# Contrasting Paths to Longevity: How Personal and Generalized Views on Aging Differentially Predict Mortality

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This study design, hypotheses, and analytic plan were not pre-registered. The deidentified raw data supporting the conclusions of this article have not been made accessible as they are still in the embargo period. Upon request, the data will be made available by the authors without undue reservation.

The materials used and the analytic code needed to reproduce the analyses presented in this paper are deposited at the Open Science Framework at

https://osf.io/6u7b8/?view\_only=71abd9a0b5af491596285f8241dba7b0.

#### Abstract

Views on aging (VoA) have consequences for development across the life span affecting the aging process of individuals in important ways. Previous research has shown that how individuals perceive their own aging (i.e., personal VoA) predict how many years they live, with more positive self-views being associated with decreased risk of mortality. While views of older adults in general (i.e., generalized VoA), or age stereotypes, have been shown to predict worse physical, mental, and cognitive health, whether and how they are associated with mortality remains unclear. In this study, we thus aimed to use a multidimensional approach to examine the impact of both personal and generalized VoA on mortality risk. Data were drawn from the Ageing as Future longitudinal study and included participants who took part in the baseline assessment in 2009 (N = 768, 49.5% female,  $M_{age} = 55.17$ , age range = 30 to 80 years). Information on mortality was obtained 15 years later, in 2024. Replicating and extending previous findings, a survival analysis indicated that individuals with more positive future views of their own aging had a lower risk of mortality. However, when examining generalized VoA, a different pattern emerged. After accounting for the influence of internalization effects (captured by personal VoA), individuals with more negative views of older adults in general were found to have a lower risk of mortality. Both effects remained significant even after controlling for participants' age, gender, household income, education, self-rated health, and life satisfaction. The findings suggest that both personal and generalized VoA influence how long individuals live, although in opposing directions. We discuss these findings in terms of internalization and dissociation of VoA.

### **Public Significance Statement**

What factors can increase longevity? This study advances the idea that views on aging (VoA) are important predictors of mortality, thus playing a role for survival time. The study

highlights a multidimensional perspective on VoA and demonstrates that how one thinks about themselves in old age (personal views of aging) and about others (views of older adults in general) contribute differently to mortality risk.

Keywords: views of aging, internalization, dissociation, longevity, mortality

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# Contrasting Paths to Longevity: How Personal and Generalized Views on Aging Differentially Predict Mortality

Research about the role of self-perceptions of aging (SPA) have extensively indicated that the beliefs individuals hold regarding their own aging process represent a powerful driver of future, later life outcomes. A recent meta-analysis on the longitudinal effects of SPA on health and longevity revealed that the association of SPA and health outcomes, including longevity, is robust (Westerhof et al., 2023; see also Tully-Wilson et al., 2021). Independent of the health-related outcome, studies systematically show that holding more negative SPA leads to poorer health (see also Wurm et al., 2017, for a review) and ultimately, to an increased risk of mortality (e.g., Kotter-Grühn et al. 2009; Levy et al., 2002; Maier & Smith, 1999; Wurm & Schäfer, 2022).

Self-perceptions of aging (SPA) are the most studied psychological predictor of mortality. However, SPA represent only one aspect of Views on Aging (VoA), which should be conceptualized as a multi-dimensional construct (Kornadt & Rothermund, 2015; Rothermund & de Paula Couto, 2024). VoA refers to beliefs and expectations about both *older adults in general* and *one's own personal aging process*. SPA primarily focuses on individuals' perceptions of their own aging, based on temporal comparisons between their current self and their past self. Another important aspect of VoA, which is not captured by SPA, involves individuals' views of their future aging—specifically, their expectations and anticipated changes regarding their future as older adults. Finally, age stereotypes, or generalized beliefs about aging and older adults, represent another relevant dimension of VoA that has not yet been explored as a predictor of longevity or mortality.

Although accumulated evidence already points to the detrimental effects of different types of negative VoA for development (e.g., increased depression, Rothermund, 2005; illness, Wurm et al., 2017; memory impairments, and an increased likelihood of developing

Alzheimer's disease, Levy et al., 2016) an investigation of whether and how different facets of VoA affect mortality is still lacking. We therefore aim to apply the multidimensional approach of VoA to compare the effects of both personal future-related self-views of aging and generalized age stereotypes on mortality.

## Personal Views on Aging as a Predictor of Mortality

The importance of self-perceptions of aging to survival has been the central focus of research investigating psychological predictors of mortality. A close look at how researchers operationalize SPA indicates that the adopted definition and measurement of self-perceptions is broad even though two types of operationalization prevail, both being *unidimensional* indicators of SPA: (1) SPA as assessed by the Attitude Toward Own Aging scale (ATOA, Lawton, 1975; Liang & Bollen, 1983; Tully-Wilson et al. 2021), and (2) subjective age (or felt age). It is important to note that while SPA can be influenced by internalized age stereotypes, they are not a direct measure of those stereotypes. For example, the widely used ATOA scale includes items which directly prompt individuals to compare their current state to their past experiences (e.g., in terms of their physical health, energy levels, happiness, and usefulness), thus focusing on *temporal comparisons*, that is, how individuals perceive their current self as compared to earlier points in their lives. Specifically, when a person assesses whether they have "as much pep as [they] did last year", they are engaging in a self-referential comparison that is inherently (intra)personal and tied to their unique aging experience and not to broader societal views of older adults.

