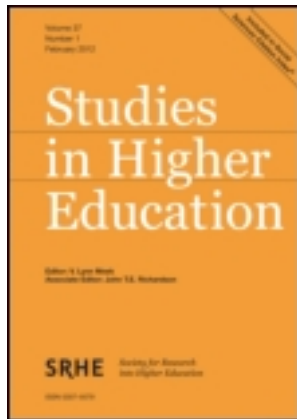


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Professor age and research assistant ratings of passive-avoidant and proactive leadership: the role of age-related work concerns and age stereotypes

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Recent research has shown that, in general, older professors are rated to have more passive-avoidant leadership styles than younger professors by their research assistants. The current study investigated professors' age-related work concerns and research assistants' favorable age stereotypes as possible explanations for this finding. Data came from 128 university professors paired to one research assistant each. Results show that professors' age-related work concerns (decreased enthusiasm for research, growing humanism, development of exiting consciousness and increased follower empowerment) did not explain the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership. However, research assistants' favorable age stereotypes influenced the relationships between professor age and research assistant ratings of leadership, such that older professors were rated as more passive-avoidant and less proactive than younger professors by research assistants with less favorable age stereotypes, but not by research assistants with more favorable age stereotypes.

Keywords: age; passive-avoidant and proactive leadership; work concerns; age stereotypes

Demographic changes and a rapidly aging workforce have increased the interest of researchers and practitioners in the relationship between age and leadership over the past few years (Barbuto et al. 2007; Kearney 2008; Vecchio and Anderson 2009; Zacher, Rosing, and Frese 2011; Zacher et al. 2011). However, in contrast to the burgeoning research on the relationship between employee age and work performance (Kanfer and Ackerman 2004; Ng and Feldman 2008), the relationships between leader age and follower ratings of leadership — the most common success measures in leadership research (Hogan and Kaiser 2005; Kaiser, Hogan, and Craig 2008) — are so far not well-understood. It is important to shed more light on the relation between age and leadership in education, because, due to the aging workforce, people have to work longer and thus leadership positions in education will be increasingly held by older workers (Stroebe 2010). Empirical studies on age and follower ratings of leadership have so far yielded inconsistent results. Whereas Barbuto et al. (2007) found a small and positive relationship between leader age and follower

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perceptions of leader effectiveness, other studies found weak and non-significant relationships (Vecchio 1993; Vecchio and Anderson 2009). The reasons for these findings are so far unclear.

What is the relationship between leader age and follower ratings of leadership in the university context? Surprisingly, hardly any theoretical and empirical research has so far been conducted on this topic (see Karp 1986 for an early exception), despite a growing interest in the topic of leadership in higher education (e.g. Bryman 2007; Davies, Hides, and Casey 2001; McRoy and Gibbs 2009; Turnbull and Edwards 2005). For example, Macfarlane (2011) recently noted that, in contrast to the leadership roles of deans and department heads, relatively little attention has focused on university professors as leaders. Similarly, Rayner et al.'s (2010) most important conclusion of their recent critical review on academic leadership was that 'there is little empirical research and a limited literature in the area of leadership and management of higher education ... There is a great need for more research' (626). A recent study shed some light onto the issue of age and leadership in higher education. Specifically, Zacher, Rosing, and Frese (2011) surveyed 106 university professors and their research assistants from two German universities, and found no relationships between professor age and transformational and transactional leadership (Bass 1985; Bass and Avolio 1994). Transformational and transactional leadership are two highly effective leadership styles (Judge and Piccolo 2004). In transformational leadership the leader is charismatic, inspiring, intellectually stimulating, and considerate toward his or her followers, while transactional leaders closely monitor their followers' performance and reward them for good work.

However, Zacher, Rosing, and Frese (2011) found a positive relationship ($r = .27$, $p < .01$) between professor age and research assistants' ratings of passive-avoidant leadership. Passive-avoidant leadership is characterized by the leader avoiding important leadership tasks and being passive, inactive and absent when needed (Bass 1985, 1999). Meta-analytic studies have shown that passive-avoidant leadership is very ineffective (Judge and Piccolo 2004; Lowe, Kroeck, and Sivasubramaniam 1996).

In this article, we argue that Zacher, Rosing, and Frese's (2011) finding of a positive relationship between professor age and research assistant ratings of passive-avoidant leadership needs to be replicated, and deserves further research attention for both theoretical and practical reasons. First, the workforces of most industrialized countries, including the workforce in higher education settings, will age dramatically over the next decades, and more flexible retirement options will be introduced that allow professors to work beyond traditional retirement ages (Cohen 2003; Dorfman 2009; Stroebe 2010). For example, the European Commission has recently observed that a key trend in the majority of the member states of the European Union has been to reward later retirement and to penalize earlier retirement (European Commission 2010; Ilmarinen 2005). In addition, many countries in the European Union have introduced more flexibility and individual responsibility in retirement options, as well as labour market measures to encourage and enable older workers to remain in the workforce. These changes require that practitioners and policy makers gain a better understanding of the role of age and age-related changes for leadership processes and outcomes in the university context. Thus, the focus of this study is on age-related differences in research assistant ratings of professors' leadership.

