Longitudinal Findings on Aging-Related Cognitions, Control Beliefs, and Health in Later Life

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We examined the influence of individual views of aging on health changes in later life. We hypothesized that aging-related cognitions affect health changes irrespective of control beliefs and that the impact of aging-related cognitions on health is higher than for the reverse direction of causality. We based our analyses on data from the longitudinal part of the German Aging Survey (N = 1,286; participants were 40–85 years of age at baseline). Because of the selectivity of the sample, we also computed the same analyses for the baseline sample (N = 4,034) with estimated Time 2 data for those individuals who dropped out. The results of structural equation modeling were concordant with our hypotheses, and therefore they corroborate previous findings on the importance of beliefs about aging.

SUBSTANTIAL research on ageism has shown that age stereotypes and age discrimination by younger age groups affect the life of older people in multiple areas (e.g., M. M. Baltes & Reisenzein, 1986; Bowling, 1999; Glover & Branine, 2001). Moreover, in applying age stereotypes to themselves (Rodin & Langer, 1980), older people influence their cognitive, functional, physiological, and psychological health (e.g., Auman, Bosworth, & Hess, 2005; Hess, Auman, Colcombe, & Rahhal, 2003; Levy, Hausdorff, Hencke, & Wei, 2000; Levy, Slade, May, & Caracchiolo, 2006). Not only age stereotypes but also individual views on aging are important for the health of older adults. This was shown in particular by the research of Levy and her colleagues. Using longitudinal data, Levy pointed to the high importance of positive views on aging for functional health and longevity (e.g., Levy, Slade, & Kasl, 2002; Levy, Slade, Kasl, & Kunkel, 2002) and thus corroborated the comparable findings of Maier and Smith (1999).

These findings are striking because they indicate that societal as well as individual views on aging can become self-fulfilling. This implies a risk for older people that goes far beyond existing, predominantly negative age stereotypes (Korthase & Trenholm, 1983). However, there are some alternative explanation models that could moderate these findings. The first of these argues that these views on aging are partly associated with control beliefs (Heckhausen & Baltes, 1991). It could be assumed, therefore, that individual views on aging do not add additional variance to the prediction of health if control beliefs are considered at the same time. A second point queries whether views on aging mainly affect health or whether there is a stronger impact in the reverse direction, indicating that views on aging could be the result of the health status of the individual. We investigate these two questions in the present study. Hereafter, we use the phrases “individual views on aging” and “aging-related cognitions” interchangeably.

Control beliefs comprise a multitude of different expectancies. Researchers have comprehensively proven the importance of control beliefs for the health of younger as well as older people over the past few decades by using constructs such as dispositional optimism (e.g., Allison, Guichard, Fung, & Gilain, 2003; Kivimäki, Elovainio, Singh-Manoux, Vahtera, Helenius, & Pentti, 2005; Scheier & Carver, 1987), self-efficacy (e.g., Bandura, 1992; Rejeski, Miller, Foy, Messier, & Rapp, 2001), and hope (e.g., Elliott, Witty, Herrick, & Hoffman, 1991; Stanton, Danoff-Burg, & Huggins, 2002).

Individual views on aging are closely connected with control beliefs, with aging-related gains perceived as much more controllable than losses (Heckhausen & Baltes, 1991). Moreover, control beliefs are regarded as having vital importance in maintaining an optimistic perspective on personal development in middle and later adulthood (Brandtstädter, 1992). This assumption of a close relationship between aging-related beliefs and control beliefs makes it questionable whether the individual view on aging has an independent explanatory value on future health, a question that so far has not been addressed.

