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# Multi-level effects of human resource bundles on the performance of aging employees

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## Abstract

Previously, scholars have studied the need for implementing different human resource (HR) configurations that foster aging employees' outcomes, but there is a lack of evidence at the group level. Using the framework of Social Exchange Theory, coupled with the Selection, Optimization, and Compensation theory, we examine associations between bundles of HR practices, age (measured both as calendar age and proportion of an aging workforce), and performance, at both the individual and group levels. First, the outcomes of our multi-level analysis show that bundles of maintenance-enhancing HR practices are positively related to performance at both levels, whereas bundles of growth-enhancing HR practices associate with performance only at the group level. Second, age relates positively to performance, both at the individual and group levels. At the group level, there is an inverted U-shaped relationship between the proportion

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of an aging workforce and group performance, such that a group's performance benefits from the participation of older employees up to a maximum proportion of 56%. Finally, age negatively moderates the association between growth-enhancing HR bundles and performance at both the individual and group levels. Results highlight the value of older employees for working organizations, and the importance of adopting HR practices that consider maintenance and growth-related needs across the life-span, while also providing useful theoretical and practical implications for Human Resource Development scholars and professionals.

#### KEYWORDS

aging, individual and group performance, maintenance-enhancing and growth-enhancing bundles of HR practices, selection optimization and compensation theory, social exchange theory

## 1 | INTRODUCTION

The demographics of the global workforce are changing and public and private organizations are confronted with an increase in “gray” labor. Several institutions already warned of productivity challenges due to the aging and dejuvenization of the population (IMFdirect, 2016). Despite the fact that old-age employment is needed to safeguard labor force needs, the labor demand by employers for older workers is strikingly low (OECD, 2019).

The recent academic literature in the field of management provides interesting insights into how to deal with nowadays' workforce, with a particular emphasis on the management of aging employees (e.g., Stirpe et al., 2018; Truxillo & Fraccaroli, 2013). For example, over the past decades, academics and practitioners alike have focused on the topic of successful aging at work, explaining that employees can keep being of added value when they can make use of evidence-based human resource (HR) practices (Zacher et al., 2018). Successful aging implies that employees can demonstrate high-performance levels throughout their whole working life. The phenomenon of successful aging can be linked to age-related experiences of maintenance or growth in the workplace (Kooij, 2015; Zacher et al., 2018). In what concerns the association between age and employee performance, previous literature has provided mixed results, indicating both negative and positive relationships (Kanfer & Ackerman, 2004; Waldman & Avolio, 1986). Other empirical findings have shown that individual performance peaks at some midpoint of age, indicating an inverted U-shaped relationship between the two variables (Goštautaitė & Bučiūnienė, 2015). At the group level, despite the exploration of age diversity and group-level outcomes (Seong & Hong, 2018), there is no empirical information yet about how the participation of older employees in working groups affects the group's performance.

A considerable amount of literature has distinguished between two theoretically meaningful bundles, namely maintenance-enhancing and growth-enhancing bundles of HR practices for young and older employees, respectively (Kooij et al., 2010; Veth et al., 2015, 2019a). Under the lens of life-span theoretical perspectives, such as the Selection, Optimization, and Compensation (SOC) theory (Baltes et al., 1999), the utility of such practices may change with age (Kooij et al., 2013). Maintenance-enhancing HR bundles consist of practices that concern protection and safety, helping employees to maintain their current performance levels (e.g., employment security and safety measures) or to return to initial levels after a loss. Such practices activate notions of preservation and maintenance and refer to

the extent to which employees view that they are entitled to secure their jobs or protect their regular income against potential cutbacks (Korff et al., 2017a). For example, in line with life-span theories, a safe workplace environment will activate these notions among aging employees, who might be more concerned with safeguarding what they have reached in their career, instead of, for instance, changing their professional activities, due to their more limited future time horizon. On the other hand, growth-enhancing HR bundles include practices related to growth, accomplishment, and advancement, which help employees to reach increased performance levels (e.g., training and internal mobility). Employees view such practices as opportunities to extend their knowledge, gain additional skills and responsibilities, and get involved in organizational decisions that will drive their professional growth and development (Korff et al., 2017a). For example, younger employees will be interested in attending training programs, when they feel that this will enable them to develop professional competencies that are necessary for further career advancement. Although previous scholars have explored the effects of those HR bundles on individual outcomes (e.g., Kooij et al., 2013; Veth et al., 2019a), we still lack an understanding of its effects at the group level. Summarizing, prior studies in aging workforce management have shown three major limitations. First, we lack evidence on the cross-level effects of HR bundles on performance. Second, although the age-performance relationship has been widely explored, its findings are inconsistent. Third, the effectiveness of such bundles on the performance of different age groups is underexplored, especially in relation to group outcomes.

To address the research problems mentioned here, our first goal is to explore associations between bundles of HR practices and performance at both the individual and group levels. In particular, we investigate the effects of maintenance-enhancing and growth-enhancing bundles of HR practices on individual and group performance. We use the specific distinction of HR practices, as it enables us to explore the age-related experiences of maintenance or growth in the workplace, which are fundamental for the notion of successful aging. Second, we examine the role of age (in terms of employee age and proportion of an aging workforce) both as a predictor of individual and group performance and as a possible moderator in the relationships between maintenance-enhancing and growth-enhancing bundles of HR practices and performance. This study contributes to the literature in three different ways. First, it contributes to the Strategic HR (SHR) literature as it is among the first to examine multi-level associations between HR practices and performance, by adopting a configurational perspective (Delery & Doty, 1996), while proposing a new conceptualization of maintenance-enhancing and growth-enhancing HR bundles. Second, this study contributes to the aging workforce literature by examining simultaneous effects of employee age and proportion of an aging workforce on performance, at both the individual and the group levels. Third, this study is one of the first ones to examine the role of age in the relationships between bundles of HR practices and performance at the group level. While previous scholars have already examined such associations at the individual level (Kooij et al., 2013; Korff et al., 2017b), our empirical work introduces the proportion of an aging workforce construct, and provides significant insights in the context of working groups. As such, the findings of this study provide an important ground for future research in the field of successful aging and aging workforce management and come up with evidence-based recommendations for practitioners (cf. Luksyte et al., 2021).

This study is, in particular, relevant for Human Resource Development (HRD) scholars and professionals, as our outcomes provide possible directions for (team) management, HR professionals, and employees themselves on how to protect and enhance performance over the life span. As performance is a key indicator of sustainable careers (Van der Heijden, 2005; happy, healthy, and productive workers), it is of utmost importance that all parties involved not only maintain the employee's performance but also focus on implementing those HR practices that safeguard a continuous development or growth over time. Obviously, building on the notion of sustainable careers (De Vos et al., 2020; Van der Heijden et al., 2020) mutual responsibility is key here. Over and above the role of the individual themselves to invest in their employability, with aging being no reason to lean back at all, (team) management and HR professionals should play an active role in aligning HR practices with the age of each individual employee. A better understanding of the added value of maintenance-enhancing and/or growth-enhancing HR bundles will increase the scholarly knowledge of how HRD can stand the test of time.