Second, hardly any study has so far investigated explanations (i.e. mediator variables) and boundary conditions (i.e. moderator variables) of the relationship between leader age and follower ratings of leadership (for an exception, see Zacher et al. 2011). Whereas

mediator variables *explain* a relationship between an independent variable (predictor) and an outcome variable, moderator variables further *qualify* a relationship between a predictor and an outcome variable, and therefore represent boundary conditions of a relationship (Baron and Kenny 1986). For example, the relationship between a predictor and an outcome variable may be weaker (or stronger) for high levels of the moderator variable, and stronger (or weaker) for low levels of the moderator variable. The neglect of mediator and moderator variables in previous research is unfortunate, because research on aging is often criticized for treating age as if it was a psychologically meaningful construct by itself. For example, Birren (1999) argued that, 'By itself, the collection of large amounts of data showing relationships with chronological age does not help because chronological age is not a cause of anything. Chronological age is only an index, and unrelated sets of data show correlations with chronological age that have no intrinsic or causal relationship with each other' (460). It is, therefore, important to gain a better understanding of how age-related changes in psychological variables, which are examined primarily in the field of life span psychology, may affect leadership ratings (Avolio and Gibbons 1988).

Finally, it is unknown how research assistants' characteristics may affect their ratings of younger and older professors' leadership. This is important, however, because research assistants perceive leadership and act upon their perceptions. Rater characteristics such as age stereotypes may pose an important boundary condition to negative relationships between worker age and work-related outcomes (Posthuma and Campion 2009).

The goal of this constructive replication study, therefore, was to replicate and extend Zacher, Rosing and Frese's (2011) finding, using a sample of 128 university professors and their research assistants from 12 different universities. We investigated not only the relationship between professor age and research assistant ratings of passive-avoidant leadership, but also the relationship between professor age and research assistant ratings of proactive leadership. Proactive behavior is considered to be a positive, effective behavior in organizations, because it involves the self-initiated generation and implementation of new ideas at work, taking an active approach to problems, and overcoming barriers (Fay and Frese 2001; Griffin, Neal, and Parker 2007). Compared to other leadership styles, such as transformational and transactional leadership (cf. Avolio, Walumbwa, and Weber 2009), we focus on passive-avoidant and proactive leadership styles, because they appear to be particularly relevant for leader-follower relations in the university context. Research assistants working towards a doctoral degree are in the early stages of their career, and therefore they are dependent on the established senior professors for ideas, guidance and support. This is consistent with recent empirical work by Macfarlane (2011), which identified professorial leadership qualities such as being a role model and mentor, an advocate and guardian, as well as an acquirer and ambassador. Our research is thus based on the assumption that relationships between research assistants and professors require high levels of proactive and low levels of passive-avoidant leadership to be effective and satisfying for the research assistants.

Furthermore, we examined potential explanations and boundary conditions of the proposed relationships between leader age and follower ratings of passive-avoidant and proactive leadership (Figure 1). Specifically, we investigated whether professors' age-related work concerns – motivational orientations that may influence how much effort professors invest into their leadership role (Mor-Barak 1995) – mediate the relationships between leader age and follower ratings of passive-avoidant and

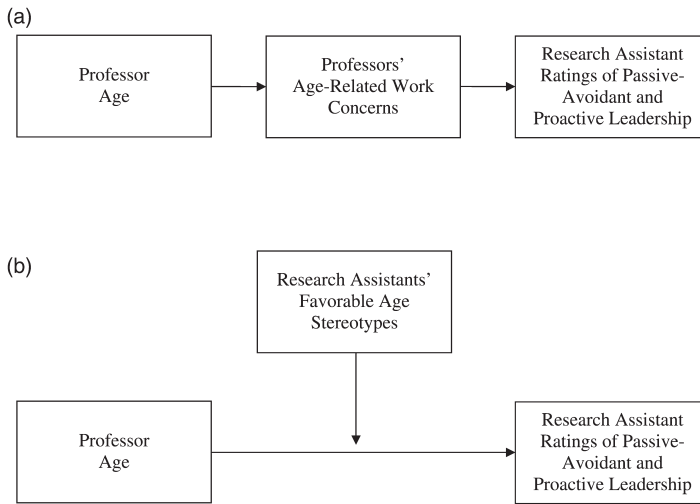


Figure 1. Theoretical models of professors' age-related work concerns as mediators and research assistants' favorable age stereotypes as moderators of the relationships between professor age and research assistant ratings of proactive and passive-avoidant leadership.

proactive leadership (Figure 1a). The literature on aging in the work context (Hedge, Borman, and Lammlein 2006; Kanfer and Ackerman 2004; Warr 2001) suggests that several changes in cognitive abilities and work concerns take place with increasing age which may impact leaders' behaviors and, in turn, affect follower ratings of leadership. Fluid intelligence (i.e. information processing speed) decreases with age, but in most jobs this decline can be compensated by age-related increases in crystallized intelligence (i.e. accumulated knowledge and experience) (Baltes, Staudinger, and Lindenberger 1999; Kanfer and Ackerman 2004). In contrast, age-related changes in motivational work concerns are more likely to influence work behaviors.

Finally, we investigated whether research assistants' favorable age stereotypes – an attitude which ascribes generally positive attributes to older people (Kite et al. 2005; Nelson 2002; Palmore 1999) – moderates the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership styles (Figure 1b). Favorable age stereotypes include seeing older workers as more reliable and better to work with, and are widespread in the workplace (Posthuma and Campion 2009; Rupp, Vodanovich, and Credé 2006). We focus on favorable age stereotypes in this study because, in general, older professors appear to be perceived as more passive-avoidant and less proactive leaders; this negative effect may be attenuated by the positive attitudes of research assistants towards older professors. In other words, we expected that research assistants need to hold positive views of older professors to undo the negative effects of age on leadership style. We propose that older professors are rated as more passive-avoidant and less proactive than younger professors by research assistants with less favorable age stereotypes. In contrast, we expected that older professors are not rated differently from younger professors by research assistants with more favorable age stereotypes.

