

**Exploring the Reciprocal Associations of
Perceptions of Aging and Social Involvement**

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Abstract

Objective: Positive perceptions of aging are known to have beneficial effects for older adults' health and well-being, but less is known regarding their social correlates. The current study aimed to disentangle the bi-directional associations of perceptions of aging with informal and formal social involvement.

Methods: Data for this study came from the 2008 and 2014 waves of the German Ageing Survey (DEAS). Informal social involvement was assessed as the frequency of providing advice and emotional support to others. Formal social involvement was measured as the number of groups and organizations one participates in and the frequency of attending them. A latent change score model was used to assess the bi-directional links between the constructs.

Results: Adults with more positive aging perception at baseline were likely to become more informally and formally socially involved over time. Informal social involvement predicted better perceptions of aging, but not formal social involvement. These trends were consistent across age groups.

Conclusions: The results suggest that having positive expectations regarding one's aging might encourage adults to maintain a more engaged and socially productive lifestyle. In addition, informal social involvement, characterized by the provision of advice and support to others is beneficial for experiencing the aging process more positively.

Keywords: ageism; social support; structural equation modeling; volunteer activity

The way adults perceive their aging process has been shown to have far reaching implications for their health and well-being (Han & Richardson, 2015; Siebert, Wahl, & Schroder, 2018; Westerhof et al., 2014). In contrast, despite the importance of living a socially active life in old age, the implications of individuals' perceptions of their own aging for social involvement have received less attention. On a theoretical level, the association between age stereotypes and social engagement can arise from two different sources. On the one hand, a common negative stereotype about older adults is that they are socially less involved and also less needed (Steverink, Westerhof, Bode, & Dittman-Kohli, 2001). Hence, the internalization of this stereotype might cause older individuals to withdraw from social activities (Levy, 2009). On the other hand, a reverse direction of effect from behavior to the internalized age stereotype might be at play as well. Social involvement can be a marker of successful aging and as such may cause people who are socially active to view their aging in a more positive light. The current study, therefore, explores the bidirectional associations of social involvement with self-perceptions of aging.

Self-perception of aging affecting social involvement

Self-perceptions of aging can be integrated into a single dimension ranging from negative to positive overall expectation towards one's own aging (Liang & Bollen, 1985; McCulloch, 1991). Individuals who hold a more positive view about their aging are found to be in better physical and cognitive health (Ayalon, 2016; Siebert et al., 2018; Westerhof et al., 2014), as well reporting lower depression and negative affect (Bellingtier & Neupert, 2016; Han & Richardson, 2015). Positive perceptions of aging were even found to predict delayed mortality more than twenty years later (Levy, Slade, Kunkel, & Kasl, 2002).

However, despite this wide body of evidence, less is known about the effects of self-perceptions of aging on older adults' social lives. Such effects need to be better understood because social engagement is a central component of successful aging (Cosco, Prina, Perales, Stephan, & Brayne, 2013; Martin et al., 2015) and leading a socially active life has general beneficial effects in old age in terms of health and well-being (Hertzog, Kramer, Wilson, & Lindenberger, 2009; Huxhold, Miche, & Schüz, 2013).

Social involvement can be described as the engagement with social ties and activities (Zunzunegui, Alvarado, Del Ser, & Otero, 2003). It can manifest in both the informal and formal social domains, which constitute different aspects of one's social life. Specifically, the current study refers to informal social involvement as relationships with people from one's social network, such as family and friends, and focuses on useful interactions that entail provision of support in which adults are needed and beneficial. Formal social involvement is defined in the current study as activity in formal organizations, such as volunteering. Previous research has found that formal and informal social participation can differ in their associations with health and social support. For example, institutional social capital had larger associations with physical health, compared to informal social capital (Muckenhuber, Strongegger, & Freidl, 2013), while informal social contacts had stronger links with social support, compared to activity in organizations (Gray, 2009). This indicates the need to examine them as two different aspects of social involvement.

