Boosting job performance: the impact of autonomy, engagement and age

Jesus Juyumaya
Facultad de Economía y Negocios, Escuela de Ingeniería Comercial, Universidad Santo Tomás, Santiago, Chile
Cristian Torres-Ochoa
Millennium Nucleus on the Evolution of Work, Santiago, Chile, and
Germán Rojas
Facultad de Economía y Negocios, Escuela de Ingeniería Comercial, Universidad Santo Tomás, Talca, Chile

Abstract

Purpose – The study aims to investigate the effect of autonomy on employee job performance and the mediation effect of engagement. It also explores whether an employee's age moderates the model.
Design/methodology/approach – Data were collected through a face-to-face survey administered to various types of workers in their workplaces. The selection of companies was based on a database available at the university. Response rate was 35%, yielding 210 instruments with complete responses. Structural Equation Modeling was the chosen method for data analysis.
Findings – Results demonstrate a positive and significant relationship between autonomy and engagement as well as between engagement and job performance. Moreover, engagement plays a full mediating role in the relationship between autonomy and job performance. Additionally, while age does not moderate the relationship, it does have a differential impact on the mediation process.
Practical implications – The creation of management strategies focused on resources such as autonomy must be adapted according to seniority, with the purpose of enhancing employee engagement and performance in today's organizations.
Originality/value – This paper closes a gap between autonomy and Job Demands-Resources theory by providing evidence on the effects of autonomy, engagement and age on job performance.
Keywords Job performance, Autonomy, Engagement, Age, Moderated mediation
Paper type Research paper

Introduction

Due to the importance of job performance for organizations to meet their goals, identifying its determinants and consequences has been a priority for various scholars and Human Resources (HR) managers. It is still a matter of researching the mechanisms that underlie the

Data availability statement: The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Ethics statement: The patients/participants provided written informed consent to participate in this study.

Conflict of interest: The author declares that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

relationship between job performance and other vital constructs (Muecke & Iseke, 2019). Hence, it is necessary to understand which are the variables associated with high performance in the workplace are which are not. Bakker and Demerouti (2017) state that engagement is crucial to generating and boosting job performance. In another way, Sonnentag and Frese (2013) argue that job performance can change simply as a function of aging. Thus, age could be an interesting variable to explore. For example, Vasconcelos (2018) states that older workers contribute effectively to the noncore domains of job performance. On the other hand, older workers tend to demonstrate more citizenship-related behaviors and fewer counterproductive work behaviors. Following the Job Demands–Resources (JD-R) model (Bakker & Demerouti, 2017), this research provides a moderated mediation model to explore the mediating role of engagement in the relationship between autonomy and job performance. Additionally, we explore the moderated role of age as a boundary condition.

Framework

Figure 1 shows our framework. Job performance is essential for organizations to meet their goals. The JD-R model has been widely used in organizational psychology research to study job performance (Katou, Koupkas, & Triantafillidou, 2022). According to the JD-R model, different work environments or characteristics can be divided into job demands and resources. The interaction between job demand and job resources explains different outcomes at work, such as job performance. Job resources may buffer the effect of job demands on job strain and boost job performance. Since job performance is conceptualized as an outcome variable in the JD-R model, the mismatch between job demands and job and personal resources plays a role in job performance through its impact on motivation and strain. In this sense, motivation positively impacts job performance, whereas job strain harms job performance (Bakker & Demerouti, 2017).

Job autonomy (henceforth, autonomy) in the workplace means allowing employees to work in a way that suits them (Juyumaya & Torres, 2022). With autonomy at work, employees decide how and when their work should be done. Autonomy is a crucial job resource that can boost engagement and job performance. As mentioned above, studies suggest that autonomy is associated with job performance because the former affects motivation. Likewise, according to Bakker (2017), autonomy allows employees to engage in individual strategies of self-management and job crafting behaviors that are beneficial in achieving work-related objectives, such as expanding one's range of tasks or specialization in certain aspects of work. Borst, Kruyen, and Lako (2019), in a work with public workers, found that autonomy was associated with performance. Tisu, Vîrgă, and Mermeze (2023) also found autonomy was associated with proficiency, as a form of performance, in their work
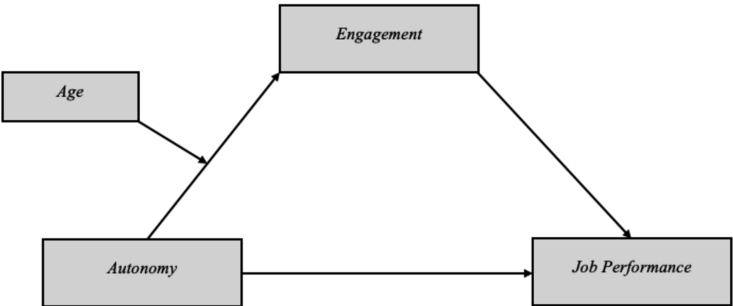

Figure 1.
A moderated mediation model of autonomy and job performance

Source(s): Authors' own work

with private workers. Some studies have found that when managers provide autonomy support, their employees perform better at their jobs and show better psychological well-being. Likewise, various studies have shown a positive relationship between autonomy and job performance (Johannsen & Zak, 2020). Thus,

H1. Autonomy is positively related to job performance.

Schaufeli, Bakker, and Salanova (2006) define engagement as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption. Highly engaged employees refer more to affiliation and positive emotions, while lowly engaged employees refer more to negative emotions and power (van Roekel, Wigger, Veldkamp, & Bakker, 2023). In the last decade there has been an increase in studies linking engagement to job performance showing that engaged employees perform better than others (Inam *et al.*, 2021; Neuber, Englitz, Schulte, Forthmann, & Holling, 2021).

Engagement is a motivational mechanism through which job resources (such as autonomy) facilitate job performance. Some researchers have studied the relationship between autonomy and positive mood. For example, using neurophysiology measuring, Johannsen and Zak (2020) found that the increase in autonomy was associated with positive mood and physiological effort, although it is not possible to know which of these is the independent variable. Likewise, several investigations have studied the relationship between engagement and job performance (Christian, Garza, & Slaughter, 2011; Sekhar, Patwardhan, & Vyas, 2018). Previous studies have shown that autonomy is positively associated with engagement (Halbesleben, 2010). In this line of thought, to advance our understanding on how autonomy improves job performance, we propose engagement as a mechanism that mediates this relationship. Therefore,

H2. Engagement mediates the relationship between autonomy and job performance.