The common finding with regard to the role of SPA for mortality is that more positive self-perceptions (Levy et al., 2002; Levy & Bavishi, 2018; Levy & Myers, 2005; Maier & Smith, 1999; Sargent-Cox et al., 2014; Schroyen et al., 2019; Zhang et al. 2020) as well as feeling younger than one's chronological age (Kotter-Grühn et al. 2009; Markides & Pappas, 1982; Rippon & Steptoe, 2015; Stephan et al., 2018; Uotinen et al., 2005) increase longevity.

Other unidimensional operationalizations of SPA include age group identity and subjective nearness to death (Benyamini & Burns, 2019) as well as perceived uselessness in aging (Zhao et al., 2017). These studies' findings indicate that identifying with older age groups, perceiving fewer remaining years, and perceiving oneself as useless due to age decrease longevity.

A shift from a unidimensional to a multidimensional approach has recently gained attention, emphasizing the importance of valence in self-perceptions of aging (SPA). Accordingly, researchers have proposed to define SPA as reflecting age-related gains and losses (Kaspar et al., 2021; Wurm & Schäffer, 2022). Kaspar and colleagues assessed agerelated self-perceptions of gains and losses with the Awareness of Age-Related Change scale (AARC-SF; Kaspar et al., 2019). Their findings revealed that perceived age-related losses and gains have opposite effects on mortality: perceived losses were associated with an increased risk of mortality, while perceived gains were linked to longer survival. Wurm and Schäfer (2022) took a similar multidimensional approach and examined the role of gain- (ongoing development) and loss-related (physical and social losses) SPA for mortality. Their findings pointed to the relevance of perceiving one's own aging as a process of ongoing development, which significantly decreased the risk of death. Taken together these studies highlight the importance of going beyond a unidimensional perspective of SPA and instead understand it as a multidimensional construct that accounts for both negative and positive valence.

One explanation for the detrimental effects of negative self-perceptions of aging on development relates to the idea that as people age, their generalized perceptions of older adults acquired early in life, become self-relevant and are integrated into their self-concept via means of internalization (Rothermund & Brandtstädter, 2003; see also Kornadt & Rothermund, 2012; Levy, 2009; Rothermund, 2024). In line with the process of internalization, perceptions of older adults in general start becoming perceptions of oneself as

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an older adult. In other words, self-perceptions and behaviors become aligned with the age stereotypes adopted earlier in life. As a result, these negative stereotypes can turn into selffulfilling prophecies, prompting cognitive and behavioral responses that reinforce the internalized, age-related perceptions (Weiss & Kornadt, 2018). Even though both positive and negative views on aging can co-exist (Kornadt & Rothermund, 2015), negative views tend to be more pervasive and widespread, being more likely to be chronically activated than positive views on aging (World Health Organization, 2021, March 18). Hence, holding positive selfperceptions of aging in a context that is permeated by negative perceptions of older adults may be an adaptive strategy to cope with the challenges of aging.

Therefore, the distinction between personal and generalized views on aging is important for various reasons. First, although generalized views on aging may become internalized and taint one's self-views, it is important to recognize that personal and generalized views represent unique and distinct dimensions of views on aging. For example, self-related views are typically more positive than views of other older people in general (Rothermund & Brandstädter, 2003). Thus, older adults may also cognitively separate themselves from negative old-age stereotypes, acknowledging that while the stereotype might apply to the group as a whole, it does not apply to them personally (Weiss et al., 2013). Furthermore, self- and other-related age stereotypes serve different functions, and show distinct patterns of relations to outcome variables (Brothers et al., 2021; Pedroso-Chaparro et al., 2023).

## Generalized Views on Aging as a Predictor of Mortality

Personal views on aging reflect an individuals' self-concept as an older person, whereas generalized views on aging pertain to how individuals perceive and describe *older adults in general*. Also known as age stereotypes, generalized VoA can be negative (e.g., comprising attributes like ill or forgetful) and positive (e.g., comprising attributes like wise

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and experienced), even though as discussed earlier, negative VoA are more prevalent. Generalized VoA are influenced by societal representations of older adults, reflecting how this group is typically viewed by others in society. Importantly, however, individuals differ widely regarding the age stereotypes they hold, indicating that generalized VoA are affected by personal factors as well. In particular, personal experiences with older people or with one's own aging can impact generalized VoA via a process of projection (Rothermund & Brandtstädter, 2003). People also differ in their tendency to ascribe negative attributes to older people. Employing such a strategy of 'social downgrading' (Heckhausen & Brim, 1997) increases the contrast between themselves and other older people, which allows them to distance themselves from their age group and to maintain a young identity (Rupprecht et al., 2024).

As explained above, age-stereotype internalization refers to the extent to which individuals incorporate stereotypes about aging into self-related views of their own aging and personal identity as older adults. The process of stereotype internalization often happens subtly and unconsciously over time, as individuals are repeatedly exposed to stereotypical views about aging in their culture (Kornadt et al., 2023).

