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Focus on Opportunities as a Mediator of the Relationships
between Age, Job Complexity, and Work Performance

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Abstract

Focus on opportunities is a cognitive-motivational facet of occupational future time perspective that describes how many new goals, options, and possibilities individuals expect to have in their personal work-related futures. This study examined focus on opportunities as a mediator of the relationships between age and work performance and between job complexity and work performance. In addition, it was expected that job complexity buffers the negative relationship between age and focus on opportunities and weakens the negative indirect effect of age on work performance. Results of mediation, moderation, and moderated mediation analyses with data collected from 168 employees in 41 organizations (mean age = 40.22 years, SD = 10.43, range = 19 to 64 years) as well as 168 peers providing work performance ratings supported the assumptions. The findings suggest that future studies on the role of age for work design and performance should take employees' focus on opportunities into account.

Focus on Opportunities as a Mediator of the Relationships

between Age, Job Complexity, and Work Performance

Over the past 25 years, the aging of the workforces in most industrialized countries has led to an increased interest among researchers and practitioners in the relationship between age and work performance (McEvoy & Cascio, 1989; Ng & Feldman, 2008; Rhodes, 1983; Sturman, 2003; Waldman & Avolio, 1986). This is not surprising, given that work performance – an individual's behavior that contributes to the goals and effective functioning of an organization (Campbell, McCloy, Oppler, & Sager, 1993) – is a central construct in work and organizational psychology and has important implications for both employees and organizations (Sonnentag & Frese, 2002). While early reviews reported mixed findings (Rhodes, 1983) or zero relationships between age and task performance (McEvoy & Cascio, 1989), Ng and Feldman (2008) recently published a meta-analysis in which they took the multidimensional nature of work performance into account. They found that although age was largely unrelated to task, innovative, and training performance, older employees seem to contribute more than younger employees to the noncore dimensions of work performance, such as organizational citizenship behavior (OCB). Thus, on a bivariate level, there is now solid evidence on how age is related to work performance.

However, the mediating mechanisms in the relationship between age and work performance are so far not well understood (Ng & Feldman, 2008). Research from the fields of adult development and life span psychology has shown that the aging process is accompanied by a number of physical (Hedge, Borman, & Lammlein, 2006), cognitive (Baltes, Staudinger, & Lindenberger, 1999), personality (Roberts, Walton, & Viechtbauer, 2006), emotional as well as motivational changes (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Lang & Carstensen, 2002) that may be important for work performance (Kanfer & Ackerman, 2004). Yet, we are not

aware of any empirical study that explicitly examined age-related factors as mediators of the

relationship between age and work performance. This would be important however, as

"conceptualizing and measuring mediating processes may be one of the most effective ways to

help researchers explain *why* age matters to job performance, not only *that* age matters to job

performance" (Ng & Feldman, 2008, p. 406). In addition, the identification of mediators of the

age-performance relationship might help organizational practitioners to maintain or improve

older employees' levels of work performance by changing these mediators through interventions.

   To address this gap in the literature, the first goal of this study is to investigate employees'

personal *focus on opportunities* as a mediator of the relationship between age and work

performance. Focus on opportunities is an age-related, cognitive-motivational concept that

describes how many new goals, options, and possibilities employees generally believe to have in

their personal work-related futures (Zacher & Frese, 2009). Employees with a strong focus on

opportunities believe that their personal future at work will be full of new goals, options, and

possibilities. In contrast, employees with a weak focus on opportunities expect that the number

of opportunities in their personal work-related future will be limited. Zacher and Frese (2009)

adapted the concept from research on the broader notion of future time perspective in the fields

of adult development and life span psychology (Cate & John, 2007) to the occupational context

and showed that it is negatively related to age. Even though researchers have speculated that

individuals' focus on opportunities is positively associated with important motivational and

behavioral outcomes (Cate & John, 2007), no empirical research has yet investigated this issue.

In this study, we draw on possible selves theory (Cross & Markus, 1991; Markus & Nurius,

1986) to suggest that focus on opportunities is positively related to work performance.

The second goal of this study is to examine focus on opportunities as a mediator of the relationship between job complexity and work performance. Numerous studies have shown that job complexity (i.e., the level of stimulating and challenging demands at work; Fried, Melamed, & Ben-Davis, 2002) is positively related to work performance (Fried & Ferris, 1987). However, it remains an important task of work design research to identify alternative mediators of this relationship (Parker, Wall, & Cordery, 2001). Zacher and Frese (2009) showed that job complexity is positively related to focus on opportunities. In this study, we extend this research by examining focus on opportunities as a mediator between job complexity and performance.

Finally, the third goal of this study is to investigate whether high levels of job complexity weaken the assumed negative and indirect effect of age on work performance through focus on opportunities. Such a finding would be important because organizational practitioners then could design jobs in a way that allows employees to maintain a focus on opportunities at higher ages, which in turn may be linked to better work performance. Zacher and Frese (2009) showed that job complexity buffered the negative relationship between age and focus on opportunities. However, the question whether job complexity also contributes to work performance by reducing the negative effect of increasing age on focus on opportunities still needs to be investigated.

Our theoretical model is displayed in Figure 1. In the model, age is negatively related to focus on opportunities (Hypothesis 1), and focus on opportunities in turn is positively related to work performance (Hypothesis 2). Focus on opportunities mediates the relationship between age and work performance (negative indirect effect; Hypothesis 3). In addition, job complexity is positively related to focus on opportunities (Hypothesis 4), and focus on opportunities mediates the relationship between job complexity and work performance (positive indirect effect; Hypothesis 5). Job complexity is assumed to moderate the negative relationship between age and

focus on opportunities, such that the relationship is weaker for employees in high-complexity jobs than for employees in low-complexity jobs (Hypothesis 6). Finally, we propose that job complexity moderates the negative and indirect effect of age on work performance (through focus on opportunities), such that the indirect effect is weaker for employees in high-complexity jobs than for employees in low-complexity jobs (conditional indirect effect; Hypothesis 7).

