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ORIGINAL INVESTIGATION

Relations between views on ageing and perceived age discrimination: a domain-specific perspective

Peggy Voss[1] · Julia K. Wolff[2] · Klaus Rothermund[1]

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Abstract This study investigates the relation between age stereotypes and perceived age discrimination. Existing evidence for such a relation is notoriously ambiguous with regard to its direction—age stereotypes can predict (perceived) discrimination, but experiencing discrimination may also change views on ageing—which is why we used a dataset with two waves to disentangle the direction of the associations. Considering research on the multi-dimensionality of views on ageing and perceived age discrimination, we addressed this question from a domain- and age group-specific perspective. Drawing on data from two measurement points of the German Ageing Survey (DEAS; t_1: 2008, t_2: 2011; age range at t_1: 40–93 years, $n = 6092$ participants at t_1), we examined reciprocal relations between views on ageing and perceived age discrimination. Cross-lagged models revealed that domain-specific views on ageing predict subsequent changes in perceived discrimination in corresponding domains: Negative views on ageing regarding personal competence, physical decline, and social interactions were associated with increases in perceived discrimination in the domains of work, medical care, and social life, respectively. However, we did not find evidence for a reciprocal effect of perceived age discrimination on views on ageing. In sum, results indicate that negative views on ageing act as self-fulfilling prophecies by predisposing people to categorize other people's behaviour as age discrimination or to act themselves in a way that might elicit ageist behaviour in others.

Keywords Views on ageing · Age stereotypes · Perceived age discrimination · Internalization

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✉ Peggy Voss
peggy.voss@uni-jena.de

[1] Friedrich-Schiller-Universität Jena, Fakultät für Sozial- und Verhaltenswissenschaften, Allgemeine Psychologie II, Am Steiger 3/Haus 1, 07743 Jena, Germany

[2] German Centre of Gerontology, Manfred-von-Richthofen-Straße 2, 12101 Berlin, Germany

Introduction

Perceived discrimination because of one's age has the highest prevalence as compared to other reasons for discrimination (Ayalon 2014). Its subjective nature is based on the fact that in everyday life behaviour is oftentimes open to interpretation: What people perceive as discriminatory does not necessarily meet law-based (e.g. certain hiring criteria; AGG 2006) or otherwise "objective" criteria (Rothermund and Mayer 2009). Imagine for example a women in her fifties who is not hired. Although she might attribute this decision to her age, the actual reason might have been her gender (discrimination based on another category) or her comparatively worse qualification (no discrimination at all). Nevertheless, its consequences are not less harmful. On the contrary, as discrimination that fulfils "objective" criteria can remain completely unnoticed even by its victims (if it is taken for being justified or natural), it is often the *perception* of age discrimination that produces detrimental effects (higher psychological distress, Vogt Yuan 2007; lowered desired retirement age, Schermuly et al. 2013). Accordingly, the identification of individual characteristics that increase the likelihood of the perception of age discrimination is of eminent importance. Research on this question has emphasized inter-individual differences in how readily people perceive discrimination (e.g. stigma consciousness, Pinel 1999) as well as

sociodemographic variables (Garstka et al. 2004; Huxhold and Wurm 2010). Even though age discrimination should be reduced by changing the behaviour of individuals who show discriminatory behaviour, research on variables associated with an increased vulnerability of perceived discrimination can inform practitioners on how to reduce negative consequences of perceived age discrimination.

Views on ageing and perceived age discrimination

Perceiving a behaviour as discriminatory implies that the victim has an idea of what constitutes disadvantaging behaviour based on age in a certain situation. This idea is often based on so-called prototypes: People have expectations of what kind of event reflects prototypical discrimination, and the closer an event resembles this idea the more likely it is for that behaviour to be interpreted as discrimination (Baron et al. 1991; Rodin et al. 1990). This prototype is fed by several characteristics of the event and of the individuals involved (Major and Sawyer 2009). One of these characteristics is that behaviour is more likely to be attributed to discrimination in situations that are characterized by stereotype asymmetry (O'Brien et al. 2008). According to this hypothesis, the victim is more likely to perceive discrimination in a situation where he/she expects to be stereotyped negatively than in a situation where he/she expects to be stereotyped positively. Applying this principle to the context of perceived age discrimination, this indicates that especially negative age stereotypes provide a guideline for situations in which the occurrence of age-discriminatory behaviour is expected to be likely. Accordingly, our aim is to investigate the relation between views on ageing and perceived age discrimination.

Another possible way in which negative age stereotypes are related to perceived age discrimination is through their influence on the behaviour of older people themselves: Stereotype-based expectations become internalized into views on one's own ageing process (Rothermund and Brandtstädter 2003; see also Kornadt and Rothermund 2012; Kornadt et al. 2015a; Rothermund 2005). These views on ageing might prompt older adults to behave in a way that confirms the stereotype (Horton et al. 2008; Lamont et al. 2015; Levy 2009) or a previously encountered ageist attitude (Hehman and Bugental 2015). By eliciting stereotype-consistent behaviours in older individuals which in turn might evoke (more) ageist responses from others, views on ageing can act as self-fulfilling prophecies (Downey and Feldman 1996).