However, beyond age-stereotype internalization, another phenomenon related to how generalized VoA impact older adults is known as age-group dissociation. Contrary to the harmful effects associated with internalizing negative generalized VoA, the process of agegroup dissociation may entail more positive consequences for older individuals. Previous studies suggest that highly negative other-related VoA give rise to age group dissociation, which shields personal self-views of one's own aging against influences of age stereotypes, and even reverses the detrimental effects of negative VoA on relevant outcomes (Weiss & Lang, 2012; Weiss et al., 2013). In line with this argument, age-group dissociation may hence be an adaptive, self-protective strategy that allows older individuals to distance or dissociate themselves from the negative views of aging, and to cut the links between generalized age stereotypes and personal views of one's own aging (Weiss & Freund, 2012; Weiss & Lang, 2012). Thus, to preserve a positive self-image, older adults may be motivated to endorse more negative views about other older people (social downgrading; Heckhausen & Brim, 1997), which allows them to engage in dissociation and downward comparisons, helping them to avoid internalizing negative generalized VoA into their self-views of aging (Weiss & Kornadt, 2018; Kornadt et al., 2023) and to maintain a young identity (Rupprecht et al., 2024). Consistent with this, Kornadt et al. (2023) provided evidence showing that negative VoA temporarily led individuals to report younger subjective ages, reflecting a positive contrast effect of holding negative generalized VoA. Thus, feeling younger appears to represent a result of endorsing more negative generalized VoA. In line with this, previous research that addressed the role of subjective age (e.g., Kotter-Grühn et al., 2009; Stephan et al., 2018) and age-group identity (Benyamini & Burns, 2019) for mortality demonstrated that younger subjective ages and identifying with younger people decreased the risk of death.

Against this backdrop, the current research investigates generalized VoA and their potential impact on longevity, beyond the influence of personal self-views of one's own aging. Based on existing evidence, we hypothesize that generalized negative views on aging may also contribute to improved survival, because older adults tend to dissociate themselves from these negative representations of older adults.

In summary, generalized age stereotypes can have both assimilative and contrastive effects on longevity and mortality. Assimilative effects are mediated via an internalization of age stereotypes into self-views of aging, whereas contrastive effects are mediated by a dissociation from the group of older adults. Importantly, dissociation does not necessarily influence future self-views of one's own aging, it rather shields self-views of aging against generalized age stereotypes by preventing a self-categorization as old. Thus, we assume that effects of dissociation should influence current self-views and related behaviors more directly, rather than being mediated via contrastive effects on future self-views of aging, which are assumed to mostly reflect internalization effects of age stereotypes.

## The Current Study

The individual's evaluation of their own aging (e.g., personal VoA: self-perceptions of aging, subjective age, aging cognitions) has long been recognized as a significant predictor of mortality (e.g., Kotter-Grühn et al., 2009; Levy et al., 2002; Wurm & Schäfer, 2022). But does how individuals perceive older adults in general (i.e., age stereotypes) and how they anticipate their own future aging process also impact longevity? In a 15-year longitudinal study, we investigated a multidimensional perspective by focusing on self- and other-related aspects of VoA and their differential influence on mortality. On the one hand, we aimed to replicate and extend previous studies, which systematically found that how one perceives their own aging is related to survival; with positive self-perceptions predicting longer lives (see Westerhof et al., 2023, for a review). Unlike earlier research, which focused on pastrelated comparisons, our study examines the effects of future-oriented self-views of aging. Focusing on the anticipation of aging may provide more insight into aging-related expectations, as it is less influenced by current factors, such as health or illness, that may not be directly related to age and aging. On the other hand, it was our goal to extend the current knowledge about the VoA – mortality association by addressing a relevant gap in the literature, that is, whether and how generalized VoA (i.e., views of older adults in general) predict mortality risk.

Based on the dissociation hypothesis (Kornadt et al., 2023; Weiss & Kornadt, 2018), we expect to observe a *contrast effect* of generalized VoA or age stereotypes. According to this hypothesis, older adults who endorse more negative generalized VoA may distance themselves from the stereotyped group of older adults, which helps protect their self-concept and functioning from the negative impact of these stereotypes (Weiss & Freund, 2012). We hypothesize that this adaptive response could reduce mortality risk in the presence of negative generalized VoA. However, an *assimilation effect* of generalized VoA is also possible (Kornadt et al., 2023; Weiss & Kornadt, 2018). In line with this effect, self-views become assimilated to generalized VoA. Previous research has shown that age stereotypes held earlier in life influence future self-views, leading generalized and personal VoA to become more similar over time (Rothermund & Brandtstädter, 2003; see also Kornadt & Rothermund, 2012). Such assimilation of self-views to age stereotypes could result in maladaptive outcomes, such as an increased mortality risk when negative generalized VoA are present.

Because the assimilative and contrastive effects of generalized age stereotypes may cancel each other out when age stereotypes are the sole predictor of longevity, we adopted a different analytical approach. To isolate the contrastive effect of age stereotypes, we controlled for the influence of future self-views of aging, which mediate the internalization (assimilative) effects of these stereotypes. By accounting for future self-views, we eliminate the variance in the outcome due to internalization processes. The remaining effect of age stereotypes—after controlling for future self-views—should reflect a pure dissociative process, highlighting how distancing from age stereotypes impacts longevity and mortality.

## Method

## **Transparency and Openness**

This study design, hypotheses, and analytic plan were not pre-registered. We report how we determined our sample size and describe all data exclusions as well as all measures that were collected. The materials and analysis code are available at https://osf.io/6u7b8/?view\_only=71abd9a0b5af491596285f8241dba7b0. The de-identified raw data supporting the conclusions of this article have not been made accessible as they are still in the embargo period. Upon request, the data will be made available by the authors without undue reservation.