Conceptualization of Work Performance

Work performance can be investigated both as a multidimensional construct as well as a single higher-order or "p-factor" (Viswesvaran & Ones, 2000). Research since the early 1990's has provided evidence that work performance involves more than just fulfilling the core tasks of one's job but also, for example, cooperating with others and helping the organization (Campbell et al., 1993). In addition to such a multidimensional conceptualization of work performance, researchers have suggested that a broader, more integrative perspective on work performance may be beneficial in certain situations (Viswesvaran & Ones, 2000). Specifically, predictor variables and outcome variables such as work performance can be expected to be more strongly related if they are conceptualized and measured at the same level of generality.

The concept of focus on opportunities refers to employees' general beliefs concerning the availability of new goals, options, and possibilities in their personal work-related future, and not necessarily to future opportunities in specific work roles such as jobholder, team member, or organizational citizen (Zacher & Frese, 2009). We expect that focus on opportunities is more strongly related to a broader work performance factor than to specific work performance dimensions, because focus on opportunities and overall work performance are conceptualized at similar levels of generality. Thus, we investigated a higher-order work performance factor in this study based on the shared variance of more specific work performance dimensions.

Development of Hypotheses

Age, Focus on Opportunities, and Work Performance

We argue that there are two main reasons why age should be negatively related to focus on opportunities. First, certain age-related norms and constraints in the work context may lead to lower perceptions of future opportunities among older employees compared to younger employees. For example, an age-graded norm in the work context is that older employees are expected to plan for retirement instead of making new and future work-related plans (Hershey, Jacobs-Lawson, & Neukam, 2002). In addition, older employees receive less support for career development than younger employees (Maurer, Weiss, & Barbeite, 2003), and many workplaces are not well-designed to meet the altered capabilities and preferences of older employees, such as decreased physical strength and increased motives for collaboration, transfer of knowledge and experience, and positive affect (Griffiths, 1999; Hedge et al., 2006; Kanfer & Ackerman, 2004).

Second, personal resources that may contribute to perceptions of future work-related opportunities are becoming more and more depleted with age. For example, the length of time employees expect to remain on the job is decreasing with age (Zacher & Frese, 2009). A certain amount of perceived time left however is necessary to identify and exploit work-related opportunities such as learning about new technologies and mentoring younger colleagues. Another personal resource that decreases with age is motivation to learn and to participate in career development (Colquitt, LePine, & Noe, 2000; Maurer et al., 2003). Finally, physical health and fast information processing abilities decrease with age (Hedge et al., 2006; Kanfer & Ackerman, 2004). Older employees can perceive these decreases quite accurately (Ackerman, Beier, & Bowen, 2002), and may infer that they have fewer future opportunities at work.

Hypothesis 1: Age is negatively related to focus on opportunities.

Seventy years ago, Kurt Lewin (1939) wrote that „Persons of all ages are influenced by the manner in which they see the future" (p. 878). Contemporary research shows that particularly positive beliefs about the future lead to higher motivation and successful performance, because they promote individual well-being, successful problem-solving, the setting of high standards, and persistence in goal pursuit (Aspinwall, 2005; Oettingen & Mayer, 2002; Peterson, 2000). Focus on opportunities represents a form of positive thinking about the future that is potentially important for motivation and successful performance (Cate & John, 2007). Drawing on these suggestions, we argue that focus on opportunities is positively related to work performance. Evidence for this assumption comes from the literature on possible selves, or the cognitive representations individuals have of themselves and their personal possibilities in the future (Cross & Markus, 1991, 1994; Markus & Nurius, 1986).

Possible selves serve two functions in motivating individuals and in directing and regulating their behavior. First, possible selves function as motivators for behavior. According to Cross and Markus (1991), possible selves provide the essential link between individuals' cognitions and motivation, because they represent self-relevant possibilities to achieve or to avoid: "As individuals choose among tasks or actions, and as they persist or withdraw from these tasks or actions, they are often guided by a sense, an image, or a conception of what is possible for them" (p. 232). Focus on opportunities may fulfill a similar function in directing and regulating positive employee behavior (i.e., work performance) as possible selves. Employees who believe to have many new goals, options, and possibilities in their personal future at work probably tend to simulate relevant actions and situations more often, choose better and more specific plans and strategies to attain their potential opportunities, and persist until as many of the potential opportunities as possible are attained. These factors should in turn lead to better performance.

Second, Markus and Nurius (1986) suggested that possible selves function as standards for evaluating individuals' current selves: "The meaning given to a particular self-relevant event depends on the context of possibility that surrounds it" (p. 962). In other words, individuals judge their current actions and situations according to their perceived future possibilities. These evaluations in turn lead to more or less positive or negative emotions, and individual actions aimed at reducing the discrepancy between their current selves and their possible future selves. Focus on opportunities might fulfill a similar function among employees. Employees who believe that they have many future opportunities should be more motivated to reduce the discrepancy between their current status and their expected future opportunities, for example by investing more time and effort into work-related activities (e.g., participating in trainings, providing better customer service). This should in turn lead to better work performance. In contrast, employees with a weak focus on opportunities regarding their future at work should be less motivated to invest time and effort into work-related activities because their standards for judging their actions and their current situation are lower.

Hypothesis 2: Focus on opportunities is positively related to work performance.

Based on our assumptions that age is negatively related to focus on opportunities (Hypothesis 1), and that focus on opportunities is positively related to work performance (Hypothesis 2), we expect that focus on opportunities mediates the relationship between age and work performance. Even though the relationship between age and work performance is typically rather small or even zero (Ng & Feldman, 2008), it is still possible that this relationship is mediated by focus on opportunities. That is, the small or zero bivariate relationship between age and work performance may be the result of several competing mediating processes. In such cases, it is quite possible to find an indirect effect in the absence of a total or bivariate relationship between a predictor and a

criterion variable (MacKinnon, Krull, & Lockwood, 2000; Shrout & Bolger, 2002). Age may be negatively related to focus on opportunities, which in turn may be positively related to work performance. Yet, there are probably other mediating processes in the complex relationship between age and work performance that balance out the negative and indirect effect of age on work performance through focus on opportunities, leading to a small overall relationship.

Hypothesis 3: Focus on opportunities mediates the relationship between age and work performance.