However, views on ageing might also exert a contrast effect on perceived discrimination: People who hold more negative views on ageing might sometimes perceive *less* age discrimination because they might tend to interpret negative behaviours of others towards themselves as being appropriate rather than as being ageist. In line with such a view, a study by Inman (2001) revealed that victims perceive discrimination especially in situations in which they are surprised, meaning that people with a positive view on themselves are more likely to feel discriminated against because of their age. However, it has been argued that congruent effects might better describe the relation in everyday life situations that usually are relatively ambiguous (O'Brien et al. 2008), and when long-term outcomes of views on ageing are considered (Rothermund 2005).

To complicate matters further, views on ageing might not only predict perceived age discrimination; a reverse relation is also possible. Again, two opposing assumptions have to be distinguished regarding the reverse effect. On the one hand, the experience of being discriminated against based on one's age might foster negative views on ageing through a projection of personal experiences into views of one's in-group (Krueger 2007; Rothermund and Brandtstädter 2003). On the other hand, members of low-status groups who are confronted with discrimination and are highly identified with their in-group have been shown to express more positive attitudes towards this group (Kaiser et al. 2009), possibly reflecting a reactant response to maintain a positive identity when confronted with threats and challenges (Garstka et al. 2004). A major focus of our study thus is to provide an empirical test of which of these opposing hypotheses dominate the relation between views on ageing and perceived age discrimination for ageing individuals in various life domains.

Domain and age group specificity of views on ageing and age discrimination

When investigating the relation between views on ageing and perceived age discrimination, it is of utmost importance to acknowledge that neither views on ageing nor perceived age discrimination should be conceived as global, homogeneous entities. People do not hold just one general view on ageing; instead it has been shown that particular situations and life domains are associated with specific age stereotypes and views on ageing (Casper et al. 2011; Kornadt and Rothermund 2011, 2015).

Relatedly, people are confronted with specific ageist behaviours in different contexts (Rothermund and Mayer 2009; Snellman et al. 2013; Voss and Rothermund 2016), for example, differential medical treatment in the health care domain (Brockmann 2002) or preference for younger job applicants in the work domain (Bendick et al. 1999). Importantly, drawing on the previous findings that domain-specific views on ageing unfold their strongest impact in matching domains (Levy and Leifheit-Limson 2009; see also Kornadt et al. 2015b), we predict similar domain-specific relations.

Furthermore, North and Fiske (2013) assume that the way age discrimination is expressed is not only

context-specific, but also age-specific. They propose that because people of different ages are perceived differently they are also confronted with distinct types of discrimination. Very old adults are more likely to be pitied or perceived as a burden to society and accordingly are faced with discrimination based on shared resources (e.g. health care). Younger ones, on the contrary, are faced with ageism based on being perceived as people who do not know when it is time to step aside (e.g. in the context of work). Additionally, someone's age also determines the importance of a context and how often it is encountered, which is a precondition for views on ageing to exert their influence. Older adults might have a higher likelihood of perceiving discrimination in the health care system as they frequent this context more often (GEDA 2009). However, they are more often retired resulting in a smaller likelihood to feel discriminated against in the domain work than middle-aged people. Accordingly, we consider domain-specific interrelations among views on ageing and perceived age discrimination that are furthermore qualified by age.

The current study

The major aim of our study is to investigate the bidirectional associations between individually held views on ageing and perceived age discrimination. Using data from two waves of the German Ageing Survey, we examined the interrelation among those variables in a large sample of middle-aged and older adults, with a special emphasis on domain- and age-specific relations. At two measurement occasions, participants answered questions about their views on ageing regarding age-related gains and losses in different life domains as well as questions related to their domain-specific experiences of age discrimination. We hypothesized that relatively more negative views on ageing with regard to personal competence, physical decline, and social interactions predict subsequent perceived age discrimination in the related life domains work, medical care, and social life, respectively. Additionally, we expected the reversed effects of perceived age discrimination on views on ageing in the same domain-specific manner. Regarding possible age group-specific effects, we hypothesized that these relations would be stronger for older adults with regard to the domain of medical care and weaker in the domain of work.

