

Awareness of Age-Related Change: Examination of a (Mostly) Unexplored Concept

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This theoretical article discusses the emerging concept of awareness of age-related change (AARC). We propose that a focus on AARC extends the research traditions on subjective age experiences and age identity and that examination of this concept can serve a stimulating role in social gerontology. After defining and contrasting AARC against similar concepts, several reasons for the relevance of this mostly unexplored construct are provided. The sample domains of health and physical functioning, cognitive functioning, and interpersonal relations are used to illustrate the relevance of AARC. Based on this review, we then provide a heuristic framework that describes antecedents, processes, and outcomes related to AARC. Overall, we argue that research on AARC should become an integral part of social gerontological research.

Key Words: Awareness of age-related change—Normative age expectations—Social gerontology.

THE awareness of having grown older is a major subjective experience during the adult years. In the past, adults' awareness about their own aging has been addressed under the headings of "subjective age" or "age identity" (e.g., Barrett, 2003; Settersten, 1999; Westerhof & Barrett, 2005). However, narrowing the personal experience of aging down to how old a person feels or with which age group the person identifies addresses only a subset of the phenomena related to the subjective experience of aging and leaves out many important features. Research by Steverink, Westerhof, Bode, and Dittmann-Kohli (2001), for example, suggests that the personal experience of aging is a multidimensional phenomenon. Specifically, these investigators identified three dimensions. Two of the dimensions captured decline- and loss-oriented aspects and represented individuals' perceptions regarding physical declines and social losses. The third dimension captured aspects of continued growth and expressed adults' perceptions that their aging also was associated with gains and further development.

Building on the work of Steverink and colleagues (2001) and other authors (Connidis, 1989), this article tries to advance the understanding of adults' subjective experience of aging conceptually by introducing and discussing the concept of awareness of age-related change (AARC). At the most general level, the construct of AARC refers to all those experiences that make a person aware that his or her behavior, level of performance, or ways of experiencing his or her life have changed as a consequence of having grown older (i.e., increased chronological age). Thus, this construct focuses on the AARC itself and acknowledges that states of awareness usually are triggered by experiences that reside either within (e.g., subjective feelings of diminished capacity) or outside the person (e.g., reactions by others and

social-structural conditions). Furthermore, although existing stereotypes about the aging process portray most of these experiences as negative and loss-related in nature, our definition is intentionally kept broad and includes the possibility of being aware of positive and gain-related changes.

The main objective of this theoretical article is to explore the conceptual and empirical utility of the concept of AARC. We approach the concept of AARC primarily from a life-span and social psychological perspective (P. Baltes, Lindenberger, & Staudinger, 2006) but also incorporate basic tenets of life course sociology (Macmillan, 2005; Settersten, 1999, 2003). First, examination of the concept of AARC needs to acknowledge that there is a great deal of within-person plasticity in terms of age-related behavior and experience, including an individual's potential to optimize his or her functioning (P. Baltes et al.). Second, there are also great between-person differences in intra-individual variability based on lifelong antecedents, such as education, socioeconomic status (SES), or attitudes and beliefs, and it is reasonable to assume that this also applies to AARC. Third, following the approach of Steverink and colleagues (2001), we assume that "multidimensionality" is a key feature of AARC.

This article has four major sections. The first section addresses the question why the construct of AARC is important for social gerontology at large. The second section focuses on conceptual challenges associated with AARC and relates AARC to general processes of self-awareness and self and identity. The third section discusses AARC with regard to three behavioral domains and illustrates how this construct can be fruitfully integrated into social gerontological research. Fourth, we present a conceptual model that underscores that the collaboration among multiple disciplines is needed to gain a deeper understanding

of AARC and to fuel future research in the field of social gerontology.

THE CONSTRUCT OF AARC IN SOCIAL GERONTOLOGY

There are several reasons why the construct of AARC deserves more attention in social gerontology. First, research has shown that people have well-defined expectations and beliefs about age-related gains and losses across the adult life span (Heckhausen, Dixon, & Baltes, 1989). These expectations are, in part, based on cultural norms that use chronological age as a marker for the occurrence of age-graded events and for the definition of a “normative” life course that corresponds to social timetables and reflects social-structural conditions (Macmillan, 2005). In a landmark study, Heckhausen and colleagues (1989) showed that young, middle-aged, and older adults had very similar expectations and beliefs regarding the occurrence of certain gains and losses throughout adulthood. In particular, developmental gains were expected to occur to some extent over the entire adult life span. However, gains were expected to be outnumbered by developmental losses in advanced old age (i.e., aged 85 years and older). These findings converge with results from research, showing that developmental changes in late adulthood tended to be perceived as less desirable and less controllable (Heckhausen & Baltes, 1991). Given these empirical findings, it seems reasonable to assume that AARC plays a major role in normative conceptions of human development. How such normative beliefs are expressed and integrated into personal perceptions of age-related changes has, however, not been elaborated very well both theoretically and empirically.

A noteworthy exception from this general rule is the classic work of Kuypers and Bengtson (1973), who proposed a “model of normal aging.” Specifically, these authors suggested that adults’ sense of self is greatly influenced by the social labeling that they experience as they grow old. They also argued that older adults are susceptible to experiencing the “social breakdown syndrome” because old age tends to be associated with a loss of normative guidance, loss of social roles, loss of reference groups, and a decrease in prestige. Although this model stimulated a great deal of debate in social gerontology, the concept of AARC takes a more agentic view and acknowledges that later adulthood has become a more clearly defined life stage that also provides the potential for successful aging. However, in discussing the role of age norms and subjective age identifications, Settersten (1999) remarked that “Little is known of the subjective experiences of age expectations and timetables, nor of how these take on important meanings for individuals” (p. 93).