The possibility that perceptions of aging impact social engagement can be predicted by the stereotype embodiment theory. The theory claims that people are exposed to old age stereotypes throughout their lifespan, internalize these stereotypes, and as they become

older they come to embody these images of older age (Levy, 2009). The internalization of negative aging stereotypes can result in a 'self-fulfilling prophecy' by leading to decreases in performances (Wurm, Warner, Ziegelmann, Wolff, & Schüz, 2013). Although the theory's predictions have been examined mostly in relation to health (Levy, 2017), it might also have relevance for the social domain. Some of the more common negative images of older persons are related to their social involvement, perceiving them as irrelevant, disconnected from society and as unable to contribute to the community (Ory, Hoffman, Hawkins, Sanner, & Mockenhaupt, 2003; Steverink et al., 2001). Therefore, it is possible that perceptions of aging impact older adults' social involvement, especially in the light of abovementioned prevalent negative stereotypes regarding the social component of old age (Shiovitz-Ezra, Shemesh, & McDonnel, 2018). On the other hand, there's an increasing societal perception of older adults as contributing to their communities through civic engagement (Martinson & Minkler, 2006). Such self-perceptions of aging might therefore promote social engagement.

Informal social involvement. Perceptions of aging can encourage social involvement in the informal social realm, by leading to the provision of help and support to others and to engagement in meaningful social roles, in a manner that negates the stereotypes of older adults as socially irrelevant. Adults that perceive their own aging in a more positive light might be inclined to play a more active role in their social surroundings, for instance to provide guidance and advice to their children and might feel less dependent on others (Coudin & Alexopoulos, 2010). For example, Menkin and colleagues showed that having more positive expectations about aging predicted more new friends two years later and less desire for additional social support one year later. This can indicate that

expectations about aging lead to people being more content with their social environment (Menkin, Robles, Gruenewald, Tanner, & Seeman, 2017). Perceptions of aging might predict not only the existence and perception of social relationships and support, as Menkin and colleagues found, but also the extent to which individuals engage in informal activities in which they are needed and beneficial.

Formal social involvement. In the formal realm, stereotypes about aging can affect older adults' inclination to participate in formal groups and organizations. Thus, adults' aging perceptions as active and contributing to society might lead to engagement in activities that contribute to wider society (Thanakwang & Isaramalai, 2013). For example, older adults identified more negative self-stereotypes about aging as a barrier to participating in formal volunteer activities (Ranzijn, 2002), indicating that aging perceptions might impact such participation. Perceptions of aging were also related to engagement in social leisure pursuits, and there was a trend effect for an association with community engagement (Robertson & Kenny, 2016).

Social involvement affecting self-perception of aging

An association of perceptions of aging and social involvement may not only be caused by perceptions influencing social involvement. It might reflect a different temporal pathway, in which perceptions of aging are shaped by social factors. Appraisals of aging are largely intersubjective and build on lifelong socialization and feedback from others (Settersten, Richard, & Hagestad, 2015). One source of social norms that might contribute to more negative aging perceptions is the age segregation of society - the limited interactions that exist between age strata (Hagestad & Uhlenberg, 2005). Spatial and cultural segregation of people based on their age leads to limited contacts between older

and younger adults, possibly enhancing negative aging stereotypes (Ory et al., 2003). These social processes might be exacerbated by the loss of social roles in old age and the characterization of later life as a “roleless role” (Rowe & Kahn, 2015). As people grow older, the most important social roles in the realms of professional and family life are relinquished or become less obligatory. The loss of these roles can lead to loss of the power, respect and social rewards that they entail, causing worse appraisals of the aging process. However, there is not enough research on the social antecedents of aging perceptions, and it is unclear whether older adults’ social experiences and involvement impact their views on aging.

Informal social involvement. Being informally socially engaged could potentially further a more positive view about aging. Older adults who help close others may experience themselves as beneficial and consequently perceive their own aging in a more positive light than older adults who are less engaged. Additionally, these close others can be younger family members (McPherson, Smith-Lovin, & Cook, James, 2001; Uhlenberg & De Jong Gierveld, 2004), and increased contacts with people from younger age groups might improve the stereotypes adults have about their aging. Evidence regarding the effect of informal social contexts indicate that people develop older age identities when experiencing stressful social situations such as divorce or death of a parent (Logan, Ward, & Spitze, 1992; Schafer, 2010; Toothman & Barrett, 2011). Such events could potentially be associated with self-perceptions of aging via the loss of informal social ties, although additional mechanisms could also be at play, e.g. the death of a parent could be a reminder of one's own aging. This line of research requires further exploration. Therefore, aging

perceptions might show an opposite trend and become more positive when adults are engaged in interactions in which they feel useful and beneficial.