Despite the great importance of control beliefs, we hypothesized that aging-related cognitions have an independent impact on health. This hypothesis had an empirical basis in the finding that control beliefs turned out to be only a partial mediator in the relationship between aging-related cognitions and functional health (Levy, Slade, & Kasl, 2002). Moreover, we assumed on a theoretical level that individual views on aging consist of more than just control beliefs, because these views refer to human development over the life span. A central aspect of human development is time, which is both an action resource and a source of meaning (Brandtstädter & Rothermund, 2003). A conspicuous feature of middle age is the awareness that life is finite and that life is restructured in terms of time to live rather than time since birth (Neugarten, 1996). The sense of a diminishing lifetime affects a person’s action resources and acts in some ways as a brake on activities, but in other ways it is an incentive for the person to use her or his remaining good years. This is what is reflected in the domain-specific concept of control beliefs, which is based on the assumption that age might relate differently to different aspects of control beliefs (Lachman, 1986).

However, the diminution of lifetime affects not only action resources but also the construction of meaning. The evaluation of actions (e.g., smoking) in terms of future personal

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SECOND, we hypothesized that the impact of aging-related cognitions on health is stronger than the impact of health on aging-related cognitions.

**METHODS**

**Participants and Procedure**

The sample included 1,286 participants from the longitudinal part of the German Aging Survey, a prospective study that, to this point, was carried out in 1996 and again in 2002. The participants were aged 40 to 85 years at baseline. The respondents’ mean age was 57 years at baseline; 52% (n = 675) were men and 48% (n = 611) were women, and 63% (n = 816) lived in Western Germany (Table 1).

The German Aging Survey is an ongoing nationwide and population-based study with a complex longitudinal and sequential design (Engstler & Wurm, 2006). In 1996, researchers built the first cross-sectional sample by means of a national probability-sampling technique with stratified sampling by age, gender, and place of residence (Eastern or Western Germany). About 50% of the persons contacted agreed to an interview (N = 4,838), and 83.4% of them additionally completed a questionnaire (N = 4,034). The response rate corresponds to that of other large survey studies in Germany (Neller, 2005). In the present study we used data predominantly assessed within the questionnaire, which is why we refer only to the sample of N = 4,034 (cf. Table 1).

In 1996, researchers asked the survey participants whether they were willing to be reinterviewed at a later point of time; 61% (N = 2,972) of the participants agreed to this. In accordance with the regulations of German data-protection laws, researchers deleted the addresses of the other participants. Six years after the first interview, 16.3% of the respondents had died or moved to unknown addresses, which reduced the sample that could be contacted for a second time to N = 2,478;
healthier, and better educated (who were reinterviewed after 6 years were mainly younger, items; see Dempster, Laird, & Rubin, 1977). Those participants will be no systematic losses of participants who missed single maximization method, which offers the advantage that there values by means of data imputation with the expectation (cf. Table 1; also note that we supplemented single missing correction for sample attrition

The longitudinal sample consists of 1,286 participants who are younger, healthier, and more educated and who have higher levels of cognitive functioning are more likely to participate in follow-up assessments (P. B. Baltes, Schaie & Nardi, 1971; Norris, 1985; Powell et al., 1990). In order to estimate the effects of selectivity that result from the reduction of the initial sample of N = 4,034 to the effective sample of N = 1,286, we employed a correction method proposed by Lüdtke, Tomasic, and Lang (2003).

With this procedure we attempted to answer the question of whether the results would be different if data were complete (Little & Schenker, 1995). Given the theoretical considerations (e.g., Allison, 2001; Dempster et al., 1977; Little & Schenker; Rubin, 1991; Schafer, 1997) and empirical evidence from simulation studies comparing different methods for the treatment of nonrandom missing data (e.g., Gold & Bentler, 2000; Graham, Hofer, & MacKinnon, 1996; Raymond & Roberts, 1987), we decided to employ the (saturated model) expectation maximization (EM) algorithm to impute missing values. For this, we considered the variables used in the models (e.g., sociodemographic and socioeconomic variables) as well as additional variables known from the literature to be partially responsible for dropouts (e.g., self-rated health). The EM algorithm provides unbiased and consistent estimates of nonrandomly missing values (Graham et al.) and outperforms other methods when the sample size is large or population parameters are the focus of the analyses (Gold & Bentler). Furthermore, as an imputation method, it is more efficient in terms of the use of available data than weighting strategies, because it uses all available data instead of the longitudinal data alone (cf. Little & Rubin, 1989).