## 2 | THEORETICAL FRAMEWORK

### 2.1 | HR bundles and performance at the individual and group levels

Over the past few decades, a substantial body of SHR research has moved beyond the investigation of the so-called HR-organizational performance relationship (Huselid, 1995; Sun et al., 2007) and put its focus on employee-centered HR research (Peccei & Van de Voorde, 2019b) and, in line with this, on the HR-employee outcomes relationship. Notwithstanding the increase in interest, there is still a lack of research dealing with individual employee outcomes, which is surprising given its fundamental role in organizational performance (Takeuchi et al., 2021). Besides, while a few studies already revealed a significant relationship between bundles of HR practices and individual performance (e.g., Kooij et al., 2013; Korff et al., 2017a), there is even a larger gap in the literature adopting a configurational approach that investigates effects on performance at the employee group level.

The relationship between HR bundles and performance, at both the individual and group levels, can be explained by Social Exchange Theory (SET) (Blau, 1964). SET focuses on processes and relationships that occur between people within social structures, and which are based on the norm of reciprocity (Blau, 1964). In particular, “people are motivated by the expectation of receiving benefits from another party in exchange for something” (Davis & Van der Heijden, 2018, p. 331). The provision of HR practices by organizations reflects a form of a positive exchange relationship (Shaw et al., 2009) that will be reciprocated by employees with positive work behaviors (cf. Fugate et al., 2021). We posit that both maintenance-enhancing and growth-enhancing bundles of HR practices are seen as positive, valuable provisions from the employer: maintenance-enhancing HR bundles because they provide resources that help employees to sustain their standards of performance, and growth-enhancing HR bundles because they provide resources that help employees to develop their performance. These valuable provisions generate feelings of indebtedness among the employees, who will engage in reciprocal behaviors (Korff et al., 2017a) towards their supervisor and employer. Furthermore, the implementation of such practices motivates employees' desire to receive future awards, in such a way that they will continue to be motivated to perform well, in order to sustain future benefits from the organization.

**H1a.** Maintenance-enhancing HR bundles are positively associated with individual performance.

**H1b.** Growth-enhancing HR bundles are positively associated with individual performance.

Newer approaches to SET have proposed that exchanges are not limited to the individual level (Ali & French, 2019) and that the effects of high- (or low-) quality social exchange relationships can diffuse to larger than the two immediate actors' areas. As Wo et al. (2019) have put it, following the notion of generalized reciprocity, perceptions, feelings, attitudes, and behaviors may also “trickle around” (e.g., from one coworker to another; Foulk et al., 2016, p. 2264). Therefore, benefits received from one party (in our case the employer) may be ‘repaid’ by granting benefits to another party, not directly involved in the exchange relationship. Such other parties may be for example, coworkers, collaborators, and members of a working group (cf. Blau, 1964; Pfeiffer et al., 2005, who refers to the construct of indirect exchange in a group wherein normative obligations generate indirect chains of exchange).

Therefore, going beyond the notion of immediate reciprocity, we expect that HR systems are not only a positive supporting mechanism that an organization may provide to its employees, to which they reciprocate with individual performance. We argue that HR systems also allow for a positive “transactional chain” that trickles around among coworkers, and increases group operation and performance, as in a beneficial cycle, because groups will respond in common to the implementation of such practices by reciprocating with increased performance.

**H2a.** Maintenance-enhancing HR bundles are positively associated with group performance.

**H2b.** Growth-enhancing HR bundles are positively associated with group performance.

## 2.2 | Age and performance at the individual and group levels

The discussion about the link between age and individual performance is timely because previous literature provided mixed results. In particular, part of the literature in this field sustains a negative relationship between age and specific aspects of individual performance, while other studies specify that there might be a positive association between the two variables (Avolio et al., 1990; Ng & Feldman, 2008; Waldman & Avolio, 1986).

Some scholars identified that there is a non-linear association between age and individual performance dimensions (Goštautaitė & Bučiūnienė, 2015; Karanika-Murray et al., 2022) and that life-span theoretical perspectives allow for a better understanding of the age-related changes in performance, because of changing individual factors (e.g., goals, motives) throughout an individual's life (e.g., Karanika-Murray et al., 2022). Specifically, while the first half of an employee's life cycle is characterized by growth processes, the second half is characterized by losses, creating a “sandwich” position for middle-aged employees (Heckhausen, 2001). We argue that early-career employees till their establishment stage, when they are about 40–45 years (Super, 1984), are likely to reach their peak performance, as they are strongly focused on professional growth and strive for advancement (Ornstein et al., 1989). However, as age progresses and employees enter the maintenance and decline stages of their careers, their individual goals change from a focus on work to a focus on family and leisure goals (Karanika-Murray et al., 2022). As a result, it is more likely that they demonstrate poorer performance at work (Super, 1984). At the same time, declining patterns emerge in terms of cognitive, physical, and mental abilities (Peeters & Van Emmerik, 2008), which are associated with negative performance outcomes (Stirpe et al., 2018). Therefore, while growth and advancement motives may positively influence performance at earlier career stages, performance will decrease during later career stages, herewith suggesting that the association between age and individual performance may be best explained by a curvilinear relationship (Ng & Feldman, 2008).

**H3a.** There is an inverted U-shaped association between employee age and individual performance.

Previous literature on age and group performance provides inconsistent results as well (Luksyte et al., 2021; Van Knippenberg et al., 2004), and focused mostly on the constructs of age diversity and heterogeneity, rather than on the proportion of an aging workforce. The only exception that we have identified is a study from Bryson et al. (2020) that investigated the association between age shares and workplace financial performance, showing that an increasing percentage of older employees might lead to a reduction in labor productivity. In addition, contrary to the common belief that age diversity is beneficial for working groups (Jungmann et al., 2020), some evidence shows that increasing age diversity may be harmful to group efficiency and performance (Joshi & Roh, 2009; Van Dijk et al., 2012). Moreover, some studies have indicated inverted U-shaped associations between age diversity and group or organizational outcomes (Ali et al., 2014; Seong & Hong, 2018).

To the best of our knowledge, even though previous works have investigated the impact of the representation and proportion of older employees on workplace financial performance (Bryson et al., 2020) and on employee retention (Stirpe et al., 2018), there is no empirical research yet on the association between the proportion of an aging workforce and group performance. We argue that this relationship will not be linear and that an increasing proportion of older employees in a group will be beneficial, but up to a specific point. In particular, from low to moderate levels of the proportion of older employees, a relatively higher proportion of an aging workforce within a group will be associated with positive group outcomes as older individuals accumulate human capital over the life cycle, being beneficial for their productivity (Bryson et al., 2020).

However, when a group is more homogenous (i.e., 50/50% of younger and older workers), it is, in particular, the *balanced* combination of, on the one hand, younger employees who usually have more physical capacity (Gall & Parkhouse, 2004), and technological aptitude (Westerman & Davies, 2000), and their older counterparts with the expertise (i.e., knowledge and skills) they have gained over the years (Bryson et al., 2020) that results in increased knowledge sharing (Burmeister et al., 2018) and increased performance, in terms of information processing,

creativity, innovative ideas generation, and problem solving (Backes-Gellner & Veen, 2013; Schneid et al., 2016; Van Knippenberg et al., 2004). Finally, from moderate to high levels of an aging workforce proportion within a group, there is a decrease in age diversity, such that further raises in the proportion of older employees can be harmful. After all, age-homogeneous groups (with a high proportion of older employees) will be less diverse in terms of group members' skills and expertise and will have limited access to resources (Ali et al., 2014). In other words, a group where the three distinguished age categories are not sufficiently represented will have relatively lower performance because it is characterized by a narrower range of skills, information, and resources.

Therefore, we assume that, ideally, a working group includes both younger and older employees to benefit from the positive effects of age diversity. As a result, including older employees in a working group may have positive effects on its performance, yet up to a maximum, as younger employees must also be represented in a group.