Formal social involvement. Participating in formal groups and organizations can also improve self-perceptions of aging. Such organizations might entail exposure to different age groups who share similar interests and entail more cross-age interactions (Uhlenberg & De Jong Gierveld, 2004). They can encourage engaging in exciting activities and provide a sense of contributing to societal causes (Jönson, 2012; Martinson & Minkler, 2006). These activities in turn may further adults' perceptions of their aging. For example, a qualitative study found that older adults viewed contributing to society as a main component in their perceptions of successful aging (Reichstadt, Sengupta, Depp, Palinkas, & Jeste, 2010).

Age differences as a potential moderator

The associations of social involvement and self-perceptions of aging might differ across the adult life span. On the one hand, they might be more prominent among adults from older age groups (65 and above). These adults might perceive their age as more salient and their social behavior can be influenced to a larger degree by these perceptions. From the perspective of the stereotype embodiment theory, individuals might be mostly affected by stereotypes when they are members of the stereotyped group (Levy, 2009). Moreover, in old age people might have limited access to social resources, resulting from processes such as ageism and deteriorating health but also from normative and non-normative life events – such as retirement, widowhood and loss of social roles (Muckenhuber et al., 2013; Rowe & Kahn, 2015). This might make their self-perceptions dependent to a larger degree on their existing informal or formal social resources. Alternatively, a stronger connection

between aging perceptions and social involvement might be seen in earlier life periods of middle-age (about 40-64). For example, middle-aged adults may feel more societal pressure to be active in formal organizations, compared to older adults (Martinson & Minkler, 2006; Pavlova & Silbereisen, 2012), and this might lead their social involvement to be connected with their aging perceptions. Given these different lines of reasoning, the current study does not pose specific hypotheses regarding which age group exhibits stronger associations. Instead, it explores age differences in these reciprocal associations.

The present study

The main goal of this study is to explore the bi-directional associations between perceptions of aging and social involvement. Older persons who have internalized fewer negative stereotypes about old age as a time of being socially inactive may continually engage in social activities more than those who have internalized these stereotypes and believe they are 'too old' for such activities (Robertson & Kenny, 2016). At the same time, individuals who are engaged in social activities might experience a high potential in old age for meaningful social roles and social integration with younger age groups and other active seniors, leading to more positive views towards their own aging. The current study examines these reciprocal relationships using two time points. In order to get a fuller account of social involvement, it will focus on both informal and formal social involvement as two aspects of active social participation. Because both domains can be relevant for older adults' perception of aging, and due to the exploratory nature of this investigation, we refrain from formulating hypotheses regarding differential effects of the two domains.

We hypothesize that both forms of social involvement have reciprocal associations with perceptions of aging, and that these associations will differ across age groups.

Methods

Sample

Data were taken from the German Ageing Survey (DEAS), a national representative survey of the German community dwelling population of 40 years and older (Klaus et al., 2017). The present study uses data collected in 2008 and 2014 as both waves include a scale of self-perceptions of aging. These waves considered a cross-sectional sample as well as a panel sample of study participants who had entered the DEAS earlier. Participants were interviewed personally by interviewers using a Computer Assisted Personal Interview (CAPI). In addition, respondents were given a paper-and-pencil questionnaire to fill out (“drop-off”). Close to three quarters of the total sample in 2008 filled in the paper-and-pencil questionnaire which contained the variables regarding self-perceptions of aging ($n = 6,089$). Of these participants 3,101 participated again in 2014. As in other studies, attrition analyses suggested that follow-up participants were on average younger, more likely to be women, better educated and healthier (physically and mentally) than the baseline sample. Effect sizes of the differences between participants who dropped out of the study and those who remained in the study did not exceed $d = 0.3$, indicating a relatively weak selectivity effect. We used full information maximum likelihood (FIML) to address issues regarding missing data, due to this method's ability to reduce selective attrition biases using all available data.