Methods

Sample

We used data from the German Ageing Survey (DEAS), which is a representative survey of adults aged 40–85 living in private households in Germany. The DEAS is a combination of cross-sectional and longitudinal assessments with up to four waves of data collection by now: 1996, 2002, 2008, and 2011. The current study uses the data of two waves (2008 and 2011) because they include measures of views on ageing as well as of perceived age discrimination in different life domains. In 2008, a new representative cross-sectional sample was drawn stratified by age, gender, and region (West or East Germany; $n = 6205$). In addition, all participants from 1996 to 2002 who provided informed consent to be contacted again were interviewed in 2008 ($n = 1995$). The DEAS assessment consists of a face-to-face computer-based interview and a paper–pencil questionnaire. Close to three quarters of the total sample in 2008 (cross-sectional and longitudinal) filled in the paper–pencil questionnaire which contained the variables of interest for the present study constituting the total sample for the present study ($n = 6092$). Of these participants, 3050 (50.1 %) participated again in 2011. The participants' age ranged from 40 to 93 at t_1 ($M_{age} = 62.9$, SD = 11.6).

Dropout analyses

Independent sample *t*-tests and Chi-square tests indicate that those participants who dropped out between 2008 and 2011 were older, $t(6090) = 3.46$, $p = .001$, less educated, $t(6086) = -11.10$, $p < .001$, more often retired or unemployed, $\chi^2(1) = 12.19$, $p = .001$, had higher values on the views on ageing subscales physical loss, $t(6074) = 5.79$, $p < .001$, and social loss, $t(6074) = 3.60$, $p < .001$, and felt less often discriminated against in the domain of work $\chi^2(1) = 4.63$, $p = .032$, but perceived age discrimination more often in the social domain $\chi^2(1) = 12.00$, $p = .001$. Significant differences were not evident in any of the other study variables.

Measures

Views on ageing

Individual views on ageing were assessed using the Age-Cog scales (Dittmann-Kohli et al. 1997; Steverink et al. 2001; Wurm et al. 2007). These multidimensional scales measure personal beliefs regarding age-related losses and gains in different areas. Three of them were included in the current study: Personal competence (PC), physical loss (PL), and social loss (SL). Each scale consists of four items (e.g. PC: "Ageing means to me that I know myself better", PL: "Ageing means to me that I am less energetic and fit", SL: "Ageing means to me that I feel less respected") which were rated on a four-point Likert scale ranging from (1) "strongly agree" to (4) "strongly disagree". To facilitate the interpretation of the results we recoded the scales PL

and SL so that higher values on all scales assessing views on ageing indicate more negative views. The global views on ageing measure was built by aggregating across the three scales. Accordingly, higher values on the aggregated measure also indicate more negative views on ageing. In the domain-specific analyses separate latent factors for PC, PL, and SL were estimated in 2008 and 2011. Measurement invariance was tested in a stepwise manner. Both the model testing for configural and the model testing for weak invariance indicated an acceptable model fit: $\chi^2(225) = 1405$, CFI = 0.95, RMSEA = 0.03, SRMR = 0.04, for configural invariance, and $\chi^2(234) = 1415$, CFI = 0.95, RMSEA = 0.03, SRMR = 0.04, for weak invariance. Furthermore a Satorra–Bentler scaled Chi-square difference test (Satorra and Bentler 2001) revealed that the model assuming weak invariance provides an equally good fit as compared to the model with less parameter constraints ($\Delta\chi^2(9) = 9.786$, $p = .368$).

Perceived age discrimination

Whether the participants felt discriminated against in any domain within the last year before the respective measurement occasion was assessed using a single item ("In the past 12 months, have you been discriminated against due to your age or placed at a disadvantage in relation to others?", termed here as global perceived age discrimination [AD_g]). We recoded this item so that 1 indicates "yes" and 0 "no". If this question was answered with "yes" a follow-up question was asked to further specify in which life domain the participant experienced age discrimination ("Can you tell us in which area of life this occurred?"). Respondents were given five areas (work, medical care, government agencies, everyday life, and finances) to choose from (multiple entries were possible), and they could also specify another area themselves. For each of the possible choices, examples were given to illustrate events that are characteristic of the respective domain. If a certain domain was chosen it was coded as 1 whereas not selected domains were coded as 0. For the purpose of analysing domain-specific relations between views on ageing and perceived discrimination, we focused on the domains for which a corresponding measure of views on ageing existed. These included "At work or looking for work (for example, in hiring decisions, in the workplace itself, or in layoff decisions)", AD_{work}; and "In medical care (for example, medical diagnoses, treatments, or prescriptions)", AD_{med}. Two additional areas: "In everyday life (for example, when shopping, at events, or in personal relationships)" and "In dealing with government agencies (for example, in the processing of applications or in decisions on the provision of benefits)" were merged into one indicator of perceived age discrimination in the social domain (AD_{social}) whereby 1 indicated perceived age discrimination in either of the two domains.

Covariates

Gender, and place of residence (a dichotomous variable indicating whether the participant lives in former East or West Germany) were included as covariates in all analyses as the DEAS sample is stratified by these variables. In addition, level of education (1 = no professional training and $\leq$10 years of school education, 2 = professional training or higher education entrance qualification, 3 = advanced training, 4 = university degree) was used as a control variable and age was included as a covariate in those analyses that did not include age as a grouping variable. Both of these variables have been shown to be related to perceived age discrimination (Huxhold and Wurm 2010). Furthermore, we chose additional covariates specifically for the domain-specific analyses. For the model including AD_{work}, we controlled for occupational status (a dichotomous variable indicating whether the participant is currently employed or looking for a job [1] or not [0]), and for the model including AD_{med}, we added the self-reported number of physical illnesses assessed with a list of eleven illnesses as a covariate.