We propose that the evolution of society, expressed in the emergence of different-generational cohorts (e.g. baby boomers and centennials), might affect how employees experience autonomy and engagement. For instance, the 21st century brought more individualism, competitiveness, and pressure to succeed. It increased the expectations of autonomy. In this context, the need for autonomy will increase among younger employees. In contrast, more experienced employees with a more classical mindset of their employment relationship do not consider autonomy necessary (Pinto, Ramos, & Nunes, 2014). Then, the effect of autonomy on job performance will be more assertive in younger generations vs older ones.

Demographic aging trends will have consequences concerning the general population, the composition of the workforce, and the shortage of some skills (Pinto *et al.*, 2014). Since this sociodemographic (age) diversity in the workplace is a substantial part of every organization, its impact outcomes must be studied. To manage a multigenerational workforce and achieve work engagement, an employer must understand the needs and expectations of different age groups. In this sense, some studies have analyzed the relationship between age and engagement with mixed results. Jaupi and Llaci (2015) found that older workers were more engaged than younger ones. Chaudhary and Rangnekar (2017) found that younger employees present less absorption but not less vigor nor less dedication. On the contrary, Avery, McKay, and Wilson (2007) reported that younger employees displayed higher engagement levels than older ones.

In contemporary workplaces, where generational diversity is increasingly prevalent, understanding the influence of age on HR practices is crucial. Different age groups bring unique perspectives, preferences, and needs to the workplace, demanding tailored HR strategies to maximize organizational effectiveness and employee engagement (Lyons & Kuron, 2014). For example, age can significantly impact recruitment and selection processes. HR professionals must ensure that recruitment practices are inclusive and do not

with private workers. Some studies have found that when managers provide autonomy support, their employees perform better at their jobs and show better psychological well-being. Likewise, various studies have shown a positive relationship between autonomy and job performance (Johannsen & Zak, 2020). Thus,

H1. Autonomy is positively related to job performance.

Revista de Gestão

399

Schaufeli, Bakker, and Salanova (2006) define engagement as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption. Highly engaged employees refer more to affiliation and positive emotions, while lowly engaged employees refer more to negative emotions and power (van Roekel, Wigger, Veldkamp, & Bakker, 2023). In the last decade there has been an increase in studies linking engagement to job performance showing that engaged employees perform better than others (Inam *et al.*, 2021; Neuber, Englitz, Schulte, Forthmann, & Holling, 2021).

Engagement is a motivational mechanism through which job resources (such as autonomy) facilitate job performance. Some researchers have studied the relationship between autonomy and positive mood. For example, using neurophysiology measuring, Johannsen and Zak (2020) found that the increase in autonomy was associated with positive mood and physiological effort, although it is not possible to know which of these is the independent variable. Likewise, several investigations have studied the relationship between engagement and job performance (Christian, Garza, & Slaughter, 2011; Sekhar, Patwardhan, & Vyas, 2018). Previous studies have shown that autonomy is positively associated with engagement (Halbesleben, 2010). In this line of thought, to advance our understanding on how autonomy improves job performance, we propose engagement as a mechanism that mediates this relationship. Therefore,

H2. Engagement mediates the relationship between autonomy and job performance.

We propose that the evolution of society, expressed in the emergence of different-generational cohorts (e.g. baby boomers and centennials), might affect how employees experience autonomy and engagement. For instance, the 21st century brought more individualism, competitiveness, and pressure to succeed. It increased the expectations of autonomy. In this context, the need for autonomy will increase among younger employees. In contrast, more experienced employees with a more classical mindset of their employment relationship do not consider autonomy necessary (Pinto, Ramos, & Nunes, 2014). Then, the effect of autonomy on job performance will be more assertive in younger generations vs older ones.

Demographic aging trends will have consequences concerning the general population, the composition of the workforce, and the shortage of some skills (Pinto *et al.*, 2014). Since this sociodemographic (age) diversity in the workplace is a substantial part of every organization, its impact outcomes must be studied. To manage a multigenerational workforce and achieve work engagement, an employer must understand the needs and expectations of different age groups. In this sense, some studies have analyzed the relationship between age and engagement with mixed results. Jaupi and Llaci (2015) found that older workers were more engaged than younger ones. Chaudhary and Rangnekar (2017) found that younger employees present less absorption but not less vigor nor less dedication. On the contrary, Avery, McKay, and Wilson (2007) reported that younger employees displayed higher engagement levels than older ones.

In contemporary workplaces, where generational diversity is increasingly prevalent, understanding the influence of age on HR practices is crucial. Different age groups bring unique perspectives, preferences, and needs to the workplace, demanding tailored HR strategies to maximize organizational effectiveness and employee engagement (Lyons & Kuron, 2014). For example, age can significantly impact recruitment and selection processes. HR professionals must ensure that recruitment practices are inclusive and do not

discriminate based on age (Kanfer & Ackerman, 2004). Additionally, understanding generational differences in communication styles and technology proficiency can inform targeted recruitment efforts and enhance the attraction of diverse talent pools (Ng & Feldman, 2016). Age can also impact other HR practices like training and development. Age-related factors such as experience levels, career aspirations, and learning preferences influence training and development initiatives (Kooij, de Lange, Jansen, Kanfer, & Dikkers, 2018). HR areas must design training programs that accommodate the diverse needs of employees across different age groups. Implementing mentoring programs, reverse mentoring opportunities, and flexible learning formats can facilitate knowledge transfer and skill development among employees of all ages.

Overall, incorporating age considerations into HR practices is essential for fostering an inclusive and productive workplace environment (Ng, Steele, & Sasaki, 2016). By recognizing the diverse needs and preferences of employees across different age groups, HR professionals can develop tailored strategies that promote employee engagement, retention, and organizational success. Embracing generational diversity in HR practices not only enhances employee satisfaction, but also contributes to a culture of innovation and resilience in today's dynamic workforce (Cascio & Boudreau, 2016). Then.

H3. Engagement mediates the relationship between autonomy and job performance, and age moderates the relationship between autonomy and engagement.

Method

The geographical area from which the sample is drawn corresponds to the city of Santiago, capital of Chile. The city concentrates 43.04% of the companies, 78.03% of the sales, and 62.50% of the dependent employees of Chile (SII, 2023). According to Hojman and Pérez (2005), organizational culture in Santiago is diverse, ranging from family-owned businesses rooted in local traditions to multinational corporations operating under global standards. This cultural diversity translates into different leadership styles, management approaches, and labor dynamics within organizations (Pérez & Rodríguez, 2003). Additionally, the city stands out for its entrepreneurial spirit and its ability to foster innovation, as reflected in the growth of startups and emerging companies in key sectors. We recruited employees from various companies in the service industry. The sample consisted of 214 participants (54% female) with an average age of 33 years. At the time of the study, all the participants were employed. Supplementary File Table A1 shows the characteristics of the sample.