Job Complexity, Focus on Opportunities, and Work Performance

We argue that job complexity is positively related to focus on opportunities. Individuals base their expectations concerning their future opportunities on their current experiences (Markus & Nurius, 1986; Markus & Wurf, 1987). Highly complex jobs demand that employees make full use of their knowledge, skills, and abilities, continuously learn about new technologies and procedures (Kozlowski & Hults, 1986), and collaboratively share their knowledge and skills with their co-workers (Man & Lam, 2003). In contrast, low-complexity jobs involve repetitive and monotonous tasks that do not involve many difficult decisions and planning activities, and are learned rather quickly (Fay & Kamps, 2006). Employees in complex jobs should be more likely than employees in low-complexity jobs to expect that their work will continue to provide them with many work-related opportunities in the future (Zacher & Frese, 2009). In addition, positive effects of job complexity on employees' cognitive and emotional functioning (Frese, 1982) may lead to a stronger focus on opportunities. Individuals hold accurate and differentiated views of their abilities (Ackerman et al., 2002), and may judge their future opportunities at work according to their perceived abilities.

Hypothesis 4: Job complexity is positively related to focus on opportunities.

Based on our assumptions that job complexity is positively related to focus on opportunities (Hypothesis 4), and that focus on opportunities is positively related to work performance (Hypothesis 2), we suggest that focus on opportunities acts as a mediator of the relationship between job complexity and work performance. Employees in high-complexity jobs should have a stronger focus on opportunities than employees in low-complexity jobs. Focus on opportunities in turn should be positively related to work performance, because employees with a strong focus on opportunities are likely to show more effort, persistence, and use more effective work strategies to achieve what they perceive to be possible for themselves in the future.

Hypothesis 5: Focus on opportunities mediates the relationship between job complexity and work performance.

The Moderating Role of Job Complexity

We argue that job complexity is an especially important situational resource for maintaining a focus on opportunities at higher ages. Jobs high in complexity offer older employees more possibilities to capitalize on age-related gains, such as increased work-related knowledge and experience, and better fulfill older employees' preferences for collaboration and knowledge sharing (Kanfer & Ackerman, 2004). In contrast, low-complexity jobs often require more aging-sensitive resources that follow a loss-trajectory, such as physical strength (Morgeson & Humphrey, 2006), and do not offer older employees many possibilities to use and transfer their increased experiential knowledge (Fay & Kamps, 2006). Thus, the attributes of high-complexity jobs should provide a better fit to older employees' changed capabilities and preferences and therefore help to maintain a focus on opportunities. In addition, we argue that the positive effects of job complexity on cognitive and emotional functioning (Frese, 1982) help employees to maintain a focus on opportunities at higher ages. Intellectual capacities (and self-perceptions of

these capacities) may facilitate older employees' participation in learning and development activities, which in turn increases their focus on future opportunities. Schooler, Mulatu, and Oates (1999) showed in a longitudinal study that job complexity helped to maintain intellectual flexibility with increasing age. In terms of emotional functioning, research showed that mental health is a particularly important resource at higher ages because it helps to protect, retain, and replenish other important resources such as physical health and learning motivation (Hobfoll & Wells, 1998; Keyes, 2007; Warr, 1990). The personal resources associated with high job complexity should in turn help employees to maintain a focus on opportunities at higher ages. *Hypothesis 6:* Job complexity moderates the negative relationship between age and focus on opportunities, such that the relationship is weaker for high levels of job complexity than for low levels of job complexity.

We further suggest that employees in complex jobs are better able to maintain a cognitive-motivational focus on opportunities at higher ages, which in turn is positively associated with work performance. So far, we have proposed that job complexity moderates the relationship between age and focus on opportunities (Hypothesis 6), and that focus on opportunities is positively related to work performance (Hypothesis 2). It is therefore likely that job complexity also moderates the strength of the mediator function of focus on opportunities for the relationship between age and work performance. As we predict a weaker relationship between age and focus on opportunities among employees in high-complexity jobs than among employees in low-complexity jobs, the negative and indirect effect of age on work performance via focus on opportunities should be weaker among employees in high-complexity jobs than among employees in low-complexity jobs.

Hypothesis 7: Job complexity moderates the negative and indirect effect of age on work performance (through focus on opportunities). Specifically, focus on opportunities mediates the indirect effect only when job complexity is low but not when it is high.

Method

Participants and Procedure

The data used in this study came from 168 employees working for 41 different organizations in Germany and Switzerland. Of these participants, 88 (52.4%) were male and 80 (47.6%) were female. Mean age was 40.22 years (*SD* = 10.43, range = 19-64 years). More specifically, 61 participants (36.3%) were 35 years or younger, 53 (31.5%) were between 36 and 45 years, and 54 (32.1%) were 46 years or older. The average participant held a high school degree (A-level). Nine participants (5.4%) had a general education degree, 42 (25.0%) had a middle school degree, 37 (22.0%) had a high school degree, and 71 (42.3%) had a college or university degree (nine participants [5.4%] did not indicate their education). Participants worked in a broad array of different jobs. For example, the job descriptions provided by the participants included office clerk, management assistant, banker, customer service, IT specialist, controller, sales engineer, nurse, teacher, secretary, software developer, tax accountant, and personnel trainer. On average, participants had been employed for 18.74 years in their lives (*SD* = 11.04, range 1-50 years) and had been working for their current employer for 10.84 years (*SD* = 8.94, range 1-43 years).

We decided to examine our hypotheses in an age-heterogeneous sample of employees from different organizations and occupational backgrounds in order to maximize the variation in our central variables and to enhance the potential generalizability of our findings. Thus, at the onset of data collection for this study, we contacted 98 representatives of different organizations in Germany and Switzerland by phone or mail. The organizations contacted were either chosen

from the yellow pages of a medium-sized city in central Germany, or based on personal contacts with representatives of the organizations. Fourty-five organizations (46%) out of those contacted agreed to participate in the study with at least two employees. Twenty-eight (62%) of the participating organizations were from the private sector, and 17 (38%) were from the public sector. In total, we provided the 45 organizations which agreed to participate with 360 questionnaire packages (on average, eight questionnaires per organization). These packages included a self-report questionnaire, a peer questionnaire, return envelopes, and two letters with detailed instructions on how to fill out the questionnaires. All participants were assured that their answers were completely confidential. Participating employees were asked to fill out the self-report questionnaire themselves and to give the peer questionnaire to another person at their work who had the chance to regularly observe their work behavior (e.g., a co-worker). On the peer questionnaire, peers were asked to independently and confidentially evaluate the work performance of the participants. We obtained data on the roles of these peer raters. Most of them were co-workers (124; 73.8%), followed by smaller numbers of subordinates (23; 13.7%) and supervisors (21; 12.5%). A Kruskal-Wallis-test indicated that there were no significant differences in work performance ratings provided by these groups (χ^2[2, $N = 168$] = 3.42, *ns*.).