Analytic procedure

Descriptive statistics and correlation coefficients were obtained using SPSS 21. Our main hypotheses regarding relations between views on ageing and perceived discrimination were tested with a series of regression analyses in Mplus 7 using a WLSMV estimator.

First, we estimated a global cross-lagged model investigating the longitudinal relationship between global views on ageing (manifest variable; averaged across all assessed domains) and domain-independent perceived discrimination (AD_g) with data of all participants who filled in the paper–pencil questionnaire ($n = 6092$).

As a next step, to test our hypothesis of a domain-specific reciprocal relation between views on ageing and perceived discrimination that further depends on the age group, we applied separate multi-group cross-lagged models for each subdomain of perceived age discrimination, using only those participants who answered the global item assessing perceived age discrimination at t_1 with "yes" ($n = 660$). We chose this reduced sample for the domain-specific analyses because this allows us to predict whether or not people feel discriminated against in a specific domain rather than predicting the occurrence of age discrimination per se. Furthermore, including the whole sample in these analyses would cause estimation problems due to a large number of participants who did not

state that they have been discriminated against in any domain at t_1 ($n = 5432$). A detailed overview of the whole sample and subsample at t_1 and t_2 can be retrieved from Fig. 1. In order to test our assumption of domain specificity of the relations, we conducted three multiple regression analyses using Mplus 7 predicting the three domains of age discrimination by all three views on ageing scales, with data of all participants who felt discriminated against at t_1. As a result the cross-lagged models tested mutual relations between views on ageing and perceived age discrimination for (a) the work domain and related views on ageing regarding personal competence, (b) the medical domain and related views on ageing regarding physical decline, and (c) the social domain and related views on ageing regarding social loss.

As shown in Fig. 2, in each of these models the perceived age discrimination at t_2 in a certain domain was predicted by views on ageing and the perceived age discrimination that were assessed in the respective domain at t_1. Additionally, the second cross-lagged path specifies the reciprocal relation where views on ageing at t_2 are predicted by perceived age discrimination in the corresponding domain controlling for views on ageing at t_1. Additionally, within each measurement occasion views on ageing were predicted by perceived age discrimination in the past 12 months to account for cross-sectional associations. We used a regression instead of an association because of the temporal order that is implied by the fact that perceived age discrimination was assessed retrospectively. Covariates were included in all cross-lagged analyses predicting views on ageing and perceived age discrimination variables at t_1 and t_2.

To evaluate age differences, the models including AD_{social} and AD_{med} were specified as multi-group models for the two age groups (40–64 and 65+). Due to the uneven distribution of AD_{work} across the two age groups, we could not apply the multi-group approach in this domain ($n = 72$ in the younger subsample and $n = 4$ in the older subsample).

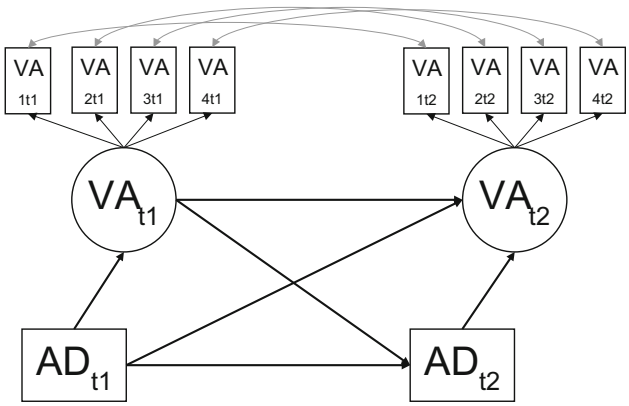

Fig. 2 Cross-lagged model for the domain-specific interrelation among views on ageing (VA) and age discrimination (AD). Additionally, gender, level of education, and place of residence were included in each cross-lagged model. Furthermore, occupational status and age were included as covariates in the work domain and the number of physical illnesses in the health domain

Participants from the older subgroup reported less discrimination in the domain work probably due to fact that they are more often retired. Hence, the whole age range of the sample was used in the cross-lagged model of this domain controlling for age.