We used validated scales published in prior research. The survey used a 5-point Likert scale (1 = disagree; 5 = agree) to rate all the constructs.

Autonomy. The survey used a 3-item scale by Idaszak and Drasgow (1987).

Engagement. We used a 9-item scale from the study by Schaufeli *et al.* (2006).

Job performance. We use Juyumaya and Torres (2022)' procedures to measure job performance.

Controls. This study included gender and work experience as control variables because they can influence creative performance (Juyumaya & Torres, 2022).

We employed a stratified sampling approach to ensure representation from different age groups. The initial step involved categorizing the population into distinct ages ranges: (1) 18–28; (2) 29–39; (3) 40–50; (4) 51–61; (5) 62 or more. We then randomly selected participants from each cohort based on proportional representation, considering the distribution of age groups in the overall population. By central limit theorem, we need at least 30 cases per range: we have ensured this lower limit in our sample. Supplementary File Table A2 shows the comparison between population and sample age distribution.

Data analysis

In this study, we employ a covariance structure analysis (Hair, 2014) to estimate the direct and indirect effect in our proposed theoretical model. To accomplish this, we performed three-stage procedures by conducting Structural Equation Modeling (SEM) analysis following the suggestions by Arbuckle (2006), Anderson and Gerbing (1988), and Podsakoff, MacKenzie, Lee, and Podsakoff (2003). We have used the software package AMOS 21.0 to run the analysis.

At the first stage, we have assessed the quality, adequacy, and the evidence for the construct validity of our measurement models, through a Confirmatory Factor Analysis (CFA), thus ensuring reliability, convergent and divergent validity (Hair, 2014). At the second stage, we tested three CFA competing models to rule out possible common method bias in our data. Next, we tested causal relationships among latent variables in our proposed structural model (Byrne, 2021). Finally, factorial equivalence was progressively analyzed by calculating Factorial Invariance (FI) using the procedure suggested by Dimitrov (2010), according to which Measurement Invariance refers to: (1) metric invariance (equality of factorial loadings between groups) and (2) scalar invariance (equality of intercepts between groups). When a strong measure of invariance is achieved, the comparison of latent means is justified. Subsequently, calculations were performed to compare the mean structural factorial loadings between the two age variable groups (39 years-old or younger and 40 years-old or older).

In each stage, Maximum Likelihood Estimation (MLE) method was employed (Byrne, 2021). Assessment of Goodness-of-Fit (GOF) was made by multiple indicators: Chi-square (χ^2), Chi-square to degree of freedom ratio (χ^2/gl), Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) (Bentler, 1990; McDonald & Marsh, 1990). According to Browne and Cudeck (1993), Hair (2014), and Catena, Trujillo, and Ramos (2003), model fit is good when indices are greater than 0.90, χ^2/gl is set between 2 and 5, and RMSEAs is below 0.08.

Measurement model

The structure of our measurement models (indicators) was tested using CFA with Maximum Likelihood Estimation (MLE). All goodness-of-fit statistics meet acceptable thresholds (χ^2 = 122.0; DF = 60; p < 0.011; χ^2/DF = 2.03; GFI = 0.923; TLI = 0.982; CFI = 0.986; RMSEA = 0.073; SRMR = 0.014). Following the recommendations of Jöreskog and Sörbom (1982), we ensured that all items were significant (Critical Ratio >2.58) with all factor loadings. We established the one-dimensionality of all constructs through CFI >0.95 (Kline, 2023) and Standardized Root Mean Square Residual less than 0.08 (Hu & Bentler, 1998).

Construct validity evidence was obtained, as observed in Supplementary File Table A3. The estimates confirm that the indicators of the latent variables autonomy and engagement share a high proportion of common variance. Regarding factor loadings, all are significant and greater than 0.7 (Ruvio, Shoham, & Makovec Brenčič, 2008). In terms of the extracted average variance (AVE) and composite reliabilities (CR), the autonomy and engagement dimensions meet the criteria of being above 0.5 (Fornell & Larcker, 1981) and above 0.7 (Hair, 2014), respectively. McDonald's omega index (1999) was used to estimate the internal consistency of each of the subscales, as it is a more reliable measure than Cronbach's alpha (Dunn, Baguley, & Brunsden, 2014), and all of them were adequate.

When evaluating convergent and discriminant validity (Hair, 2014), we employed the shared variance methodology of Fornell and Larcker (1981) and Malhotra and McCort (2001). For discriminant validity, we compared: (1) the Average Shared Variance (ASV) to AVE, and (2) the Maximum Shared Variance (MSV) to AVE. The measurement model exhibits good discriminant validity when MSV < AVE and ASV < AVE. For convergent validity, we compared: (1) CR to 0.7, (2) CR to AVE and (3) AVE to 0.5. The measurement model has good

convergent validity when CR > 0.7, CR > AVE, and AVE >0.5. Supplementary File Table A4 shows that autonomy and engagement constructs are distinct and different, meaning that these latent variables are valid and reliable, which currently does not allow for estimating the proposed theoretical causal model.

Although Fornell and Larcker's (1981) recommendation to examine shared variance to assess discriminant validity has been popular in the past, recent research has begun to question the sensitivity of this test in capturing discriminant validity issues among constructs (Henseler, Ringle, & Sarstedt, 2015). Henseler *et al*. (2015) proposed an approach based on the Heterotrait-Monotrait (HTMT) matrix to evaluate discriminant validity, called the HTMT correlation ratio. The method measures the proportion of shared variance between two constructs relative to unshared variance. If the HTMT ratio value is less than 0.90, discriminant validity between two constructs is established. Supplementary File Table A5 indicates that all constructs demonstrate discriminant validity.

Common method bias
To verify the presence of common method bias in our data, we applied two complementary strategies (Supplementary File Table A6). Following Cote and Buckley (1987), we developed three competitive CFA. The first CFA (Model 1) was a method-only model in which all measurement items were modeled under a single latent factor, resulting in the following fit indices: χ^2/DF = 10.181; RMSEA = 0.216; NFI = 0.851; CFI = 0.860; AIC = 722.35. In Model 2, we estimated a trait-only model. In this estimation, measurement items were loaded onto their respective latent factors, providing the following fit indices: χ^2/DF = 2.034; RMSEA = 0.070; NFI = 0.973; CFI = 0.986; AIC = 183.48. Finally, we estimated a method and trait model with the following fit indices for the Model 3: χ^2/DF = 3.212; RMSEA = 0.103; NFI = 0.965; CFI = 0.976; AIC = 240.15. Comparison of the three models (Supplementary File Table A6) indicates that Model 2 and Model 3 outperform Model 1, and Model 3 is not substantially better than Model 2. This demonstrates that common method bias does not significantly affect our study.