Both self-report and peer questionnaires were returned directly and independently back to the investigators, in their respective sealed envelope to ensure confidentiality. The questionnaires were later reallocated using six letters or numbers which the participating employee wrote on both questionnaires before handing the second questionnaire to a chosen peer. In total, 176 sets of questionnaires (i.e., 176 self-report and 176 peer questionnaires) were returned (49%). Out of the questionnaire sets returned, 168 employees and 168 peers from 41 organizations provided complete data, which we used for this study.

Measures

   Focus on opportunities was assessed with three self-report items from Carstensen and Lang's (1996; see also Lang & Carstensen, 2002) German future time perspective scale, which we adapted by adding the word "occupational" to each item (cf. Zacher & Frese, 2009). The items are "My occupational future is filled with possibilities," "I expect that I will set many new goals in my occupational future," and "There are only limited possibilities in my occupational future" (reverse coded). Participants gave their answers on a 5-point scale ranging from 1 (*does not apply at all*) to 5 (*applies completely*). Cronbach's alpha of the scale was .88.

   Job complexity was measured with four self-report items from a well-validated German scale (Semmer, 1982; Zapf, 1993). A sample item is "Do you receive tasks that are extraordinary and particularly difficult?" Participants gave their answers on a scale ranging from 1 (*very little*) to 5 (*very much*). Cronbach's alpha of the scale was .72. Semmer (1984) showed that job complexity ratings of job incumbents and external observers were highly correlated ($r = .67$). There is a high degree of evidence that job complexity is reported with little subjective bias (Spector, 1992).

   Work performance was measured by asking participants' peers to rate participants' performance on all of the 20 items from Welbourne, Johnson, and Erez' (1998) Role-based Performance Scale.[1] Each of the five work performance dimensions included in this scale (i.e., task, career, innovative, team member performance, and OCB) is measured with four short items such as "Quality of work output" (task performance) or "Working for the overall good of the company" (OCB). Welbourne et al. (1998) explicitly recommended the use of their scale to researchers who want to apply a generalizable measure of work performance. Further advantages of the scale are that it is based on theory, it has been shown to be a reliable and valid measure in several occupations and organizational contexts, and is useful for researchers as well as

practitioners due to its shortness and face validity. As suggested by Welbourne et al. (1998), the

peer raters provided their answers on a 5-point scale ranging from 1 (*needs much improvement*)

to 5 (*excellent*). We computed an overall work performance score for each participant using his

or her value on the first unrotated factor derived by a factor analysis. The factor analysis showed

that all work performance items had their highest loading on this first unrotated factor (ranging

from .59 to .78) and that this factor explained 49.13% of the variance in the ratings.[2]

Finally, participants indicated their age, job/organizational tenure, job description, gender (0 =

male and 1 = *female*), and their highest educational degree (0 = *no degree*, 1 = *general education

degree*, 2 = *middle school degree*, 3 = *high school degree*, and 4 = *college / university degree*).

Control variable. We controlled for age squared (age²) in all analyses to take into account the

possibility that the relationship between age and work performance is non-linear (Sturman,

2003). As recommended by Little, Bovaird, and Widaman (2006), we orthogonalized the age

squared term from age by regressing age squared on age and saving the residuals of this

regression as a new variable. This new age squared variable is uncorrelated with age, and its use

helps to avoid problems with multicollinearity and enhances the interpretability of results.

Analyses

Hypotheses 1 to 3 as well as Hypotheses 2, 4, and 5 represent together two simple mediation

models, one in which the effect of age on work performance is mediated by focus on

opportunities (H1-3; negative indirect effect), and one in which the effect of job complexity on

work performance is mediated by focus on opportunities (H2, 4, and 5; positive indirect effect;

see Figure 1).[3] Simple mediation models are usually tested according to the multistep procedure

recommended by Baron and Kenny (1986). According to these authors, mediation exists if (1) an

initial variable X has a "total effect" on the outcome variable Y (c path), (2) X has an effect on the

mediator variable M (a path), (3) M has an effect on Y when controlling for X (b path), and (4) the effect of X on Y becomes significantly smaller or non-significant when controlling for M (c' path, or "direct effect"). Methodologists have recently argued that Baron and Kenny's (1986) approach is limited because of the Step 1 requirement that the total effect of the initial variable X on the outcome variable Y (c path) must be significant (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). According to these critics, if the mediating process is rather distant or complex (as in the age-performance relationship), the magnitude of the relationship between X and Y becomes smaller due to additional or competing factors in the mediating process (MacKinnon et al., 2000; MacKinnon et al., 2002; Shrout & Bolger, 2002). Thus, it is recommended to drop the Step 1 requirement from tests of mediation and instead employ significance tests of the indirect effect ab, that is, the product of the a and b paths (Preacher & Hayes, 2004).

One possibility to test the indirect effect ab for significance is the Sobel test (Sobel, 1982), which assumes normal distribution of the indirect effect. As this assumption cannot be maintained (Edwards & Lambert, 2007), methodologists recommend the bootstrapping method to test indirect effects. This method estimates the sampling distribution of the indirect effect by repeatedly drawing random samples with replacement from the original sample. This allows to generate bootstrapped confidence intervals to test the indirect effect for significance (Shrout & Bolger, 2002). To test our mediation models, we used a SPSS macro for simple mediation analysis developed by Preacher and Hayes (2004; 2008). This macro includes the four steps recommended by Baron and Kenny (1986) as well as parametric (i.e., Sobel test) and non-parametric (i.e., bootstrapping) tests of the estimated indirect effect (Preacher & Hayes, 2004).