Results

Descriptive analyses

Table 1 provides an overview of the sample characteristics for the whole sample as well as for the two subgroups. At t_1 660 participants stated to have experienced age discrimination. The highest prevalence (52.6 %) was obtained in the domain work. In 2011, 286 of the participants who took part in the questionnaire study in 2008 felt discriminated against; again, half of them perceived age discrimination in the domain work (50.7 %). An overview of descriptive

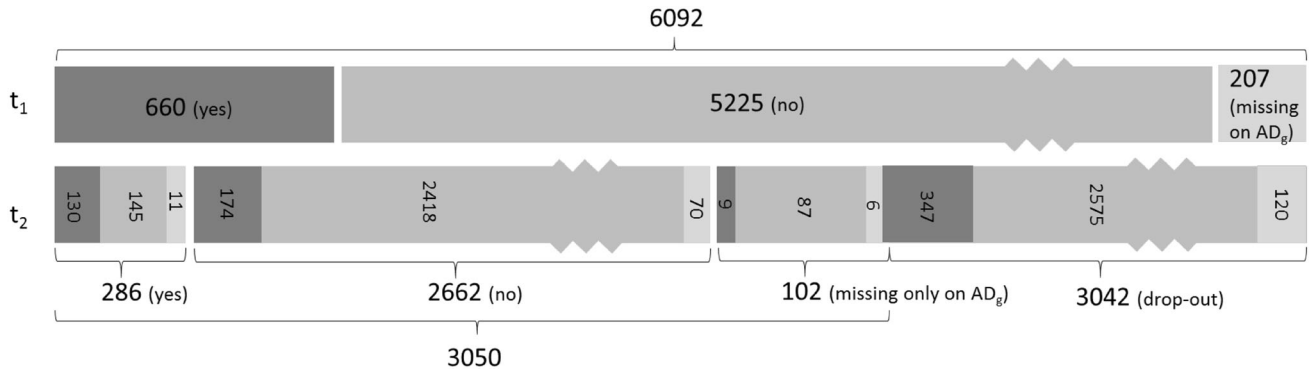

Fig. 1 Sample at t_1 and t_2 broken down by the answer to the global item assessing age discrimination (AD_g; yes or no) and missing values

Table 1 Sample characteristics for the total sample, the subsample, and the two age groups at t_1 and t_2

	t_1				t_2			
	Total $n = 6092$	Subsample[a] $n = 660$	40–64 $n = 385$	65+ $n = 275$	Total $n = 3050$	Subsample[a] $n = 313$	40–64 $n = 193$	65+ $n = 120$
Age *M* (SD)	62.90 (11.64)	62.50 (11.39)	54.29 (5.94)	73.99 (5.97)	65.38 (10.85)	64.9 (10.30)	58.05 (5.65)	75.82 (5.53)
Gender (% female)	48.7	52.9	54.5	50.5	49.9	55.6	55.4	55.8
East–west (% east)	35.7	44.5	46.0	42.5	36.0	43.5	46.6	38.3
Employment status (% employed or looking for a job during the last 4 weeks)	38.4	31.5	50.6	4.7	37.0	31.7	50.2	2.9
Education *M* (SD)	2.51 (0.96)	2.43 (0.93)	2.52 (.92)	2.32 (.94)	2.64 (0.96)	2.52 (0.96)	2.60 (0.92)	2.40 (1.00)
Number of physical illnesses *M* (SD)	2.38 (1.84)	3.04 (1.99)	2.48 (1.78)	3.84 (2.01)	2.49 (1.84)	3.09 (1.91)	2.66 (1.73)	3.76 (1.98)

Level of education ranging from 1 (no professional training and ≤10 years of school education) to 4 (university degree); number of physical illnesses from a list of 11 illnesses

[a] Values in these columns refer to the subsample of participants who indicated that they had been discriminated against at t_1 (left part of the table). Subsample characteristics in the right part of the table refer to those participants who indicated that they had been discriminated against at t_1 and also participated in the study at t_2

statistics of views on ageing and perceived (domain-specific) age discrimination is provided in Table 2. Additionally, Table 3 provides an overview of correlations among all variables of interest at t_1.

Test of domain specificity

We applied multiple regression analyses to test the assumed relationships between views on ageing subscales and domains of perceived age discrimination. That is, we examined whether the specific views on ageing subscale (at t_1) are always the strongest predictor of perceived age discrimination (at t_2) for the respective domain, and whether they predict domain-specific perceived age discrimination over and above the two other views on ageing subscales. In line with our hypotheses, PC was the strongest predictor of AD_{work} ($b = 0.99$, SE $= .37$, $p = .007$), PL was the strongest predictor of AD_{med} ($b = 0.95$, SE $= .46$, $p = .039$), and AD_{social} was predicted by SL ($b = 0.82$, SE $= .30$, $p = .006$). None of the additional predictors reached significance in the domains of work and medical care (all other $b \leq |0.51|$, $p \geq .279$; $b \leq 0.24$, $p \geq .428$, respectively). In the social domain, PC was predictive of perceived age discrimination as well ($b = -0.86$, SE $= .35$, $p = .015$; PL: $b = 0.36$, SE $= .46$, $p = .438$). However, as shown in Table 3, PC does not predict perceived age discrimination in the social domain on a bivariate level. The significant regression weight for PC emerges only when PL and SL are included in the regression, and thus indicates a suppression effect.