Additionally, following Simmering, Fuller, Richardson, Ocal, and Atinc (2015), two differential chi-squared tests were conducted between trait-only method versus unconstrained method plus trait-only method versus Equality-constrained method plus trait (Supplementary File Tables A7 and A8). The contrasts between model trait only and models method + trait is significant, indicating an absence of common method bias in any of the analyzed indicators (Lower Chi-Square).

Causal model
Figure 2 shows the SEM model. The results of the evaluation of the direct and indirect effect model show a good overall fit to the empirical data for all indices. We found (Supplementary File Table A9) adequate ratios compared to the Recommended Value for all the Adjustment Ratios exhibited.

Supplementary File Table A10 shows that autonomy has a positive and significant impact on job performance (β = 0.803; t = 15.62; p < 0.001), thus supporting hypothesis 1. For its part, autonomy does not have an impact on job performance (β = −0.132; t = −1.28; p = 0.199), thus not supporting hypothesis 1. Finally, engagement has a positive and significant impact on job performance (β = 0.632; t = 6.64; p < 0.001), thus supporting hypothesis 2.

39 years-old or younger
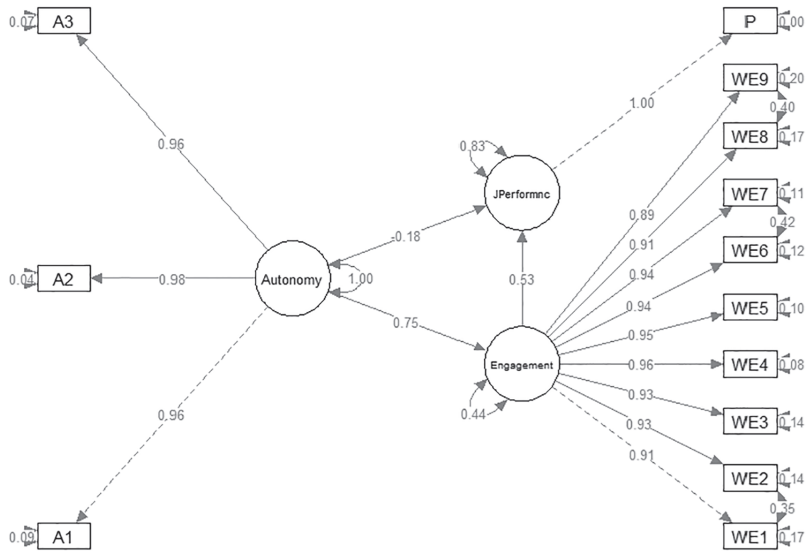
40 years-old or older
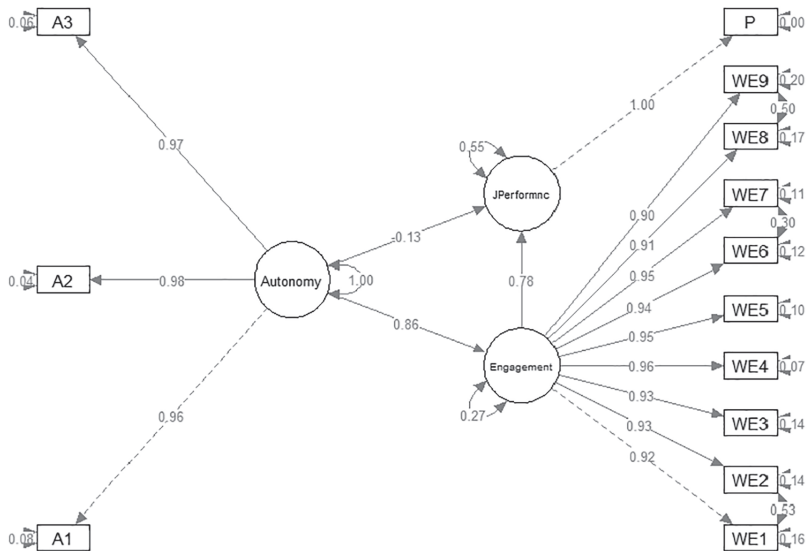
Source(s): Authors' own work

Figure 2.
SEM mediation-
moderation model

We analyzed the mediation effect of engagement on the relationship between autonomy and job performance. Supplementary File Table A11 shows the main direct, indirect, and total effects of the moderate mediation hypothesis. We only found a significant indirect effect of autonomy on job performance, partially mediated by engagement ($t = 5.784$; $p < 0.001$).

The significant effect on the indirect path through the mediation variable suggests that employee engagement plays an important role in the relationship between autonomy and job performance. Thus, supporting hypothesis 2.

Factorial invariance analysis

Following the procedure described by Cheung and Rensvold (2002), factorial equivalence (FI) was evaluated as a function of age. The model fit was calculated for both samples, showing an adequate fit in both cases (Supplementary File Table A12). Furthermore, results suggest that the squared multiple correlations coefficient of job performance for the Over 40 year-old group ($r^2 = 0.450$) is significantly higher than that of the under 39 year-old group ($r^2 = 0.167$).

Concerning the issue of aging and work, along with the problems faced by older individuals in companies, the choice was to evaluate generational age as a moderating variable. When contrasting the age and work experience of the interviewee, measured in an ordinal manner, a positive relationship between both is shown ($\chi^2 = 221.1$, df $= 16$; $p < 0.001$; Cramer's V $= 0.513$).

The factorial loadings of the structural mediation model are shown in Supplementary File Table A13. For both age groups, the results indicate that autonomy has a positive and significant impact on engagement. Autonomy has no impact on job performance. Finally, engagement has a positive and significant impact on job performance.

The next step consisted of testing the metric invariance or equivalence of the factor loadings between the two groups (weak invariance). To do this, first the unrestricted multigroup model (M0) was calculated. Next, the model was calculated by establishing the equality of factor loadings of the two samples (M1).