Analyses were conducted using R version 4.3.3 (R Development Core Team, 2022) and the Survival package (Therneau, 2021). Research procedures for the study ("*Alter(n) als Zukunft. Zukunftsbezogenes Alternshandeln in kulturvergleichender Perspektive*") were approved by the Institutional Review Board at Friedrich Schiller University Jena (protocol number FSV 18/36).

## **Sample and Procedure**

We used data from the Ageing as Future longitudinal study (AAF, Lang et al., 2024). Participants were recruited from two German cities, Jena and Erlangen. The AAF study used stratified random sampling (balanced design) such that the sample was stratified by birth cohort (1929-1938, 1939-1948, 1949-1958, 1959-1968, 1969-1978) and gender (male, female). The number of sampled participants in each stratum was set to n = 50. For the current analyses, we included participants who took part in the baseline assessment of the AAF study in 2009. The baseline sample comprised N = 768 German participants aged 30-80 years at the time of inclusion ( $M_{age} = 55.17$ , SD = 14.85, 49.5% female). For those who died during the observational period (112 respondents, 14.6%), the mean age at death was 78.56 years (SD = 9.76; age range: 49-95 years), and 36.6% were female. For 74 participants survival check was not possible either because they moved to another city where access to information was not possible (n = 40) or because they have restricted access to their personal information at the local registry office (n = 34).

Participants were recruited via mail based on large databases that we received from local registry offices from the two included cities. Participants answered the questionnaire alone, at home. After providing informed consent, completing and returning the questionnaire, participants received a gift card valued approximately \$20 as compensation.

#### Measures

The measures used in the current analyses were part of a larger questionnaire developed in German. The questionnaire included a wide range of variables that assessed different aspects of aging and included, among others, different dimensions of views on aging, like personal (i.e., views of oneself as an older adult) and generalized views (i.e., views of older adults in general). For all measures, we report aggregated values across seven different life domains (family and one's committed relationships; friendships and acquaintances; leisure activities and commitment; personality and life management; finances and dealing with money; work and professional life; health and appearance).

## Personal and Generalized Views on Aging

We used scales that assess domain-specific personal and generalized VoA (Kornadt & Rothermund, 2011). Participants read one-sentence description of the domain, and rated *themselves when they are older* (personal VoA) and *older adults in general* (generalized VoA) on an 8-point bipolar scale using exactly the same item content for both scales (e.g., personal VoA: friendships and acquaintances, "When I am older, I will have few (vs. many) friends and acquaintances"; generalized VoA: "Old people have few (vs. many) friends and acquaintances."). Higher values indicate more positive personal and generalized VoA. Reliabilities of the of the VoA scales were high,  $\alpha \leq .90$  and  $\alpha \leq .88$ , for personal and generalized VoA, respectively.

## Survival Information

To determine whether and when participants had died, we contacted the local registry offices in Jena and Erlangen and had the status of each person who took part in the AAF baseline assessment in 2009 checked. The status check was conducted from March to June 2024 and informed us about those participants who died (as well as the date of death), those still alive and living in the same address, and those still alive who moved to a new address in the area covered by the local registry offices. We used right-censored event times as well as Type I censoring. The censoring is non-informative (i.e., participants who survived to the end of the study have a survival time that is right-censored at 5,659 days). We did not censor participants whose survival check was not possible. The decision not to censor these participants and exclude them from analyses was due to missing information on survival, which made it not possible to ascertain whether they were alive or deceased.

### *Covariates*

We selected covariates that were significantly correlated with the time to death in previous (e.g., Levy et al., 2002; Wurm & Schäfer, 2022) and the current research, including age (in years), gender (1 = female, 2 = male), self-rated health (scale: 0 = "not good at all" to 4 = "very good"), and household income (in euros). While life satisfaction and education were not correlated with time to death, they were significantly associated with both generalized and personal VoA (Table 2). Education was assessed according to the International Standard Classification of Education (ISCED 2011), which includes the following levels: 0 (Early childhood education), 1 (Primary education), 2 (Lower secondary education), 3 (Upper secondary education), 4 (Post-secondary non-tertiary education), 5 (Short-cycle tertiary education), 6 (Bachelor's or equivalent), 7 (Master's or equivalent), and 8 (Doctoral or equivalent). Life satisfaction was measured with an 11-item domain-specific scale that was developed for the AAF study. We asked participants "How satisfied are you with your personal situation in the domain of..." and they gave their responses in a 5-point Likert scale ranging from 0 ("very unsatisfied") to 4 ("very satisfied"). Reliability for the scale was good,  $\alpha = .80$ .

## **Statistical Analyses**

#### **Data Preparation**

We used multiple imputation to handle missing data using the mice package (van Buuren & Groothuis-Oudshoorn, 2011). Specifically, imputations were performed by means of predictive mean matching and based on continuous variables with less than 5% missing data. The mean scores were calculated across imputed data.

We excluded six multivariate outliers (Mahalanobis distance, cutoff point > 22.322) all from the sample of participants still alive. The analyses were conducted using only complete cases. The final sample for the survival analyses thus included 671 participants (n =564 alive participants, n = 107 deceased participants).

