

The Relationship between Perceived Stress and Work Engagement – Evidence from Public Institutions Managing EU Funds

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Abstract. Organizational stress is the ability of employees to responde to workplace demands with limited resources. At times, stress can be good for work engagement, but an overdose of it results in negative outcomes. Given that the role of stress is determined as a critical one in workplace dynamics, assessing employees' perceptions of stress is essential. In this study we examine the relationships between stress, work engagement, gender, and age among employees managing European funds in Romanian public institutions. Employees that are involved in EU projects take on additional responsibilities that contribute to national development. It, therefore, becomes particularly relevant to explore the stress and the engagement of their perception levels. The importance of these factors is crucial, as their work directly impacts the efficient management of public resources. For data collection, this investigation used the Perceived Stress Scale and the Utrecht Work Engagement Scale - Short Version (UWES-9) as measurement tools for the research variables, and validated their internal consistency via McDonald's Omega coefficient. This research adds value by testing established hypotheses in the context of public sector employees managing European funds – an understudied group in the existing literature. According to the outcomes, the study also supports the hypothesis that women report higher stress levels than man, consistent with prior research. Likewise, contrary to our predictions, the study shows that stress levels increase with age. Furthermore, the results of our study showed no signs of a similar relationship affect between work engagement and age. Despite no significant gender differences in work engagement were identified, a significant negative correlation between stress and work engagement was strongly determined. The data point out the importance of stress management strategies, particularly for employees in demanding public sector roles. Future research should search out for the additional new determinants that influence stress and engagement, including coping mechanisms and organizational support systems.

Keywords: organizational stress, Utrecht work engagement scale, Perceived stress scale, employees managing European funds, Romanian public institutions.

Introduction

The investigation's primary objective is to establish whether there is a correlation between organizational stress, work engagement, gender, and age among public institutions' employees that manage European funds in Romania. Given that employees in Romanian public institutions who are assigned to project teams perform additional work compared to other employees, we aim to understand their perception of organizational stress.

We will not only confirm our own results by consulting the abundant literature in the field but also we will assess the extent to which they align. We will also attempt to find out how far the people's feeling of work engagement is affected by their gender and age.

We will be able to test the truth of three declared hypotheses and two research questions, which are related to women's view of the stress level compared to the same issue in men, the correlation between stress and age, work engagement of women and men, and the relationship between stress and work engagement.

For this research we utilized Perceived Stress Scale and Utrecht Work Engagement Scale - Short Version (UWES-9) on the basis of two instruments through which the study tried to measure stress and work engagement and the reliability of the related factors was tested using McDonald's Omega coefficient.

Literature review

Organizational stress and coping strategies

Stress can be seen as our body's capacity to deal with external influences. Employees' stress in organizations is rooted in the perception of an individual that the resources at their disposal are not enough to meet the demands of the job. It is very important that the existing stress is not only the result of the stressor itself but also the way in which the person understands and values the situation (Chauhan, 2014; Shirom, 1982).

The way how we handle stress can be different and it depends on many factors such as gender, experience, adaptability, and also the source of stress. Employees who are not satisfied with the various aspects that increase their stress levels like their financial situation, promotions, workload, inadequate benefits, and lack of free time. However, two strategies can be used to control organizational stress: problem-focused coping and emotion-focused coping (Ersen et al., 2024). The first one refers to proactive addressing of stressful situations by finding strategies to combat and reduce stress, such as effective stress management. Whereas, the latter one consists of integrating the practice of various relaxation techniques in daily life and seeking emotional support to overcome difficult times.

Employees who are under stress may commit deviant acts like resource waste, bribery, theft, or sabotage (Ayu Swandewi et al., 2024). Increasing organizational commitment, offering career advancement opportunities, involving employees in decision-making, recognizing and rewarding performance, enforcing clear policies on ethical behavior and sanctioning deviant actions, providing training programs for communication and conflict resolution skills, effectively managing workload, ensuring a work-life balance, and fostering an organizational culture that prioritizes employee health and well-being are all effective ways to combat deviant behaviors (Banisi, 2024).