Hypothesis 6 is a moderator hypothesis and was tested with moderated regression analysis (Cohen, Cohen, West, & Aiken, 2003). Hypothesis 7 is a *moderated mediation* hypothesis,

which means that the mediating process between the initial variable X and an outcome variable Y depends on the value of a moderator variable W (Preacher, Rucker, & Hayes, 2007). Two regression equations – one for the "mediator variable model" (1) and one for the "dependent variable model" (2) are used to test moderated mediation models (Preacher et al., 2007):

$$M = a_0 + a_1X + a_2W + a_3XW + r \qquad (1)$$

$$Y = b_0 + c'_1X + c'_2W + c'_3XW + b_1M + r \qquad (2),$$

where M is the mediator, X is the independent variable, W is the moderator, Y is the dependent variable, and XW is the interaction term; a_0 and b_0 are intercept terms, a_1, a_2, and a_3 are slope coefficients of M regressed on X, W, and XW, respectively; c'_1, c'_2, and c'_3 are slope coefficients of Y regressed on X, W, and XW (conditional on b_1), respectively; b_1 is a slope coefficient of Y regressed on M (conditional on X, W, and XW); and r is a regression residual.

According to Preacher et al. (2007), the estimate of the indirect effect is $\hat{a}_1\hat{b}_1$, and the estimate of the moderated mediation effect (consistent with Preacher et al., 2007, we use the term *conditional indirect effect* from here on) is $f(\hat{\theta}|W) = \hat{b}_1(\hat{a}_1 + \hat{a}_3W)$. This equation indicates that the indirect effect is a function of regression coefficients included in the vector $\hat{\theta}$ which are assessed at conditional values of the moderator W. The equation further shows that the conditional indirect effect depends on the moderator W to the extent that the estimated interaction coefficient $\hat{a}_3$ deviates from zero. We used another SPSS macro for moderated mediation analysis (Preacher et al., 2007) that integrates procedures to test our Hypotheses 6 and 7 simultaneously. The macro also uses bootstrapping to test the conditional indirect effect for significance at different values of the moderator variable. Specifically, the coefficients of the mediator variable model and dependent variable model are estimated repeatedly, with each set of estimates being based on random samples drawn with replacement from the original sample.

Results

Intercorrelations of Study Variables

Table 1 shows the descriptive statistics and intercorrelations of the study variables. Age was negatively related to focus on opportunities ($r = -.50$, $p < .01$), and weakly and not significantly related to work performance ($r = .07$, *ns*). Job complexity was positively related to focus on opportunities ($r = .20$, $p < .01$) and to work performance ($r = .18$, $p < .05$). Focus on opportunities was positively related to work performance ($r = .19$, $p < .05$).

Test of Hypotheses

Table 2 shows the results of the simple mediation analysis to test Hypotheses 1 to 3. According to Hypothesis 1, age is negatively related to focus on opportunities. As can be seen in Table 2, age had a significantly negative effect on focus on opportunities (*a* path: $B = -.05$, $SE = .01$, $\beta = -.54$, $t = -8.34$, $p < .01$). This finding supports Hypothesis 1.

According to Hypothesis 2, focus on opportunities is positively related to work performance. Table 2 shows that focus on opportunities had a significantly positive effect on work performance when controlling for age, age squared, and job complexity (*b* path: $B = .25$, $SE = .09$, $\beta = .26$, $t = 2.85$, $p < .01$). Thus, Hypothesis 2 received support.

According to Hypothesis 3, focus on opportunities mediates the relationship between age and work performance. The lower part of Table 2 shows that age had a negative and indirect effect on work performance (unstandardized value = -.013, standardized value = -.14). The results of the Sobel test showed that this indirect effect was significant (Sobel $z = -2.70$, $p < .01$). Table 2 also shows that the results of the bootstrap confirmed the Sobel test. Specifically, the bootstrapped 95% confidence interval around the unstandardized indirect effect did not include zero (-.025, -.004). Hypothesis 3 was therefore also supported. Table 2 also shows that Baron

and Kenny's (1986) Step 2 and 3 requirements were fulfilled (i.e., significant *a* and *b* paths), but

not the Step 1 and 4 requirements (i.e., the *c* path was not significant, but the *c'* path was

significant). In fact, the results indicate that the total effect of age on work performance (*c* path:

$B = .00$, $SE = .01$, $\beta = .05$, $t = .60$, $p = .547$) was closer to zero than the estimate controlling for

focus on opportunities (*c'* path: $B = .02$, $SE = .01$, $\beta = .19$, $t = 2.07$, $p < .05$). In addition, the

indirect effect (standardized value = -.14) was negative and the effect of age on work

performance controlling for focus on opportunities ($\beta = .19$) was positive. These findings suggest

that mediational suppression (MacKinnon et al., 2000; Shrout & Bolger, 2002) is present. In

mathematic terms, the positive relationship between age and work performance (controlling for

focus on opportunities) includes the variation in age that is unrelated to focus on opportunities.

Table 3 shows the results of the simple mediation analysis to test Hypotheses 4 and 5.

According to Hypothesis 4, job complexity is positively related to focus on opportunities. As

shown in Table 3, job complexity had a significantly positive effect on focus on opportunities (*a*

path: $B = .38$, $SE = .09$, $\beta = .27$, $t = 4.12$, $p < .01$). This supports Hypothesis 4.

According to Hypothesis 5, focus on opportunities mediates the relationship between job

complexity and work performance. The results in Table 3 demonstrate that job complexity had a

positive and indirect effect on work performance (unstandardized value = .094, standardized

value = .07). The Sobel test indicated that this indirect effect was significant (Sobel $z = 2.34$, $p <$

.05). Table 3 shows that the bootstrap results confirmed the Sobel test, as the bootstrapped 95%

confidence interval around the unstandardized indirect effect did not include zero (.026, .208).

Thus, Hypotheses 5 also received support. Table 3 also illustrates that all of Baron and Kenny's

(1986) requirements for full mediation were fulfilled. Specifically, the total effect of job

complexity on work performance was significant (*c* path: $B = .23$, $SE = .11$, $\beta = .17$, $t = 2.23$, $p <$

.05), fulfilling the Step 1 requirement. Job complexity was significantly related to focus on

opportunities (*a* path), and focus on opportunities was significantly related to work performance

(*b* path: *B* = .25, *SE* = .09, *β* = .26, *t* = 2.85, *p* < .01), fulfilling the Step 2 and 3 requirements.