#### **Survival Analyses**

The survival analyses used days since baseline assessment as the time scale and had a maximum observation period of 5,659 days, with the survival time ranging from January 1, 2009, to June 30, 2024. To investigate whether VoA at baseline predict mortality, we used univariate and multivariate Cox proportional-hazards regression models. In multivariate Cox analysis, the hazard ratio (HR) represents the effect size of a predictor, providing an estimate of how the predictor influences the time-to-event data.

We first carried out two Kaplan-Meier survival curves, one with personal VoA and one with generalized VoA. The participants were dichotomized into those below and those equal to or above the personal and generalized VoA means of 5.69 and 4.22, respectively. For continuous covariates, we included z-scores in our analyses to facilitate the interpretation of regression coefficients, that is, one unit increase can be interpreted as an increase by 1 SD. In a similar way, for dichotomous variables we used sum contrasts (i.e., the value when the reference level is at 0 represents the mean effect of that factor). For the Cox proportionalhazards regression models, we first calculated hazard ratios (HR) for chronological age at baseline (Model 1). We then conducted four combined models: Model 2 included chronological age and future-related personal VoA; Model 3 included chronological age and generalized VoA; and Model 4 examined the joint effects of chronological age, generalized VoA, and future-related personal VoA. Finally, we added the following covariates measured at baseline to the model: gender, self-rated health, household income, education, and life satisfaction (Model 5).

### **Selectivity Analyses**

Selectivity analyses used *t*-tests for independent samples and  $\chi^2$  tests to compare characteristics of respondents included in our analyses (N = 694) with those that took part in the AAF study in 2009 (baseline assessment) but had to be excluded in the present study due to missing information on survival (lost at follow-up, N = 74). Table 1 shows a detailed description of these subsamples as well as the differences between groups.

Our study sample was significantly older, t(766) = 5.39, p < .001, d = -.68, and reported a significantly lower household income, t(733) = 2.86, p = .004, d = -.41, than those respondents who were lost at follow-up. In terms of gender,  $\chi 2(1) = .11$ , p = .735, self-rated health, t(761) = -.56, p = .577, education, t(757) = -1.29, p = .198, life satisfaction, t(83.40) =1.61, p = .111, personal VoA, t(762) = .55, p = .580, and generalized VoA, t(763) = 1.14, p= .256, our study sample did not differ from the sample lost at follow-up. Overall, except for age and household income, this study sample closely resembles the group that was excluded from the analyses due to attrition.

In addition to the sensitivity analyses, we carried out *t*-tests for independent samples and  $\chi^2$  tests to compare characteristics of survivor (n = 582) and deceased participants (n =112). As Table 1 shows, the deceased sample included older participants, t(219.67) = -15.84, p < .001, d = 1.41, as well as more male participants than the survivor sample  $\chi^2(1) = 8.58$ , p = .003. The deceased participants reported worse self-rated health, t(139.94) = 5.75, p < .001, d = .63, more positive generalized VoA, t(690) = -2.22, p = .027, d = .23, and more negative personal VoA, t(689) = 2.02, p = .044, d = .20. Survivors reported higher household income, t(666) = 3.43, p < .001, d = .38. In terms of life satisfaction, t(686) = 1.24, p = .216, and education, t(156.30) = 1.96, p = .051, survivor did not differ from deceased participants.

#### Results

Table 2 shows descriptive statistics and bivariate Person correlations for all continuous variables. The bivariate correlation between personal and generalized VoA was r = .62, indicating 38% of shared variance, which suggests that these two dimensions of VoA, while related, represent independent constructs.

## **Prediction of Mortality Based on VoA**

Before conducting the multivariate Cox proportional-hazards regression models, we examined Kaplan–Meier survival curves for personal and generalized VoA.

Figure 1A presents the Kaplan–Meier curve showing the relationship between personal VoA and mortality. The log-rank test revealed a significant difference between those with positive and negative self-views of aging (p = .006). Individuals with positive self-views of aging had a higher survival probability than those with negative self-views. Figure 1B shows the Kaplan–Meier curve for the relationship between generalized VoA and mortality. The log-rank test also found a significant difference between those with positive and negative generalized views of aging (p = .007). However, in this case, individuals holding negative generalized VoA had a higher survival probability than those holding positive views.

## Prediction of Mortality Based on Chronological Age

As shown in Table 3 (Model 1), chronological age was associated with an increased risk of death. Specifically, each additional year of age was linked to an increase of 4.47 in the risk of death (HR = 4.47, z = 9.40, p < .001, 95% CI [3.27, 6.10]) over the 15-year follow-up.

# Prediction of Mortality Based on Chronological Age and Generalized VoA

In Model 2 (Table 3), which included both chronological age and generalized VoA, age remained strongly associated with mortality. For each additional year of age, the risk of

death increased by 4.41 (HR = 4.41, z = 9.25, p < .001, 95% CI [3.22, 6.03]). However, generalized VoA was not significantly associated with mortality (HR = 1.12, z = 1.10, p = .273, 95% CI [0.92, 1.36]).

## Prediction of Mortality Based on Chronological Age and Personal VoA

Model 3 (Table 3), which included both chronological age and future-related personal VoA, showed that age was still strongly associated with mortality (HR = 4.32, z = 9.30, p < .001, 95% CI [3.17, 5.88]). Personal VoA significantly predicted mortality over and above age, with positive self-views of aging associated with a 19% reduction in the risk of death (HR = 0.81, z = -2.14, p = .033, 95% CI [0.67, 0.98]).