**H3b.** There is an inverted U-shaped association between the proportion of an aging workforce and group performance.

### 2.3 | The impact of employee age on the association between HR bundles and performance, at the individual and group levels

At the individual level, there is some evidence of the moderating effect of age on the relationship between HR and employee outcomes (Goštautaitė et al., 2022; Innocenti et al., 2013; Sun & Pan, 2008). For example, Kooij et al. (2013) showed that the associations between growth-enhancing HR practices and well-being are undermined with age, while the associations between maintenance-enhancing HR practices and well-being, and between growth-enhancing HR practices and individual performance, are boosted with age. Also, Korff et al. (2017a) demonstrated that employee age negatively moderates the association between maintenance-enhancing HR practices and in-role performance, while Conway (2004) found that the relationship between HR practices and commitment changes with age. Drawing on life-span theoretical perspectives, we assume that an employee's goal focus and work motives change across the life-span. In particular, while younger employees strive for growth and development (i.e., competence-related motive), this goal decreases with aging and people become more focused on managing their own work processes and adapt their efforts (i.e., autonomy-related motive) in order to prevent losses, and on deepening their relationships (need for relatedness) (see Goštautaitė et al., 2022 who built on Self-Determination theory; Ryan & Deci, 2000).

Being at the core of theoretical frameworks on successful aging (Veth et al., 2019a), SOC theory (Baltes et al., 1999) proposes that, with increasing age, individuals will allocate fewer resources to growth, in response to losses in resources, such as the perception of time (Freund & Ebner, 2005) by using different strategies. On the one hand, in order to maximize gains, they will select desirable outcomes or goals (i.e., elective selection), and optimize their resources (cf. Conservation of Resources theory; Hobfoll, 2001) to reach these outcomes or goals. On the other hand, to minimize losses, they will select fewer goals and will compensate for losses by investing their remaining resources in counteracting these losses (cf. primacy of resource loss<sup>1</sup>).

More specifically, older workers have a more closed-time perspective than younger colleagues for whom time is perceived as more expansive and open-ended. Therefore, development goals aimed at optimizing the future are relatively less important (Bal et al., 2010) for older workers. The age-related decline in future time perspective is supposed to shift the focus from developmental goals to maintenance ones, and consequently reduce the strength of growth-related motives at work.

Therefore, age-related changes in motives will affect the utility of the bundles of HR practices in light of employee performance (Kooij et al., 2013). Aging reduces the added value of the growth-enhancing HR bundle and increases the value of the maintenance one. Combining SOC and SET, we argue that as employees grow older, and move from a promotion to a maintenance and prevention focus (Veth et al., 2019b) (cf. Socio-emotional Selectivity Theory; Carstensen, 1992), they attach more value to maintenance-enhancing HR bundles and they will be more inclined to reciprocate to these in

comparison with younger employees. Conversely, younger employees put more value on growth-enhancing HR bundles because these are associated with development and advancement, being goals young employees strive for. Therefore, they will respond to these with higher levels of individual performance in comparison to their older counterparts.

**H4a.** Employee age moderates the association between maintenance-enhancing HR bundles and individual performance, such that this association is stronger for older employees than for younger employees.

**H4b.** Employee age moderates the association between growth-enhancing HR bundles and individual performance, such that this association is stronger for younger employees than for older employees.

Moreover, drawing again on SET and SOC, we contend that working groups will reciprocate the provision of the two distinguished types of bundles of HR practices (i.e., maintenance and growth-enhancing) with high performance, as a result of positive transactional chains (Cropanzano et al., 2017), and that the level of these reciprocations will be different for groups depending on their proportion of an aging workforce, due to the change of motives across the life-span. Specifically, we posit that working groups including a relatively higher proportion of older employees will be more concerned with maintenance and prevention, and less with growth and development. As a result, such a type of group will respond more positively to the implementation of maintenance-enhancing HR bundles in comparison with a group with a relatively lower proportion of older employees, because the latter are more focused on maintenance and prevention motives. Hence, when a working group includes a relatively higher proportion of older workers, such practices will result in increased levels of group performance. However, a working group with a relatively lower proportion of older employees (i.e., a group with a higher proportion of younger employees) will respond more positively to the implementation of growth-enhancing HR bundles in comparison with a group with a relatively higher proportion of older employees. Such practices will lead to increased levels of group performance, as younger employees are more likely to focus on growth and development.

**H5a.** The proportion of an aging workforce moderates the association between maintenance-enhancing HR bundles and group performance, such that this association is stronger for working groups with a relatively higher proportion of an aging workforce.

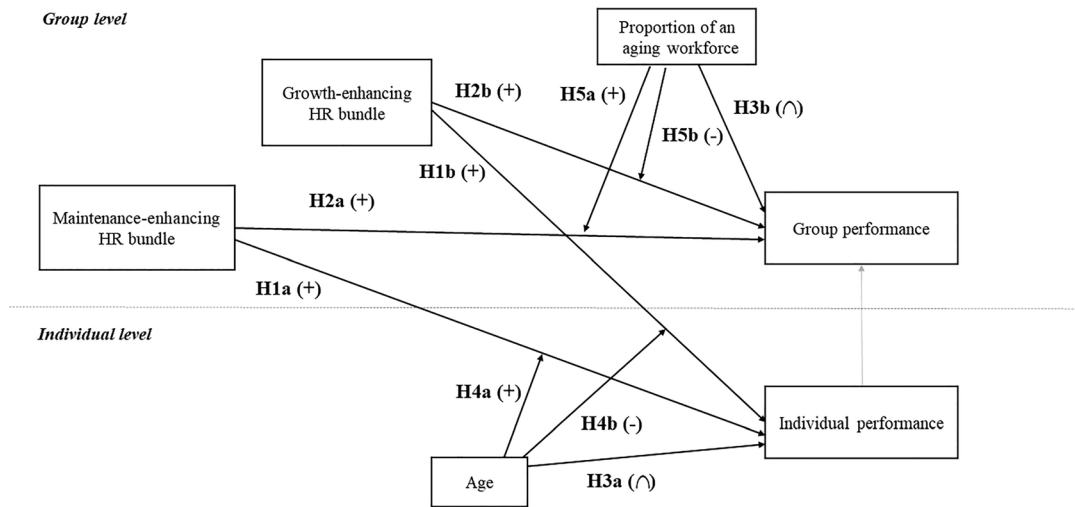
**H5b.** The proportion of an aging workforce moderates the association between growth-enhancing HR bundles and group performance, such that this association is stronger for working groups with a relatively higher proportion of a younger workforce.

The conceptual framework is visualized in Figure 1.

## 3 | METHOD

### 3.1 | Sample and procedure

Data for this study were collected from 115 working groups (response rate = 56.10%) from service organizations in Greece. Connections of the HR laboratory<sup>2</sup> at the Athens University of Economics and Business were informed about the study and invited to participate through email, phone conversations, and/or meetings. Initial contact with the organizations was made with selected middle and top-level supervisors from diverse departments, including HR, marketing, supply chain, logistics, etc. Two questionnaires were distributed; one addressed to the supervisors of working groups and one addressed to their subordinates. The supervisors answered questions wherein they evaluated specific aspects of their subordinates' and working groups' performance, as well as the implementation of HR practices in the organization. Also, they indicated the proportion of employees over 45 years old, in their group.