Second, it has been shown that societal aging stereotypes are often internalized by older adults (Hess, 2006; Levy, 2003), leading, in turn, to negative self-stereotyping

with major behavioral consequences. Levy (1996) showed that positive or negative age-related self-stereotyping affected older adults’ performance on a memory task. Specifically, older adults who engaged in positive self-stereotyping performed significantly better on the memory task than individuals in the negative self-stereotyping condition. These results are complemented by longitudinal data, showing that individuals with positive self-perceptions lived, on average, 7.5 years longer than those with less positive self-perceptions (Levy, Slade, Kunkel, & Kasl, 2002). Given this overall phenomenon, there is good reason to postulate that AARC should have significant effects on adults’ behavior, experiences, and actions. On one hand, AARC may impose developmental constraints on a person’s behavior and experiences if the awareness is associated with negative perceptions and consequences (Levy et al.). On the other hand, AARC may lead to the identification of developmental opportunities if it is based on positive perceptions and informs and motivates new meaningful plans and actions. Despite this potential, the role of AARC as a motivating influence on adult development has not been discussed in great detail in the social gerontological literature.

Third, although the experience of perceived age-related changes and experienced age-related loss is at the center of all major life span-oriented self-regulation models, the circumstances surrounding age-related change and loss have been discussed in fairly general ways. To be specific, models such as the assimilative/accommodative coping theory (e.g., Brandstädter & Rothermund, 2002), the life-span theory of control (Heckhausen & Schulz, 1995), or the model of selective optimization with compensation (P. Baltes et al., 2006) all rely to some extent on the subjective experience of loss and individuals’ AARCs without explicating the role of these experiences in more detail. Thus, we are advocating for the inclusion of AARC in these life-span theories of human development because we believe that this construct fills a theoretical void.

Fourth, we propose that the concept of AARC can fulfill an important integrative function. In particular, the effects and processes of aging have been studied in multiple domains and from multiple perspectives but attempts to link findings and concepts across domains have remained rather limited. For example, findings related to the subjective experience of the aging body (Whitbourne, 1996) have so far neither been linked systematically to changes in cognition and metacognition as they describe the aging mind (Hertzog & Hultsch, 2000) nor to the subjective age identification of aging individuals. We argue that all these processes are essential for understanding the concept of AARC and that addressing such diverse processes in a converging manner via the AARC construct will contribute to a more holistic picture of what the subjective experience of aging is all about (see Cook & Marsiske, 2006).

BASIC CONCEPTUAL ISSUES RELATED TO AARC

Definition of AARC and Its Implications

According to the definition provided earlier, AARC refers to a person's state of awareness that his or her behavior, level of performance, or way of experiencing life has changed as a consequence of having grown older. It is important to note that in contrast to the concepts of subjective age or age identity, the emphasis of AARC is on being aware that something in one's life has changed due to aging. From an assessment perspective, this emphasis requires, at a minimum, that a person can verbalize his or her age-related change experiences or can provide a subjective evaluation of his or her perceptions. Furthermore, it is essential to the concept of AARC that individuals attribute the perceived change to having grown older, that is, to chronological age and to the passing of time. The major issue here is that attributing change to chronological age has quite specific features in naive theories of adult human development. Specifically, these features are often informed by references to biological processes and basic principles, such as universality, generality, and irreversibility (P. Baltes et al., 2006).

Furthermore, we also argue that the translation of relatively objective age-related changes (e.g., changes in sensory functioning, body weight, physical strength) into subjective representations is a defining criterion of AARC. That is, we view AARC as the major driving force for adaptational efforts and not objective change per se. To illustrate this point, all individuals undergo objective age-related changes, for instance, at the cellular and organ level; however, these objective changes are often not subjectively noticed until they start to have a direct impact on a person's level of functioning or well-being. Thus, although AARC does not exclude such objective age-related change, as long as the occurring change is not perceived as being age related (e.g., perceived as being related to an illness), our construct would not apply. Another implication of this conceptualization of AARC is that an individual may have considerable subjective AARC in a given behavioral domain, whereas objectively measured change has been fairly small or has not occurred at all. For example, an individual may subjectively interpret his or her forgetfulness as a sign of developing dementia, whereas objective measures of memory functioning show that the person's performance is well within the normal range of functioning. Thus, AARC also requires an understanding of how and to what extent subjectively perceived changes are linked to or independent from objectively assessed changes (Zimprich & Kliegel, in press).

Finally, we view it as an advantage that our definition does not only focus on negative and loss-related changes but also explicitly incorporates the possibility of becoming aware of positive and gain-related changes (see Steverink et al., 2001; Timmer, Bode, & Dittmann-Kohli, 2003). That is, we propose that the AARC, in general, is not a neutral experience but tends to be associated with a negative or pos-

itive valence. This creates the possibility that awareness of positive age-related changes may serve as motivational force for continued development into very old age and as an important counterbalancing factor to perceived negative age-related changes. Further theoretical clarification also requires that we reflect on the status of AARC vis-à-vis other self-related constructs, including general self-awareness.

The Relation Between General Self-Awareness and Age-Related Awareness of Change

A large body of social psychological research has shown that individuals differ in the level of awareness for their own conditions and states and in the tendency to focus attention on their own person (Duval & Wicklund, 1972). Thus, in the social psychological and personality literature, self-awareness has, in general, been treated as an individual difference variable that indicates to what extent a person focuses his or her attention on aspects of the self (Carver & Scheier, 1998). The basic assumption is that self-awareness is relevant for forming intentions, setting goals, and guiding subsequent behavior and actions (Carver, 2004). This tradition in psychology is complemented by the perspective of symbolic interactionism in sociology (Wells & Stryker, 1988). Symbolic interactionists view self-awareness and, more importantly, awareness of how others see us as the foundation for salient identities and emphasize that these identities are constructed and reconstructed as social roles and interpersonal relations change over the life course (Wells & Stryker). Similar to action theorists in psychology, symbolic interactionists also emphasize that individuals reflect on their actions and circumstances and that human behavior is conscious, interpretive, and intentional (Wells & Stryker).

In contrast to general self-awareness, AARC refers to a specific kind of self-awareness, namely the understanding that something has changed as a consequence of having grown older. The connection to general self-awareness exists because the attentional focus of the individual is directed on the own person due to perceived changes in functioning and experiences that are related to having grown older. We believe that there are several reasons why it is meaningful to focus on AARC as a component of self-awareness related to aging.