Supplementary File Table A14 reveals no statistically significant differences in the χ^2 increase between models (M0) and (M1). Consequently, a scalar invariance analysis was conducted, ensuring equivalent item intercepts across groups (M2). The comparison of χ^2 values demonstrated no substantial distinctions between the two models. While Dimitrov (2010) does not prescribe a rigid criterion for acceptable partial invariance, practical applications suggest that keeping fewer than 20% of parameters released is acceptable. We contend that, if the decrease in CFI is less than 0.01 and the χ^2 increase is not statistically significant, partial invariance can be reasonably assumed. In this study, both conditions were met. Therefore, it can be conclusively affirmed that both metric and scalar invariance exist, indicating strong invariance. This suggests that age does not act as a moderator in the relations of engagement in the relationship between autonomy and engagement; neither does it act as a moderator between engagement and job performance (M1 vs M2; $\Delta X^2 = 0.346$; gl $= 1$; $p = 0.556$).

In the final analysis, and for each age group (moderator), we scrutinize the mediated effect of engagement on the autonomy and job performance relationship (Table 1). The findings reveal a positive and significant indirect effect for both groups. Nevertheless, the magnitude of the indirect effect in the 40-year and above age group is 69% greater than that in the 39-year and under group.

To elucidate the disparity in the magnitude of the indirect effect across age groups, we delve into differences in factor loadings. The results highlight a significant difference in the assessment of the item "The job gives me a considerable opportunity for independence and freedom in how I do the work" (A2) ($\chi^2 = 288.14$; df $= 1$; $p = 0.048$) and "My job inspires me" (WE5) ($\chi^2 = 402.28$; df $= 1$; $p = 0.045$), thus partially supporting hypothesis 3.

Discussion
There are three main theoretical implications in this study. First, the results of hypotheses 1 and 2 reinforce the theorical assumptions of the motivational process of the JD-R model, since job resources such as autonomy play a role in job performance through their impact on motivation and then increased engagement, which positively impact job performance. This is in line with the proposal of Bakker and Demerouti (2018), who consider employees as active actors who seek to capitalize the existing resources by engaging in goal-directed behaviors, known as individual strategies to achieve goals, impacting on organizational outcomes such as job performance.

Second, our study offers a methodological alternative to evaluate performance at work. We propose an alternative methodological measure to assess job performance, which is in line with the proposal of Bakker and Demerouti (2017), for whom it is crucial to include alternatives to self-report measures in research models to develop the field of management and human resources.

Third, even though one of our three hypotheses was not confirmed (H3), this result contributes to general human resources research and its sub-disciplines, such as organizational psychology. Many positive results support the tested hypothesis in psychological science (Haeffel, 2022), which suggests a selection bias toward statistically significant results in the published literature (Chambers, 2017; Scheel *et al.*, 2021). Although there are several incentives only to publish positive results (Fanelli, 2010), negative results are significant to the progress of science since these can contribute to rephrasing or refuting contingent knowledge and give rise to new knowledge. Since psychology – including its organizational branch - is a young discipline (in the scientific canon) looking for supported theories (Burghardt and Bodansky, 2021), negative results like those in our research can contribute in small doses to constructing better theories and face the replication crisis in general psychology. Negative results such as this allow us, for instance, to continue testing this hypothesis with other samples of more significant heterogeneity. In this line and following our model, we encourage researchers to investigate the moderating role of age with larger samples, using age as a continuous variable, and to test the moderating effect not only with the autonomy variable, but also with engagement.

Also, future research can test other models adding other mediating variables to investigate the relationship between autonomy and engagement, such as job satisfaction; and add new moderating variables in addition to age, such as gender or work experience. The aim is to establish an explanatory model that lays out when and how there is a relationship between autonomy and job performance and the mediators and moderators of this relationship.

Practical implications
Job performance serves as a cornerstone for organizational success and remains a primary focus for HR areas aiming to optimize overall work performance (Campbell & Wiernik, 2015).

| Group | Path | β | β 95% confidence intervals | | z | p |
			Lower	Upper		
39 years-old or younger	Autonomy $\Rightarrow$ Engagement $\Rightarrow$ J. Performance	0.393	0.192	0.595	3.611	<0.001
40 years-old or older		0.665	0.415	0.915	4.777	<0.001

Source(s): Authors' own work

Table 1.
Mediated effect between autonomy, engagement, and job performance for each moderator variable group (age)

However, recognizing the nuanced impact of age on HR practices and their implications for employees is critical, yet often overlooked (Kooij, Jansen, Dikkers, & De Lange, 2010; Vasconcelos, 2018). Our study underscores the pivotal role of autonomy as a critical job resource perceived by all employees, positively influencing both engagement and job performance (Tisu *et al.*, 2023). This highlights the strategic importance of autonomy as a lever for enhancing engagement levels across the organization.

Then, in pursuit of better outcomes, human resources professionals can design individual and group interventions to enhance job resources such as autonomy to increase employee engagement (Bakker, Demerouti, & Sanz-Vergel, 2023). For example, HR professionals can improve learning and development opportunities through training, and give employees more responsibility and accountability. Such interventions may either take the form of workshops and trainings on an individual or group level. Additionally, HR professionals can train supervisors to foster an employee's autonomy. Likewise, HR professionals can redesign the job with the employees themselves as ways to deal with job demands.

While traditional HR dimensions such as autonomy, salary, training needs, recognition, and participation hold universal value (Kooij *et al.*, 2010), it is imperative for HR professionals to consider age-related preferences when implementing HR strategies. For example, younger employees may respond more favorably to practices promoting flexible work arrangements and psychological empowerment (Juyumaya, 2022), whereas older employees may prioritize job security (Fishman, 2016a, b).

In response to these insights, HR practitioners are encouraged to adopt a nuanced approach to HR practices that accommodates age-related dynamics. By tailoring selection and training strategies to resonate with the diverse needs and preferences of employees across different age groups, organizations can foster greater engagement, retention, and overall workforce satisfaction (Lyons & Kuron, 2014). Furthermore, ongoing research efforts are necessary to deepen our understanding of the intricate interplay between age and HR practices (Ng & Feldman, 2016). This will enable HR professionals to develop more targeted and effective interventions that address the evolving needs of a multigenerational workforce, ultimately driving organizational success in an increasingly diverse and dynamic business environment.

In the future, it would be interesting to know the role of age and engagement in various types of jobs, such as those related to technology versus those related to physical work. This information might be helpful to know if the role of these variables depends on the nature of the job. A mixed-method approach could be helpful for this aim, along with new perspectives of the JD-R theory (see Juyumaya & Torres, 2023; Juyumaya, 2023). Moreover, this line of research could benefit of the analysis other variables, like organizational and national cultures, and of the inclusion of other organizational variables.