**FIGURE 1** Conceptual model.

Subsequently, the supervisors forwarded the second questionnaire to their subordinates with the request to return the completed questionnaire directly to the research team. The subordinates provided their calendar age and evaluated the implementation of HR practices. Anonymity was guaranteed during all steps of the procedure, as the subordinates did not know the scores of their supervisors' evaluations, and the other way around. During the distribution, an identification number was assigned to each of the subordinates (i.e., their mobile number) and a black sticker was positioned over the specific field in the supervisors' questionnaire. Similarly, the subordinates provided their identification number in their questionnaires, which was again hidden with a black sticker. Research assistants individually collected the questionnaires from each respondent, safeguarding that the answers would not be disclosed to other participants and that only the research team would be able to relate questionnaires to individual respondents.

The final sample includes 342 subordinates (57.9% women) with a mean age of 39.6 years ( $SD = 10.18$ ) and 115 supervisors (34.8% women) with a mean age of 47.34 years ( $SD = 9.99$ ). The average number of subordinates per supervisor is 2.97. The mean proportion of older employees in the working groups is 32.76% ( $SD = 29.16$ ). 295 out of the 342 subordinates (86.3%) are white-collar employees, whereas 47 (13.7%) are blue-collar employees. The average years of formal education of the subordinates is 14.09 ( $SD = 2.82$ ). 86 out of the 111 organizations (76.5%) are private organizations.

## 3.2 | Measures

### 3.2.1 | Group performance

Applying the scale of Seong and Hong (2018), the direct supervisors rated their groups' performance by means of three items, in a Likert-type scale, ranging from 1 to 5 (totally disagree = 1, totally agree = 5). Sample items are: "This group achieves high performance" and "This group fulfils the assigned goals." The internal reliability of this measure is 0.71.

### 3.2.2 | Individual performance

To measure *individual performance*, we adopted the Role-Based Performance Scale (RBPS) (Welbourne et al., 1998), which measures performance on 20 aspects that include elements of both in-role and extra-role performance. RBPS

is a multi-dimensional measure, with a broader and more generalizable application than traditional performance measures, which emphasize either the job or the organization (Welbourne et al., 1998). The supervisors evaluated their subordinates' performance, on these 20 aspects, using a scale ranging from 1 = "needs much improvement" to 5 = "excellent." Sample questions from the RBPS are: "Quality of work output" and "Working as part of a group or work group." The scale indicates acceptable item reliability (Cronbach's alpha = 0.91).

### 3.2.3 | Maintenance-enhancing and growth-enhancing HR bundles

We measured HR practices with the High Performance Work Systems (HPWS) scale developed by Sun et al. (2007). HR practices were evaluated both by the supervisors and subordinates, on a 5-point Likert scale, ranging from "I totally disagree" to "I totally agree."

To achieve the distinction between maintenance-enhancing and growth-enhancing bundles, we conducted a Delphi study (Okoli & Pawlowski, 2004), with the participation of 29 experienced academics from the Cranet research network. Cranet is the largest academic HR network in the world and it has been collecting comparative data on HR in more than 40 countries for almost three decades. The advice of Cranet members was collected through an online survey, the link to which was sent via a personalized email to all 89 Cranet members, reaching a response rate of 33% (29 out of 89). The participants were asked to identify whether each of the 27 items of the HPWS scale pertains to a maintenance-enhancing or to a growth-enhancing HR bundle. Subsequently, the items that were categorized by at least 20 out of the 29 experts (69%) in the same bundle were assigned to the respective bundle. Eventually, the maintenance-enhancing HR bundle includes five items pertaining to job security and role clarity (Cronbach's alpha = 0.71), and the growth-enhancing HR bundle includes nine items (Cronbach's alpha = 0.81), pertaining to training, promotion, and decision-making opportunities. The specific items of both HR bundles are presented in Table 1.

To measure the two types of HR bundles, we integrated supervisors' and employees' perceptions of each HR system variable (Boon et al., 2019). Specifically, we aggregated employees' and supervisors' evaluations, building on the data triangulation method, which refers to collecting data from more than one data source or respondent group (Flick, 2018). To assess agreement between the two sources of information, we estimated  $r_{wg}$  for within-group agreement,  $ICC_1$  for between-group variance and  $ICC_2$  for reliability between ratings. Mean  $r_{wg}$  values were above 0.70 (0.77 and 0.80 for the maintenance-enhancing and growth-enhancing HR bundle, respectively),  $ICC_1$  values were above 0.12 (0.33 and 0.29), and  $ICC_2$  values were above 0.40 (0.49 and 0.44), herewith providing fair support for the appropriateness of aggregation at the group level (Cicchetti, 1994; Fleiss, 1986). To create the variables for each HR bundle, we first estimated the mean score of the individual practices (Boon et al., 2019) for each source of information (employee and supervisor), and then calculated the mean score of the aggregated employees' and supervisors' ratings, giving equal weights to each source.<sup>3</sup> Specifically, each type of HR bundle was estimated through the following function: HR bundle = 0.5 \* supervisors' ratings of HR + 0.5 \* aggregated employees' ratings of HR.

### 3.2.4 | Proportion of an aging workforce

The proportion of the aging workforce was operationalized as the percentage of employees aged 45 or over. Specifically, supervisors answered to: "What is the proportion of employees over 45 years old, in the group that you supervise?" We chose this cut-off point based on previous literature suggesting that employees' physical and functional abilities start to decrease at around 45 years (Ilmarinen, 2001; Stirpe et al., 2018). Also, 45 is the cut-off age proposed by the World Health Organization (1993), because of the decrease of "functional capacities that are necessary for some kinds of work" (World Health Organization, 1993, p. 3).

**TABLE 1** Categorization of HR bundles.

HR bundles	Question items	Cronbach's alpha
Maintenance-enhancing	<p>The job description for a position accurately describes all of the duties performed by individual employees</p> <p>Employees in this job can be expected to stay with this organization for as long as they wish</p> <p>This job has an up-to-date description</p> <p>Job security is almost guaranteed to employees in this job</p> <p>The duties in this job are clearly defined</p>	0.71
Growth-enhancing	<p>Employees in this job are often asked by their supervisor to participate in decisions</p> <p>Employees who desire promotion have more than one potential position they could be promoted to</p> <p>Individuals in this job are allowed to make decisions</p> <p>Employee appraisals emphasize long-term and group-based achievement</p> <p>Formal training programs are offered to employees in order to increase their promotability in this organization</p> <p>Long-term employee potential is emphasized</p> <p>Employees are provided with the opportunity to suggest improvements in the way things are done</p> <p>Employees have clear career paths in this organization</p> <p>Extensive training programs are provided for individuals</p>	0.81

### 3.2.5 | Age

Subordinates' age was measured with the chronological dimension (i.e., calendar age), as a continuous variable (number of years).

### 3.2.6 | Control variables

The *supervisor's age* was measured as a continuous variable (number of years). *Company ownership* was included as a dichotomous variable (1 = public, 2 = private organization). *Gender* (1 = male, 2 = female) and *job type* (1 = white-collar employee, 2 = blue-collar employee) were included and measured as dichotomous variables and *education* was measured as a continuous variable (number of years of completed formal education).

## 4 | RESULTS

Table 2 displays descriptive statistics, including the means, standard deviations, and correlations.

### 4.1 | Measurement issues

A series of confirmatory factor analyses (CFA) for our key variables in STATA 14 was applied to examine the constructs' and model's validity.

