though the ratio between gains and losses becomes more negative with age (e.g., Baltes, 1987; Heckhausen, Dixon, & Baltes, 1989). Midlife marks the shift from the predominance of growth and gains to an increasing risk of age-related losses. Also, changes related to restricted time perspective and declining physical functioning tend to start in midlife and continue into old age (Heckhausen, 2001).

Building on these basic tenets of life span developmental theory about the multidimensional and multidirectional nature of aging, some researchers have studied self-perceptions of aging as a multifaceted phenomenon to understand the differential impact of various views on aging. This approach did not only draw from a theoretical perspective but was also grounded in qualitative studies on self-perceptions of aging showing that older adults often view aging as both accompanied by losses—mainly in the physical and social domain—and gains, such as more freedom and time for new interests (Connidis, 1989; Dittmann-Kohli, 1995; Keller, Leventhal, & Larson, 1989). Based on these theoretical and empirical insights, Steverink et al. (2001) developed a multidimensional scale measuring cognitions about aging as physical decline, social loss, and ongoing development. This scale has been used both in several cross-sectional studies (e.g., Steverink et al., 2001; Westerhof, 2003; Westerhof et al., 2012) as well as longitudinal studies (e.g., Wurm, Tesch-Römer, & Tomasik, 2007; Wurm, Tomasik, & Tesch-Römer, 2010). All items of this multidimensional scale begin with the stem “Aging means to me . . .” followed by domain-specific endings. Exemplary items for the view that aging is accompanied by physical losses are “Aging means to me that I am less healthy” or “Aging means to me that I am less energetic and fit,” whereas the items “Aging means to me that I continue to make plans” or “Aging means to me that my capabilities are increasing” are two examples for the view of aging as ongoing development.

### **Empirical Evidence**

The German Aging Survey is a longitudinal study on healthy aging that is based on a nationally representative sample of individuals in their second half of life (40–85 years). The longitudinal studies on subjective aging used the scales of

aging as physical losses and aging as ongoing development. These two domain-specific self-perceptions of aging were significant predictors for health and subjective well-being over and above major sociodemographic and socioeconomic indicators (e.g., age, gender, education) and beyond psychological factors such as control beliefs (Wurm et al., 2007; Wurm, Tomasik, & Tesch-Römer, 2008). Moreover, both the loss-oriented self-perception of aging as physical decline and the gain-oriented view of ongoing development have been shown to be better predictors of physical health than the other way around (Wurm et al., 2007). This finding is in line with previously described studies showing a higher impact of general self-perceptions of aging on functional health than vice versa (Levy, Slade & Kasl, 2002; Sargent-Cox, Anstey, & Luszcz, 2012). In addition, a recent study on domain-specific self-perceptions of aging and longevity showed that the perception of aging as ongoing development was predictive of survival, even after controlling for sociodemographic and health indicators (i.e., self-rated health, chronic conditions, and functional limitations). The same, however, was not the case for the self-perception of aging as physical loss (Wiest & Wurm, 2012).

### **Pathways**

To understand how the gain-related view on aging as ongoing development might impact health and longevity, Wurm et al. (2010) examined physical activity as one possible behavioral pathway. They showed that middle-aged and older individuals who viewed aging as ongoing development were physically more active and better able to maintain a higher level of activity over time than those with a less gain-related view on aging. Furthermore, the authors were interested in the question of whether the positive effect of a gain-related view on aging might come to its limits when a serious health event occurs (Wurm et al., 2008). Because serious falls and illnesses can considerably hamper the striving for ongoing development, individuals with gain-related views on aging might have more difficulties to adapt to such an event. However, this assumption was not supported by the data. Individuals with a more gain-related view were able to maintain better self-rated health and life satisfaction even after a serious health event.