References

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423. doi: 10.1037/0033-2909.103.3.411.

Arbuckle, J. (2006). Amos 7.0 User's Guide. SPSS.

Avery, D. R., McKay, P. F., & Wilson, D. C. (2007). Engaging the aging workforce: The relationship between perceived age similarity, satisfaction with coworkers, and employee engagement. *Journal of Applied Psychology*, *92*(6), 1542–1556. doi: 10.1037/0021-9010.92.6.1542.

Bakker, A. B. (2017). Strategic and proactive approaches to work engagement. *Organizational Dynamics*, *46*(2), 67–75. doi:10.1016/j.orgdyn.2017.04.002.

Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, *22*(3), 273–285. doi: 10.1037/ocp0000056.

Bakker, A. B., & Demerouti, E. (2018). Multiple levels in job demands-resources theory: Implications for employee well-being and performance. In E. Diener, S. Oishi, & L. Tay (Eds), *Handbook of well-being* (pp. 1–13). DEF.

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. (2023). Job demands–resources theory: Ten years later. *Annual Review of Organizational Psychology and Organizational Behavior*, 10(1), 25–53. doi: 10.1146/annurev-orgpsych-120920-053933.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238–246. doi: 10.1037/0033-2909.107.2.238.

Borst, R. T., Kruyen, P. M., & Lako, C. J. (2019). Exploring the job demands–resources model of work engagement in government: Bringing in a psychological perspective. *Review of Public Personnel Administration*, 39(3), 372–397. doi: 10.1177/0734371X17729870.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen, & J. S. Long (Eds), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Byrne, B. (2021). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. New York: Lawrence Erlbaum Associates.

Burghardt, J., & Bodansky, A. N. (2021). Why psychology needs to stop striving for novelty and how to move towards theory-driven research. *Frontiers in Psychology*, 12, 609802. doi: 10.3389/fpsyg.2021.609802.

Campbell, J. P., & Wiernik, B. M. (2015). The modeling and assessment of work performance. *Annual Review of Organizational Psychology and Organizational Behavior*, 2(1), 47–74. doi: 10.1146/annurev-orgpsych-032414-111427.

Cascio, W. F., & Boudreau, J. W. (2016). The future of work: We're not in Kansas anymore. In P. Sparrow, H. Scullion, & A. Tarique (Eds), *Strategic talent management: Contemporary issues in international context* (pp. 11–22). Cambridge University Press.

Catena, A., Trujillo, H., & Ramos, M. (2003). *Análisis multivariado un manual para investigadores*. Madrid: Biblioteca Nueva.

Chambers, C. (2017). *The seven deadly sins of psychology: A manifesto for reforming the culture of scientific practice*. New Jersey: Princeton University Press.

Chaudhary, R., & Rangnekar, S. (2017). Socio-demographic factors, contextual factors, and work engagement: Evidence from India. *Emerging Economy Studies*, 3(1), 1–18. doi: 10.1177/2394901517696646.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. doi: 10.1207/S15328007SEM0902_5.

Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64(1), 89–136. doi: 10.1111/j.1744-6570.2010.01203.x.

Cote, J. A., & Buckley, M. R. (1987). Estimating trait, method, and error variance: Generalizing across 70 construct validation studies. *Journal of Marketing Research*, 24(3), 315. doi: 10.2307/3151642.

Dimitrov, D. M. (2010). Testing for factorial invariance in the context of construct validation. *Measurement and Evaluation in Counseling and Development*, 43(2), 121–149. doi: 10.1177/0748175610373459.

Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, 105(3), 399–412. doi: 10.1111/bjop.12046.

Fanelli, D. (2010). Do pressures to publish increase scientists' bias? An empirical support from US states data. *PLoS One*, 5(4), e10271. doi: 10.1371/journal.pone.0010271.

Fishman, A. A. (2016a). How generational differences will impact America's aging workforce: Strategies for dealing with aging millennials, generation X, and baby boomers. *Strategic HR Review*, 15(6), 250–257. doi: 10.1108/SHR-08-2016-0068.

Fishman, J. A. (2016b). Age and work-related outcomes: The moderating role of career stage. *Journal of Managerial Psychology*, 31(1), 52–66. doi: 10.1108/JMP-08-2014-0257.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39. doi: 10.2307/3151312.

Haeffel, G. J. (2022). Psychology needs to get tired of winning. *Royal Society Open Science*, 9(6), 220099. doi: 10.1098/rsos.220099.

Hair, J. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Georgia: Sage Publications.

Halbesleben, J. R. B. (2010). A meta-analysis of work engagement: Relationships with burnout, demands, resources, and consequences. In A. B. Bakker, & M. P. Leiter (Eds), *Work engagement: A handbook of essential theory and research* (pp. 102–117). Psychology Press.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. doi: 10.1016/j.jretconser.2015.11.006.

Hojman, D. E. Y, & Pérez, G. (2005). Cultura nacional y cultura organizacional en tiempos de cambio: la experiencia chilena. *Academia. Revista Latinoamericana de Administración*, 35, 87–105.

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424–453. doi: 10.1037/1082-989X.3.4.424.

Idaszak, J. R., & Drasgow, F. (1987). A revision of the job diagnostic survey: Elimination of a measurement artifact. *Journal of Applied Psychology*, 72(1), 69–74. doi: 10.1037/0021-9010.72.1.69.

Inam, A., Ho, J. A., Zafar, H., Khan, U., Sheikh, A. A., & Najam, U. (2021). Fostering creativity and work engagement through perceived organizational support: The interactive role of stressors. *Sage Open*, 11(3). doi: 10.1177/21582440211046937.

Instituto Nacional de Estadísticas (INE). (2022). *Censo 2022*. Gobierno de Chile.

Jaupi, F., & Llaci, S. (2015). The impact of communication satisfaction and demographic variables on employee engagement. *Journal of Service Science and Management*, 8(02), 191–200. doi: 10.4236/jssm.2015.82021.

Johannsen, R., & Zak, P. J. (2020). Autonomy raises productivity: An experiment measuring neurophysiology. *Frontiers in Psychology*, 11, 963. doi: 10.3389/fpsyg.2020.00963.

Jöreskog, K. G., & Sörbom, D. (1982). Recent developments in structural equation modeling. *Journal of Marketing Research*, 19(4), 404–416. doi: 10.1177/002224378201900402.

Juyumaya, J. (2022). How psychological empowerment impacts task performance: The mediation role of work engagement and moderating role of age. *Frontiers in Psychology*, 13, 889936. doi: 10.3389/fpsyg.2022.889936.