TABLE 2 Descriptive statistics.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Individual performance <sup>a</sup>	3.70	0.64											
2. Age	39.60	10.18	0.08										
3. Gender	1.58	0.49	0.13*	-0.02									
4. Job type	1.14	0.35	-0.12*	-0.17**	-0.24*								
5. Education	14.06	2.81	0.10	-0.04	0.18*	-0.30**							
6. Group performance <sup>a</sup>	4.20	0.55	0.16**	0.05	-0.03	-0.03	0.03						
7. Maintenance-enhancing HR bundle <sup>b</sup>	3.64	0.58	0.21**	-0.12*	-0.01	0.13*	0.02	0.27**					
8. Growth-enhancing HR bundle <sup>b</sup>	3.44	0.50	0.15**	-0.09	-0.03	-0.11	0.04	0.26**	0.63**				
9. Proportion of an aging workforce	33.02	28.95	0.19**	0.49**	0.03	-0.08	-0.01	0.09	-0.10*	-0.13*			
10. Supervisor's age	47.34	9.99	-0.03	0.39**	0.06	-0.15**	0.07	-0.01	-0.13*	-0.20**	0.30**		
11. Company ownership	1.26	0.44	0.23**	0.36**	0.17**	-0.18**	0.07	-0.14*	-0.03	-0.10*	0.32**	0.37**	

Note: N = 342 subordinates and 115 supervisors.

<sup>a</sup>Supervisors' ratings.

<sup>b</sup>Aggregated scores of supervisors and subordinates (Assigning 0.5 weighted score to both subordinates' and supervisors' ratings).

\* $p < 0.05$ ; \*\* $p < 0.01$ .

First, we conducted a CFA for the growth-enhancing and maintenance-enhancing HR bundles. The fit index showed an acceptable and better fit for the two-factor model ( $\chi^2[72] = 201.854$  [ $p < 0.001$ ], CFI = 0.93, TLI = 0.91, RMSEA = 0.07, SRMR = 0.07) than for the one-factor model, where all items were grouped into one factor, showing that the two bundles should be treated as distinct variables.

Second, we ran a series of CFA for all the latent constructs of our model, using the partial disaggregation/parceling approach (Williams & O'Boyle, 2008), which involves aggregating items that represent all of the lower-order factors. Following suggestions from previous scholars (Diefendorff & Richard, 2003), randomly chosen item parcels were formed to create: (a) 3 parcels for the growth-enhancing HR bundle, (b) 2 parcels for the maintenance-enhancing HR bundle, and (c) 10 parcels for employee performance. Because group performance was composed of only three items, each group performance item was used as a separate indicator of the latent construct.

We examined a measurement model with the four measures (i.e., maintenance-enhancing HR bundle, growth-enhancing HR bundle, individual performance, and group performance). The analysis revealed a good fit between the model and the data:  $\chi^2(129) = 351.898$  ( $p < 0.001$ ), CFI = 0.94, TLI = 0.93, RMSEA = 0.07, SRMR = 0.05 (Browne & Cudeck, 1993). We compared the four-factor model to two alternative three-factor models (model a: combined HR bundles, individual performance, and group performance; model b: combined individual and group performance, distinct HR bundles). The four-factor model appeared to be the best-fitting model, indicating that the HR bundles, individual performance, and group performance are distinct constructs.

Before testing our research model, we also checked for the common-method variance of our data, by controlling for the effects of an unmeasured latent methods factor (Podsakoff et al., 2003). Specifically, we introduced a new latent variable, which we linked to all manifest variables in our model. After constraining the variance of the latent factor to be "1" and all the paths to be equal, the common variance was estimated to be 26.01%, indicating an acceptable value.

## 4.2 | Data analysis

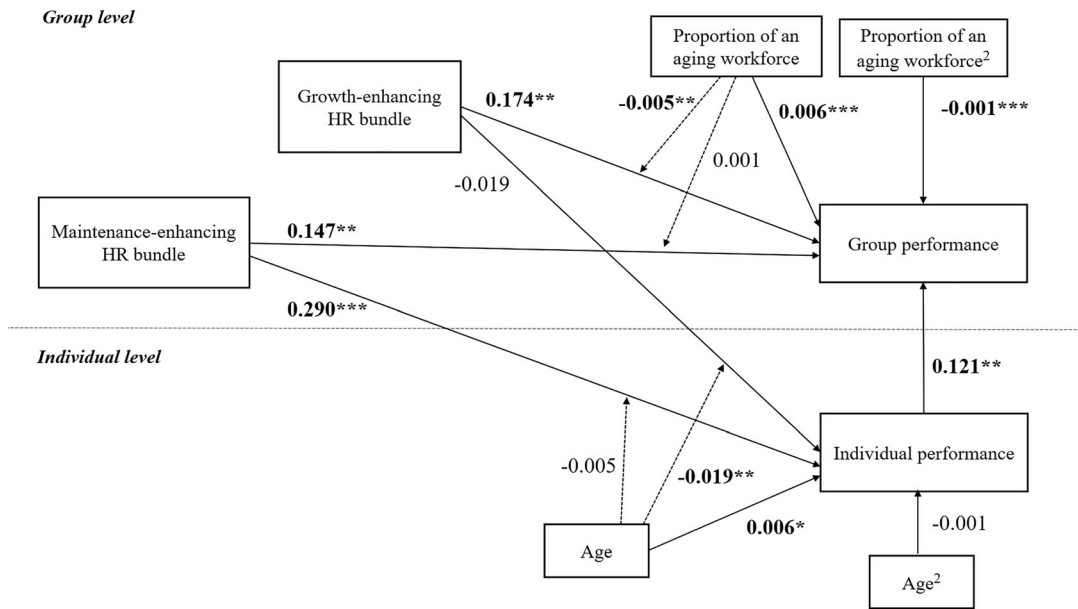
Our study used a multi-level data structure, with employees being nested in different working groups. Multi-level models have gained importance in the field of HR over the past decade. Multi-level structures offer important theoretical implications as they enable a better understanding of the cross-level effects of HR practices on outcomes of interest (Peccei & Van de Voorde, 2019a).

For the purpose of our study, we used STATA 14 software and conducted a two-step Generalized structural equation modeling procedure (GSEM), which supports multi-level analysis, where first the measurement and then the structural model were examined. GSEM is a technique that has been used in previous literature (Mostafa et al., 2021) and is ideal for examining research hypotheses with nested data (Preacher et al., 2010). In our case, the use of GSEM enabled us to account for the clustering of employees within working groups. We used a random-intercept multi-level model, where we included individual performance and age at the individual level, whereas, at the group level, we included maintenance-enhancing and growth-enhancing HR bundles, the proportion of the aging workforce, and group performance. Before performing our analyses, each group-level predictor variable was grand mean-centered (see Figure 2 and Table 3 for the specific details).

Regarding the control variables in our research model, at the individual level, white-collar employees seem to perform better than blue-collar ones ( $\beta = -0.211$ ,  $SE = 0.112$ ;  $p < 0.10$ ). At the group level, employees of the private sector portray a better performance than those working in the public sector ( $\beta = -0.207$ ,  $SE = 0.070$ ;  $p < 0.01$ ).