Table 1 contains means and correlations for the entire sample (N = 4,034) with estimated values for the follow-up study. We performed all analyses for both the baseline sample with estimated Time 2 data and the estimated longitudinal sample.

### Measures

**Physical illnesses.**—We measured physical illnesses by using a symptom checklist of 11 health problems (e.g., cardiovascular diseases, circulatory problems, back or joint diseases, diabetes, gastrointestinal diseases, and respiratory diseases). For each person we computed a sum score based on the absolute number of self-reported illnesses. We chose to use the sum score because there was a lack of medical checkups among the participants and there were various advantages to the use of the sum score than to the use of single self-reported illnesses. First, the best accordance between medical reports and self-reports is achieved when summary scores are used (Katz, Chang, Sangha, Fossel, & Bates, 1996). Moreover, global scores of self-reported illnesses are considered as better proxies to functional disability than are single illnesses (Neugarten, 1996), and they turned out to be a good predictor of 1-year mortality (Chaudhry, Jin, & Meltzer, 2005).

**Control beliefs.**—We used the Dispositional Hope Scale (Snyder et al., 1991) to assess general control beliefs. The scale consists of efficacy expectancies reflecting the belief that one can achieve goals (agency; four items) and outcome expectancies reflecting the perception of available strategies for achieving those goals (pathways; four items). The participants rated the items on a scale ranging from 1 (definitely true) to 4 (definitely false); see Table 2 for the item wordings. For the

<table>
<thead>
<tr>
<th>Construct</th>
<th>Reliability</th>
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<td>1. Age</td>
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<tr>
<td>2. Gender</td>
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<td>3. Place of residence</td>
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<td>4. Living arrangement (with or without partner)</td>
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<td>5. Education</td>
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<tr>
<td>6. Occupational prestige</td>
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<tr>
<td>7. AgeCog Develop</td>
<td>.75 .73</td>
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<td>8. AgeCog PhyLoss</td>
<td>.79 .79</td>
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<td>9. Hope</td>
<td>.86 .81</td>
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Notes: AgeCog PhyLoss = aging-related cognition of physical losses; AgeCog Develop = aging-related cognition of ongoing development.
analyses, we reverse scored the answers. Snyder and colleagues have suggested that a general hope factor is the best predictor of outcomes; pathway and agency components of the Hope Scale are highly correlated, particularly when one removes measurement error by using structural equation modeling, leading to correlations above $r = .80$ (Roesch & Vaughn, 2006). This is in line with the finding that outcome and self-efficacy expectancies usually do not emerge as distinct dimensions (Schwarzer, 1994). The hope concept is considered to be very close to general self-efficacy and optimism (e.g., Luszczynska, Gutierrez-Dona, & Schwarzer, 2005; Snyder et al.). Several studies have shown correlations of medium extent (.50 $\leq r \leq .60$) between hope and dispositional optimism or self-efficacy (e.g., Magaletta & Oliver, 1999; Snyder et al.). A recent study based on structural equation modeling (Bryant & Cvengros, 2004) even pointed to high correlations of hope with dispositional optimism ($r = .81$) and self-efficacy ($r = .77$).