Like other person characteristics, such as gender or race/ethnicity, chronological age tends to be outwardly visible and is a primary category for social judgments (Cuddy & Fiske, 2002). In addition, chronological age is a category that is used by societies to assign social positions and responsibilities within given social structures (George, 2007). However, chronological age is not only important from a macrolevel perspective as a marker for the organization of social structures but also plays a crucial role at the microlevel in giving individuals an understanding of their position along the life course (Macmillan, 2005; Settersten, 1999). For example, research has shown that as people age,

Table 1. Overview of Dimensions of Awareness of Age-Related Change

Dimension	Major content	Examples
Health and physical functioning	Perceived changes related to physical appearance, health, and physical functioning.	Awareness of graying of the hair, awareness of loss of stamina, diagnosis of an age-related disease (e.g., arthritis, diabetes), awareness of loss of physical strength and mobility.
Cognitive functioning	Perceived changes related to all cognitive processes and abilities, including processes related to the functioning of the central nervous system.	Awareness of changes in memory functioning, realization that learning new material takes longer, awareness of increasing expertise and world knowledge in specific areas.
Interpersonal relations	Perceived changes in social relationships, interactions, and communication.	Increased interest in mentoring of younger people and being involved in one's community, prioritization of emotionally rewarding relationships over instrumental ones, increased focus on family relations.
Social-cognitive and social-emotional functioning	Perceived changes that relate to the aging self and the emotional domain.	Awareness of improved coping skills, being more calm in the face of conflict and stress, acknowledging the inherent relativity of important matters of life, awareness of decreasing self-efficacy, realistic evaluation of strengths and weaknesses.
Lifestyle and engagement	Perceived changes related to overall behavior in daily life.	Adjusting personal interests and activities to physical abilities, selecting activities to optimize enjoyment and personal fulfillment, satisfaction with one's achievements.

there is an increased tendency of individuals to become aware of their remaining lifetime, and this subjective sense of remaining time “has profound effects on basic human processes, including motivation, cognition, and emotion” (Carstensen, 2006, p. 1913). Munnichs (1966) referred to this awareness as the “confrontation with the finitude of life” (p. 3), and Marshall (1975) used the term “awareness of finitude” (p. 114; see also Marshall, 2005). Although it is debatable to what extent awareness of remaining time until death is a conscious (explicit) or nonconscious (implicit) process, it indicates that individuals become aware of how much time of their overall life they already have lived and how much time there remains to be lived. In this sense, awareness of remaining lifetime has been examined as a major factor associated with motivational, cognitive, and emotional processes across the adult life span (Carstensen). AARC has a certain affinity to awareness of remaining lifetime but is also different from this concept in that AARCs may be linked to processes of meaning making that, in turn, become the foundation for forming specific intentions (e.g., intention to become physically active) and motivating specific actions (e.g., joining an exercise group).

As a specific form of self-awareness, we also postulate that AARC is intricately linked to other self-related constructs, such as beliefs of self-efficacy, self-concept clarity, or role- and situation-specific self-representations (Diehl, 2006). That is, we assume that AARC becomes an important part of individuals' self-knowledge and can be viewed as an integral component of a knowledge structure that incorporates both content-related and evaluative information about age-related changes observed by the individual.

MULTIDIMENSIONALITY OF AARC

A key aspect of our conceptualization of AARC is that it should be conceived as a multidimensional construct. That

is, AARC should be studied within and across behavioral domains. Table 1 provides an overview in terms of the core domains that we consider relevant for examination. These core domains are health and physical functioning, cognitive functioning, interpersonal relations, social-cognitive and social-emotional functioning, and lifestyle and engagement. In the following, we discuss the first three domains in more depth because a discussion of all five domains exceeds the scope of this article. By comparing and contrasting AARC in these three domains, we try to illustrate in an exemplary way that the investigation of AARC should draw on subjective and objective criteria that differ both in their specificity as well as in their overall behavioral relevance. In addition, the selection of these three domains also underscores the proposition that AARC has both negative as well as positive connotations and requires an interdisciplinary approach.

Health and Physical Functioning

Subjective and experiential aspects.—Surprisingly, the experience of age-related changes of the body has not been addressed intensively in social gerontology. For example, in the most recent edition of the *Handbook of the Psychology of Aging*, Newell, Vaillancourt, and Sosnoff (2006) provide a discussion of objective age-related changes in movement, posture, and locomotion but make no attempt to link these occurrences to the question, when and how these changes are subjectively perceived and how such subjective perceptions may subsequently influence behavior. There is, however, a good deal of reflection and research on the aging body as a personal, societal, and cultural “marker” of old age. For example, Tulle (2008a, b) has addressed in a series of qualitative studies the social construction of the aging body and how such a construction affects the actual experience of aging. Similarly, Powell and Longino (2001) have examined

the role of the body for identity management in later life, and Calasanti (2005) and Twigg (2004) have emphasized issues of gender and aging. A large body of research has documented that gender-based differences and double standards exist with regard to the interpretation of age-related changes in physical appearance (Ferraro et al., 2008). Similarly, a large body of research documents gender differences in disability, morbidity, and mortality rates leading to the conclusion of gender-specific vulnerabilities and health disparities (Moen & Spencer, 2006).

The most comprehensive treatment of age-related bodily changes has been provided by Whitbourne (1996). According to her overview, a major area of AARC is physical appearance and mobility. Awareness of changes in physical appearance usually involves changes in the skin (e.g., losing firmness and elasticity), hair (e.g., change in color), body build (e.g., loss of standing height), body weight, and shape (Ferraro et al., 2008). Changes in mobility are experienced as a consequence of the aging of the muscular-skeletal system, including the loss of muscle mass and muscle strength, reduced bone mass and bone density, and problems with joints due to chronic illness conditions, such as arthritis. In addition, AARC is often linked to other vital body systems, such as the sensory system (e.g., loss in sight and hearing), the cardiovascular system (e.g., quicker exhaustion during physical activity), the respiratory system (e.g., loss in lung volume/maximum breathing capacity), and the digestive and urinary system (e.g., incontinence).