### 4.2.1 | Hypotheses 1 and 2: The relationship between types of HR bundles and performance at the individual and group levels

At the individual level, the maintenance-enhancing HR bundle is positively associated with performance ( $\gamma = 0.290$ ,  $SE = 0.103$ ;  $p < 0.01$ ), herewith supporting Hypothesis H1a. On the contrary, the growth-enhancing HR bundle is



**FIGURE 2** Results of the MSEM analysis.  $n = 342$  individuals nested in 115 groups; \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

not significantly associated with individual performance ( $\gamma = -0.019$ ,  $SE = 0.122$ ;  $p = ns$ ), herewith rejecting Hypothesis H1b. At the group level, both the maintenance-enhancing ( $\beta = 0.147$ ,  $SE = 0.061$ ;  $p < 0.05$ ) and the growth-enhancing HR bundles ( $\beta = 0.174$ ,  $SE = 0.072$ ;  $p < 0.05$ ) are positively associated with a group performance, herewith supporting Hypotheses H2a and H2b.

#### 4.2.2 | Hypothesis 3 The relationship between age and performance at the individual and group levels

At the individual level, age is positively associated with performance ( $\beta = 0.006$ ,  $SE = 0.003$ ;  $p < 0.10$ ). At the group level, the proportion of an aging workforce is positively associated with group performance ( $\beta = 0.006$ ,  $SE = 0.001$ ;  $p < 0.01$ ). Age square is not associated with individual performance ( $\beta = -0.001$ ,  $SE = 0.000$ ;  $p = ns$ ), herewith rejecting Hypothesis 3a which stated a curvilinear association between the two variables. However, at the group level, the squared term of the aging workforce composition appears to be negatively associated with group performance ( $\beta = -0.001$ ,  $SE = 0.001$ ;  $p < 0.01$ ), herewith supporting Hypothesis 3b. Taking together the positive effect of the linear term ( $\beta = 0.006$ ,  $SE = 0.001$ ;  $p < 0.01$ ) and the negative effect of the curvature term ( $\beta = -0.001$ ,  $SE = 0.001$ ;  $p < 0.01$ ), we suggest that the relationship between the proportion of an aging workforce and group performance can be characterized as a concave downward curve—also referred to as an inverted U-curve (Aiken & West, 1991). In other words, an increasing proportion of an aging workforce within a group benefits the performance of the group, but only up to a specific point, after which, an increasing proportion of older employees will be harmful to the group's performance. We used the Dawson's quadratic regression tool to create the quadratic plot (see Figure 3). We used the same tool to estimate the turning point of the polynomial regression ( $y = ax^2 + bx + c$ ) at  $x = -b/2a$ . Applying our results to this equation, we find the turning point to be at 55.72.

**TABLE 3** Results of the MSEM analysis.

<b>Individual performance</b>	
Gender	0.058 (0.062)
Job type	−0.211* (0.112)
Education	0.011 (0.013)
Maintenance-enhancing HR bundle	<b>0.290***</b> (0.103)
Growth-enhancing HR bundle	−0.019 (0.122)
Age	<b>0.006*</b> (0.003)
Age <sup>2</sup>	−0.001 (0.000)
Maintenance-enhancing HR bundle * Age	−0.005 (0.007)
Growth-enhancing HR bundle * Age	−0.019** (0.008)
<b>Group performance</b>	
Supervisor's age	0.002 (0.003)
Company ownership	−0.207*** (0.070)
Maintenance-enhancing HR bundle	<b>0.147**</b> (0.061)
Growth-enhancing HR bundle	<b>0.174**</b> (0.072)
Proportion of an aging workforce	<b>0.006***</b> (0.001)
Proportion of an aging workforce <sup>2</sup>	−0.001*** (0.001)
Maintenance-enhancing HR bundle * Proportion of an aging workforce	0.001 (0.002)
Growth-enhancing HR bundle * Proportion of an aging workforce	−0.005** (0.002)
Individual performance	<b>0.121**</b> (0.047)
var(M1[Company_ID])	0.171
var(e. Individual performance)	0.200
var(e. Group performance)	0.251
Log-likelihood	−531.103

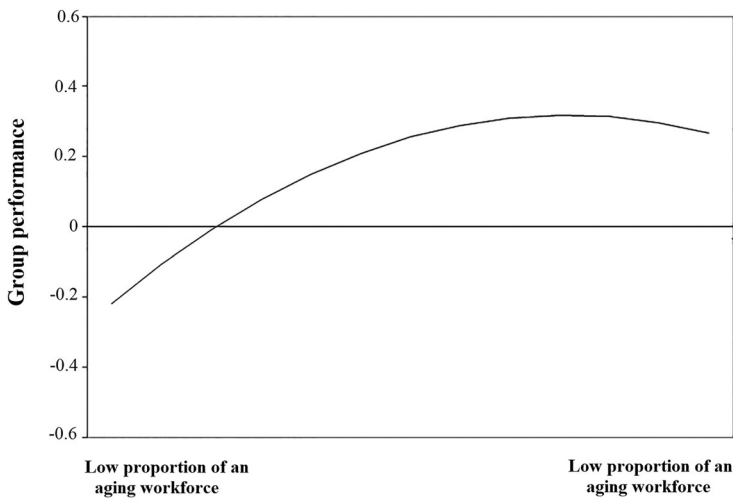
Note:  $n = 342$  individuals nested in 115 groups.

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Constant omitted for conciseness (positive, statistically significant).

### 4.2.3 | Hypotheses 4 and 5: Age as a moderator in the relationships between types of HR bundles and performance at the individual and group levels

Regarding the interaction terms, at the individual level, age does not positively moderate the association between the maintenance-enhancing HR bundle and individual performance ( $\gamma = -0.005$ ,  $SE = 0.007$ ;  $p = ns$ , herewith rejecting Hypothesis 4a). On the other hand, age negatively moderates the association between the growth-enhancing HR bundle and individual performance ( $\gamma = -0.019$ ,  $SE = 0.008$ ;  $p < 0.05$ , herewith confirming Hypothesis 4b). At the group level, the proportion of an aging workforce does not moderate the association between the maintenance-enhancing HR bundle and group performance ( $\beta = 0.001$ ,  $SE = 0.002$ ;  $p = ns$ , herewith rejecting Hypothesis H5a). On the other hand, the proportion of an aging workforce negatively moderates the association between the growth-enhancing HR bundle and group performance ( $\beta = -0.005$ ,  $SE = 0.002$ ;  $p < 0.05$ , herewith confirming Hypothesis 5b).

To further understand the character of these interactions, we plotted the regression lines for the relationships between individual performance and group performance, on the one hand, and the growth-enhancing HR bundle, on the other hand, at different levels of both the employee age and the proportion of an aging workforce. Specifically, we created the interaction plots by applying the marginal-effects approach in moderation (e.g., Preacher et al., 2006).



**FIGURE 3** Quadratic plot for the relationship between the proportion of an aging workforce and group performance. In order to create the quadratic plot, all terms were mean-centered with the exception of the proportion of an aging workforce.