Development of hypotheses

Professor age and research assistant ratings of leadership

As mentioned above, hardly any theories and empirical findings on relationships between professor age and research assistant ratings of leadership exist. However, some research indicates that professor age and research assistant ratings are negatively related, such that older professors receive worse ratings by their research assistants than younger professors. Consistent with the finding by Zacher, Rosing, and Frese (2011), we propose that professor age is positively related to research assistant ratings of passive-avoidant leadership, and negatively related to research assistant ratings of proactive leadership. There may be a number of explanations and boundary conditions for these age-related differences. First, age-related changes in professors' work concerns may influence their leadership behavior. For example, Zacher, Rosing, and Frese (2011) suggested that older professors have a more limited occupational future time perspective (Zacher and Frese 2009), which causes them to prioritize non-work activities and think more often about retirement plans. When professors grow older, they become aware that time until retirement is running out. Hence, older compared to younger professors perceive the length of their remaining time until retirement to be shorter, which causes them to prioritize non-work activities. Thus, they may be less likely to be proactive in changing and influencing their (social) environment. In addition, older professors may have more leadership experience and other work-related commitments besides their research, and therefore they may provide their research assistants with more responsibilities and discretion to make their own decisions at work than younger professors. Followers may interpret this as passive-avoidant leadership.

- *Hypothesis 1a.* Professor age is positively related to research assistant ratings of passive-avoidant leadership, such that older professors receive more negative ratings by their research assistants than younger professors.
- *Hypothesis 1b.* Professor age is negatively related to research assistant ratings of proactive leadership, such that older professors receive more negative ratings by their research assistants than younger professors.

Professor age, age-related work concerns and research assistant ratings of leadership

Based on a series of qualitative interviews with faculty members from different US universities, Karp (1986) suggested that professors experience six distinct changes in work concerns with increasing age. Specifically, he proposed that professors become more selective with regard to their work and non-work activities (*greater work selectivity; greater non-work selectivity*), and think more often about their life after retirement (*development of exiting consciousness*) as they get older. Whereas younger professors may invest their personal resources (e.g. time, energy) into a broad variety of different activities (e.g. teaching, publishing, consulting, engagement in administrative duties) to maximize future outcomes, older professors may focus on fewer and more important work activities, such as writing '*the book*' (for the swan-song phenomenon, see also Simonton 1989). Thus, older professors are more likely to focus on the most important things they want to achieve in their remaining time, while placing less emphasis on issues that they conceive of as less important, but which may be perceived as much more important by the younger research assistants.

In terms of non-work selectivity, older professors' life and work experience may lead them to balance work and life/family activities more carefully than younger professors, who still have to achieve their career goals. Karp's (1986) propositions are consistent with the life span theories of selective optimization with compensation (Baltes and Baltes 1990) and socioemotional selectivity (Carstensen 1992), which suggest that older people become more selective due to decreases in important resources such as physical strength and perceived remaining time left in life. These theories also suggest that older people increasingly focus on emotionally important and meaningful goals due to the increasing imbalance between (perceived) losses and growth with increasing age (Lang and Carstensen 2002).

Karp (1986) further proposed that with increasing age, professors become more skeptical and less excited about new developments in their field (*decreased enthusiasm for research*), that they increasingly want to transmit their values and experience to their research assistants (*growing humanism*), and that they give more autonomy to their research assistants to make their own decisions (*increased follower empowerment*). Whereas the first assumption is so far based more on unsystematic observations and popular thinking than on empirical facts (Stroebe 2010), the second and third assumptions are supported by generativity theory (Erikson 1950; McAdams and de St. Aubin 1992). This theory suggests that people develop an increasing concern for the next generation starting in midlife (i.e. roughly the time between 40 and 60 years of age).

In the current study, we aim to extend Karp's (1986) research on university professors by developing scales to assess the six changes in professors' work concerns, and by investigating the proposed relationships between professor age and changes in work concerns. We expected that older professors would endorse all of the six changes in work concerns more strongly than younger professors, and the increase in these work concerns would explain why older professors are perceived as more passive-avoidant and less proactive leaders by research assistants. Thus, we examined whether the changes in work concerns are related to follower ratings of passive-avoidant and proactive leadership. We expected that all of the six age-related changes in work concerns lead to professors' withdrawal (or withdrawal as perceived by research assistants) from an active leadership role, which in turn is related to less favorable follower ratings of leadership (Figure 1a). In sum, we expect work concerns to explain the relations between professor age and leadership styles. The second hypothesis therefore is:

- *Hypothesis 2.* Age-related changes in professors' work concerns (greater selectivity in work and non-work activities, decreased enthusiasm for research, growing humanism, development of exiting consciousness, and increased follower empowerment) mediate the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership.

Professor age, research assistant age stereotypes and leadership ratings

Based on the extant literature on age stereotypes, both in the workplace (DeArmond et al. 2006; Posthuma and Campion 2009; Rosen and Jerdee 1976) and outside it (Kite et al. 2005; Nelson 2002; Palmore 1999), we propose that favorable age stereotypes influence research assistants' leadership ratings of younger and older professors. Consistent with the age stereotypes literature, favorable age stereotypes about older workers include seeing them as more dependable, stable, trustworthy and reliable

than younger workers (Posthuma and Campion 2009). There is some evidence for the validity of this stereotype, suggesting that older workers are better organizational citizens (e.g. helping others and defending the organization) and show fewer counterproductive work behaviors (e.g. stealing, absenteeism) (Ng and Feldman 2008).