Relevant research.—The health belief model (Becker, 1974) may be applied as one possible conceptual framework to address the issue of AARC in the domain of physical health and functioning. In this model, perceived vulnerability plays a major role with regard to health behavior and preventive action. In terms of AARC, the concept of perceived vulnerability may be translated from the general health and illness domain to the experience of increased physical vulnerability due to growing older. Thus, perceived-felt vulnerability has taken a prominent role in the common sense model of health and illness (Leventhal, Rabin, Leventhal, & Burns, 2001). Specifically, perceived-felt vulnerability is viewed as a trigger of self-regulation strategies and intentions to preserve an individual's self-identity and may thus also foster AARC.

Another important body of research in this context is work on adults' subjective health, often assessed in the form of single-item ratings. However, whereas the construct of subjective health aims to provide an evaluation of a person's overall health (Idler & Benyamini, 1997), AARC in the domain of physical health and functioning places the primary emphasis on the perceived changes in health and physical functioning. Given the evidence showing that subjective health ratings are often stronger predictors of health outcomes, including mortality, than objective physician examinations (Deeg & Kriegsman, 2003), it seems also rea-

sonable to speculate whether and to what extent AARC in the area of physical functioning may play a similar role. In particular, it is important to understand to what extent perceived changes in subjective health are predictive of levels of functioning and of outcomes such as well-being and depression compared with objectively assessed health changes.

In sum, focusing on AARC in this domain is not meant to replace the previous approaches. Rather, the concept of AARC is proposed to serve an integrating role by focusing on the extent to which adults are aware of age-related changes in health and physical functioning and how this awareness is related to their behaviors and experiences.

Cognitive Functioning

Subjective and experiential aspects.—In particular, three domains of cognitive functioning tend to be a potential source of AARC: memory functioning, slowing in speed of information processing, and intellectual abilities and learning. First, self-perceptions about changing or declining memory abilities are common among older adults (Lineweaver & Hertzog, 1998) and often raise fears regarding illness processes that may underlie such changes. Indeed, older adults often have detailed perceptions about what memory abilities (e.g., memory for names or faces and memory for semantic or episodic material) have changed for them as a function of age (Lineweaver & Hertzog) and, hence, may engage in efforts to compensate for the perceived negative changes.

A second area in which older adults tend to perceive notable age-related changes is speed of information processing (Hartley, 2006). In particular, older adults may show their awareness about their cognitive and psychomotor slowing in everyday contexts by adjusting their actions and behavior to take into account that they are slower than at a younger age (e.g., taking more time to read important documents, adjustment of driving behavior, etc.). This self-knowledge of older adults is consistent with a large body of laboratory-based research, showing that slowing in speed of processing occurs with regard to many cognitive tasks and tends to be a normative age-related change (Hartley).

Finally, adults also tend to have a sense of how their ability to learn new materials and their overall intellectual performance changes with age. This self-knowledge is in part based on normative expectations about age-related changes (Heckhausen et al., 1989) but is also rooted in personal experiences related to objective performance (Willis, Jay, Diehl, & Marsiske, 1992).

Relevant research.—The fact that memory complaints are pervasive in middle-aged and older adults was one reason for the development of memory training programs and for examining the effectiveness of such programs. Although

a number of effective training programs have been developed and examined (Neely & Bäckman, 1995), the transfer of the mnemonic skills into adults' daily lives and the long-term effectiveness of the training programs continue to be the topic of ongoing debates. It is in this context, where adults' AARCs related to their memory abilities become relevant. In particular, adults' awareness and knowledge related to their memory have been studied under the heading of metamemory (Hertzog & Hultsch, 2000). Overall, research on metamemory has shown that adults possess considerable self-knowledge about their memory abilities, including beliefs about strengths and weaknesses, affective states associated with memory-demanding situations, and demand characteristics of different memory tasks and situations (Hertzog & Hultsch). However, little systematic research exists that relates this self-knowledge to behavioral efforts to counteract and compensate for perceived age-related changes.

A similar lack of research exists in the area of slowing of information processing. Although research on cognitive slowing and changes in psychomotor performance has a long tradition in gerontology, there is a paucity of systematic research on how adults' self-awareness in this domain may affect their behavior and, in particular, how it may motivate compensatory efforts in everyday life. In the workplace, for example, older adults may take on responsibilities that require less speed of processing and instead more elaborated knowledge and expertise, or they may adjust their behavior in ways so that they maintain their overall level of performance. With regard to the latter strategy, Salthouse (1984) showed in a classic experiment that expert typists compensated for an age-related slowing in simple finger tapping speed by reading further ahead in the to-be-typed text, thus maintaining their overall level of performance and accuracy. This research is exemplary and illustrates how compensatory efforts can protect older adults' overall level of performance and how AARC may be linked to compensatory behavior.

Besides memory and speed of processing, adults also tend to be aware that their ability to acquire new knowledge and their intellectual performance change across the adult years. Research on adults' perceptions regarding their performance on intelligence tests has shown that older adults tend to be fairly accurate and that they rely on their actual performance to make predictions about their future functioning (Willis et al., 1992). Schaie, Willis, and O'Hanlon (1994) examined young, middle-aged, and older adults' perceptions of age-related change with regard to several intelligence factors. These authors showed that a greater proportion of older adults compared with young or middle-aged adults perceived themselves as having declined in their cognitive performance. Consistent with our argument that AARC should be conceived as a domain-specific construct, the perceived changes were ability specific, suggesting that older adults "do not hold global

perceptions of universal decline across all abilities" (Schaie et al., p. 117). Furthermore, when perceptions of cognitive change were compared with objectively measured change over 7 years, these researchers found that about half of the sample accurately categorized their performance change over time. Schaie and colleagues concluded from these findings that their study participants were not only aware of their concurrent levels of performance but they were also able to make reasonably accurate estimates of change in performance that had occurred over a 7-year period.

In sum, we believe that integrating the concept of AARC into cognitive aging research may be useful in shedding additional light into cognitive processes relevant for maintaining the highest levels of functioning possible.