Furthermore, a recent study examined the question of how domain-specific self-perceptions of aging as physical losses might impede health and well-being over a 6-month period (Wurm, Warner, Ziegelmann, Wolff, & Schüz, 2013). In this study, the occurrence of a serious health event predicted the increased use of strategies of developmental regulation: Selection, Optimization, and Compensation (SOC; Baltes & Baltes, 1990). These, in turn, predicted higher self-rated health and life satisfaction. However, this effect was moderated by the domain-specific self-perception of aging as physical losses; that is, in the case of

a serious health event, a self-perception of aging as physical losses was associated with a lower use of SOC strategies. These findings point to a possible psychological pathway of how a loss-related view on aging can turn into a self-fulfilling prophecy through less effective developmental regulation strategies and, hence, can contribute to poorer health and lower life satisfaction (Wurm et al., 2013).

Taken together, domain-specific self-perceptions of aging reflect the current view on life-span development as both growth and decline and shed more light on possible mechanisms, explaining the link between self-perceptions of aging, health, and longevity. Although perceiving aging as associated with further goals and plans seems to be beneficial, the contrary was found for the self-perception of aging as physical losses.

### A HEURISTIC MODEL

As mentioned earlier, we have reviewed the conceptualizations, empirical evidence, and possible pathways through which subjective aging might affect health and longevity over time. As this review shows, there is substantial evidence that subjective aging is related to health and survival in a way that more youthful age identities, more positive general self-perceptions of aging, as well as more positive perceptions of age-related decline and growth serve to protect health and contribute to longevity (Westerhof et al., in press). We have discussed several pathways which may account for the effects of subjective aging on health and longevity. We have seen that there is some, but only limited, empirical evidence for these pathways. To synthesize the reviewed studies and to guide further research, we have synthesized the theoretical pathways in a heuristic model (Figure 7.1).

The left box of Figure 7.1 shows the three different conceptualizations of subjective aging which were addressed in this chapter: age identity, general self-perceptions of aging, and self-perceptions of aging as growth and decline. The second box groups the different psychological resources which were discussed in this chapter: subjective well-being, control beliefs, will to live, developmental regulation (SOC), and health behaviors. The third box concerns different indicators of health, and the last box concerns survival. All four boxes are placed in a larger box, referring to the context in which these processes operate. The basic idea of the pathways indicated by the arrows is that subjective aging contributes to the accumulation of psychological resources that help to maintain a good health which, in turn, contribute to survival. The processes take place in a context that is indicated by the larger box. A final characteristic of the model is that we also included feedback loops. That is, the loss of psychological resources or health may affect subjective aging in a negative way.

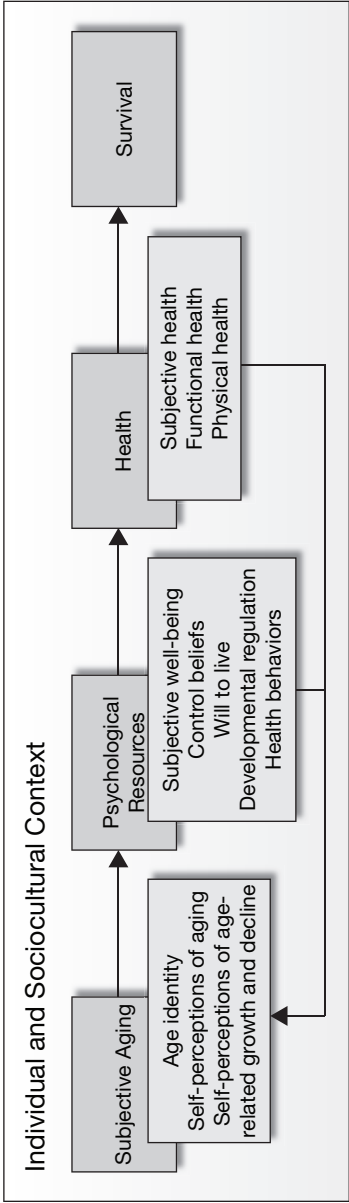


FIGURE 7.1 A heuristic model of pathways linking subjective aging to psychological resources, health, and survival.