Posthuma and Campion (2009) suggested that age stereotypes may act as moderators – such that they influence the strength of relationships between workers' age and work-related outcomes. For example, they suggested that a negative relationship between worker age and promotions may be stronger when the manager deciding who will be promoted holds less favorable age stereotypes. In contrast, the relationship between worker age and promotions may be weaker when the manager holds more favorable age stereotypes. So far, hardly any research has investigated these potential mechanisms. In this study, we extend previous research on age stereotypes to the university context by investigating how research assistants' favorable age stereotypes influence their leadership ratings of younger and older professors (Figure 1b). We expect that if research assistants hold more favorable views of older professors in general, they rate their professors as less passive-avoidant and more proactive than research assistants without positive stereotypes about older professors. In contrast, research assistants without general positive views of older professors are more likely to focus on the negative aspects of the leadership styles of older professors, and thus rate them as more passive-avoidant and less proactive (Posthuma and Campion 2009). Hence, our third hypothesis is:

- *Hypothesis 3.* Research assistants' favorable age stereotypes moderate the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership, such that older professors are rated as more passive-avoidant and less proactive than younger professors by research assistants with less favorable age stereotypes, but not by research assistants with more favorable age stereotypes.

Method

Participants and procedure

The data used in this study came from 128 tenured associate and full professors from 12 German universities and from one research assistant paired to each of these professors. In the German university system, each professor is responsible for a work group, which in most cases includes one or more research assistants. Such a work group is usually part of a larger department headed by a dean. Individuals working towards obtaining a doctoral degree are most frequently employed by the university as research assistants for up to five years, and are not considered students as in other countries such as the United States. These research assistants are members of the *Mittelbau* (subprofessorial middle-rank academics), and are dependent on the established senior professors for guidance and support (Pritchard 2006). We obtained leadership ratings from only one research assistant of each professor, because virtually every professor in Germany has one research assistant but not necessarily more.

Twenty-two (17%) of the professors in the sample were women and 101 (79%) were men (five professors did not report their gender). Their age distribution ranged from 30 to 70 years, and the average age was 50.06 years ($SD = 7.98$; two professors did not report their age). Fifty-one (40%) of the research assistants were women and 72 (56%) were men (five assistants did not indicate their gender). The age distribution ranged from 21 to 55 years, and the average age was 32.35 years ($SD = 6.14$; five

assistant did not report their age). These demographic statistics were similar to the overall populations of university professors and research assistants in Germany (Autorengruppe Bildungsberichterstattung 2008; see also Zacher et al. 2011).

As a first step of data collection for this study, 2029 professors from all academic disciplines represented at 12 large German universities (language and cultural sciences; sport sciences; law, business and social sciences; mathematics and natural sciences; medicine and health sciences; agriculture, forestry and nutrition sciences; engineering sciences; arts) were contacted and asked whether they and one of their research assistants would be willing to participate in a study on leadership. Subsequently, we sent a questionnaire package to those 314 professors who indicated their general interest in participating (15.5% response rate). In the cover letter, professors were asked to answer the first questionnaire themselves and to give the second questionnaire to an assistant. Professors and assistants directly and independently mailed their questionnaires back to the researchers in prepaid envelopes. 128 questionnaire sets (i.e. questionnaires from a professor and a corresponding assistant) were returned for a response rate of 40.8 percent (6.3% response rate overall). Unfortunately, due to universities' demands for anonymity, we were not able to assess academic discipline in the questionnaires, and therefore do not know whether certain academic disciplines were over- or under-represented in our final sample. We imputed missing data using the SPSS/PASW routine for expectation-maximization estimation, which is recommended over listwise or pairwise deletion (Schafer and Graham 2002). The number of missing values ranged between zero and five (3.9%) in the study variables.

Measures

Age-related work concerns

For the purpose of this study, we developed six new scales with three items each, based on Karp's (1986) qualitative study, to measure age-related changes in work concerns (greater work selectivity, greater non-work selectivity, decreased enthusiasm for research, growing humanism, development of an exiting consciousness, increased follower empowerment). The items were answered by professors on 5-point scales ranging from 1 (does not apply at all) to 5 (applies completely). Cronbach's α s of the scales were .84, .89, .74, .85, .80, and .79. The items and the results of an exploratory factor analysis with varimax rotation are shown in Table 1. All of the items had their highest loading on their designated factor. We also conducted a confirmatory factor analysis to test whether the data fitted a six-factor model well. Consistent with Hu and Bentler (1999), we assumed that confirmatory fit index (CFI) values above .95 and root mean square error of approximation (RMSEA) values below .06 represent a good fit. The confirmatory factor analysis showed that a six-factor model provided a good fit to the data (χ^2 [df = 120] = 161.85, $p < .01$; CFI = .96; RMSEA = .05).

Favorable age stereotypes

We used three items adapted from the age stereotype scale developed by Hassel and Perrewé (1995) to measure research assistants' favorable stereotypes. The items were answered by research assistants on 5-point scales ranging from 1 (do not agree at

Table 1. Professors' age-related work concerns: factor loadings (varimax rotation; N = 128).