Finally, the relationship between work performance and job complexity became smaller and non-

significant when focus on opportunities was controlled (*c'* path: *B* = .14, *SE* = .11, *β* = .10,

t = 1.30, *p* = .197), fulfilling the Step 4 requirement.

   Table 4 presents the results of the moderator and moderated mediation analyses to test

Hypotheses 6 and 7. According to Hypothesis 6, the negative relationship between age and focus

on opportunities is weaker for employees in high-complexity jobs than for employees in low-

complexity jobs. The upper part of Table 4 shows that the interaction between age and focus on

opportunities significantly predicted focus on opportunities (*B* = .02, *SE* = .01, *β* = .14, *t* = 2.17,

p < .05). Consistent with our expectations, the simple slope for employees in high-complexity

jobs (*B* = -.04, *SE* = .01, *β* = -.39, *t* = -4.05, *p* < .01) was weaker than the simple slope for

employees in low-complexity jobs (*B* = -.07, *SE* = .01, *β* = -.66, *t* = -7.78, *p* < .01). The

interaction effect is graphically shown in Figure 2. These findings support Hypothesis 6.

   According to Hypothesis 7, job complexity moderates the negative and indirect effect of age

on work performance (through focus on opportunities), such that focus on opportunities mediates

the indirect effect only when job complexity is low but not when it is high. We probed the

conditional indirect effect of age on work performance (through focus on opportunities) at three

values of job complexity (i.e., at the mean and at one standard deviation below and above the

mean). The results, shown in the middle part of Table 4, indicated that the conditional indirect

effect was weaker at high levels of job complexity than at low levels of job complexity.

Specifically, the standardized conditional indirect effect was -.19 at one standard deviation below

the mean of job complexity ($p < .01$), -.15 at the mean of job complexity ($p < .01$), and -.11 at

one standard deviation above the mean of job complexity ($p < .05$). The moderated mediation

SPSS macro also calculates several conditional indirect effects at different values of the

moderator variable. The *region of significance* (Preacher et al., 2007) includes those values of

the moderator variable for which the conditional indirect effect is statistically significant. The

results, shown in the lower part of Table 4, suggested that the conditional indirect effect of age

on work performance (through focus on opportunities) was significant at the .05 alpha level for

all job complexity values lower than approximately 1.30 on a *z*-standardized job complexity

scale (i.e., $M = 0$, $SD = 1$). Together, these results support Hypothesis 7.

Discussion

Increasingly aging workforces require that researchers and practitioners arrive at a better

understanding of the role of age in the work context, particularly with regard to important

outcome variables such as work performance. On a bivariate level, meta-analyses showed that

age is largely unrelated to task, training, and innovative performance, but positively related to

noncore work performance dimensions such as OCB (Ng & Feldman, 2008). However, the

mediators of the age-work performance relationship have so far not received much research

attention. In this study, we tested a moderated mediation model of the relationships between age,

job complexity, and overall work performance. Specifically, we investigated the central variable

of focus on opportunities (Zacher & Frese, 2009) as a mediator of the relationships between age

and work performance and between job complexity and work performance. In addition, we

examined whether high levels of job complexity buffer the negative effect of age on focus on

opportunities and weaken the negative and indirect effect of age on work performance through

focus on opportunities. The three main results can be summarized and interpreted as follows.

First, our results demonstrated that focus on opportunities acted as a mediator of the relationship between age and work performance. Previous research showed that focus on opportunities declines with age (Cate & John, 2007; Zacher & Frese, 2009), but empirical evidence that focus on opportunities is also associated with work performance was still missing. Based on the literature on possible selves (Markus & Nurius, 1986), we suggest that a strong focus on opportunities results in better work performance. Our findings are consistent with previous research from social psychology indicating that positive thinking about the future has positive effects on motivation and performance (Aspinwall, 2005; Oettingen & Mayer, 2002).

It is important to note that the negative and indirect effect of age on work performance via focus on opportunities was significant even though the total, bivariate relationship between age and work performance was close to zero and non-significant. This indicates that additional, competing age-related mediators also influence work performance, leading to a small overall association between age and work performance. Our findings nevertheless indicate that focus on opportunities by itself is an important negative age-related factor associated with work performance. Specifically, when focus on opportunities was held constant in the regression equation, the relationship between age and work performance became positive and significant. This suppression effect suggests that, given a younger and an older employee with the same level of focus on opportunities, the older employee shows better work performance than the younger employee. One possible explanation may be that perceptions of work-related opportunities are more motivating for older employees because they are not taken for granted. Another possible explanation may be that older employees possess more work-related knowledge and experience (Kanfer & Ackerman, 2004) and are more conscientious than younger employees (Roberts et al., 2006), and these factors additionally enhance work performance.

Second, we found that focus on opportunities also mediated the relationship between job complexity and work performance. This finding suggests that employees in more complex jobs not only have more opportunities at their work (e.g., to make difficult decisions, to use their knowledge and skills, to learn new things), but that they also believe to have more work-related opportunities in their personal work-related future. Our results add to the growing research literature on alternative mediators of the relationships between work characteristics such as job complexity and work performance (Parker et al., 2001).

Finally, we showed that high levels of job complexity buffered the negative relationship between age and focus on opportunities, and weakened the negative and indirect effect of age on work performance (through focus on opportunities). Employees in highly complex jobs were better able to maintain a focus on opportunities at higher ages, which in turn was positively associated with work performance. These findings extend research by Zacher and Frese (2009), who showed that job complexity buffered the negative relationship between age and focus on opportunities. It seems as if job complexity also contributes to work performance by buffering the negative and indirect effect of age on work performance through focus on opportunities.