The heuristic model can be of help in guiding further research. The first direction concerns variables which were put together in one box but might have differential contributions to different pathways. We will focus on the different aspects of subjective aging distinguished in this chapter. The second direction focuses on the role of health as a separate box between subjective aging and survival. The third direction addresses the role of the individual and sociocultural context.

### **Differential Contributions of Different Aspects of Subjective Aging**

The impact of different aspects of subjective aging has rarely been studied together in one study. This is why the question is still open how the relations between the different indicators of subjective aging should be conceptualized; that is, how are they connected with each other and how do they differentially impact health and longevity. Little is known about the interrelations among age identities, self-perceptions of aging, and self-perceptions of age-related growth and decline. It can therefore not be ruled out that effects on health and survival do not exist independently because the different measures, as would be expected, do have some conceptual and empirical overlap (Diehl et al., 2014). Furthermore, new concepts have been proposed, such as awareness of age-related change and preparation for aging, which also need to be incorporated when further longitudinal evidence is collected (Diehl & Wahl, 2010).

Different aspects of subjective aging may have different consequences for the accumulation of psychological resources. In methodological terms, they may show differential validity. For example, the main pathway of age identity to health and survival that was addressed in this chapter was through subjective well-being. The pathways of self-perceptions of aging and age-related growth and decline were through processes such as will to live, control beliefs, health behaviors, or processes of developmental regulation. It thus remains a task for future research to further study which pathways are most important for which indicators of subjective aging and which developmental outcomes.

### **The Role of Health**

In most studies, health is seen as an endpoint in itself. We have placed it in between psychological resources and survival because one might argue that declining health itself plays an important role in survival. We believe that it is hard to imagine a pathway from subjective aging to survival without considering the mediating role of health. However, the effects of subjective aging on survival through health have not been studied extensively yet. Rather, studies addressing the impact of subjective aging on longevity have controlled for health indicators as possible confounders. Although this is justified in establishing evidence on the unique relations of subjective aging to survival, this might also have led to an underestimation of the

relation because indirect effects through health were not considered. We therefore propose to study the indirect effects of subjective aging on survival through health more intensively and in particular in a prospective longitudinal way.

The role of health might indeed be even more complex. Findings from longitudinal studies (e.g., Kleinspehn-Ammerlahn, Kotter-Grühn, & Smith, 2008; Sargent-Cox et al., 2012; Schafer & Shippee, 2010b; Uotinen, Rantanen, Suutama, & Ruoppila, 2006; Wurm et al., 2013) suggest that physical health and changes in physical health play an important role in developing older age identities and more negative self-perceptions of aging. When people experience health problems, they may attribute their health problems to age (rather than, for example, to lifestyle) and, hence, may start to feel older. This, in turn, may lead to the reinforcement of already existing negative age stereotypes and the development of more negative self-perceptions of aging. Furthermore, negative self-perceptions of aging may in turn diminish psychological resources such as subjective well-being, control beliefs, will to live, developmental regulation strategies, and health behaviors and thereby contribute to an even worse health. This would again lead to older and more negative perceptions of aging and so on. In this way, a vicious cycle of breakdown in later life could occur (Kuypers & Bengtson, 1973).

### **Individual and Sociocultural Context**

The third focus for future research involves the inclusion of the individual and sociocultural context. Individual characteristics, such as personality traits or personal values, may affect subjective aging in fundamental ways. For example, neuroticism has been related to lower levels of subjective well-being as well as worse physical functioning and survival (e.g., Friedman & Kern, 2014; Wilson, de Leon, Bienias, Evans, & Bennett, 2004). Kotter-Grühn et al. (2009) considered neuroticism as a covariate in their analyses on subjective aging and found that the effect of subjective aging remained independently significant after emotional instability had been accounted for. Further research could clarify whether it is indeed subjective aging that results in the proposed pathways or whether other characteristics of the individual and sociocultural context can explain part of these relations. Similarly, the sociocultural context, such as social relations, media portrayals, social policies, health care systems, or institutional arrangements may influence the proposed pathways as well. For example, although social policies regarding aging have changed over the past decades, few studies have addressed how these changing social policies might have had an impact on subjective aging. It would therefore be prudent to take these individual and sociocultural contexts into account when studying the impact of subjective aging on health and longevity.