Work Concerns Items	Rotated factor solution					
Compared to the beginning of my career, ...						
Greater Work Selectivity						
... I select my work activities much more carefully today.	.212	.229	.783	.104	.067	-.043
... I balance the importance of different work activities more today.	.198	.174	.827	.057	.075	-.008
... I am much more selective with scheduling my work time today.	.333	.116	.589	.121	.126	.022
Greater Non-Work Selectivity						
... I balance the value of work and leisure more strongly today.	.706	.046	.334	.068	.015	.138
... I try harder today to maximize the quality of my free time.	.883	.072	.150	.015	.176	.116
... I make more careful decisions about my free time today.	.838	.104	.222	-.017	.132	.057
Decreased Enthusiasm for Research						
... I get less carried away by the research in my field today.	.183	-.025	.112	.026	.085	.899
... my enthusiasm for new research ideas is generally lower today.	-.003	.014	-.074	.085	.108	.736
... I am much more sceptical with regard to new research concepts and methods today.	.102	.025	-.035	.218	.188	.442
Growing Humanism						
... passing on of my occupational knowledge and experience is more important to me today.	.039	.753	.232	.102	.062	-.016
... I not only want to teach facts, but also values today.	.072	.833	.137	.114	.047	-.051
... I pass on much more about myself, my experiences and beliefs today.	.102	.756	.095	.136	.241	.097
Development of Exiting Consciousness						
... I think much more often about my retirement today.	-.068	-.017	.104	.574	.001	.084
... I have already several ideas about what I want to do when I am retired today.	.128	.230	.032	.870	.090	.047
... I plan much more for the time after my active work life today.	.049	.188	.078	.861	.018	.152
Increased Follower Empowerment						
... I give my research assistants more responsibility today to make important decisions about their work themselves.	.118	.180	.137	.004	.627	.042
... I give my research assistants today the discretion to handle difficult situations the way they think is best.	.170	.012	.109	.130	.810	.161

(Continued.)

Table 1. (Continued.)

Work Concerns Items	Rotated factor solution					
... my research assistants do not have to consult with me today before they can make an important decision at work.	.010	.101	-.014	-.020	.751	.166
Explained variance of factor (total: 65.74%)	12.79	11.55	10.98	10.98	10.09	9.36

Note: Highest loadings of items are printed in bold.

all) to 5 (agree completely). Specifically, we selected three items from Hassel and Perrewé's scale that seemed most fitting to the context of university leadership. For example, we did not adapt items such as 'Older employees have fewer accidents on the job' or 'Occupational diseases are more likely to occur among younger employees'. The items used to measure research assistants' favorable age stereotypes were 'If two professors had similar skills, I'd pick the older one as my supervisor' (adapted from the original item 6, 'If two workers had similar skills, I'd pick the older worker to work with me'), 'Older professors are more dependable supervisors' (11, 'Older workers are more dependable'), and 'Older professors are better supervisors' (17, 'Older employees are better employees'). Cronbach's α of the scale was .80.

Research assistant ratings of passive-avoidant leadership

Research assistants rated professors on the eight items from the laissez-faire and passive management-by-exception scales of the Multifactor Leadership Questionnaire (Form 5X-Short) (Avolio and Bass 1995). Example items are 'Avoids getting involved when important issues arise', 'Is absent when needed', 'Waits for things to go wrong before taking action' and 'Demonstrates that problems must become chronic before taking action'. [Reproduced by special permission of the publisher, Mind Garden, Inc., www.mindgarden.com, from the Multifactor Leadership Questionnaire by Bernard M. Bass & Bruce J. Avolio. Copyright 1995 by Bernard M. Bass & Bruce J. Avolio. Further reproduction is prohibited without the Publisher's written consent. All rights reserved.] Previous factor-analytic research suggested combining the laissez-faire and passive management-by-exception scales into an overall score as they are highly related (Avolio, Bass, and Jung 1999; Den Hartog, Van Muijen, and Koopman 1997). The items were answered on 5-point scales ranging from 1 (not at all) to 5 (frequently, if not always) (note that the Multifactor Leadership Questionnaire typically uses a scale from 0 to 4). Cronbach's α was .84.

Research assistant ratings of proactive leadership

Research assistants rated professors on seven items adapted from Frese et al.'s (1997) reliable and well-validated personal initiative scale. The items were 'My supervisor actively attacks problems', 'My supervisor searches for a solution immediately whenever something goes wrong', 'My supervisor takes every chance to get actively involved', 'My supervisor takes initiative immediately even when others don't', 'My supervisor uses opportunities quickly in order to attain his/her goals', 'My supervisor usually does more than he/she is expected to do', and 'My supervisor is particularly

good at realizing ideas'. The items were answered on 5-point scales ranging from 1 (does not apply at all) to 5 (applies completely). Cronbach's α of the scale was .92.

Demographic variables

Professors and research assistants reported their gender and age. For age, we used ten 5-year-intervals ranging from 1 (21–25 years) to 10 (66–70 years) to comply with universities' demands for protection of data privacy. No participant indicated that he or she was younger than 21 years or older than 70 years. For descriptive purposes, the responses were later recoded by using the midpoint of each age interval (e.g. 23 for '21–25 years'). This recoding did not change the results in any way.