Aging-related cognitions.—Previous studies on individual views on aging were based on a unidimensional indicator that implied that older people have either a positive or a negative view on aging. In contrast, several studies showed that older adults often view aging as being accompanied both by losses (mainly physical and social losses) and by gains, such as more freedom and time for new interests (e.g., Keller, Leventhal, & Larson, 1989). We therefore generated multidimensional scales, which we call AgeCog scales,7 to measure both positive and negative aging-related cognitions based on items developed by Dittmann-Kohli and colleagues (Dittmann-Kohli, Kohli, Künemund, Motel, Steinleitner, & Westerhof, 1997). In the present study we used two of the AgeCog subscales, which turned out to be significant predictors for the health of middle-aged as well as older adults, even after we controlled for established demographic, socioeconomic, and psychological indicators (Wurm, 2006). The first of these scales, labeled AgeCog Physical Losses, refers to the view of aging as accompanied by physical losses and consists of four items. The second scale, labeled AgeCog Ongoing Development, implies that aging is also seen as a time of ongoing personal development (four items; see Table 2 for the item wordings). The participants rated the items on a scale ranging from 1 (definitely true) to 4 (definitely false), and we reverse scored the items for the analyses.

Sociodemographic characteristics.—We included four sociodemographic and two socioeconomic variables as control variables, because of their known relation (see, e.g., Adler et al., 1994; Aldwin & Gilmer, 2004; Schwartz & Buser, 2005) to health outcomes: (a) age; (b) gender; (c) place of residence (Eastern or Western Germany); (d) living arrangement (with or without a partner); (e) level of education (1 = fewer than 10 years of school education, 2 = 10 or 11 years of school education, 3 = at least 12 years of school education) and (f) a measure of occupational prestige; for individuals who have never been part of the labor force, we used the occupational prestige of the spouse (Treiman, 1977).

Data Analysis

We carried out a descriptive data analysis and data screening by using SPSS 12.0. We used Pearson correlations to examine the interrelationship between the study variables. We analyzed the data with structural equation modeling, using LISREL 8.5 (Jöreskog & Sörbom, 1996) as our computer program and maximum likelihood (ML) as our estimation method. No variable turned out to have a skewness or kurtosis larger than a value of 2 (Curran, West, & Finch, 1996). We began with separate measurement models for the three scales of Hope, AgeCog Physical Losses, and AgeCog Ongoing Development. All the specified measurement models were one-factor models, as expected, including the Hope Scale, because the subscales were highly correlated ($rs > .90$) in both samples and at both measurement occasions. We parceled the eight items of the Hope Scale (see Table 2) in order to increase the stability of the parameter estimates and improve the normality of the distributions (Bandalo & Finney, 2001).

We computed measurement models for each of the three predictors at Time 1 (T1) and then added a measurement model for the follow-up data at Time 2 (T2). These longitudinal measurement models demonstrated that the same scales load on the latent variables on both occasions (configural invariance; see Horn & McArdle, 1992). In the measurement model of AgeCog Ongoing Development, the modification indices suggested a correlation between two error terms at T1 and T2 that we admitted. Subsequently, we tested the measurement models by forcing longitudinal invariance in the estimated factor loadings (metric invariance; see Horn & McArdle, 1992). Establishing the longitudinal invariance of the factor loadings is an important prerequisite to ensure that the latent variable measures the same thing on different measurement occasions. We found metric invariance for the model of AgeCog Ongoing Development and partial invariance for both the scales of AgeCog Physical Losses and Hope. Against these models, we additionally tested models with longitudinal invariance for error variances to ensure the same reliabilities over the two measurement occasions. All items with invariant factor loadings also had invariant measurement error variances over time. Taken together, the preponderance of invariant factor loadings and error variances ensure that the factors reflect the same attributes across time and are measured with the same precision. The three measurement models showed a good fit even after we fixed metric and configural invariance as well as invariance of error variances. This finding is not trivial, given the fact that there is a lag of 6 years between the two assessments and an age range of the respondents that spans about five decades. Table 2 contains the factor loadings of the latent endogenous constructs.