Limitations and Implications for Future Research

This study has a number of limitations which mandate caution with regard to the interpretation of our findings. First, cross-sectional designs do not allow investigating intraindividual changes over time (i.e., aging). It is therefore possible that the indirect effect of age on work performance is due to differences between different birth cohorts or selection effects (Baltes & Nesselroade, 1979). Specifically, it is possible that the older employees in our sample represented a selected group as those employees with lower health or work motivation may have left their organizations before reaching their 50's or 60's. Future research should examine our

hypotheses using longitudinal and cohort-sequential designs. However, it should be added that there is probably no other area of organizational research in which it is more complicated to conduct longitudinal studies than in the area of aging (Ng & Feldman, 2008). In addition, the study of interindividual differences between age groups present in the current workforce may nevertheless be important. Cross-sectional studies such as ours show that older employees in general do not perform worse at work than younger employees. This knowledge can help to defy negative age stereotypes still present in many organizations (Posthuma & Campion, 2009).

Second, researchers have suggested that individual and context characteristics interact in influencing work performance over time, and that work performance at one point in time influences work performance at a later point in time (Sonnentag & Frese, 2002). Thus, the sequence of events in our model may be better represented by a cyclic model. Specifically, age and job complexity might interact in influencing subsequent work performance through focus on opportunities, and work performance in turn might again influence employees' focus on opportunities and work performance at a later point in time. We find the issue of such cycles of particular importance and urge future research to take notice of this possibility.

A variant of what we just discussed is the introduction of new mediators and moderators into our model. Our results showed that when focus on opportunities was held constant, the relationship between age and work performance became positive, suggesting the presence of additional, positive age-related mediators. Future research should therefore continue to identify mediators of the age-performance relationship and investigate them simultaneously in more comprehensive, multiple mediation models. For example, such models might include age-related cognitive abilities such as fluid and crystallized intelligence (Baltes et al., 1999), personality traits such as conscientiousness (Roberts et al., 2006), as well as motivational variables such as

motivation to learn (Colquitt et al., 2000). Additionally, research needs to investigate the links between individuals' beliefs that they have many opportunities, their motivation to attain these opportunities, and subsequent work performance.

Third, our measures of job complexity (perceptions by job incumbent) and work performance (peer ratings) have potential problems as perceptual biases may have influenced our results. Even though research has shown that there is generally good agreement between self-report ratings of job complexity, observer ratings, and archival data (Morgeson & Humphrey, 2006; Semmer, 1984; Spector, 1992), future research needs to replicate our findings with more objective indicators of job complexity. Similarly, even though researchers have argued that peer ratings are reliable and valid indicators of work performance (Harris & Schaubroeck, 1988), future studies should also employ other performance measures. In addition, the fact that the peer raters were not chosen randomly but by the participants is another limitation of this study, because the work performance ratings may have been subject to leniency bias. In future studies, researchers should assign peer raters randomly to participants. However, note that leniency bias would most likely lead to a reduction of the size of the relationships and make our results more conservative.

Implications for Theory and Practice

The findings of our study contribute to theory development in several ways. First, they suggest that focus on opportunities should be included as an age-related, cognitive-motivational mediator in models of age and work performance. More comprehensive models should include both positive and negative age-related mediators, and conceptualize work performance both as a higher-order as well as a multidimensional construct. These models should also encompass potential boundary conditions of these mediation effects, such as work characteristics.

Second, this study contributes to the literature on work design by identifying focus on opportunities as an additional, age-related mediator of the relationship between job complexity and work performance. Recently, researchers have called for theoretical extensions of work design models (Parker et al., 2001) and for the incorporation of a temporal dimension into these models (Fried, Grant, Levi, Hadani, & Slowik, 2007). An important difference between focus on opportunities and other mediators of the job complexity-work performance relationship is that focus on opportunities is negatively related to age (Zacher & Frese, 2009). Thus, future models of work design and work performance should not only take focus on opportunities, but also employee age and other time-related variables such as work experience and tenure into account.

The rudimentary nature of our data and some tentative findings warrant caution when deriving practical implications on the basis of this study. Thus, we would like to offer only a few general remarks and preliminary suggestions. First, it may be beneficial for work performance if practitioners more strongly take the roles of age and age-related resources and preferences into account when designing jobs (Griffiths, 1999). Second, increasing the degree of complexity at work seems to be important for employees at all ages (Fay & Kamps, 2006), but it may be particularly important when employees grow older as high job complexity might help to maintain a focus on work-related opportunities. Finally, there may be ways to increase and maintain employees' focus on opportunities even when it is not possible to increase jobs' complexity. One possible way to do so may be to provide not only younger, but also middle-aged and older employees with adequate development opportunities as well as vertical and horizontal career options. In addition, organizations could create new and challenging work possibilities for older employees, such as organizational mentor and ambassador roles (Calo, 2005).

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Footnotes

[1] The items from the Role-Based Performance Scale were used with permission of Theresa Welbourne, Stephen M. Ross School of Business, University of Michigan, 701 Tappan Street, Ann Arbor, MI 48109-1234, USA.

[2] Due to space limitations, we report only the results for overall work performance. The results for the three specific work performance dimensions of task performance, career performance, and OCB were very similar to the results reported for overall work performance. The results for all of the five specific work performance dimensions can be obtained from the first author.

[3] We use the terms "mediated effect" and "indirect effect" interchangeably because we examine only one intervening variable (i.e., focus on opportunities). A mediated effect is a special case of indirect effects when there is only one intervening variable (Preacher & Hayes, 2004).

Table 1

Means (M), Standard Deviations (SD), and Intercorrelations of Variables

Variable	*M*	*SD*	1	2	3	4
1. Age	40.22	10.43	-			
2. Job complexity	3.55	.73	.14	(.72)		
3. Focus on opportunities	3.21	1.04	-.50**	.20**	(.88)	
4. Work performance[a]	.00	.98	.07	.18*	.19*	(.94)

Note. Listwise $N = 168$. [a]This variable is derived from the first unrotated factor of a factor analysis of all 20 work performance items. Reliability estimates (α) are shown in parentheses on the diagonal.