# Prediction of Mortality Based on Chronological Age, Generalized VoA, and Personal VoA (Mutual Control Predictor Model)

In Model 4 (Table 3), which included all three predictors—chronological age, generalized VoA, and personal VoA—chronological age remained a strong predictor of mortality (HR = 4.04, z = 8.80, p < .001, 95% CI [2.96, 5.52]). More importantly, both generalized and future-related personal VoA independently predicted mortality in opposite directions. Positive generalized VoA was associated with a 35% increase in the risk of death (HR = 1.35, z = 2.60, p = .009, 95% CI [1.08, 1.68]), meaning that negative generalized VoA was linked to lower mortality. In contrast, positive self-views of aging were linked to a 30% decrease in the risk of death (HR = 0.70, z = -3.21, p = .001, 95% CI [0.56, 0.87]) over the 15-year follow-up.

## Controlling for Covariates

As shown in Model 5 (Table 3), when controlling for all covariates, both personal and generalized VoA remained significant but opposite predictors of mortality. Positive personal VoA was associated with a 22% decrease in the risk of death (HR = 0.78, z = -1.98, p = .048, 95% CI [0.62, 0.99]), while positive generalized VoA was linked to a 27% increase in

mortality risk (HR = 1.27, z = 2.00, p = .046, 95% CI [1.00, 1.60]), reinforcing the finding that negative, rather than positive, VoA was associated with reduced mortality. Even when adjusting for sociodemographic covariates (chronological age, gender, household income, education, self-rated health) and life satisfaction, these associations held. Additionally, age, gender, and self-rated health accounted for a significant amount of variance in mortality (Table 3).

## Moderations by Age

We also examined whether the predictive value of generalized and personal VoA depended on chronological age by including interaction terms between age and each type of VoA in the Cox proportional hazards regression (without controlling for covariates). However, none of the interaction terms significantly predicted mortality: generalized VoA by age (HR = 0.96, z = -0.26, p = .795, 95% CI [0.68, 1.35]), personal VoA by age (HR = 1.10, z = 0.54, p = .600, 95% CI [0.77, 1.57]).

#### Discussion

The quest for longevity, or regarding how to push the limits of human lifespan, seems to be one that occupies researchers who try to unveil what may help individuals to live longer, healthier lives. In our study, we tried to untap some new elements in relation to the pursuit of longevity. Extending previous research, we examined the role of generalized VoA (i.e., age stereotypes, or beliefs about older adults in general) and future-related personal VoA for mortality risk. That represents a strength of our study since previous research has so far focused on the relevance of past-related self-perceptions of one's own current aging-related experiences for mortality (e.g., Levy et al., 2002; Maier & Smith, 1999; Sargent-Cox et al., 2014).

Over a 15-year period, we found that holding negative generalized views of old age (VoA) was associated with a lower risk of mortality when controlling for future-related selfviews of aging. While this may seem counterintuitive, it supports our hypothesis that distancing oneself from the group of older adults can be an effective coping strategy that contributes to longevity in a context marked by ageism and discrimination (Kornadt et al., 2023; Weiss et al., 2013). This distancing can occur by adopting more negative views of old age, which helps individuals feel younger in comparison and maintain a younger identity (Rupprecht et al., 2024).

Our study also replicated and extended previous findings showing that positive selfperceptions of aging (SPA) are linked to better survival outcomes. This aligns with the idea that self-perceptions of aging influence development in later life through both behavioral and psychological pathways, a process known as "embodiment" (Levy, 2009). Our study extends previous research by focusing specifically on future-related views of one's own aging. These views provide a more direct measure of aging-related beliefs and expectations, as they are less influenced by current factors, such as health or illness, that are unrelated to the aging process itself. By using a multidimensional approach VoA that incorporates both societal and selfrelated perspectives, we highlight the importance of moving beyond one-dimensional frameworks (e.g., Kaspar et al., 2021; Wurm & Schäfer, 2022). Our findings confirmed that personal and generalized VoA are related but distinct, emphasizing their independent roles.

## The Contrasting Effects of Personal and Generalized VoA for Mortality

A key finding of this study is that personal and generalized beliefs about aging represent distinct, yet interrelated dimensions. Older adults may internalize negative generalized views of aging (VoA), incorporating them into their personal perceptions, or they may project their own aging experiences onto these generalized views (Kornadt & Rothermund, 2012; Kornadt et al., 2017; Rothermund & Brandtstädter, 2003). This interplay is reflected in the positive correlation between personal and generalized VoA observed in our study. However, individuals may also try to distance themselves from negative aging stereotypes by attributing more negative traits to the broader group of older adults, thus creating a sharper contrast between themselves and others (Weiss et al., 2013). Furthermore, previous research has shown that personal and generalized VoA have different patterns of association with outcome variables (e.g., Brothers et al., 2021), reinforcing the importance of considering these dimensions separately.