The fit indices for the three final measurement models, including two waves, and invariant factor loadings and measurement errors over time were as follows. For the Hope model, $\chi^2(22) = 117.83$, root mean square error of approximation (RMSEA) = 0.058, nonnormed fit index (NNFI) = 0.98, and standardized root mean residual (SRMR) = 0.035; for the measurement model for AgeCog Ongoing Development, $\chi^2(24) = 159.02$, RMSEA = 0.066, NNFI = 0.96, and SRMR = 0.039; for the measurement model for AgeCog Physical Losses, $\chi^2(24) = 65.18$, RMSEA = 0.037, NNFI = 0.99, and SRMR = 0.026. To compute the scale reliabilities of the three latent constructs with multiple items, we applied a method proposed by Raykov (2004) to our data because it offers more consistent estimates of scale reliability for latent scales than Cronbach’s
Figure 1. Longitudinal factor model for aging-related cognitions related to physical loss or ongoing development (AgeCog PhyLoss or Develop), control beliefs (Hope), and self-reported physical illnesses, including age, gender, place of residence, partner, education, and prestige as covariates; T1 = Time 1 and T2 = Time 2. (Note: Only standardized regression coefficients are shown; nonsignificant ones, \( p \geq .05 \), are italicized. Additional results for an estimated total sample are shown in parentheses; see the Results for the Estimated Sample section in the text.)

alpha does (cf. Table 2). The values suggest that the reliability of the three constructs is good at baseline and follow-up.

RESULTS

Descriptive Results: Correlations at Baseline

As Table 1 reveals, AgeCog Ongoing Development and Hope are negatively correlated to physical illnesses. Both correlations are of comparable extent for the effective longitudinal sample with \( r = -0.13 \) and \( r = -0.16 \). There is a higher correlation between AgeCog Physical Losses and physical illnesses \( (r = .35) \), indicating that the higher the number of physical illnesses, the stronger the perception of aging-related physical losses. Correlations in the total sample are comparable but somewhat stronger.

Longitudinal Factor Model

On examining our first hypothesis, we specified a longitudinal regression model that included the three predictors AgeCog Ongoing Development, AgeCog Physical Losses, and Hope, each of them measured at T1, as well as self-reported physical illnesses measured at T1 and T2. Chronological age, gender, place of residence, partner, education, and occupational prestige served as covariates. This model had a very good fit, with \( \chi^2(122) = 366.33 \), RMSEA = 0.039, NNFI = 0.97, and SRMR = 0.027. The results of this model are shown in Figure 1, which contains the estimated regression paths for the prediction of change in physical illnesses. The findings revealed, as we expected, a close relation between chronological age and changes in the number of physical illnesses. Moreover, women had higher increases in physical illnesses than men, although the indicators of place of residence, partner, education, and prestige were not significantly related to changes in physical illnesses.

In accordance with our hypothesis, the view of aging as being closely associated with physical losses has turned out to be significantly related to increases in physical illnesses 6 years later (\( \beta = .12, p < .01 \)). Conversely, viewing the aging process as ongoing development was beneficial for a person’s health, leading to lower increases or even to decreases in the number of self-reported illnesses \( (\beta = -.10, p < .01) \). Control beliefs (hope) were not significantly related to changes in physical illnesses over a period of 6 years, although the bivariate correlation between the two variables at the first measurement was comparable with that of aging-related gains and physical illnesses. To check whether the nonsignificant result for control beliefs was due to high correlations between the predictors, we performed an additional longitudinal factor model that omitted aging-related cognitions: \( \chi^2(26) = 85.29 \), RMSEA = 0.042, NNFI = 0.96, SRMR = 0.016. In this model too, hope could not significantly explain changes in physical illnesses \( (\beta = -.04; p > .05) \).