Juyumaya, J. (2023). Digitally reflective employees as facilitators of digital work. *Management Research*, 21(4), 343–355. doi: 10.1108/MRJIAM-01-2023-1371.

Juyumaya, J., & Torres, J. P. (2022). Effects of transformational leadership and work engagement on managers' creative performance. *Baltic Journal of Management*, 18(1), 34–53. doi: 10.1108/BJM-11-2021-0449.

Juyumaya, J., & Torres, J. P. (2023). A managers' work engagement framework for the digital tasks. *Frontiers in Psychology*, 14, 1009459. doi: 10.3389/fpsyg.2023.1009459.

Kanfer, R., & Ackerman, P. L. (2004). Aging, adult development, and work motivation. *Academy of Management Review*, 29(3), 440–458. doi: 10.5465/amr.2004.13670968.

Katou, A., Koupkas, M., & Triantafillidou, E. (2022). Job demands-resources model, transformational leadership and organizational performance: A multilevel study. *International Journal of*

Productivity and Performance Management, *71*(7), 2704–2722. doi: 10.1108/IJPPM-06-2020-0342.

Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). New York: The Guilford Press.

Kooij, D. T. A. M., de Lange, A. H., Jansen, P. G. W., Kanfer, R., & Dikkers, J. S. E. (2018). Age and work-related motives: Results of a meta-analysis. *Journal of Organizational Behavior*, *39*(3), 317–341. doi: 10.1002/job.2241.

Kooij, D. T. A. M., Jansen, P. G. W., Dikkers, J. S. E., & De Lange, A. H. (2010). The influence of age on the associations between HR practices and both affective commitment and job satisfaction: A meta-analysis. *Journal of Organizational Behavior*, *31*(8), 1111–1136. doi: 10.1002/job.666.

Lyons, S. T., & Kuron, L. K. (2014). Generational differences in the workplace: A review of the evidence and directions for future research. *Journal of Organizational Behavior*, *35*(S1), S139–S157. doi: 10.1002/job.1913.

Malhotra, N. K., & McCort, J. D. (2001). A cross-cultural comparison of behavioral intention models - Theoretical consideration and an empirical investigation. *International Marketing Review*, *18*(3), 235–269. doi: 10.1108/02651330110396505.

McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. *Psychological Bulletin*, *107*(2), 247–255. doi: 10.1037/0033-2909.107.2.247.

Muecke, S., & Iseke, A. (2019). How does job autonomy influence job performance? A meta-analytic test of theoretical mechanisms. *Academy of Management Proceedings*, *2019* (1). 14632. doi: 10.5465/ambpp.2019.145.

Neuber, L., Englitz, C., Schulte, N., Forthmann, B., & Holling, H. (2021). How work engagement relates to performance and absenteeism: A meta-analysis. *European Journal of Work and Organizational Psychology*, *31*(2), 292–315. doi: 10.1080/1359432X.2021.1953989.

Ng, A. H., Steele, J. R., & Sasaki, J. Y. (2016). Will you remember me? Cultural differences in own-group face recognition biases. *Journal of Experimental Social Psychology*, *64*, 21–26. doi:10.1016/j.jesp.2016.01.003.

Ng, T. W. H., & Feldman, D. C. (2016). The moderating effects of age in the relationships of job embeddedness with its outcomes: A meta-analysis. *Journal of Vocational Behavior*, *92*, 81–91. doi: 10.1016/j.jvb.2015.11.001.

Pérez, G., & Rodríguez, J. (2003). *Organizational culture and innovation in Chile*. Santiago: Universidad de Santiago.

Pinto, A. M., Ramos, S., & Nunes, S. (2014). Managing an aging workforce: What is the value of human resource management practices for different age groups of workers?. *Tékhne*, *12*, 58–68. doi: 10.1016/j.tekhne.2015.01.007.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. doi: 10.1037/0021-9010.88.5.879.

Ruvio, A., Shoham, A., & Makovec Brenčič, M. (2008). Consumers' need for uniqueness: Short-form scale development and cross-cultural validation. *International Marketing Review*, *25*(1), 33–53. doi: 10.1108/02651330810851872.

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of engagement with a short questionnaire, a cross-national study. *Educational and Psychological Measurement*, *66*(4), 701–716. doi: 10.1177/001316440528247.

Scheel, A. M., Schijen, M. R. M. J., & Lakens, D. (2021). An excess of positive results: Comparing the standard psychology literature with registered reports. *Advances in Methods and Practices in Psychological Science*, *4*(2). doi: 10.1177/25152459211007467.

Sekhar, C., Patwardhan, M., & Vyas, V. (2018). Linking work engagement to job performance through flexible human resource management. *Advances in Developing Human Resources*, *20*(1), 72–87. doi: 10.1177/1523422317743250.

Servicio de Impuestos Internos (SII). (2023). *Estadísticas de Empresas por Región*. Santiago de Chile: Gobierno de Chile.

Simmering, M. J., Fuller, C. M., Richardson, H. A., Ocal, Y., & Atinc, G. M. (2015). Marker variable choice, reporting, and interpretation in the detection of common method variance: A review and demonstration. *Organizational Research Methods*, 18(3), 473–511. doi: 10.1177/1094428114560023.

Sonnentag, S., & Frese, M. (2013). Stress in organizations. In N. W. Schmitt, S. Highhouse, & I. B. Weiner (Eds), *Handbook of psychology: Industrial and organizational psychology* (pp. 560–592). John Wiley & Sons.

Tisu, L., Vîrgă, D., & Mermeze, I. (2023). Autonomy and performance: Proactive vitality management and work engagement as sequential mediators of the relationship. *Psychological Reports*, 126(1), 411–433. doi: 10.1177/00332941211048470.

van Roekel, H., Wigger, E. F. J., Veldkamp, B. P., & Bakker, A. B. (2023). What is work engagement? A text mining approach using employees' self-narratives. *Applied Psychology: International Review*, 73(3), 1071–1102. doi: 10.1111/apps.12501.

Vasconcelos, A. F. (2018). Older workers as a source of wisdom capital: Broadening perspectives. *Revista de Gestão*, 25(1), 102–118. doi: 10.1108/REGE-11-2017-002.