Measures

Self-perceptions of aging. The “Attitudes toward Own Aging” subscale from the Philadelphia Geriatric Center Morale Scale was used to measure self-perceptions of aging (Liang & Bollen, 1985; McCulloch, 1991). The subscale appeared in the drop-off of the waves of data collected in 2008 and 2014. This subscale consists of five items: (1) “The older I get, the worse everything becomes”, (2) “I have the same energy as last year”, (3) “The older I get, the less useful I am”, (4) “The older I get, life is better than expected”, and (5) “I am now as happy as in younger years”. The response options for each item ranged from 1 “Strongly agree” to 4 “Strongly disagree”. Positively phrased items were reverse-coded, such that a higher score on all items reflects a more positive perception of one’s own aging. The scale demonstrated good reliability in the present sample (Cronbach’s alpha at baseline: 0.75; follow-up: 0.74).

Informal social involvement. Two measures were used to assess informal social participation. Participants were asked about the frequency of providing advice and the frequency of providing comfort to others: “How often in the past 12 months have others asked you for advice, for example, when they had to take an important decision?” and “How often in the past 12 months did you comfort or cheer up others?” The response options ranged from 1 (“Often”) to 4 (“Never”). The answers were reverse-coded such that a higher score indicated higher frequency of providing support.

Formal social involvement. Formally engaging in socially productive activities was assessed by asking respondents whether they participate in a group or organization, either focusing on older adults or any group in general. Two variables were created to assess

formal involvement in such groups. The first was a summary score of the number of organizations respondents participated in, and the second was the mean frequency of attending these gatherings, events, or meetings over the past 12 months. The response options ranged from 1 (“Several times a week”) to 6 (“Never”). Answers were re-coded such that higher scores meant higher frequency of participation. Those who did not participate in any organization were given the score of 0.

Covariates. The multivariate analyses controlled for age, gender, education, place of residency (West \ East Germany), subjective health, physical health and mental health, due to their possible associations with perceptions of aging and social involvement (Levy, Slade, & Kasl, 2002; Menkin et al., 2017). Age was entered as a continuous variable when it was used as a covariate. Education was based on the international standard classification of education (ISCED; UNESCO, 1997). It was divided into low and middle education versus high education. Place of residency was assessed as East Germany and West Germany.

Subjective health was indicated by a single item of self-rated health (“How would you rate your present state of health?”) with answers ranging from 1 (“Very bad”) to 5 (“Very good”). Physical health was assessed using a summary of answers to a checklist of 11 illnesses, such as diabetes and cardiovascular diseases. Similar questionnaires that assess diseases have been validated against medical records (Katz, Chang, Sangha, Fossel, & David, 1996). Mental health was measured with the short form of the German translation of the CES-D (Center for Epidemiologic Studies Depression) Scale. The scale contains 15 items assessing depressive symptoms, and its value is the sum of the 15 items that must all

be available. High values indicate higher depressive symptoms. The scale had good reliability in the present study (Cronbach's alpha: 0.87).

Data analysis

The analysis began with examining univariate descriptive statistics and Pearson correlations for the variables in the study. Next, the analysis used a structural equation model to examine the main study questions. It utilized a Latent Change Score (LCS) approach. LCS models are a powerful and flexible class of structural equation modeling that explicitly model change as a latent variable (McArdle, 2009). Latent change scores are created by setting the regression path between baseline and follow-up equal to 1, implying that some portion of the follow-up score is equal to the baseline score, and the residual variable is interpreted as a change score (For more information, see: McArdle & Nesselroade, 2014).

Informal social participation and perceptions of aging were modeled as latent variables to account for measurement error. Perceptions of aging were composed of the five scale items described above. The error terms of the negatively phrased items were allowed to covary, as were the error terms of the positively phrased items. The informal social participation construct was estimated using the two indicators of frequency of providing advice and comfort. Formal social involvement was assessed using the count of organizations and average frequency of attending them. Both indicators of social involvement were used in the same model. In each latent factor, the first path loading was set to 1. The models testing the study hypotheses included covariates controlling for the

variables of interest at both measurements. Figure 1 shows an illustration of the model examined in the current study.