Cross-Lagged Path Models for Aging-Related Cognitions and Physical Illnesses

With regard to the second hypothesis, we investigated the causal relationship between the two aging-related cognition scales and self-reported physical illnesses. We calculated two cross-lagged path models as depicted in Figures 2 and 3. Both the model for physical losses, \( \chi^2(36) = 91.66 \), RMSEA = 0.035, NNFI = 0.99, and SRMR = 0.025, and for ongoing development, \( \chi^2(36) = 167.82 \), RMSEA = 0.053, NNFI = 0.97, and SRMR = 0.033, fit the data well. In both models, all cross-lagged paths are significant, indicating that there is no single causal direction: Aging-related cognitions predict changes in self-reported physical illnesses over time and vice versa. However, the regression weights of aging-related cognitions predicting physical illnesses were stronger than the regression weights in the opposite direction, that is, of physical illnesses predicting aging-related cognitions. These differences
are statistically significant for both aging-related cognitions of physical losses, $\Delta \chi^2(1) = 30.91, p < .001$, and ongoing development, $\Delta \chi^2(1) = 29.06, p < .001$. These results confirm our hypothesis and emphasize the predictive importance of aging-related cognitions. In addition, for the cross-lagged path models we additionally computed the analysis without outliers and again the beta weights were virtually identical to the analysis including outliers [cross-lagged path model for AgeCog Physical Losses, $N = 1,229, \chi^2(36) = 106.13, \text{RMSEA} = 0.040$, NNFI = 0.99, and SRMR = 0.028; for AgeCog Ongoing Development, $N = 1,229, \chi^2(36) = 178.54, \text{RMSEA} = 0.057$, NNFI = 0.96, and SRMR = 0.034].

Results for the Estimated Sample

We performed the same analyses based on the total sample, which now included estimated T2 values for those people who dropped out (cf. the Correction for Sample Attrition section). As seen in Table 2, the intercorrelations between the indicators were somewhat higher in the estimated T2 sample as compared with the effective longitudinal sample at T2.

Next, we computed the three previously mentioned structural equation models in a manner identical to that of the models for the effective longitudinal sample, with the exception that we did not force longitudinal invariance for error terms because this led to poorer model fits. We calculated the general fit of the model for prediction of change in physical illnesses [Model 1, cf. Figure 1: $\chi^2(122) = 994.42, \text{RMSEA} = 0.042, \text{NNFI} = 0.97, \text{and SRMR} = 0.026$], the general fit of the cross-lagged model for aging-related physical losses [Model 2, cf. Figure 2: $\chi^2(33) = 500.87, \text{RMSEA} = 0.059, \text{NNFI} = 0.98, \text{and SRMR} = 0.026$], and finally the fit of the cross-lagged model for aging-related development [Model 3, cf. Figure 3: $\chi^2(32) = 825.95, \text{RMSEA} = 0.078, \text{NNFI} = 0.97, \text{and SRMR} = 0.045$]. All three models had a reasonable fit. Hence, the measurement properties for the latent variables are similar between the unselected sample and the effective longitudinal sample. However, notable differences occurred in the structural part of the models, as can be seen particularly for both cross-lagged models (Figure 2 and 3; results in parentheses). The regression weights in the estimated unselected sample were even higher than those in the selected sample and corroborated the higher impact of aging-related cognitions on changes in physical illnesses than in the reverse direction.

**DISCUSSION**

Previous studies have indicated that aging-related cognitions are important for health and longevity in later life. With the present longitudinal study, we systematically checked whether the importance of aging-related cognitions for health can still be upheld when it is challenged by three alternative explanations. First, we examined whether positive and negative aging-related cognitions had an independent impact on health changes when we took into account control beliefs; this was the case. Second, the results of cross-lagged panel analyses supported a higher impact of aging-related cognitions on health compared with the reverse direction of causality. Finally, we tested whether the findings are limited to selective samples, because the present study, like comparable previous ones, was based on longitudinal data. The additional analyses of an estimated sample clearly supported the findings of the longitudinal sample.