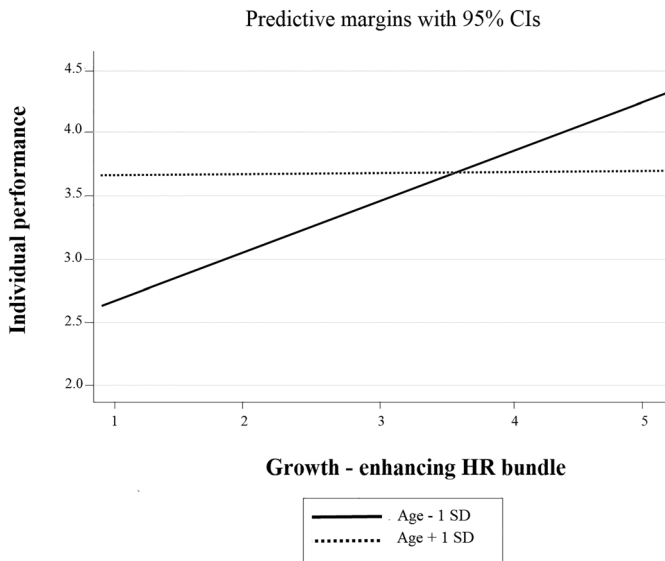
These plots present the simple-slope coefficient of the focal variable and its 95% confidence interval across the range of the moderator variable (McCabe et al., 2018), which in our case ranges from 1 SD below to 1 SD above the mean. The association between the growth-enhancing HR bundle and individual performance is stronger for younger employees ( $\gamma = 0.387$ ,  $SE = 0.098$ ;  $p < 0.001$ ) in comparison with their older counterparts ( $\gamma = -0.002$ ,  $SE = 0.101$ ;  $p = ns$ ) (see Figure 4). The association between the growth-enhancing HR bundle and group performance is stronger when a group does not include a high proportion of older employees ( $\beta = 0.424$ ,  $SE = 0.086$ ;  $p < 0.001$ ) in comparison with a situation wherein a group includes a high proportion of an aging workforce ( $\beta = 0.184$ ,  $SE = 0.089$ ;  $p < 0.05$ )<sup>4</sup> (see Figure 5).

## 5 | DISCUSSION

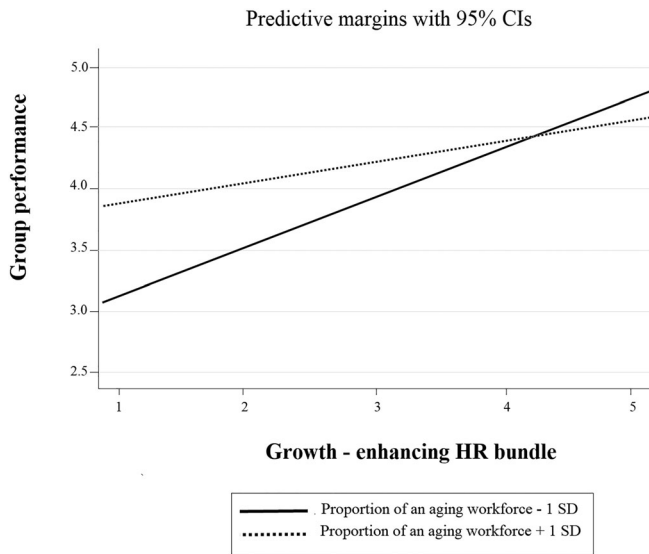
### 5.1 | Reflection on the outcomes and theoretical implications

Although previous research has identified the differential utility of HR configurations on work-related outcomes of employees from different age groups (Kooij et al., 2013; Korff et al., 2017a), we lack an understanding of its impact at the group level. To advance the scholarly knowledge on this topic, we integrated SET with life-span theoretical perspectives to test a multi-level model which examines the HR-performance link, along with the effects of age on these relationships. To the best of our knowledge, our empirical work is among the first to address such relationships at both the individual and group levels simultaneously, while introducing the construct of the proportion of an aging workforce.

First, we found a positive relationship between the maintenance-enhancing HR bundle and individual performance, which adds to the outcomes from previous scholarly work (Kooij et al., 2013; Korff et al., 2017a). In addition, our findings showed positive effects of both the maintenance-enhancing and growth-enhancing HR bundles on group performance, hereby complementing earlier literature findings (Bouwman et al., 2019; Han et al., 2017; Raineri & Valenzuela-Ibarra, 2021). The positive effects of HR bundles on performance at both levels are in accordance with central theoretical propositions in strategic HR and SET (Blau, 1964). Specifically, under the lens of a



**FIGURE 4** Moderating effect of age on the relationship between growth-enhancing HR bundle and individual performance.



**FIGURE 5** Moderating effect of the proportion of an aging workforce on the relationship between growth-enhancing HR bundle and group performance.

configurational approach in HR (Delery & Doty, 1996), our results suggest that HR practices are conducive to performance when adopted as a system of mutually reinforcing practices. At the same time, the relationship between HR bundles and performance at both levels can be represented as a social exchange system, wherein employees and working groups will demonstrate high-performance levels, as a relational reciprocating response to the positive perceptions of HR practices (Cropanzano et al., 2017). The outcomes of our research also confirm recently added

notions of SET on the “trickle around” (Foull et al., 2016) and “positive cycle” (Cropanzano et al., 2017) effects. According to the notion of a trickle-around effect, positive relationships develop as a result of social exchanges between, in our case, employees and their supervisors in the first place, which subsequently translate into indirect exchanges in a group among their coworkers as third parties. We posit that our claim for a trickle-around effect is even more pronounced if we take into account that our model controls for the direct association between individual performance and group performance; implying that  $b = 0.174^{***}$  and  $b = 0.147^{***}$  are direct effects that are independent of the improvement of individual performance of the members contributing to the group performance.

Second, as regards the relationship between age and individual performance, our findings support the proposition that individual performance increases with age (Cleveland & Lim, 2007), a finding that is in contrast to our expectation (curvilinear effect). Our study adds knowledge to the ongoing conversation about the age-performance link and adds to the mixed literature findings (Ng & Feldman, 2008). It must be noted that aligning with the recent literature trends of performance research, our scholarly work has used a multi-dimensional conceptualization of individual performance (Griffin et al., 2007). As such, our findings suggest that older employees portray a higher performance, when the performance requirements are not strictly based on task performance elements (i.e., in-role performance) only, but also take into account dimensions such as organizational citizenship behaviors and contribution to the team (i.e., extra-role performance). As regards the outcomes at the group level, as the proportion of an aging workforce in a working group increases, so does group performance, but only up to a certain point, after which group performance decreases with a further increase in the proportion of an aging workforce. Peak performance can be achieved when there is an approximately equal representation of older and younger employees in a certain group, which can also be translated as an age-diverse working group. This finding confirms the scarce studies that show curvilinear associations between age diversity and group or organizational-level outcomes (Ali et al., 2014; Seong & Hong, 2018), but also goes against a literature stream that reports that a high level of age diversity may be harmful to the team functioning (Shin & Zhou, 2007). A possible explanation for the curvilinear finding in our study (which contrasts previous literature findings on the age diversity–group performance link) might be explained by the “too-much-of-a good-thing effect (TMGT effect)” (Pierce & Aguinis, 2013). According to the TMGT effect, variables that usually have a beneficial effect might have negative relationships with certain outcome variables, after they reach a specific point (Pierce & Aguinis, 2013). An additional important theoretical contribution of this study lies in the fact that we have used the “proportion of an aging workforce” construct rather than the ‘age diversity’ one. In line with Stirpe et al. (2018), by adopting this approach, we add to the scholarly domain that is focused on increasing evidence-based knowledge related to workforce management.

Third, as to the age moderation hypotheses, it appears that the provision of a maintenance-enhancing HR bundle is equally beneficial for all age groups, thereby corroborating the findings by Veth et al. (2019b). In other words, a maintenance-enhancing HR bundle is beneficial for individual and group performance, regardless of the individual's age and the group's age composition. On the contrary, the negative moderating effect of age on the relationship between growth-enhancing HR practices and employee outcomes contradicts the findings of other studies that show a positive moderation effect of age on this relationship (Kooij et al., 2013; Korff et al., 2017a). Also at the group level, our findings indicate that when a working group includes a relatively higher proportion of an aging workforce, the implementation of growth-enhancing HR bundles is less beneficial to their performance than in a working group with a relatively lower proportion of an aging workforce. In line with the theoretical perspectives from SET (Blau, 1964) and SOC (Baltes et al., 1999), our empirical work indicates that younger employees seem to respond more positively to the implementation of growth-enhancing HR practices, which we attribute to the fact that they give a higher priority to growth and promotion motives. Our study complements previous scholarly literature that combines SET with life-span theoretical perspectives (Veth et al., 2019b) and adds knowledge to this field of research by integrating SOC theory for the interpretation of the moderating effects.