In our study, personal and generalized VoA shared 38% of their variance (a correlation of .62), highlighting their interconnectedness, and attesting to the dominance of internalization over dissociation processes (e.g., Kornadt & Rothermund, 2012; Kornadt et al., 2017, 2023). However, this also indicates that each facet of VoA contains unique sources of variance, demonstrating their independence from one another. When we further examined the correlation between generalized and personal VoA across different age groups in our sample, we found strong correlations in all groups: 30-49 years (r = .52), 50-65 years (r = .68), and 66-80 years (r = .69). The shared variance between generalized and personal VoA was therefore less than 50% in each age group, including the oldest group, indicating that collinearity was not a concern. This pattern of associations between generalized and personal views on aging aligns with previous research (Kornadt & Rothermund, 2012; Rothermund & Brandtstädter, 2003), which has shown that the internalization of age stereotypes increases with age, while maintaining the unique sources of variance in each dimension. Controlling for the effects of the other facet of views on aging allowed us to isolate the unique contribution of each facet. In our mutual control model, which included both personal and generalized VoA along with age, we found that the predictive value of each facet increased when accounting for the other. Specifically, for personal VoA, the hazard ratio (HR) was 30% in the mutual control model, compared to 19% when it was included with age alone. For generalized VoA, the HR was 35% in the mutual control model, but only 12% (non-significant) when included with age alone. On the one hand, this indicates that personal VoA was the strongest predictor

of survival. On the other hand, this shows that for personal VoA, controlling for generalized VoA removes the shared variance linked to age stereotype internalization, thereby emphasizing the influence of personal aging experiences. For generalized VoA, controlling for personal VoA minimizes the shared variance related to projection processes, highlighting the effects of age group dissociation and "social downgrading" (Heckhausen & Brim, 1997).

While generalized VoA can influence personal VoA, the primary focus of personal VoA, or self-perceptions of aging (SPA), is the individual's own evaluation of their aging process, rather than a direct reflection of societal age stereotypes (i.e., generalized VoA). Personal VoA reflect an individual's beliefs and expectations about their own aging, both positive and negative, and although they can be shaped by generalized VoA, they are not synonymous with them. In addition, personal VoA often involve comparing one's current self with their past or future self, which represents a temporal, intrapersonal evaluation. Although personal VoA can be influenced by global age stereotypes through processes of internalization (e.g., Kornadt & Rothermund, 2012; Kornadt et al., 2017; Levy et al., 2002; Rothermund & Brandtstädter, 2003; Tully-Wilson et al., 2021), they also capture a significant amount of variance reflecting individual differences in how people experience and evaluate their own aging process. Therefore, the current findings suggest that equating personal VoA (or self-perceptions of aging, SPA) with internalized global age stereotypes oversimplifies the complex ways in which individuals understand and experience aging. The focus on personal VoA captures just one aspect of how aging-related beliefs affect real-life outcomes like mortality risk, primarily through processes of embodiment. In contrast, generalized views of aging (VoA)—which reflect beliefs about older people in general—represent a separate influence with independent and often opposite effects, driven by mechanisms such as age group dissociation and social downgrading. Our findings highlight the contrasting roles that personal and generalized VoA play in predicting survival. By adopting a multidimensional

approach to views on aging, this study provides deeper insights into how both self-perceptions and broader societal beliefs about aging influence mortality risk, moving beyond the current understanding of the relevance of SPA to developmental outcomes.

Given the opposite predictive patterns of personal and generalized views on aging for mortality, it is crucial to understand the mechanisms by which individuals respond to negative generalized VoA. Two key mechanisms—internalization and dissociation—explain these responses. Internalization refers to the process by which older adults accept and internalize negative generalized VoA, leading them to adopt behaviors that align with age stereotypes (embodiment). In this case, less internalized negativity boosts survival. In contrast, dissociation occurs when older adults distance themselves from negative generalized VoA. Here, negative views about aging act as a comparative standard, allowing individuals to protect their self-concept by emphasizing their differences from other older adults. By endorsing more negative views of older people, individuals enter a "dissimilarity search mode" (Mussweiler, 2003), which triggers contrast effects. This process helps them maintain a younger identity and avoid self-related ageism. For example, by viewing themselves as younger and distancing from their peers, older adults can protect themselves from internalizing negative VoA, avoiding being labeled or treated according to these stereotypes, which ultimately supports their survival.

#### Limitations

This study has several strengths, including a 15-year longitudinal design and a multidimensional assessment of views on aging. However, there are also limitations to consider. First, our sample consists of highly educated and healthy participants, which may not fully represent the broader population. Additionally, since the sample is drawn from Germany, the findings may not be easily generalizable, particularly given that aging contexts

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can vary across cultures, influencing the content, the valence, and the impact of views on aging, as well as processes of internalization and dissociation.

Second, although our sample size is adequate given the challenges of obtaining reliable survival data, about 15% of participants had passed away by the end of the study. This is largely due to the age range of participants at baseline (2009), which spanned from 30 to 80 years. As a result, most participants were relatively young at the start of the study and are still alive. This also explains why the overall survival risk in our sample was around 75%, rather than reaching 50%. Despite these limitations, we believe that the 15-year study period, the substantial sample size, and the multidimensional approach to views on aging provide valuable insights and represent a significant contribution to the field.

#### Conclusions

This study offers a significant contribution by being the first to examine a multidimensional approach to views on aging (VoA) in predicting mortality over a 15-year period. Our findings not only replicate previous research highlighting the protective role of positive self-perceptions of aging (SPA) in reducing mortality risk, but also reveal a novel insight: Generalized views of aging play a distinct role in mortality. Specifically, we found that negative views of older adults—rather than positive ones—were associated with a lower risk of mortality, at least after controlling for effects of internalization that are mediated via future-related personal VoA, highlighting the potential protective effects of social downgrading and dissociation from age-related stereotypes. In sum, our results underscore the existence of contrasting pathways to longevity, depending on whether views on aging are personal or generalized, providing new perspectives on how aging perceptions shape developmental outcomes.