Before discussing our findings, we would like to mention some methodological limitations of the present study as well as the contributions it makes. A first limitation concerns the fact that the data were based solely on self-reports. This limitation mainly pertains to the assessment of health. Additional data about medical assessments would have been preferable, but in large survey studies, such as the German Aging Survey used here, a medical checkup is often not practically feasible. There are two arguments that moderate the effects of this limitation. First, some researchers have found that self-reported health indicators turned out to conform to a great extent with the health status evaluated by a physician (Bush, Miller, Golden, & Hale, 1989; Kehoe, Wu, Leske, & Chylack, 1994), showing a particular high accordance rate for global comorbidity scores (Katz et al., 1996). Second, it is known that individual biases in health assessment are at least in part constant over time, which is why change scores, as considered in the present study, remain unaffected by them (Beckett et al., 1996).

A second limitation refers to the Hope Scale as a measure for control beliefs. The scale might have some shortcomings compared with other scales such as the Life Orientation Test (Scheier & Carver, 1985; Scheier, Carver, & Bridges, 1994). The majority of items refer to the present or past, although hope seems to be a future-oriented concept; moreover, the pathway items seem to tap particular self-regulatory skills such as being able to think of many ways to get out of a jam (Aspinwall & Leaf, 2002). This may have attenuated the impact of hope on health. However, we have empirical support for the validity of the Hope Scale. Although the present study focused on health changes, we additionally computed the same factor model as already described (cf. Figure 1), but now we examined whether hope predicted physical illnesses on a cross-sectional level. In this model, hope did significantly predict physical illnesses both in the baseline sample ($\beta = -0.20; ps < .001$), which suggests that hope is related to health but not to health changes. This refers to the assumption that a loss of control might be more important for health changes than are low control beliefs on a stable level (Rodin, 1986).

A substantial methodological contribution of the present study concerned the treatment of the selective longitudinal sample. The participants of the longitudinal sample were mainly younger and healthier than those who dropped out after the baseline interview.

![Figure 3. Cross-lagged panel design for the aging-related cognition of ongoing development (AgeCog Develop) and self-reported physical illnesses; T1 = Time 1 and T2 = Time 2. (Note: Additional results for an estimated total sample are shown in parentheses; see the Results for the Estimated Sample section in the text. All regression weights are significant; ps < .001).](image)
We therefore estimated how the whole baseline sample would have answered had they participated in the follow-up stage as well. It has to be emphasized that the results for the estimated sample were very similar to those for the selected longitudinal sample. Thus, there is empirical evidence that the present findings can be generalized beyond the selected longitudinal sample.

How can the results be interpreted in respect to general theories of development and aging? We had hypothesized that positive as well as negative views on aging predict health changes independent of control beliefs, because they include not only action resources but sources of meaning as well. With increasing age, a future orientation is taken less for granted because there is a stronger awareness of personal finitude. However, projects and life activities gain meaningful value from intended future goals, and they may lose sense and meaning when these intentional links are interrupted (Brandstätter & Rothermund, 2003). According to the socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999), people prioritize future-oriented goals when the future is perceived as expandable, whereas people are more likely to be present oriented and focused on proximate emotional satisfaction when time is perceived as limited. The view that aging brings ongoing personal development might reflect that a person has a more extended future time perspective, whereas the view that aging is accompanied by physical losses might rather reflect a more limited future time perspective. The experienced temporal horizon of the remaining lifetime acts as an essential resource for control beliefs (Mirowsky, 1997). Thus, our assumption that aging-related cognitions have an independent impact on health because they not only imply action resource but also sources of meaning is one explanation for their impact on health.