Global cross-lagged model

In a global cross-lagged model, the variable of domain-independent perceived discrimination at t_2 was predicted by views on ageing at t_1 (averaged across domains), and views on ageing at t_2 were predicted by perceived age discrimination at t_1 (see Table 4, first line). This indicates that more negative views on ageing at t_1 predict a subsequent increase in perceived age discrimination ($b = .44, p < .001$) and also that the perceived discrimination at t_1 predicts that views on ageing become more negative, although the latter effect was only marginally significant ($b = .05$, $p = .058$). Within both measurement occasions, the results mirrored the longitudinal findings where the participants who indicated that they had experienced age discrimination during the previous year also held more negative views on ageing ($b_{t1} = .17$, $p < .001$; $b_{t2} = .04, p < .001$).

Domain-specific cross-lagged models

Three separate domain-specific cross-lagged models were estimated to test our hypotheses of domain-specific

Table 2 Descriptive statistics of perceived age discrimination and views on ageing in the full sample and in each of the two age groups

	t_1			t_2		
	Total $n = 6092$	Aged 40–64[a] $n = 385$	Aged 65+[a] $n = 275$	Total $n = 3050$	Aged 40–64[a] $n = 193$	Aged 65+[a] $n = 120$
AD_g	660 (10.8)	385	275	286 (9.4)	91	39
n_{yes} (% yes)						
AD_{work} n_{yes} (% yes of AD_g)	347 (52.6)	305 (79.2)	42 (15.3)	145 (50.7)	72 (37.3)	4 (3.3)
AD_{med} n_{yes} (% yes of AD_g)	244 (37.0)	77 (20.0)	167 (60.7)	97 (33.9)	23 (11.9)	25 (20.8)
AD_{social} n_{yes} (% yes of AD_g)	214 (32.4)	97 (25.2)	117 (42.5)	91 (31.8)	24 (12.4)	17 (14.2)
PC *M* (SD)	1.93 (.47)	1.98 (.50)	1.99 (.54)	1.93 (.48)	2.02 (.44)	1.95 (.50)
PL *M* (SD)	2.80 (.55)	2.84 (.59)	3.08 (.56)	2.79 (.57)	2.89 (.49)	3.12 (.57)
SL *M* (SD)	1.86 (.59)	2.07 (.62)	2.20 (.66)	1.81 (.56)	2.04 (.61)	2.10 (.67)

AD age discrimination, AD_g global, domain-independent age discrimination, AD_{work} perceived age discrimination in the domain work, AD_{med} perceived age discrimination in the domain medical care, AD_{social} perceived age discrimination in the domain social interactions, *VA* views on ageing, *PC* personal competence, *PL* physical loss, *SL* social loss. Higher values indicate more age discrimination and more negative views on ageing for all variables

[a] Values in these columns refer to the subsample of participants who indicated that they have been discriminated against at t_1

Table 3 Correlations between perceived age discrimination and views on ageing at t_1

	AD_g	AD^a_{work}	AD^a_{med}	AD^a_{social}	VA_{agg}	PC	PL	SL
AD_g	–							
AD_{work}	–	–						
AD_{med}	–	**−.48**	–					
AD_{social}	–	**−.17**	**.15**	–				
VA_{agg}	**.14**	−.02	**.20**	**.18**	–			
PC	**.04**	−.02	−.02	.06	–	–		
PL	**.09**	**−.16**	**.23**	**.12**	–	**.14**	–	
SL	**.16**	−.04	**.10**	**.21**	–	**.25**	**.40**	–

AD age discrimination, AD_g global, domain-independent age discrimination, AD_{work} perceived age discrimination in the domain work, AD_{med} perceived age discrimination in the domain medical care, AD_{social} perceived age discrimination in the domain social interactions, *VA* views on ageing, VA_{agg} views on ageing aggregated across the three scales, *PC* personal competence, *PL* physical loss, *SL* social loss

Values printed bold are significant ($p < .05$)

[a] All correlations with domain-specific AD were computed using the subsample

relations. All path coefficients and model fit indices are presented in Table 4. In all three models more positive views on ageing at t_1 related to personal competence, physical decline, and social loss were significantly associated with less perceived discrimination in the respective domains at t_2 (i.e. work, $b = 1.15$, $p = .017$, medical care, $b_{40–64} = 0.22$, $p = .704$, $b_{65+} = 2.14$, $p = .004$, and social life, $b_{40–64} = 1.15$, $p = .017$, $b_{65+} = 0.94$, $p = .113$). However, the second cross-lagged path that indicates whether perceived age discrimination is a predictor of changes in views on ageing did not reach significance in any of the three models (work, $b = 0.11$, $p = .358$, medical care, $b_{40–64} = 0.23$, $p = .152$; $b_{65+} = 0.06$, $p = .606$, and social life, $b_{40–64} = 0.02$, $p = .846$; $b_{65+} = 0.07$, $p = .378$).