Model fit was evaluated primarily based on the criteria of CFI > .95, SRMR < .08 and RMSEA < .08 (Hooper, Coughlan, & Mullen, 2008). Factorial invariance of the latent variables was measured across measurement points with a series of increasingly stringent tests (Meredith, 1993). We used the criteria offered by Cheung and Rensvold (2002) to determine factorial invariance in large samples, in which a decrease in CFI of more than .01 indicates that additional constraints imposed on the model (compared to a previous model) are not justified. The test of factorial invariance demonstrated strong factorial invariance. The factor loadings and intercepts of the latent factors were therefore set to equality at the two measurements.

The measurement model of the three constructs at the two time points had good fit to the data ($\chi^2 = 335.53$, $df = 103$, CFI = 0.99, RMSEA = 0.02, SRMR = 0.02), with standardized factor loadings ranging from 0.48 to 0.84. Data analysis was performed using R (version 3.4.3; R Core Team, 2018). In order to compare the strength of regression effects across constructs, measures were standardized to a T metric ($M = 50$ and $SD = 10$).

The main analysis was conducted by comparing a series of nested models using Chi-square tests (Kline, 2011). The first model predicted bidirectional paths between perceptions of aging and social involvement, i.e. baseline social involvement to change in perceptions of aging and vice versa. It was compared to subsequent models to assess whether model fit deteriorated as a result of setting pathways of interest to zero (i.e., indicating no temporal effect). In the first nested model, the path from self-perceptions of aging to the change in informal social participation was excluded. The second nested model

dropped the path from perceptions of aging to formal participation. In the third model, the path from informal social participation to change in perceptions of aging was set to zero. The fourth model omitted the path from baseline formal social participation to perceptions of aging. All models controlled for gender, age, education, place of residency, subjective health, functional health and depression at baseline. Error terms were allowed to covary among matching factor loadings across the two time points.

Further analyses examined whether the models differ by age. This was done by running a multi-group model for middle aged and older adults, aged 40-64 and 65+, respectively. Equality of factor loadings was established for both age groups and these loadings were constrained to equality between the two groups. Age group difference were determined by comparing the models without constraints to models in which the path coefficients of interest were set to equality in both groups (Kline, 2011). A significant decline in model fit, were it to occur, would indicate the path coefficients to differ significantly between the two age groups.

Results

The descriptive statistics of each variable are presented in Table 1. Overall perceptions of aging were rather positive (3 out of 4). Most participants were “sometimes” asked for advice (2.6-2.7 of 4) and comforted others slightly less frequently (2.4 in T1, 2.6 in T2). They participated in about one group at T1 and at 1.4 groups at T2. They had a low frequency of attending groups (2.1 in T1, 2.5 in T2, range: 0-6). At baseline, the respondents were aged 63 on average, with almost half women (49%). Slightly more than

a third lived in East Germany and a similar percentage had high education. They rated their health on average as 3.5, between “average” and “good” (range: 1-5) and had on average 2.3 illnesses (range: 0-10). Their mean score in mental health was 6.

Correlations among the main study variables are presented in Table 2. Perceptions of aging were significantly positively related to formal and informal social involvement at both time points. That is, those who had better aging perceptions were more likely to be asked for advice, provide comfort, were active in more groups and organizations and participated in these groups more often. The social involvement variables were also significantly associated. Those who performed more informal activities were also more often active in formal settings.

Testing bi-directional associations between social involvement and perceptions of aging. The full bi-directional model showed good fit to the data ($\chi^2 = 1306.69$, $df = 202$, CFI = 0.95, RMSEA = 0.03, SRMR = 0.03). Table 3 details the parameter estimates for the full model. In order to test the study’s hypotheses, a series of nested model contrasts were conducted. In the first nested model the path from perceptions of aging to the change in informal social participation was excluded. This led to a significant decline in model fit ($\Delta\chi^2(1) = 8.61$, $p < .01$). The second nested model dropped the path from perceptions of aging to formal participation, also resulting in a significant decline in model fit ($\Delta\chi^2(1) = 12.76$, $p < .001$). Taken together, these results indicate that better perceptions of aging at baseline were associated with higher informal social participation and increased formal social involvement over time.