Interpersonal Relations

Subjective and experiential aspects.—Interpersonal relations represent another domain in which AARC becomes relevant in what has been coined identity management in old age (Biggs, 2005). Although there may be no longer the same desire of jumping into new relationships and new intimacies as individuals grow older, many older adults report that they are relating better to their close social partners than at younger ages (Antonucci, 2001). Social roles also change dramatically as people age. For example, the role as a parent changes as children grow up and become adults themselves. Indeed, children's growing up, their accomplishments and struggle with developmental tasks may turn into powerful reminders of a person's age and age-related changes (Ryff, Lee, Essex, & Schmutte, 1994). Roles frequently also change as people become "older" employees, an experience frequently connected with lower performance expectations or negative feedback from others (Hess, 2006). Becoming a retiree typically leads to a fundamental rearrangement of a person's social contacts and the redefinition of major roles, such as being a spouse or a grandparent. In addition, although older adults may proactively streamline their social networks (Antonucci), the experience of losing loved ones and close friends is common in old and very old age and serves as a strong marker in terms of a person's position in the life course and a reminder that time is passing (Carstensen, 2006).

Relevant research.—The understanding of AARC in the domain of interpersonal relations can benefit from various established conceptions, phenomena, and empirical findings. One important issue is that, in general, older adults experience social relationships as more positive than younger adults, and they also perceive themselves as becoming more agreeable, even if relations involve the potential for serious interpersonal conflict (Sorkin & Rook, 2006). Socioemotional selectivity theory (Carstensen, 2006) has

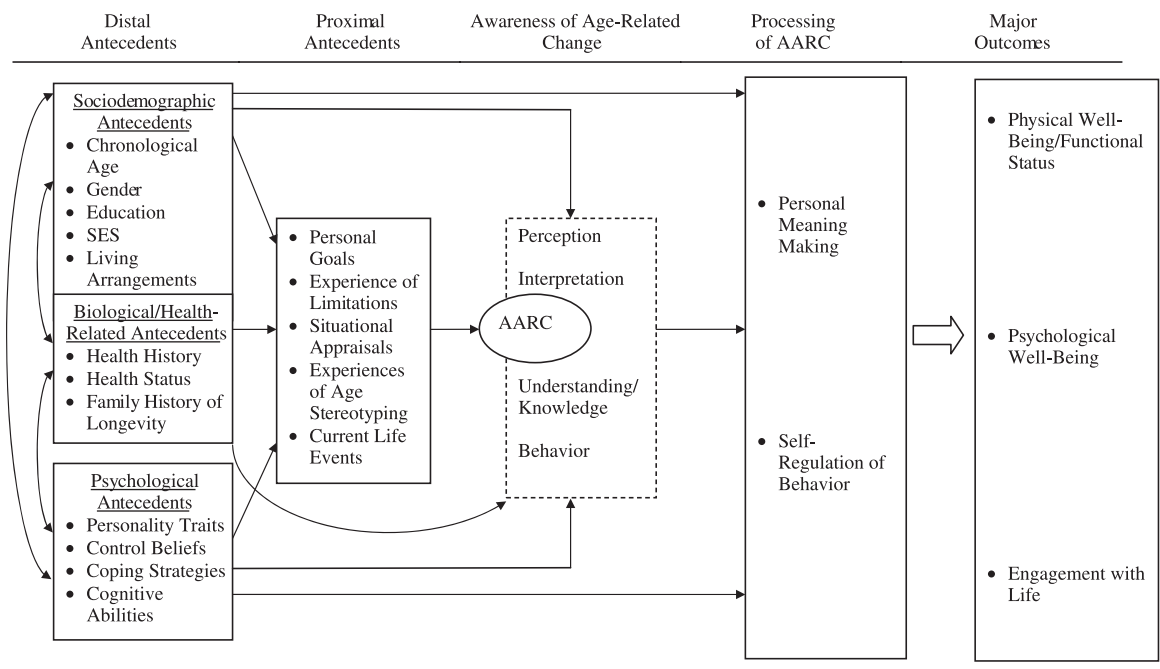


Figure 1. Conceptual framework for awareness of age-related change (AARC).

contributed to a deeper understanding of social development across the life span by elaborating the role that the awareness of remaining lifetime plays in the selection of social goals. As Carstensen and her research group have shown in a number of studies, individuals who have a limited future time perspective (e.g., older adults, younger adults who anticipate an ending) report that their preferences for social partners are primarily motivated by the desire to have meaningful and emotionally satisfying relations. In contrast, individuals who have an expansive future time perspective are more likely to select social partners based on knowledge acquisition goals. In other words, it seems reasonable to expect that AARC in the interpersonal domain should be reflected in the experience of a shift of meaning from information-seeking goals to intimacy-related goals.

On a more general level, Wahl and Lang (2006) suggested a differentiation between person–environment “agency” versus person–environment “belonging” motivations as people age. These authors postulate that agency-related motivations are expected to decrease in older adults’ relations with their social and physical environments, whereas their belonging-related motivations are expected to increase and to infuse strong feelings of attachment to a select number of persons and places. Often, such strong attachments tend not to be present in the same way in young adulthood and arise later in life. In that sense, the desire for stability in the social and physical environment that is particularly strong in very old age could be interpreted as an age-related change in the social–emotional domain.

Positive experiences in the social domain, however, are also contrasted by negative experiences that should trigger

AARC. These negative experiences include the age-related increase of becoming the target of negative stereotyping and being treated as an inferior person by others (Hess, 2006). In addition, it is well documented that adults are often the target of negative external feedback and, therefore, are at greater risk than other age groups to engage in negative self-stereotyping (Levy, 2003). Thus, as individuals grow older, they tend to be increasingly exposed to social interaction scripts based on their interaction partners’ assumptions about their chronological age. Most of these interaction scripts tend to contain negative expectations and stereotypical attributions with regard to aging and the life stage of old age, and it is plausible to expect that these socially established scripts have an influence on adults’ AARC, particularly in social settings, such as nursing homes (M. M. Baltes & Wahl, 1996).

In sum, positive aspects related to AARC may include perceiving oneself as becoming more agreeable and gaining more expertise in dealing with interpersonal relations. Negative aspects may include the awareness of increasing dependency on others and the experience that others tend to perceive old age as an inferior life stage.