For medical care and the social domain, age group differences in the multi-group models were investigated. As expected, in the domain of medical care the significant effect only applied to the older age group ($b = 2.14$, $p = .004$), whereas in the domain of social interactions the effect was only significant in the younger age group ($b = 1.15$, $p = .017$). Wald tests show that while the age group difference of the effect of views on ageing on perceived age discrimination is significant in the health domain, $\chi^2(1) = 4.19$, $p = .04$; it does not differ significantly between the two age groups in the social domain, $\chi^2(1) = 0.08$, $p = .78$.

Table 4 Stabilities, unstandardized regression coefficients, and model fit indices for global/aggregated and domain-specific cross-lagged models. Standard errors in brackets

Variables	Age group	Stability		Within time regression		Cross-lagged effects		Model fit		
		VA_{12}	AD_{12}	$AD_1 \rightarrow VA_1$	$AD_2 \rightarrow VA_2$	$AD_1 \rightarrow VA_2$	$VA_1 \rightarrow AD_2$	χ^2 (df)	RMSEA	CFI
AD_g, VA_{agg}	–	**0.55 (.01)**	**1.34 (.09)**	**0.17 (.01)**	**0.04 (.01)**	0.05 (.02)†	**0.44 (.09)**	–	–	–
AD_{work}, PC	–	**0.67 (.31)**	**1.03 (.50)**	−0.02 (.02)	−0.07 (.08)	0.11 (.12)	2.64 (1.51)†	74 (60)	0.019	0.982
AD_{med}, PL[a]	40–64	**0.58 (.10)**	**1.12 (.38)**	0.08 (.04)†	0.13 (.11)	−0.23 (.16)	0.22 (.58)	134 (112)	0.025	0.979
	65+	**1.41 (.29)**	0.12 (.30)	**0.10 (.04)**	**−0.35 (.04)**	0.06 (.12)	**2.14 (.75)**			
AD_{social}, SL	40–64	**0.73 (.14)**	**0.76 (.33)**	**0.16 (.04)**	−.02 (.09)	.02 (.10)	**1.15 (.48)**	**170 (99)**	0.047	0.906
	65+	**0.68 (.20)**	0.35 (.31)	**0.13 (.05)**	0.05 (.11)	0.07 (.08)	0.94 (.59)			

Values printed bold are significant ($p < .05$)

AD age discrimination, AD_g global, domain-independent age discrimination, AD_{work} perceived age discrimination in the domain work, AD_{med} perceived age discrimination in the domain medical care, AD_{social} perceived age discrimination in the domain social interactions, *VA* views on ageing, VA_{agg} views on ageing aggregated across the three scales, *PC* personal competence, *PL* physical loss, *SL* social loss. Higher values indicate more age discrimination and more negative views on ageing for all variables

[a] In the domain medical care a non-significant negative residual variance had to be fixed to zero

† Values marked with a cross are significant as indicated by $p < .10$

Discussion

We investigated the interplay of individually held views on ageing and perceived age discrimination in a large-scale longitudinal study. Results of our study consistently support the hypothesis that more negative views on ageing are related to an increased risk of perceiving age discrimination. Thus, there was no indication of contrast effects in our data, which speaks against the proposition that overly positive views on ageing pose a risk of feeling undervalued and discriminated against (Inman 2001). Additionally, the experience of age discrimination was not associated with more negative (or positive) views on ageing.

Domain specificity of the relation of views on ageing and perceived age discrimination

Our results highlight that perceived age discrimination is a domain-specific phenomenon. Most important is the finding that the domain-specific perceived age discrimination in the domains of work, medical care, and social life were specifically predicted by views on ageing that refer to similar domains and attributes (personal competence for the work domain, physical attributes for the health care domain, and social attributes for the social domain). These results extend previous findings that domain-specific views on ageing predict behaviours and life events in related life domains (Kornadt et al. 2015b).

Underlying mechanisms of effects of negative views on ageing on perceived age discrimination

There are two possible pathways that may explain why negative views on ageing turn into self-fulfilling prophecies for experiencing age discrimination. A first explanation focuses on the association between views on ageing and the interpretation of other people's behaviour. Negative age stereotypes might sensitize older people to view other people's behaviours as discriminating. This might happen through a process of priming or projection, meaning that believing that age is associated with negative developments results in an expectation of being discriminated against because of these shortcomings due to the ageing process. Similar results were shown with regard to effects of stereotypes on the perceptions of people belonging to the stereotyped group (Fiske 1998; Robbins and Krueger 2005; Schneider 2004). Alternatively, holding a negative view on ageing in a certain domain might also shape older people's own behaviour in that domain which might, in turn, provoke discriminating behaviours by others. Previous research already shows this self-fulfilling character of age stereotypes through processes of internalization, self-stereotyping, or stereotype threat (Casper and Rothermund 2012; Hehman and Bugental 2015; Hess et al. 2003; Horton et al. 2008; Lamont et al. 2015; Kornadt and Rothermund 2012; Rothermund 2005; Rothermund and Brandtstädter 2003). Even though this self-fulfilling character of views on ageing cannot justify any discriminatory behaviour by others, it shows that fostering positive views on ageing may decrease the vulnerability for the consequences of discrimination as individuals with more positive views on ageing seem to perceive less discriminatory behaviour by others. Although these two pathways are derived from empirical evidence, we cannot rule out the possibility that both perceived discrimination and views of ageing are related through a third variable.