In the third model, the path from informal social participation to change in perceptions of aging was set to zero, leading to a significant deterioration in model fit

($\Delta\chi^2(1) = 5.43, p < .05$). A fourth model omitted the path from baseline formal social participation to perceptions of aging, resulting in a non-significant change in model fit ($\Delta\chi^2(1) = 1.11, p > .05$). To directly test differential associations between informal involvement and change in perceptions of aging and formal involvement and change in perceptions of aging a final model was introduced in which both pathways were constrained to equality. This model did not differ significantly from our baseline model in which all pathways were estimated freely ($\Delta\chi^2(1) = 2.31, p < .05$). Furthermore, setting both pathways to equal strength led to informal as well as formal involvement at baseline to be significantly associated with changes in perceptions of aging ($p < .05$). A summary table of model fit statistics is available as supplementary table 1.

Taken together, the results indicate that higher baseline informal social involvement as well as formal social involvement were related to more positive perceptions of aging over time. However, the non-significant association of formal involvement with changes in perceptions of aging, if estimated separately, might indicate a tendency that informal involvement may be more important for the development of perceptions of aging in old age than formal involvement.

Comparing the strength of bi-directional associations. Because a bi-directional association was found between aging self-perceptions and informal social involvement, we explored which direction of association was stronger. For that purpose, we imposed equality constraints on the directional regression paths and compared their fit to a non-constrained model. The constraints did not lead to deterioration in model fit ($\Delta\chi^2(1) = 0.97, p > .05$), indicating statistical equality between the two paths. Perceptions of aging were thus found to have a similar association with change in informal social involvement as the

corresponding association of informal social involvement with change in perceptions of aging.

Testing for age differences. Finally, analyses were conducted by examining the bi-directional associations across age groups, differentiating between middle aged (40-64) and older (65+) adults. The results showed no differences between age groups in any of the bi-directional pathways of the model. Further details and summary table of model fit statistics are presented in the supplementary data and in supplementary table 2. However, we note that age was related to perceptions of aging and to informal social involvement, as can be seen in Table 3. Adults who were older had worse perspectives of their aging and were less likely to engage in informal social involvement.

Discussion

The current study set out to disentangle the bidirectional associations between social involvement and self-perceptions on aging. It found evidence of a reciprocal association with informal involvement, such that persons with positive initial perceptions of aging became more informally socially involved and persons who were more informally involved reported improved views of their aging process. Additionally, more positive perceptions of aging predicted a higher likelihood of participating in organizations and groups over time. These trends did not differ between middle aged and older adults.

A main finding indicated that the way people perceive their aging can encourage their social engagement. Therefore, feeling better and being more optimistic about one's aging does not only lead to better health and well-being, as previously found, it can also be

followed by higher informal guidance and emotional support to others and by increased participation in groups and organizations. Those who consider their aging as more positive may have internalized more positive aging stereotypes, resulting in a positive ‘self-fulfilling prophecy’ regarding their social performance in old age (Levy, 2009; Wurm et al., 2013). Such aging perceptions might constitute an internal source of strength that motivates extraversion and proactive attitudes towards social involvement (Coudin & Alexopoulos, 2010). These results indicate that both spheres of adults' social lives – the informal and the formal – are influenced by individual’s expectations regarding their own aging process.

The current results also showed that frequent provision of guidance and emotional support to others (e.g., informal social engagement) is associated with improvements to one’s views on aging. These findings emphasize the active role that adults can have in their close social milieu and its beneficial effects on perceptions of aging. This emphasis is particularly valuable as not all forms of informal support provision are necessarily positive. For example, caregiving is often associated with stress and illness and can make the negative aspects of aging more salient (Choi, Stewart, & Dewey, 2013; Matz-Costa, Besen, Boone James, & Pitt-Catsouphes, 2014). The informal activities examined in this study, of advice and support, are possibly positively related to perceptions of aging because they can signal that the emotional support provider is able and needed, without necessarily being linked to stress and health deterioration of the receiving party.