A CONCEPTUAL MODEL OF AARC: AN INTERDISCIPLINARY APPROACH

In this section, we make an attempt to place the construct of AARC into a broader conceptual framework. Specifically, we outline a model that describes major antecedents, processes, and consequences of AARC (see Figure 1). Before discussing this model in detail, three general comments

are in order. First, the model is presented as a heuristic framework and does not claim to be exhaustive in terms of the included variables. Thus, we consider this model a blueprint rather than a fully developed theory. Second, although we have argued in favor of a multidimensional conceptualization of AARC, the figure displays AARC as a global concept because a discussion of relevant antecedents and consequences separately for each proposed dimension would exceed the scope of this article. Third, we present this model with the intention to invite a range of social gerontological research traditions such as perspectives and approaches not only from psychology and sociology but also from the health sciences to conceptually and empirically contribute to a better understanding of the phenomenon of AARC.

Antecedents of the AARC

When examining possible antecedents of AARC, it seems helpful to distinguish between distal and proximal influences. As can be seen in Figure 1, we distinguish between sociodemographic antecedents (e.g., age, gender, SES, living arrangements), a predominantly sociology related component, biological/health-related influences (e.g., health status and health history), a predominantly geriatric medicine-related component, and psychological antecedents (e.g., personality traits, cognitive abilities) as distal influences on AARC. In terms of its association with chronological age, for example, empirical evidence suggests that age should show a positive relation with the frequency and intensity of AARC (Steverink et al., 2001). Moreover, it seems reasonable to assume that the frequency of positive or negative experiences of AARC should vary by behavioral domain, with negative age-related experiences occurring more often in the physical and health domain compared with the social or emotional domain (Heckhausen et al., 1989; Steverink et al.).

We also expect that education and SES play a major role with regard to AARC, although current research suggests that the effects of SES on AARC may be mediated by health-related variables (Barrett, 2003). Thus, at this point in time, the directionality of the effects of SES on AARC in different behavioral domains is open for further examination and predictions very likely will vary by domain. For the domain of health and physical functioning, for example, one may predict that individuals with lower SES would show lower levels of AARC because they are more likely to have a history of poorer health behaviors and earlier onset of health limitations (Barrett) and, thus, may be less likely to attribute declines in physical functioning to aging-related factors. In contrast, one might hypothesize that individuals with higher SES show greater AARC in the cognitive domain because a higher SES tends to be associated with better cognitive functioning and with activities that foster maintenance of high levels of cognitive functioning so that even normal

age-related changes may be noticed more readily (Schaie, 2005). Next, we consider individuals' health status and health history as a distal variable related to AARC. Health status and health history may be particularly predictive of the valence of adults' experiences of AARC. Specifically, individuals with poor health status and health history are expected to have age-related awareness experiences that are more negative in nature (Kleinspehn-Ammerlahn, Kotter-Grühn, & Smith, 2008), whereas individuals with good health status and a normal or better than normal health history would be expected to have age-related awareness experiences that tend to be more positive in nature (Barrett).

In terms of psychological variables, we postulate that personality traits, control beliefs, and coping strategies should play a role with regard to AARC. Personality traits such as neuroticism or conscientiousness should be related to the frequency and content of AARC experiences (McCrae & Costa, 2003). Individuals who score high on neuroticism may show a higher level of worrying about their aging process than those who have lower scores, resulting in more frequent experiences of AARC. In contrast, individuals who score high on conscientiousness may be quite different in terms of their AARC experiences compared with those with low levels of conscientiousness because conscientiousness has been shown to be related to positive health behaviors and, thus, may be associated with more positive aging experiences (Bogg & Roberts, 2004).

In contrast, we consider psychological variables, such as personal goals, current experiences of limitations and age stereotyping, situational appraisal processes, and current life events as proximal antecedents of AARC. A person's overall level of functioning in terms of basic cognitive abilities, world knowledge, and inclination to reflect on his or her own life, for example, is likely to mediate the effects of the distal antecedents on the subjective perceptions of age-related change (Hertzog & Hultsch, 2000). Similarly, it seems reasonable to expect that certain personal goals may not be attainable anymore after a certain age (e.g., having a child and professional achievements) and may lead to a profound awareness of how age can become an indicator of normative expectations within established opportunity structures (George, 2007; Heckhausen, Wrosch, & Fleeson, 2001). Similarly, certain life events (e.g., children leaving home and birth of grandchildren) and experiences in everyday life (e.g., age-based stereotyping) create situations in which individuals are reminded of their chronological age.

Processing of AARC

How such experiences are appraised by the individual and how these appraisals influence subsequent behavior depends a great deal on the person's own perceptions of aging, his or her knowledge about the multidimensionality and plasticity of human aging, and his or her goals with regard to the own aging process (see Figure 1). That is, we see predominantly

a place here for psychological processes, although they are framed within social–structural and health contexts as indicated in the antecedent component of the model. Although these processes work together in complex ways, we postulate that experiences of AARC may trigger a host of reactions that can broadly be summarized as processes of personal meaning making and self-regulation. These processes may include temporal comparisons in which individuals compare their current performance in a behavioral domain with their performance in the past (i.e., within-person past–present comparisons), or they may include social comparisons in which individuals compare their own performance and experiences with the performance of others. Moreover, these evaluation processes may result in a readjustment of personal goals (Wrosch, Miller, Scheier, & Brun de Pontet, 2007) and in a selective acknowledgment of self-relevant abilities with the overall objective to stabilize the individual's sense of self (Greve & Wentura, 2003) and to optimize adjustment and subjective well-being. The key question that remains to be answered in this context is under what conditions (i.e., personal and contextual factors) does AARC result in behavioral responses that lead to resilience and optimal aging and under what conditions does AARC lead to suboptimal and possibly negative outcomes?

Outcomes of AARC

Like the aging process in general, there is reason to believe that the outcomes of AARC in terms of behavior and degrees of functioning are characterized by great interindividual variability. After all, aging is a highly individualized process and is influenced by lifelong factors that shape the entire course of a person's development. In general, we propose that the outcomes that should be targeted in the context of AARC should focus on subjective and objective assessments of physical well-being and functional status, different dimensions of psychological well-being, and other indicators of functioning and quality of life (Figure 1).