Corresponding author

Jesus Juyumaya can be contacted at: jesusjuyumayafu@santotomas.cl

Variable	
Sex	
Female	54.8%
Male	45.2%
Age range	
18 to 28 years-old	21.9%
29 to 39 years-old	30.0%
40 to 50 years-old	21.5%
51 to 61 years-old	13.3%
62 and over	13.3%
Work experience	
0 to 5 years	29.4%
6 to 11 years	24.8%
12 to 17 years	14.8%
18 to 23 years	12.9%
24 and over	18.1%
Autonomy. M (SD) [Min-Max]	2.75 (1.74) [1–5]
Engagement. M (SD) [Min-Max]	3.10 (1.31) [1–5]
Performance. M (SD) [Min-Max]	2.76 (1.75) [1–5]

Note(s): M = Means. SD = Standard deviations. Min = Minimum. Max = Maximum
Source(s): Authors' own work

Table A1.
Characteristics of the sample

Age range	Population (*)	Sample	Difference
18 to 28 years old	21.6%	21.9%	−0.3%
29 to 39 years old	25.1%	30.0%	−4.9%
40 to 50 years old	21.0%	21.5%	+0.5%
51 to 61 years old	18.5%	13.3%	+3.2%
62 and over	13.8%	13.3%	+0.5%

Note(s): (*) Projection based on 2017 Census information Chile. INE (2022)
Source(s): Authors' own work

Table A2.
Comparison between population and sample age distribution

Constructs	Items	Standardized item loading	McDonald Omega index	CR	AVE
Work engagement	WE1. At my work, I feel bursting with energy	0.927	0.978	0.948	0.937
	WE2. At my job, I feel strong and vigorous	0.915			
	WE3. When I get up in the morning, I feel like going to work	0.925			
	WE4. I am enthusiastic about my job	0.962			
	WE5. My job inspires me	0.949			
	WE6. I am proud of the work that I do	0.937			
	WE7. I feel happy when I am working intensely	0.946			
	WE8. I am immersed in my work	0.914			
	WE9. I get carried away when I'm working	0.895			
Autonomy	A1. The job gives me almost complete responsibility for deciding how and when the work is done	0.966	0.978	0.936	0.867
	A2. The job gives me a considerable opportunity for independence and freedom in how I do the work	0.978			

Source(s): Authors' own work

Table A3.
Reliability indices of the scales

Constructs	AVE	MSV	ASV
Engagement	0.937	0.641	0.641
Autonomy	0.867	0.587	0.513

Source(s): Authors' own work

Table A4.
Discriminant validity indices

Constructs	Engagement	Autonomy
Engagement	1	0.803
Autonomy	0.803	1

Source(s): Authors' own work

Table A5.
Matrix HTMT

Indicator	Model 1 method only	Model 2 trait only	Model 3 method + trait (a)	Model 4 method + trait (b)
χ^2/DF	10.181	2.034	3.212	2.936
CFI	0.860	0.986	0.976	0.974
NFI	0.851	0.973	0.965	0.961
RMSEA	0.216	0.070	0.103	0.096

Note(s): Method + Trait (a): Method Unconstrained
Method + Trait (b) Method Equal Constrained
Source(s): Authors' own work

Table A6.
Indicator common method analysis

Model	χ^2	DF	$\lvert\Delta\chi^2\rvert$; $\lvert\Delta DF\rvert$	p-value
Trait only	105.4	50	48.7; 2	<0.001
Method unconstrained + Trait	154.1	48		
Source(s): Authors' own work				

Table A7.
Unconstrained test
common method
analysis

Model	χ^2	DF	$\lvert\Delta\chi^2\rvert$; $\lvert\Delta DF\rvert$	p-value
Trait only	105.4	50	67.8; 9	<0.001
Method equal constrained + Trait	173.2	59		
Source(s): Authors' own work				

Table A8.
Constrained test
common method
analysis

Fit indices and R^2	Recommended value	Model
χ^2		121.484
df		60
χ^2/df	<3.0	2.025
GFI	≥ 0.90	0.918
NFI	≥ 0.90	0.973
CFI	≥ 0.95	0.986
PNFI	≥ 0.5	0.748
RMSEA	≤ 0.07	0.070
SRMR	≤ 0.05	0.037
AIC	Lowest	148.43
R^2		0.283
Source(s): Authors' own work		

Table A9.
Result of causal model

Paths	Coefficients (β)	t-value	p-value
Autonomy → Engagement (+)	0.803	15.62	<0.001
Autonomy → J. Performance (+)	−0.132	−1.28	0.199
Engagement → J. Performance (+)	0.632	6.64	<0.001
Source(s): Authors' own work			

Table A10.
Model

414

Paths	Direct	Indirect	Total
Autonomy→ Engagement→ J. Performance	−0.132 (*)	0.508 (**)	0.375 (**)
Note(s): * Not significant. ** Significant			
Source(s): Authors' own work			

Table A11.
Standardized effects:
total, direct, indirect

Fit indices and R^2	39 years old and under	40 years old and over
χ^2	61.5	174.9
df	59	59
χ^2/df	1.040	2.965
GFI	0.922	0.898
NFI	0.971	0.935
CFI	0.999	0.956
PNFI	0.734	0.705
RMSEA	0.019	0.104
SRMR	0.046	0.052
AIC	125.38	238.27
R^2	0.167	0.450
Source(s): Authors' own work		

Table A12.
Model Fit Indicators
for each age group

Group	Dependent	Predictor	β	β 95% confidence intervals Lower	Upper	z	p
39 year-old and under	Engagement	Autonomy	0.749	0.663	0.8355	10.524	<0.001
	J. Performance	Engagement	0.525	0.272	0.7783	3.803	<0.001
	J. Performance	Autonomy	−0.179	−0.447	0.0883	−1.306	0.192
40 year-old and over	Engagement	Autonomy	0.857	0.802	0.9128	13.739	<0.001
	J. Performance	Engagement	0.776	0.497	0.1546	4.991	<0.001
	J. Performance	Autonomy	−0.126	−0.427	0.1747	−0.821	0.411
Source(s): Authors' own work							

Table A13.
Parameter estimates of
the structural
mediation model,
moderated by age

Model Invariance criterion	$\Delta\chi^2$	Δ gl	p-value $p > 0.05$	Δ CFI <0.01	Δ RMSEA <0.015
Measurement weights (M1)	13.421	12	0.339	0.000	−0.003
Structural weights (M2)	0.346	1	0.556	0.000	−0.001
Structural residuals (M3)	3.342	2	0.188	−0.001	0.000
Measurement residuals (M4)	97.221	16	0.000	−0.018	0.014
Source(s): Authors' own work					

Table A14.
Goodness of fit indexes
of the models of
invariance by age,
assuming model
unconstrained to be
correct (M0)