The positive impact of informal involvement might be explained by the beneficial psychological implications of being socially useful and productive (Thanakwang & Isaramalai, 2013). Moreover, as old age might be considered a “roleless role”, adults who

feel they are needed and contributing to others can have a sense of power and respect from their immediate environment, a sense which might otherwise be reduced as they grow older (Warburton & Mclaughlin, 2006). Informal help can also be provided to persons from different generations, lessening age segregated experiences and resulting in a less negative interpretation of the aging process (Hagestad & Uhlenberg, 2005). Such informal involvement might reflect these adults' wisdom, an ability that can increase with age and remind them of the advantages of growing old (Ardelt, Pridgen, & Nutter-Pridgen, 2018). The finding that only informal involvement predicted aging self-perceptions might be explained by the Socioemotional Selectivity Theory, which claims that the emotionally close relationships grow in importance among older adults (Carstensen, 2006). Thus, the informal and closer social realm might be given a higher priority in later life and therefore influence aging self-perceptions, whereas the formal social realm might be less influential. The different results for informal and formal social involvement can indicate the usefulness of examining different aspects of one's social lives in future studies of aging self-perceptions.

These trends were found to be similar among different age groups. It is noteworthy, however, that as adults became older their aging perceptions were found to become less positive and they became less informally socially involved, in accordance with previous research (Kalmijn, 2012; Kleinspehn-Ammerlahn, Kotter-Grühn, & Smith, 2008). This can indicate that while age is relevant for aging views and social involvement, the interdependence of these constructs does not change throughout later life.

Limitations. The results from this study must be interpreted within the context of its limitations. First, the analysis was based on two waves of data collection, as they were

the only time points that a global measurement of self-perceptions of aging was carried out in the DEAS. Whereas this enabled a valuable distinction between parallel change processes, future studies might expand upon the current findings by using more time points and exploring more elaborate processes. Another limitation is the measurement of change within a span of approximately six years. Different time periods might have allowed the study to track shorter changes or more extensive changes that take place following detrimental shifts in one's life. For example, shorter time period might have revealed even more pronounced effects (Westerhof et al., 2014).

Additionally, the distinction between positive and negative self-perceptions of aging might not as clear-cut as one might think. For example, acknowledging some losses associated with advanced age might trigger coping mechanisms - such as choosing more easily attainable goals – that help to adjust to these losses (Rothermund & Brandtstädter, 2003). However, to clearly differentiate between adaptive and non-adaptive negative perceptions of aging a more nuanced analysis is needed, which would go beyond the scope of the current study. Moreover, further analyses are needed to give attention to the broader social context of individuals' social activities and age perceptions. Such analyses can examine, for example, whether the current results differ according to gender or socio-economic factors. We also note the attrition in our sample. Even though we used FIML to reduce selective attrition biases, respondents who did not participate in the follow-up measurement may differ from those participants who were eventually included.

Conclusion. Viewing one's aging in a positive manner was broadly related to different measures of social engagement. More positive perceptions of aging improved informal social involvement in terms of increased provision of support and advice to others

as well as formal engagement in terms of higher involvement in formal organizations over time. This can indicate the association of aging perceptions with change in different domains of social engagement and suggest that a more positive view on aging may counter some of the social declines that can accompany the process of aging. In addition, individuals who provided more informal support were also more likely to report improved aging perceptions six years later. These findings expand the understanding of perceptions of aging by providing an in-depth exploration of their social correlates, highlighting the dynamic and inter-dependent nature of this association. The results of this study can encourage interventions that improve perceptions of aging as means to prevent the harmful effects of social disengagement in later life, as well as emphasize the importance of being involved with one's close environment in old age.