Results

The descriptive statistics and intercorrelations of the study variables are shown in Table 2. Professor age was positively related to research assistant ratings of passive-avoidant leadership ($r = .18, p < .05$), and negatively related to proactive leadership ($r = -.24, p < .01$), supporting hypothesis 1. In addition, Table 2 shows that professor age was positively related to leaders' decreased enthusiasm for research ($r = .19, p < .05$), growing humanism ($r = .27, p < .01$), development of exiting consciousness ($r = .65, p < .01$) and increased follower empowerment ($r = .25, p < .01$). In contrast, professor age was not significantly related to greater work selectivity or greater non-work selectivity.

According to hypothesis 2, age-related changes in professors' work concerns mediate the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership (Figure 1a). The results of a mediation analysis used to test hypothesis 2 are displayed in Table 3. We entered professor age in the first step, and the four work concerns which were found to be significantly related to age in the second step. As shown in Table 3, the four age-related work concerns did not significantly predict research assistant ratings of passive-avoidant and proactive leadership in the second step, and the effects of professor age did not decrease (due to suppression effects, the standardized coefficients even increased in magnitude to $\beta = .22, p < .10$, and $\beta = .38, p < .01$). Thus, hypothesis 2 was not supported.

According to hypothesis 3, research assistants' favorable age stereotypes moderate the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership, such that older professors are rated as more passive-avoidant and less proactive than younger professors by research assistants with less favorable age stereotypes, but not by research assistants with more favorable age stereotypes (Figure 1b). Table 4 shows the results of two hierarchical moderated regression analyses. Following the procedures outlined by Aiken and West (1991), professor age and research assistants' favorable age stereotypes were entered in the first step, and the interaction term of the mean-centered predictor and moderator variables was entered in the second step.

As can be seen in Table 4, the interaction of professor age with research assistants' favorable age stereotypes significantly predicted research assistant ratings of passive-avoidant leadership ($\beta = -.18, \Delta R^2 = .03, p < .05$) and research assistant ratings of proactive leadership ($\beta = .18, \Delta R^2 = .03, p < .05$). We utilized simple slope analysis (Aiken and West 1991) to test whether the significant interaction effects were also consistent with the hypothesized pattern. Specifically, we regressed research assistant

Table 2. Means (M), standard deviations (SD), and intercorrelations of study variables.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Professor age	50.11	7.94	—									
2. Greater work selectivity ^a	3.73	.89	.08	(.84)								
3. Greater non-work selectivity ^a	3.13	1.10	-.03	.53**	(.89)							
4. Decreased enthusiasm for research ^a	1.96	.94	.19*	.09	.26**	(.74)						
5. Growing humanism ^a	3.48	.98	.27**	.40**	.23**	.10	(.85)					
6. Development of exiting consciousness ^a	2.36	1.22	.65**	.25**	.15	.26**	.29**	(.80)				
7. Increased follower empowerment ^a	3.41	.90	.25**	.26**	.29	.31**	.27**	.16	(.79)			
8. Research assistants' favorable age stereotypes ^b	2.29	.77	.16	.06	-.03	-.01	.15	.10	.12	(.80)		
9. Research assistant ratings of passive-avoidant leadership ^b	1.98	.68	.18*	.12	.00	.09	.12	.06	.07	.12	(.84)	
10. Research assistant ratings of proactive leadership ^b	3.95	.71	-.24**	.01	.03	-.06	-.09	-.06	.05	-.02	-.67**	(.92)

Note: $N = 128$. ^aLeader ratings. ^bFollower ratings. Reliability estimates (α) are shown in parentheses along the diagonal.

* $p < .05$. ** $p < .01$.

Table 3. Results of mediation analyses.

Variable	DV: Research assistant ratings of passive-avoidant leadership						DV: Research assistant ratings of proactive leadership					
	Step 1			Step 2			Step 1			Step 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Step 1												
Professor age	.02	.01	.18*	.02	.01	.22†	-.02	.01	-.24**	-.03	.01	-.38**
Step 2												
Decreased research enthusiasm				.06	.07	.08				-.07	.07	-.09
Growing humanism				.06	.07	.09				-.06	.07	-.09
Development of exiting consciousness				-.07	.07	-.13				.12	.07	.21†
Increased follower empowerment				-.01	.07	-.01				.13	.07	.17†
ΔR^2				.02						.04		
R^2	.03*			.05*			.06**			.10*		

Note: $N = 128$. DV = dependent variable.

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 4. Results of hierarchical moderated regression analyses.

Variable	DV: Research assistant ratings of passive-avoidant leadership						DV: Research assistant ratings of proactive leadership					
	Step 1			Step 2			Step 1			Step 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Step 1												
Professor age	.01	.01	.16†	.02	.01	.19*	-.02	.01	-.25**	-.03	.01	-.28**
Research assistants' favorable age stereotypes	.09	.08	.10	.10	.08	.12	.02	.08	.02	.00	.08	.00
Step 2												
Professor age x Research assistants' favorable age stereotypes				-.02	.01	-.18*				.02	.01	.18*
ΔR^2				.03*						.03*		
R^2	.04†			.07*			.04*			.07**		

Note: $N = 128$. DV = dependent variable.