Nevertheless, there is another perspective that can also explain the impact of aging-related cognitions on health. Individual views on aging can also reflect action resources, namely domain-specific control beliefs. In the present study we considered generalized control beliefs. These beliefs refer to different areas of life, are regarded as dispositional, and accordingly vary little with age; also, hope was not significantly correlated with age in the present study. By contrast, domain-specific control beliefs refer to only one area in life and they vary with age, which is why they often have a stronger predictive power in the respective area than do generalized control beliefs, particularly in older age (e.g., Fung, Abeles, & Carstensen, 1999; Lachman, 1986; Lachman & Andreouletti, 2006). Aging-related cognitions can be considered as domain-specific control beliefs because they refer solely to aging, which is inherently associated with a worsening of health and a loss of control over bodily functions or the mind (Lachman & Weaver, 1998). Hence, the view that aging brings physical losses can reflect low health-related control beliefs whereas the view that aging brings ongoing development can reflect control over future strivings. Thus, the impact of aging-related cognitions on health can likewise be due to their importance as domain-specific control beliefs, and the future time perspective can also serve as a proxy for control.

The cross-lagged path models have shown that aging-related cognitions have a higher impact on changes in health than vice versa. What, then, are the potential mechanisms by which aging-related cognitions can have an impact on health? First, aging-related cognitions can influence health behavior. Individuals with a more positive view on aging may have more health-promoting behaviors and self-care. Studies on control beliefs have shown that people with higher levels of control beliefs take greater responsibility for their health (Rodin, 1986). When physical decline is seen as an unalterable part of the aging process, the belief in still having some control might even become more critical for health-promoting behavior. Older people who attribute symptoms to their age instead of to an illness tend to have less beneficial health behaviors (e.g., Leventhal & Prohaska, 1986). Furthermore, it is known that the individual future time perspective is important for health behavior (Ziegelmann, Lippke, & Schwarzer, 2006), presumably because the benefits of positive health behaviors must show an effect within the individually perceived time horizon; otherwise, there is little motivation for these behaviors (Rakowski, 1986). Support for the impact of individual views on aging on health behavior has been provided by a recent study by Levy and Myers (2004).

Second, besides health behavior, physiological mechanisms may also be responsible for the impact of aging-related cognitions on health. The view that aging is accompanied by physical losses may cause stress and anxiety, which is due to the perception of low control of this decline and the perception that limited future time cannot provide a prospect of better health. This can produce a sense of discouragement that has physiological concomitants. Psychoneuroimmunological studies have provided substantial evidence that psychological stress is linked to immune downregulation, in particular for older adults, which leads to a further health impairment (Kiecolt-Glaser, McGuire, Glaser, & Robles, 2002). Conversely, a sense of personal control as well as an optimistic, even unrealistically optimistic, view of the future might be physiologically protective (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Evidence in this regard has been provided by an experimental study that has shown a protective effect of positive aging self-stereotypes against physiological stress response (Levy et al., 2000).

The present study provided further support for the health risks of negative views, and the protective function of positive views, on aging. It appears therefore that one key to improved healthy aging is to change societal views on aging, which shape individual views to a considerable extent. In western countries people grow up with predominantly negative age stereotypes. Some of these stereotypes are among the debunked “myths of aging,” such as the view that aging is equated with illnesses, or that it is too late for older persons to gain benefit from positive lifestyle behaviors (Rowe & Kahn, 1998). The present results corroborate that it would be worthwhile to adjust the debunked views of aging to give people of all ages a better chance of aging well.

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END NOTES

1. Altogether, the AgeCog scales comprise four scales measuring the view of aging as associated with physical losses, social losses, ongoing development, and self-knowledge. We examined the scales by means of confirmatory factor analytic models performed in LISREL, and we confirmed them within cross-sectional as well as longitudinal data, namely for different age groups (40–85 years) and for different points in time (1996, 2002). The latent correlations among the scales were in fact only of moderate extent and therefore supported the multidimensional design.

2. Screening the data, we detected 2 univariate and 55 multivariate outliers and therefore additionally computed the analyses without outliers to scrutinize whether we would find stable results. For this, we excluded the outliers from the data. Subsequently, we computed the same longitudinal factor model as before: $N = 1,229, \chi^2(122) = 360.47$, RMSEA = 0.040, NNFI = 0.97, and SRMR = 0.027. The beta weights of this additional analysis were virtually identical to that which included outliers.