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# Figures

# Figure 1

Influence of Personal (A) and Generalized (B) VoA on Mortality (Unadjusted Effects)





# Tables

# Table 1

Sensitivity Analyses (Included vs. Lost at Follow-Up Participants) and Sample Description for Survivors and

Deceased Participants at Baseline (T1)

Entire Sample ( $N = 768$ )							
	Lost at Included (n = 694) (n = 74)		Survivors ( <i>n</i> = 582)	Deceased ( <i>n</i> = 112)	р		
Age, M (SD)	56.19 (14.70)	46.58 (13.41)	<.001	53.49 (14.00)	70.23 (9.35)	<.001	
Age Range	30-80	30-80	-	30-80	38-80	-	
Male, <i>n</i> (%)	352 (50.7)	36 (48.7)	.735	281 (48.3)	71 (63.4)	.003	
Generalized VoA, M (SD)	4.95 (.92)	4.82 (.83)	.256	4.91 (.92)	5.12 (.94)	.027	
Personal VoA, M (SD)	5.65 (.93)	5.59 (.91)	.580	5.68 (.93)	5.49 (.94)	.044	
Self-Rated Health, M (SD)	3.63 (.96)	3.70 (1.05)	.577	3.73 (.90)	3.10 (1.10)	<.001	
Household Income (euro), M (SD)	2720 (1486)	2185 (1103)	.004	2806 (1511)	2274 (1267)	<.001	
Education, M (SD)	4.82 (1.76)	5.09 (1.83)	.198	4.87 (1.77)	4.52 (1.69)	.051	
Life Satisfaction, M (SD)	3.90 (.50)	3.78 (.62)	.111	3.91 (.50)	3.84 (.48)	.216	

*Notes.* SD: standard deviation;  $x^2$ -test is reported for gender. In bold are significant differences.

Table 2

Means, Standard Deviations, and Correlations (N=671)									
Variable	М	SD	1	2	3	4	5	6	
1. Personal VoA	5.65	0.92							
2. Generalized VoA	4.95	0.91	.62**						
3. Age	56.10	14.73	.00	.15**					
4. Self-Rated Health	3.63	0.96	.34**	.10*	26**				
5. Houselhold Income	2678	1343	.27**	.07	21**	.30**			
					. –				
6. Education	4.80	1.75	.21**	.08	07	.20**	.37**		
7. Life Satisfaction	3.90	0.50	.56**	.28**	.12**	.48**	.27**	.17**	

*Note.* VoA = Views on Aging. Household Income in Euro. Education was assessed according to the International Standard Classification of Education (ISCED 2011). *M* and *SD* are used to represent mean and standard deviation, respectively.  $p < .05^*$ ,  $p < .01^{**}$ 

# Table 3

*Views on Aging as Predictor of Mortality Risk (N=671)* 

	Madal	Variable –		95% CI			
	Model		HR	Lower	Upper	Z.	р
Chronological Age	Model 1	Age	4.47	3.27	6.10	9.40	<.001
Generalized VoA	Model 2	Age	4.41	3.22	6.03	9.25	<.001
		Generalized VoA	1.12	0.92	1.36	1.10	.273
	Likelihood Ratio Test	df = 2	142.3	-	-	-	<.001
	Wald Test	df = 2	88.8	-	-	-	<.001
Personal VoA	Model 3	Åge	4.32	3.17	5.88	9.30	<.001
		Personal VoA	0.81	0.67	0.98	-2.14	.033
	Likelihood Ratio Test	df = 2	145.7	-	-	-	<.001
	Wald Test	df = 2	95.9	-	-	-	<.001
Views on Aging (VoA)	Model 4 (mutual control)	Åge	4.04	2.96	5.52	8.80	<.001
		Generalized VoA	1.35	1.08	1.68	2.60	.009
		Personal VoA	0.70	0.56	0.87	-3.21	.001
	Likelihood Ratio Test	df = 3	152.5	-	-	-	<.001
	Wald Test	df = 3	104.6	-	-	-	<.001
Combined Model	Model 5 (controlling for covariates)	Åge	3.72	2.72	5.08	8.22	<.001
	· · · · · · · · · · · · · · · · · · ·	Generalized VoA	1.27	1.00	1.60	2.00	.046
		Personal VoA	0.78	0.62	0.99	-1.98	.048
		Gender	0.70	0.56	0.86	-3.31	<.001
		Self-rated Health	0.75	0.60	0.94	-2.49	.013
		Household Income	1.00	0.76	1.32	0.11	.912
		Education	0.91	0.74	1.13	-0.83	.410
		Life Satisfaction	0.93	0.72	1.22	-0.51	.610
	Likelihood Ratio Test	df = 8	174.3	-	-	-	<.001
	Wald Test	df = 8	132.7	_	-	-	<.001

*Note.* VoA = Views on Aging; df = degrees of freedom; HR = hazard ratio. For Personal and Generalized VoA, the contrast refers to positive compared to negative VoA. For Gender, the contrast indicates female compared to males.