† $p < .10$. * $p < .05$. ** $p < .01$

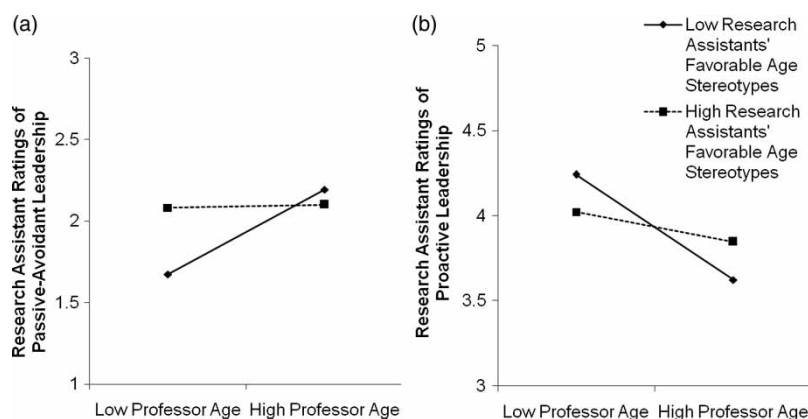


Figure 2. Research assistants' favorable age stereotypes as a moderator of the relationships between professor age and research assistant ratings of proactive and passive-avoidant leadership.

ratings of leadership on professor age at high values (i.e. one standard deviation above the mean) and low values (i.e. one standard deviation below the mean) of research assistants' favorable age stereotypes. The relationship between professor age and research assistant ratings of passive-avoidant leadership was weak and non-significant when research assistants held more favorable age stereotypes ($B = .003$, $SE = .01$, $\beta = .04$, $t = .34$, $p = .74$), and positive and significant when research assistants held less favorable age stereotypes ($B = .03$, $SE = .01$, $\beta = .35$, $t = 2.70$, $p < .01$). The interaction effect between professor age and research assistants' favorable age stereotypes predicting research assistant ratings of passive-avoidant leadership is graphically depicted in Figure 2a.

The relationship between professor age and research assistant ratings of proactive leadership was weak and non-significant when research assistants held more favorable age stereotypes ($B = -.01$, $SE = .01$, $\beta = -.12$, $t = -1.16$, $p = .25$), and negative and significant when research assistants held less favorable age stereotypes ($B = -.04$, $SE = .01$, $\beta = -.44$, $t = -3.42$, $p < .01$). The interaction effect between professor age and research assistants' favorable age stereotypes predicting research assistant ratings of proactive leadership is graphically depicted in Figure 2b. Thus, hypothesis 3 was supported: research assistants' favorable age stereotypes moderated the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership, such that older professors were rated as more passive-avoidant and less proactive than younger professors by research assistants with less favorable age stereotypes.

Discussion

A recent study reported that older university professors were rated as more passive-avoidant leaders than younger professors by their research assistants (Zacher, Rosing, and Frese 2011). The goal of this study was to contribute to the literature on age and leadership in higher education settings by replicating this finding, and by investigating possible mechanisms (age-related changes in professors' work concerns) and

boundary conditions (research assistants' favorable age stereotypes) of the relationships between professor age and research assistant ratings of passive-avoidant and proactive leadership. Replicating Zacher, Rosing, and Frese's (2011) finding, the results showed that professor age was positively related to research assistant ratings of passive-avoidant leadership. Thus, this is the second study which finds that older professors are perceived as more passive-avoidant leaders than younger professors by their research assistants.

In addition, this study showed that older professors were also perceived by their research assistants as less proactive leaders than younger professors. In contrast to passive-avoidant behaviors, proactive behaviors have positive consequences for individuals and organizations. For example, proactive leaders are perceived as more charismatic by their supervisors (Crant and Bateman 2000) and attain higher levels of subjective and objective career success (Seibert, Crant, and Kraimer 1999).

To further probe these bivariate relationships between professor age and research assistant ratings of leadership, this study examined professors' age-related work concerns as potential mechanisms and research assistants' favorable age stereotypes as boundary conditions. There was no empirical support for the assumption, based on Karp's (1986) qualitative research, that age-related changes in professors' work concerns mediated these relationships. Thus, future research is needed that investigates alternative mechanisms that might explain research assistants' differential ratings of younger and older professors. For instance, future studies could examine the role of occupational future time perspective (Zacher and Frese 2009), with its two dimensions of focus on opportunities and perceived remaining time, as explanations for the relationships between professor age and research assistant ratings of leadership. More specifically, it could be that older professors, because they experience time as running out, become less proactive and more avoidant leaders. Proactive leadership in order to change things at the workplace may take time, and older professors may have the feeling that they do not have the time to change things in their work, thus becoming more passive.

The results on favorable age stereotypes as a moderator variable suggest that not all research assistants rate older professors more negatively than younger professors. Specifically, the relationships between professor age and leadership ratings were stronger when research assistants held fewer favorable age stereotypes. In contrast, the relationships were weak and non-significant when research assistants held favorable age stereotypes. This shows that research assistants' age stereotypes influence the assessments they make of younger and older professors. Thus, this study may help explain previous inconsistent findings on the relationship between leader age and follower ratings of leadership. For instance, it might be the case in some studies that participants hold very favorable views towards older workers, which results in non-significant relationships between age and leadership. It could be argued that the moderating effect of age stereotypes on the relationship between professor age and research assistant ratings of leadership is not particularly surprising. However, this process has not been empirically demonstrated before, and we showed in our study that the relationships between professor age and research assistant leadership ratings are more strongly influenced by research assistants' characteristics than by actual age-related changes of professors (i.e. age-related work concerns) – a less intuitive finding.

While we do not argue that research assistants' perceptions of professors are the ultimate criterion for assessing professors' performance, we do think that research assistants' perceptions and ratings of professors' leadership are important, because they are likely to influence research assistants' work satisfaction, effort and

performance. Future research needs to assess the relative importance of professors' actual behaviors and research assistants' perceptions by collecting additional information from professors themselves and their colleagues, as well as objective performance indicators such as publications and teaching evaluations.