Another approach would be to assess whether individual and sociocultural contexts are conditional to the proposed pathways. For example, Schafer and Shippee (2010a) found a relationship in the MIDUS study between age identity and expectations concerning cognitive aging for women but not for men. Furthermore, findings from the German Aging Survey suggested that middle-aged individuals with more positive self-perceptions of age-related growth and decline not only engaged in sports more frequently but even increased the activity over time, provided that they were healthy enough to do so (Wurm et al., 2010). Older individuals with more positive self-perceptions of aging, however, mainly walked more regularly and increased walking over time, which is positive because walking is often the only physical activity that is even recommended in the presence of health problems (Wurm et al., 2010).

Besides individual characteristics, the sociocultural context may also play a moderating role. In our meta-analysis, we found that effects of subjective aging on health and survival were stronger in the United States than in Western Europe (Westerhof et al., *in press*). This finding may be related to differences in welfare state regimes (Bambra, 2007; Esping-Andersen, 1990). In the United States, which has a so-called liberal welfare regime, there is a strong need for individuals to take responsibility for their own aging process and for their financial security in old age because the social security provisions from the states and/or the federal government are very limited. In European countries, the so-called conservative welfare states, such as the German one, more state provisions and social security policies, including policies for late life, are in place. Aging individuals may thus feel less responsible for their own aging process because they feel that economic security and health care are generally provided by society. Also, in European countries, eligibilities and entitlements are still more often tied to chronological age (e.g., obligatory retirement at age 65 years), and this may make chronological age more salient for the individual. Further research could therefore assess whether individual and sociocultural contexts play a moderating role in the association between subjective aging and health and survival.

## CONCLUSION

The goal of this chapter was to synthesize existing evidence from longitudinal studies and to develop a heuristic model which may guide future empirical research on how subjective aging may contribute to health and survival. We found evidence in support of the predictive value of subjective aging for health and survival and proposed three further directions for research. These directions focus on the differential contributions of different dimensions of subjective aging, the role of health, and the role of the individual and sociocultural

context. It is our hope that pursuing these new directions will contribute to further evidence and insights into the processes involved in subjective aging. Specifically, such research needs to focus on the further clarification of questions about the pathways from subjective aging to survival as well as the conditions under which these pathways operate. Gaining insights into the vicious cycle that might be at work between subjective aging and physical decline would also provide the needed information to intervene in this process. Given the existing evidence, public health professionals would be well-advised to start thinking about positive and constructive interpretations of the aging process which may help adults to escape the vicious breakdown cycle, but further evidence is needed on how exactly this could be possible. First steps have been made in developing interventions aiming at changing negative self-perceptions of aging to promote a healthier lifestyle (Sarkisian, Prohaska, Davis, & Weiner, 2007; Wolff, Warner, Ziegelmann, & Wurm, 2014). However, more research in this direction is needed by simultaneously considering that overly positive views on aging might also be difficult, because aging is not only associated with gains but with increasing losses as well.

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**Richard A. Settersten, Jr., PhD**, Professor of Social and Behavioral Health Sciences, College of Public Health & Human Sciences, Oregon State University, Corvallis, OR

**Ursula M. Staudinger, PhD**, Robert N. Butler Professor of Sociomedical Sciences and Professor of Psychology, Columbia Aging Center, Columbia University, New York, NY

**Hans-Werner Wahl, PhD**, Professor of Psychological Aging Research, Department of Psychological Aging Research, Institute of Psychology, Ruprecht-Karls-University of Heidelberg, Germany

**Gerben J. Westerhof, PhD**, Adjunct Professor of Psychology, Director, Dutch Life Story Lab, University of Twente, Enschede, The Netherlands

**Susanne Wurm, PhD**, Associate Professor of Psychology, Institute of Psychogerontology, Friedrich-Alexander-University of Erlangen-Nuremberg, Nuremberg, Germany

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