This research also adds to the scholarly domain of HRD by nuancing our insights on the added value of maintenance-enhancing versus growth-enhancing HR practices across the life-span for an individual's and work group functioning. It seems that core attention for *maintaining* a worker's performance is crucial, no matter their age

or their work group's age composition, for both their individual and group performance. On the contrary, when looking at both the individual and group level performance, where we would have expected that investing in *the further development or growth* of the individual worker would pay off especially (Kooij et al., 2013; Korff et al., 2017a), it seems to be the other way around. In particular younger workers and working groups with a relatively lower proportion of an aging workforce reap the fruits of HR practices that focus on further development and growth. This outcome has far-reaching implications for HRD theorizing underlying research focusing on the age-performance linkage, and the role HR/D practices play in this regard (cf. Van der Heijden et al., 2022).

## 5.2 | Limitations and recommendations for future research

For the measurement of the aging workforce variable, based on previous literature and directions from policy-making organizations (World Health Organization, 1993), we have adopted the age of 45 as a cut-off point between older and younger employees. However, it should be noted that, in light of the extension of life expectancy, some recent literature considers the age of 45 as too young, and has, therefore, proposed a raise of the cut-off point to 55 years of age (McCarthy et al., 2014). Future research is needed to establish which should be the proper age division in this regard.

Second, our conceptualization of HR bundles, as it emerged from the Delphi study, misses elements that may also be crucial for the performance of the aging workforce. Specifically, for the definition of the HR bundles, we have used HPWS which, by definition, are HR systems that aim at high performance. Looking closely at the items in the maintenance-enhancing HR bundle, we notice that it includes items relevant to job security and task clarity. Items like flexible working practices and health and safety provisions, which are proposed to be especially useful for more mature employees (Kooij et al., 2010), are not included in the traditional conceptualizations of HPWS. We argue that with the growth of an older working population, it is time to rethink the conceptualization of HPWS in order to include practices that enable older employees to remain productive, such as practices that were traditionally categorized in high commitment and caring work systems, rather than in high-performance ones.

Finally, according to our experts' classification, employee training pertains to a growth-enhancing HR bundle. However, notably for an aging workforce, employee training could be more of a maintenance-enhancing HR bundle, than a growth-enhancing one. Future research could establish whether the perceptions of maintenance-enhancing and growth-enhancing bundles evolve over the employees' life cycle, in such a way that a certain practice could be perceived to be growth-enhancing by younger employees while the same practice is perceived to be maintenance-enhancing by older staff members.

## 5.3 | Practical recommendations and conclusions

First, we confirm the usefulness of distinguishing between "generic" HR practices (Kooij et al., 2013) and separate HR bundles. In particular, from our study, we conclude that both maintenance-enhancing and growth-enhancing HR bundles are good practices to implement and that organizations should focus and invest in them, as a means of enhancing employees' as well as working groups' performance outcomes.

Second, employers, management professionals, and policy-makers should understand that employees are not less productive as they get older. On the contrary, they are valuable assets and should be treated as such. In addition, the inverted U-shaped association between the aging workforce proportion and group performance indicates that organizations should foster age diversity, as a way to increase productivity and remain competitive (Wentling & Palma-Rivas, 1998), by creating environments that welcome youthful exuberance together with experience and maturity. Organizations could adopt recommendations regarding quotas for the representation of all age groups so that working groups comprise a sound representation of workers across the career span. This could prove to be even

more beneficial for working organizations if they concurrently adopted lean management structures that allow for closer collaboration across hierarchical levels, herewith also fostering age diversity of working groups.

Moreover, against common propositions (Kooij et al., 2013; Korff et al., 2017a), it appears that maintenance-enhancing HR bundles do not improve the performance of an aging workforce more strongly than for other age categories. As a result, organizations should ensure the availability of these practices and “facilitate that they will be used by all age groups to result in enhancement of positive employee outcomes at work” (Veth et al., 2019b, p. 2802). Therefore, implementing maintenance-enhancing policies that maintain job security, and clearly define work responsibilities and arrangements, should be a priority for Greek organizations, to foster the performance of both younger and older employees. Our results also highlight that both age and the proportion of an aging workforce moderate the association between growth-enhancing HR bundles and performance at the individual and group levels, showing that such practices are more effective for a younger workforce. Therefore, working organizations should prioritize such practices for their junior staff members.

At the same time, we know from previous research in this field (e.g., Le Blanc et al., 2017) that sound and tailor-made interventions at the workplace, comprising both maintenance- and growth/development-related HR practices, and wherein the direct supervisor, management, and HR professionals build on a broader conceptualization (i.e., a multi-dimensional process-based; Sterns & Miklos, 1995) of aging at work, are crucial. Chronological or objective age is something one cannot change. Yet, in the case aging is seen as a multi-dimensional process indicating changes in psychological, physical, social as well as societal functioning across time (De Lange et al., 2006; Kooij et al., 2008), the employee and their surrounding stakeholders can better understand how the process of aging might impact one's performance at work. Supervisors, management, and HR professionals that adopt a broader perspective on aging at work will be better suited to determine which HR/D practices in particular are needed to understand and to comply with the *real* impact of aging at work for a specific individual and/or their working group.

To conclude, the change in workforce demographics urges organizations to respond to its accompanying challenges, as without appropriate strategic planning and intervention, there will be both quantitative and qualitative labor shortages (in terms of both volume and skills). Adopting an age-based HR approach responds to this call, and we believe that, given the performance potential of older employees identified in this study, it is worth exploring further how its utilization can be optimized. Obviously, all stands or falls with line management being carefully trained in adopting HR practices while taking into account the age-related needs of their staff, which is unfortunately not self-evident in many circumstances. Yet, only in case supervisors are aware of differences in needs, capacities, and preferences across the life-span the career sustainability of their subordinates can be protected (Van der Heijden et al., 2022).

## FUNDING INFORMATION

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## DATA AVAILABILITY STATEMENT

The dataset is available at: [10.5281/zenodo.4572943](https://zenodo.org/record/4572943#YmuqgPw2w)<https://zenodo.org/record/4572943#YmuqgPw2w>

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## ENDNOTES

<sup>1</sup> The primacy of loss is a recurring theme in the COR theory. In general, it is expected that as individuals grow older, they are more concerned with how they can sustain the status quo and minimize losses, instead of acquiring new achievements and resources.

- <sup>2</sup> At the HR Laboratory, a database is kept with contact details of managers who have participated in previous research projects, and who have agreed to be contacted for communication of research outcomes and about activities of the laboratory. From this list, we have identified strata analogous to the Greek business population in terms of public and private firms, multinationals, local companies, and enterprise size.
- <sup>3</sup> Assigning equal weights is the most common weighing strategy in data triangulation design types (Creswell & Clark, 2007).
- <sup>4</sup> The above-mentioned values were estimated with the use of the online tool “<http://www.quantpsy.org>”, which has been developed by Preacher et al. (2006) for evaluating interactions.

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