In sum, this study has a number of strengths. First, it made use of data that came from two independent sources: professors and their research assistants. The use of such 'multisource data' is still relatively rare in the social and behavioral sciences. Most studies in these fields rely on single-source self-report questionnaires, which may increase the potential problem of 'common method bias'. Common method bias refers to the problem of artificially inflated correlations due to single-source self-report measurement (Podsakoff et al. 2003). In contrast, we assessed professors' age-related work concerns as well as research assistants' age stereotypes and leadership ratings. In addition, this study sheds further light into the processes underlying relationships between professor age and research assistant ratings of leadership by examining several mediators and a moderator variable. Research on the relationships between leader age and follower ratings of leadership has so far yielded inconsistent findings. This study suggests that follower characteristics, such as age stereotypes, may play an important role in explaining these mixed findings.

Practical implications

Research assistant ratings of passive-avoidant and proactive leadership are important to assess. Their perceptions may importantly influence their individual career outcomes (e.g. the desire to become a university professor themselves), as well as various team (e.g. publications) and organizational outcomes (e.g. talking positively or negatively about the university and its representatives in public). Thus, the most important practical implications arising from the current study are that universities should find ways to promote proactive leadership behaviors among older professors, as well as research assistants' positive views of older university professors as leaders. For example, universities could offer leadership training (Frese, Beigel, and Schoenborn 2003) to all professors, in which the topics of working in older age and age-related changes in proactive and passive-avoidant leadership are covered. One possibility to influence research assistants' perceptions may be to communicate a favorable view of older professors through university newsletters and brochures. This may involve reports about older professors' mentoring activities and research activities. Another possibility may be to foster mentoring relationships between research assistants and older professors who are not their immediate supervisors. This could have benefits for both the older professors as well as research assistants. Taking on mentoring roles may enable older professors to act in generative ways, including the transmission of their accumulated experience and tacit knowledge (Calo 2005, 2007). Research assistants may profit from mentoring relationships with older professors, by not only increasing their knowledge and experience, but also by gaining a more favorable view of older peoples' strengths and virtues.

Limitations and future research

This study has a number of limitations which should be taken into account when interpreting the findings. First, the cross-sectional design does not allow inferences regarding causality as well as intra-individual changes across the life span, as the age-related

differences found may also be due to differences between generational cohorts (Smola and Sutton 2002). Thus, future research should use longitudinal and cohort-sequential designs to disentangle aging and cohort effects on work concerns and leadership ratings.

Second, the response rate in this study was low, which raises concerns about the generalizability of the findings. Due to the sampling procedure and anonymity guaranteed to participants, there is no way of assessing whether and how respondents may have differed from non-respondents. For example, it may be possible that certain academic disciplines were over- or under-represented in the final sample. Stroebe (2010) suggested that there is still a widespread belief in the academic community that science is a young person's game, and that younger professors are more productive than older professors. However, it remains unclear whether these age stereotypes apply only to professors working in mathematics and the natural sciences, or also to professors in the social and behavioral sciences. Findings from life span developmental psychology (Baltes, Staudinger, and Lindenberger 1999) indicate that younger scholars excel in disciplines such as mathematics that require high levels of fluid intelligence (i.e. information processing speed), whereas older scholars are more successful in disciplines such as philosophy and history that require high levels of crystallized intelligence (i.e. knowledge and experience; see also Kanfer and Ackerman 2004). Future research is needed that examines the role of academic discipline in the relationships among professor age and proactive as well as passive-avoidant leadership.

Moreover, the current sample was limited to German university professors. The German university system differs in many ways from university systems in the United Kingdom or the United States. For example, PhD students are not required to take classes in Germany, which might increase contacts between research assistants and professors other than the supervisor. This might be related to more favorable views of older professors. In addition, German university professors' approach to their work may be quite different to the approach taken by their international colleagues. For example, Frese (2005) wrote that 'German professors tend to build little kingdoms around them and there is little cooperation between them' (86). Thus, future studies need to replicate and extend the present findings with university professors from other academic and national cultures.

Third, it may be a limitation of the newly developed items to assess professors' age-related work concerns that they asked professors for a comparison with the time they started their career. It may be argued that this item format inevitably leads to correlations with professors' age, as older professors have had more time for changes to take place since the beginning of their careers. However, there were no significant relationships with age for the work and non-work selectivity scales. In addition, the other correlations differed in magnitude, and participants were able to distinguish between the six different dimensions of work concerns.

Finally, it may be that the procedure of asking university professors to select the research assistant who provided the ratings has biased the findings, because professors with several research assistants may have chosen the assistants with whom high-quality relationships existed. Future studies should obtain leadership ratings from all followers in a given group or select followers randomly. In addition, it would be interesting to also assess professors' self-ratings of leadership as these may be fundamentally different from the assessments of their research assistants (Judge, LePine, and Rich 2006).

In conclusion, research on age and leadership in higher education settings is important, because demographic changes and more flexible retirement options will lead to a growing number of older professors in the academic workforce over the next decades (Dorfman 2009; Stroebe 2010). This study represents a first attempt to gain a better understanding of the complex relationships between professors' age and leadership ratings of their research assistants, by showing a positive relationship of professor age with passive-avoidant leadership and a negative relation with proactive leadership. However, this relationship was attenuated by positive stereotypes of followers. Studies are now needed that shed further light on alternative explanatory mechanisms and further boundary conditions of these relationships.

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