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Table 1. Descriptive analyses of the study variables

Variable	M \ %	SD	N	Range
SPA T1	2.91	0.58	6013	1-4
SPA T2	2.96	0.55	2770	1-4
Gave advice T1	2.62	0.94	6047	1-4
Gave advice T2	2.70	0.89	3091	1-4
Gave comfort T1	2.43	0.97	6029	1-4
Gave comfort T2	2.56	0.90	3091	1-4
Number of groups T1	1.06	1.22	6084	0-8
Number of groups T2	1.43	1.42	3101	0-9
Frequency participating in groups T1	2.13	2.07	6084	0-6
Frequency participating in groups T2	2.49	2.00	3101	0-6
Age	62.89	11.64	6089	40-93
Gender (women)	48.7%		6089	
Residence (East Germany)	35.7%		6089	
Education (high)	36.3%		6085	
Subjective health	3.53	0.86	6082	1-5
Number of illnesses	2.31	1.84	5970	0-10
Depression	6.13	5.93	5994	0-45

Notes. SPA = Self-perceptions of aging.

Table 2. Pearson correlations of the main study variables

	SPA T2	Gave advice T1	Gave advice T2	Gave comfort T1	Gave comfort T2	No. of groups T1	No. of groups T2	Frequency participating in groups T1	Frequency participating in groups T2
SPA T1	0.54***	0.11***	0.11***	0.05***	0.07***	0.15***	0.14***	0.14***	0.12***
SPA T2	-	0.13***	0.14***	0.06**	0.08***	0.08***	0.10***	0.08***	0.10***
Gave advice T1		-	0.33***	0.46***	0.25***	0.13***	0.08***	0.10***	0.07***
Gave advice T2			-	0.26***	0.47***	0.08***	0.09***	0.04*	0.08***
Gave comfort T1				-	0.29***	0.17***	0.09***	0.12***	0.08***
Gave comfort T2					-	0.05**	0.11***	0.04*	0.09***
Number of groups T1						-	0.56***	0.63***	0.35***
Number of groups T2							-	0.39***	0.55***
Frequency of participating in groups T1								-	0.48***

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$; SPA = Self-perceptions of aging.

Table 3. Parameter estimates for the full latent change score model

	Baseline (T1)						Change score (Δ)					
	SPA		Informal social involvement		Formal social involvement		SPA		Informal social involvement		Formal social involvement	
	β	SE	β	SE	B	SE	β	SE	β	SE	β	SE
SPA (T1)			0.07**	0.70	0.12***	0.10	-0.44***	0.04	0.12**	0.04	0.13***	0.01
Informal involvement (T1)					0.21***	0.12	0.09*	0.03	-0.55***	0.04	0.01	0.01
Formal involvement (T1)							0.03	0.11	-0.02	0.11	-0.49***	0.02
SPA (Δ)									0.03	0.88	0.02	0.14
Informal involvement (Δ)											0.12***	0.14
Age	-0.07***	0.01	-0.25***	0.01	0.02	0.01	-0.17***	0.01	-0.16***	0.02	-0.01	0.02
Gender (female)	0.06***	0.17	0.20***	0.19	-0.03**	0.27	0.01	0.25	0.11***	0.28	0.03	0.33
Education (high)	0.13***	0.19	0.16***	0.22	0.16***	0.28	0.03	0.25	0.09***	0.28	0.05*	0.33
Residence (East Germany)	-0.11***	0.19	-0.12***	0.20	-0.22***	0.25	0.04	0.27	-0.08**	0.29	-0.06**	0.33
Subjective health	0.30***	0.01	0.07***	0.01	0.07***	0.02	0.08**	0.01	0.03	0.01	0.02	0.02
Number of illnesses	-0.09***	0.01	0.16***	0.01	0.07***	0.02	-0.09**	0.01	0.01	0.02	0.03	0.01
Depression	-0.35***	0.01	0.04*	0.01	-0.08***	0.01	0.05	0.01	0.11***	0.02	0.03	0.01

Notes. N = 6,089; β represents standardized coefficients; * $p < .05$, ** $p < .01$, *** $p < .001$; SPA = Self-perceptions of aging.

Figure 1. Illustration of the Latent Change Score Model used in the study. Note. SPA = Self perceptions of aging; Observed variables are drawn as squares and unobserved (latent) variables are drawn as circles.