Future research should further investigate the possible pathways by which views on ageing are related to the

perceptions of discrimination. A promising way to investigate the behavioural pathway would be to include domain-specific behavioural indicators that may serve as mediators of the relation between views on ageing and perceived age discrimination (e.g. health behaviour in the medical care domain; participation in further training and education in the work domain). However, it is less evident how the impact of interpretive biases regarding the behaviours of others in everyday situations can be investigated. This would probably require an assessment of their actual, "objective" behaviour, which is rarely possible in real-life settings over an extended time period, but may be possible in specific settings (e.g. at the workplace). Additionally, it would be interesting to use a continuous measure of perceived age discrimination which might better reflect the subjective character of the interpretation of another persons' behaviour in situations of uncertainty.

Age dependence of domain-specific relations of views on ageing and perceived age discrimination

Another important aspect of our findings is that the strength of the domain-specific relation between views on ageing and perceived age discrimination depended on age. Negative views on ageing regarding physical decline affected perceived age discrimination in the health and medical care domain only for the older subsample.

These age group differences may be due to the fact that the probability of being exposed to specific contexts varies by age. Old and very old people can be assumed to have a higher probability of coming into contact with the medical care context, which would explain why their respective age stereotypes are activated more often, and thus can exert a stronger influence on their perceptions of others' behaviour or on their own behaviour in this context. This is certainly also true for the work domain. However, due to sample size issues we could not test this hypothesis in the current study. In addition, views on ageing might also vary in their quality (i.e. manifest themselves differently) in different age groups (North and Fiske 2013; O'Brien et al. 2008) and thus provide different prototypes of discrimination for different age groups (Major and Sawyer 2009). For example, views of old people as being frail and helpless may become dominant only in very old age, whereas views of young–old or middle-aged adults may indicate reduced fitness or stamina, which may not yet have direct implications for (perceived) age discrimination in medical care contexts.

Furthermore, other potential moderators might alter the strength of the relation between views on ageing and perceived age discrimination. Wurm and Benyamini (2014), for example identified global optimism as a buffer for detrimental effects of negative views on ageing regarding health on mental and physical health. In a similar vein, some sociodemographic indicators that are known to predict perceived age discrimination (such as gender and education) might alter the relation between views on ageing and perceived age discrimination. It would be interesting, therefore, to further clarify for whom and when the relation holds.

Reciprocal relation of perceived age discrimination and views on ageing

Our data did not yield support for the idea that perceived age discrimination predicts views on ageing. We did not find evidence for domain-specific effects in this direction in the cross-lagged paths. Only for general indicators of views on ageing and perceived age discrimination was a marginal effect found. Thus, there are only weak and inconsistent effects showing that perceived age discrimination predicts views on ageing. One may speculate that this relation might be limited to a certain subgroup of participants (e.g. people with a low social status). Some authors suggest that one's relative social status determines the consequences of feeling discriminated against, with negative consequences being more likely for people who feel that their group has a low status (Garstka et al. 2004; Schmitt and Branscombe 2002). In addition, some individuals might show an opposite effect that neutralizes the positive association. Perceived age discrimination can increase in-group identification especially among older adults (Garstka et al. 2004) which is in turn associated with a strengthened self-enhancement and more positive attitudes towards the in-group (Kaiser et al. 2009; Lindeman 1997), but also has been shown to have negative long-term effects (Pavalko et al. 2003). These diverging consequences might tend to cancel out each other. In sum, these relations are generally weaker and less clear-cut than what was observed for the reverse effect of views on ageing on perceived age discrimination.

Conclusion

Previous research has emphasized that negative age stereotypes may trigger behaviours towards older people that constitute age discrimination (e.g. Diekman and Hirnisey 2007; Krings et al. 2011). Our study has taken a decidedly different perspective on that issue by focusing on the relation between views on ageing and *perceived* age discrimination. The findings demonstrate a relation between views on ageing and perceived age discrimination, which has important implications for the well-being and development of older people. Demonstrating that negative individually held views on ageing predict perceived age

discrimination implies that targeting views on ageing is a potential starting point to reduce perceived age discrimination and its detrimental effects (cf. interventions to promote positive views on ageing; Wolff et al. 2014). Furthermore, life domain and age group-specific analysis allow us to identify who is especially vulnerable to experience age discrimination and in which context perceptions of being discriminated are most likely to occur.

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