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

Table 2

Results of Mediation Analysis (Hypotheses 1 to 3)

Baron and Kenny (1986) Steps	*B*	*SE*	*β*	*t*	*p*
Direct and total effects					
Step 1: Work performance regressed on age (*c* path)	.00	.01	.05	.60	.547
Step 2: Focus on opportunities regressed on age (*a* path)	-.05	.01	-.54	-8.34	.000
Step 3: Work performance regressed on focus on opportunities, controlling for age (*b* path)	.25	.09	.26	2.85	.005
Step 4: Work performance regressed on age, controlling for focus on opportunities (*c'* path)	.02	.01	.19	2.07	.040
Partial effects of control variables on work performance					
Job complexity	.14	.11	.10	1.30	.197
Age squared	.02	.08	.02	.27	.791

	Unstandardized value	*SE*	LL 95% CI	UL 95% CI	Standardized value	*z*	*p*
Indirect effect and significance using normal distribution							
Sobel	-.013	.005	-.023	-.004	-.14	-2.70	.007
Bootstrap results for indirect effect							
Effect	-.013	.005	-.025	-.004	-.14		

Note. Listwise *N* = 168. LL = lower limit; CI = confidence interval; UL = upper limit. Bootstrap sample size = 5,000. All predictor variables were mean-centered.

Table 3

Results of Mediation Analysis (Hypotheses 4 and 5)

Baron and Kenny (1986) Steps	B	SE	β	t	p
Direct and total effects					
Step 1: Work performance regressed on job complexity (*c* path)	.23	.11	.17	2.23	.027
Step 2: Focus on opportunities regressed on job complexity (*a* path)	.38	.09	.27	4.12	.000
Step 3: Work performance regressed on focus on opportunities, controlling for job complexity (*b* path)	.25	.09	.26	2.85	.005
Step 4: Work performance regressed on job complexity, controlling for focus on opportunities (*c'* path)	.14	.11	.10	1.30	.197
Partial effects of control variables on work performance					
Age	.02	.01	.19	2.07	.040
Age squared	.02	.08	.02	.27	.791

	Unstandardized value	SE	LL 95% CI	UL 95% CI	Standardized value	z	p
Indirect effect and significance using normal distribution							
Sobel	.094	.040	.016	.172	.07	2.34	.019
Bootstrap results for indirect effect							
Effect	.094	.044	.026	.208	.07		

Note. Listwise *N* = 168. LL = lower limit; CI = confidence interval; UL = upper limit. Bootstrap sample size = 5,000. All predictor variables were mean-centered.

Table 4

Results of Moderated Mediation Analysis (Hypotheses 6 and 7)

Predictor variable	*B*	*SE*	*β*	*t*	*p*
DV: Focus on opportunities (Mediator variable model)					
Constant	-.02	.07		-.30	.762
Age squared	-.10	.07	-.09	-1.42	.156
Age	-.05	.01	-.52	-8.13	.000
Job Complexity	.36	.09	.25	3.93	.000
Age * Job complexity	.02	.01	.14	2.17	.031
DV: Work performance (Dependent variable model)					
Constant	.02	.07		.28	.783
Age squared	.04	.08	.04	.48	.633
Age	.02	.01	.18	2.08	.039
Job complexity	.15	.11	.11	1.39	.165
Age * Job complexity	-.02	.01	-.15	-1.94	.054
Focus on opportunities	.28	.09	.29	3.16	.002

Job Complexity	Unstandardized boot indirect effect	Boot *SE*	Standardized boot indirect effect	Boot *z*	Boot *p*
Conditional indirect effect at job complexity = $M \pm 1\ SD$					
- 1 *SD* (-.73)	-.018	.007	-.19	-2.68	.007
M (.00)	-.014	.005	-.15	-2.65	.008
+ 1 *SD* (.73)	-.011	.005	-.11	-2.23	.026

Job Complexity[a]	Unstandardized boot indirect effect	Boot *SE*	Standardized boot indirect effect	Boot *z*	Boot *p*
Conditional indirect effect at range of values of job complexity (standardized scale)					
-1.84	-.022	.008	-.22	-2.60	.009
-1.36	-.020	.007	-.20	-2.65	.008
-.88	-.018	.007	-.18	-2.69	.007
-.41	-.016	.006	-.17	-2.69	.007
.07	-.014	.005	-.15	-2.64	.008
.55	-.012	.005	-.13	-2.49	.013
1.02	-.010	.005	-.11	-2.21	.027
1.50	-.009	.005	-.09	-1.81	.071
1.98	-.007	.005	-.07	-1.34	.180

Note. Listwise $N = 168$. DV = dependent variable. [a]Range of values represent an abbreviated version of the output provided by the macro. Bootstrap sample size = 5,000. All predictor variables were mean-centered.

Figure 1

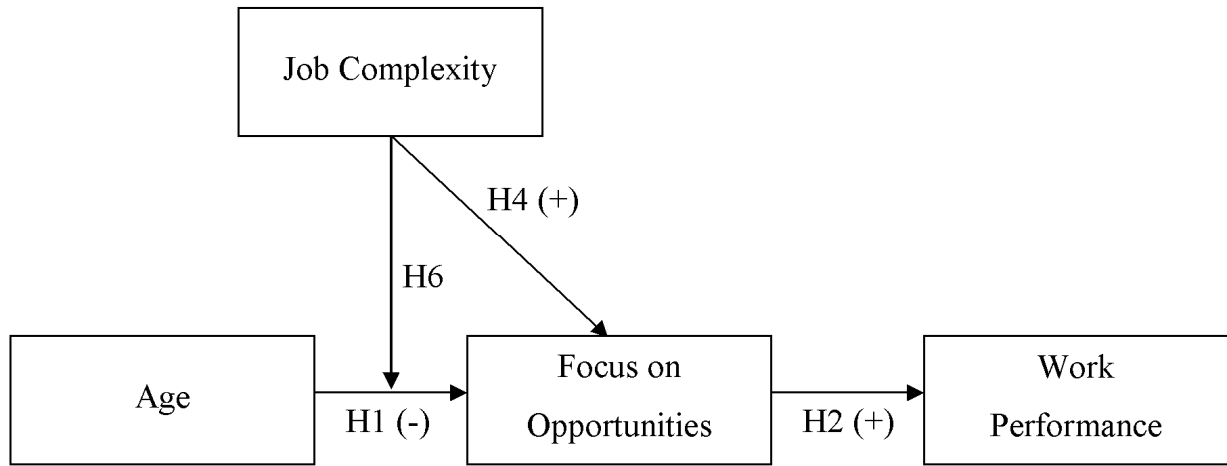*The Proposed Model and Summary of Hypotheses*

Figure 2

Focus on Opportunities Predicted by Age Moderated by Job Complexity