The main challenge in determining the empirical relevance of AARC consists in elaborating the circumstances under which AARC leads to positive or negative developmental outcomes. These circumstances include both context (i.e., physical and social contexts) and person-specific variables that interact with AARC to produce individualized outcomes within and across domains of behavior. In general, we believe that the explanatory value of AARC has not been exhaustively examined in current gerontological theory and research, although interesting and promising findings from several research traditions are available.

CONCLUSIONS

Drawing on several key principles of life-span psychology (P. Baltes et al., 2006) and life course sociology (George, 2007; Macmillan, 2005; Settersten, 2003), such as within-person plasticity, between-person diversity, multidimension-

ality, and contextual embeddedness of functioning, the objective of this article was to discuss the concept of AARC and to elucidate its role in social gerontological theory and research. In particular, we argued that the construct of AARC goes beyond the established concepts of subjective age or age identity because its emphasis is on the extent to which adults are aware of age-related changes and how this awareness translates into subsequent behaviors either in terms of optimization, maintenance, or compensation. The definition of AARC was intentionally kept broad in order to incorporate both loss- and decline-related as well as gain- and growth-related experiences of aging adults. Furthermore, AARC needs to be studied using both subjective and objective assessments as well as behaviors in multiple domains (e.g., physical, cognitive, social domain) to determine how AARC in one domain may influence and be influenced by AARC in other domains. The proposed conceptual model underscores that focusing on AARC has the potential to integrate, as we have argued, the contributions from several research traditions in social gerontology, such as sociology, psychology, and applied disciplines, thus, potentially stimulating interdisciplinary research as the field as a whole moves forward. Overall, we believe that the concept of AARC is able to fill a theoretical void in social gerontology and can serve an integrating and stimulating purpose with regard to empirical research.

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REFERENCES

- Antonucci, T. C. (2001). Social relations: An examination of social networks, social support, and sense of control. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (5th ed., pp. 427–453). San Diego, CA: Academic Press.
- Baltes, M. M., & Wahl, H.-W. (1996). Patterns of communication in old age: The dependency-support and independence-ignore script. *Health Communication*, 8, 217–231.
- Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Life span theory in developmental psychology. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 569–664). New York: Wiley.
- Barrett, A. E. (2003). Socioeconomic status and age identity: The role of dimensions of health in the subjective construction of age. *Journal of Gerontology: Social Sciences*, 58B, S101–S109.
- Becker, M. H. (1974). The Health Belief Model and personal health behavior. *Health Education Monographs*, 2, 326–473.
- Biggs, S. (2005). Beyond appearances: Perspectives on identity in later life and some implications for method. *Journal of Gerontology: Social Sciences*, 60B, S118–S128.

- Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin*, 130, 887–919.
- Brandtstädter, J., & Rothermund, K. (2002). The life course dynamics of goal pursuit and goal adjustment: A two-process framework. *Developmental Review*, 22, 117–150.
- Calasanti, T. (2005). Ageism, gravity, and gender: Experiences of aging bodies. *Generations*, 39, 8–12.
- Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, 312, 1913–1915.
- Carver, C. S. (2004). Self-regulation of action and affect. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 13–39). New York: Guilford.
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Oxford University Press.
- Connidis, I. (1989). The subjective experience of aging: Correlates of divergent views. *Canadian Journal on Aging*, 8, 7–18.
- Cook, S., & Marsiske, M. (2006). Subjective memory beliefs and cognitive performance in normal and mildly impaired older adults. *Aging & Mental Health*, 10, 413–423.
- Cuddy, A. J. C., & Fiske, S. T. (2002). Doddering but dear: Process, content, and function in stereotyping of older persons. In T. D. Nelson (Ed.), *Ageism: Stereotyping and prejudice against older persons* (pp. 3–26). Cambridge, MA: MIT Press.
- Deeg, D. J. H., & Kriegsman, D. M. W. (2003). Concepts of self-rated health: Specifying the gender difference in mortality risk. *The Gerontologist*, 43, 376–386.
- Diehl, M. (2006). Development of self-representations in adulthood. In D. K. Mroczek & T. D. Little (Eds.), *Handbook of personality development* (pp. 373–398). Mahwah, NJ: Erlbaum.
- Duval, T. S., & Wicklund, R. A. (1972). *A theory of objective self-awareness*. New York: Academic Press.
- Ferraro, F. R., Muehlenkamp, J. J., Paintner, A., Wasson, K., Hager, T., & Hoverson, F. (2008). Aging, body image, and body shape. *Journal of General Psychology*, 135, 379–392.
- George, L. K. (2007). Age structures, aging, and the life course. In J. M. Wilmoth & K. F. Ferraro (Eds.), *Gerontology: Perspectives and issues* (3rd ed., pp. 203–222). New York: Springer.
- Greve, W., & Wentura, D. (2003). Immunizing the self: Self-concept stabilization through reality-adaptive self-definitions. *Personality and Social Psychology Bulletin*, 29, 39–50.
- Hartley, A. (2006). Changing role of the speed of processing construct in the cognitive psychology of human aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 183–208). San Diego, CA: Academic Press.
- Heckhausen, J., & Baltes, P. B. (1991). Perceived controllability of expected psychological change across adulthood and old age. *Journal of Gerontology: Psychological Sciences*, 46B, P165–P173.
- Heckhausen, J., Dixon, R. A., & Baltes, P. B. (1989). Gains and losses in development throughout adulthood as perceived by different adult age groups. *Developmental Psychology*, 25, 109–121.
- Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review*, 102, 284–304.
- Heckhausen, J., Wrosch, C., & Fleeson, W. (2001). Developmental regulation before and after a developmental deadline: The sample case of “biological clock” for child-bearing. *Psychology and Aging*, 16, 400–413.
- Hertzog, C., & Hultsch, D. F. (2000). Metacognition in adulthood and old age. In F. I. M. Craik & T. A. Salthouse (Eds.), *The handbook of aging and cognition* (2nd ed., pp. 417–466). Mahwah, NJ: Erlbaum.
- Hess, T. M. (2006). Attitudes toward aging and their effects on behavior. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 379–406). San Diego, CA: Academic Press.
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38, 21–37.
- Kleinspehn-Ammerlahn, A., Kotter-Grühn, D., & Smith, J. (2008). Self-perceptions of aging: Do subjective age and satisfaction with aging change during old age? *Journal of Gerontology: Psychological Sciences*, 63B, P377–P385.
- Kuypers, J. A., & Bengtson, V. L. (1973). Social breakdown and competence: A model of normal aging. *Human Development*, 16, 181–201.
- Leventhal, H., Rabin, C., Leventhal, E. A., & Burns, E. (2001). Health risk behaviors and aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (5th ed., pp. 186–214). San Diego, CA: Academic Press.
- Levy, B. (1996). Improving memory in old age by implicit self-stereotyping. *Journal of Personality and Social Psychology*, 71, 1092–1107.
- Levy, B. (2003). Mind matters: Cognitive and physical effects of aging self-stereotypes. *Journal of Gerontology: Psychological Sciences*, 58B, P203–P211.
- Levy, B., Slade, M. D., Kunkel, S. R., & Kasl, S. V. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology*, 83, 261–270.
- Lineweaver, T. T., & Hertzog, C. (1998). Adults’ efficacy and control beliefs regarding memory and aging: Separating general from personal beliefs. *Aging, Neuropsychology, and Cognition*, 5, 264–296.
- Macmillan, R. (2005). The structure of the life course: Classic issues and current controversies. In R. Macmillan (Ed.), *Advances in life course research: Vol. 9. The structure of the life course: Standardized? Individualized? Differentiated?* (pp. 3–24). Amsterdam, The Netherlands: Elsevier.
- Marshall, V. W. (1975). Age and awareness of finitude in developmental gerontology. *Omega*, 6, 113–129.
- Marshall, V. W. (2005). Agency, events, and structure at the end of the life course. *Advances in Life Course Research*, 10, 57–91.
- McCrae, R. R., & Costa, P. T., Jr. (2003). *Personality in adulthood: A five-factor perspective*. New York: Guilford.
- Moen, P., & Spencer, D. (2006). Converging divergence in age, gender, health and well-being: Strategic selection in the third age. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (6th ed., pp. 127–144). San Diego, CA: Academic Press.
- Munnichs, J. M. A. (1966). *Old age and finitude: A contribution to psychogerontology*. Basel, Switzerland: Karger.
- Neely, A. S., & Bäckman, L. (1995). Effects of multifactorial memory training in old age: Generalizability across tasks and individuals. *Journal of Gerontology: Psychological Sciences*, 50B, P134–P140.
- Newell, K. M., Vaillancourt, D. E., & Sosnoff, J. J. (2006). Aging, complexity, and motor performance. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 163–182). San Diego, CA: Academic Press.
- Powell, J. L., & Longino, C. F. (2001). Towards the postmodernization of aging: The body and social theory. *Journal of Aging and Identity*, 6, 199–207.
- Ryff, C. D., Lee, Y. H., Essex, M. J., & Schmutte, P. S. (1994). My children and me: Midlife evaluations of grown children and self. *Psychology and Aging*, 9, 195–205.
- Salthouse, T. A. (1984). Effects of age and skill in typing. *Journal of Experimental Psychology: General*, 113, 345–371.
- Schaie, K. W. (2005). *Developmental influences on adult intelligence: The Seattle Longitudinal Study*. New York: Oxford University Press.
- Schaie, K. W., Willis, S. L., & O’Hanlon, A. M. (1994). Perceived intellectual performance change over seven years. *Journal of Gerontology: Psychological Sciences*, 49B, P108–P118.
- Settersten, R. A. (1999). *Lives in time and place: The problems and promises of developmental science*. Amityville, NY: Baywood.
- Settersten, R. A. (Ed.). (2003). *Invitation to the life course: Toward new understandings of later life*. Amityville, NY: Baywood.
- Sorkin, D. H., & Rook, K. S. (2006). Dealing with negative social exchanges in later life: Coping resources, goals, and effectiveness. *Psychology and Aging*, 21, 715–725.
- Steverink, N., Westerhof, G. J., Bode, C., & Dittmann-Kohli, F. (2001). The personal experience of aging, individual resources, and subjective

- well-being. *Journal of Gerontology: Psychological Sciences*, 56B, P364–P373.
- Timmer, E., Bode, C., & Dittmann-Kohli, F. (2003). Expectations of gains in the second half of life: A study of personal conceptions of enrichment in a lifespan perspective. *Ageing and Society*, 23, 3–24.
- Tulle, E. (2008a). The ageing body and the ontology of ageing: Athletic competence in later life. *Body and Society*, 14, 1–19.
- Tulle, E. (2008b). *Ageing, the body and social change*. Palgrave, UK: MacMillan.
- Twigg, J. (2004). The body, gender, and age: Feminist insights in social gerontology. *Journal of Aging Studies*, 18, 59–73.
- Wahl, H.-W., & Lang, F. (2006). Psychological aging: A contextual view. In P. M. Conn (Ed.), *Handbook of models for human aging* (pp. 881–895). San Diego, CA: Academic Press.
- Wells, L. E., & Stryker, S. (1988). Stability and change in self over the life course. In P. B. Baltes, D. L. Featherman & R. M. Lerner (Eds.), *Life-span development and behavior* (Vol. 8, pp. 191–229). Hillsdale, NJ: Erlbaum.
- Westerhof, G. J., & Barrett, A. E. (2005). Age identity and subjective well-being: A comparison of the United States and Germany. *Journal of Gerontology: Social Sciences*, 60B, S129–S136.
- Whitbourne, S. K. (1996). *The aging individual: Physical and psychological perspectives*. New York: Springer.
- Willis, S. L., Jay, G. M., Diehl, M., & Marsiske, M. (1992). Longitudinal change and prediction of everyday task competence in the elderly. *Research on Aging*, 14, 68–91.
- Wrosch, C., Miller, G. E., Scheier, M. F., & Brun de Pontet, S. (2007). Giving up on unattainable goals: Benefits for health? *Personality and Social Psychology Bulletin*, 33, 251–265.
- Zimprich, D., & Kliegel, M. (in press). An age-comparative analysis of predictors of subjective cognitive complaints in middle and old adulthood. *Journal of Adult Development*.