Prevention is a widely discussed issue regarding stress in organizations. By handling workplace conflicts with effective communication and solid time management, companies can greatly improve employee satisfaction. And when employees are happy at work, it can lead to better overall performance for the company (Gabor et al., 2024).

Organizational stress can actually have a positive impact on professional satisfaction, as employees are able to view challenges as a good thing and be satisfied with their jobs. This is generally what is called eustress (Le Fevre et al., 2003). However, if workplace situations are perceived as tense, conflictual, or worrying, the increased stress level can negatively affect employee satisfaction, leading to higher turnover (the more well-known facet of stress, *distress*).

Since employee satisfaction plays a vital role in a company's overall performance, it's essential for organizations to explore ways to enhance job satisfaction to help lower turnover, which can drain company resources (Marlapa & Endri, 2024).

Employee performance brings job satisfaction, regardless of the effort put into work; sometimes, job performance followed by satisfaction can be achieved with minimal, accidental effort – this is the case for those who are not very engaged or passionate about their work. Unfortunately, burnout negatively affects the perception of performance, even if the effort was considerable. Those who use coping mechanisms and approach the stressful situations they encounter with a positive attitude focused on finding solutions tend to have a low level of burnout – this is often the case for many managers and entrepreneurs (Radu et al., 2020).

There are many scales developed for measuring the perceived stress, mainly the extent to which individuals perceive situations in their lives as stressful, and thus how unpredictable, uncontrollable, and overwhelming respondents perceive their lives to be (Warttig et al., 2013).

Findings from research conducted in 1983, 2006, and 2009 indicate the following: stress levels are higher in women than in men and tend to decrease as age, education level, and income increase; unemployed individuals and retirees are at opposite ends of the spectrum in terms of reported stress levels, with the former experiencing higher stress; overall, stress levels increased as a result of the 2008-2009 economic recession; psychological stress levels are influenced by gender, age, education, income, occupational status, and ethnicity (Cohen & Janicki-Deverts, 2012). As we age, we tend to approach life situations more calmly and develop better coping strategies, which help reduce stress levels.

Employee organizational engagement

Organizational engagement is represented by the level of identification employees have with the organization they work for, and the higher this level, the more productive the employees are. While workplace conflicts negatively influence employee organizational commitment, organizational stress is mediated by the employee's motivation to work for that organization (Baihaqy, 2024).

Tight deadlines for completing work tasks can enhance employees' engagement at work, because they make them feel important to the organization. Additionally, work resources, such as colleagues' support, contribute to greater work engagement. On the other hand, support from superiors has a negative effect on work engagement, as it is more often associated with the obligation to complete tasks. Another argument for employees' lack of engagement at work is role ambiguity. If employees are unclear about their role in the organization, their engagement decreases – without well-defined activities, they lack a specific purpose (Inoue et al., 2014). Work engagement is directly proportional to the emotions experienced at work; the more positive these emotions are, the higher the engagement. Those who are more engaged in their work tend to support others and are more attentive to the needs of their colleagues (Virgă et al., 2009). The perception that the organization respects and treats employees with dignity makes them more engaged at work, more enthusiastic, and better able to concentrate. Job resources contribute positively to employee work engagement, so the support of supervisors and colleagues is very important. Furthermore, job satisfaction reduces the occurrence of depression and other disorders, and helps retain employees in the workplace.

The most well-known scale for measuring organizational engagement is the Utrecht Work Engagement Scale (UWES), which has two main versions that differ in the number of items applied to the respondents (17 versus 9). The results of a study conducted in Thailand on a sample of nurses demonstrated that both versions of the Utrecht Work Engagement Scale, the long version with 17 items and the short version with 9 items, lead to similar results. Therefore, the short version of the scale could be preferred for practical reasons. According to this study, young employees with less professional experience reported a lower level of work engagement, while managerial staff showed

a higher level of work engagement compared to employees in non-managerial positions (Tatha et al., 2024). There is also a third scale, the Ultra-Short Work Engagement Scale (UWES-3), it was demonstrated that is as valid as the UWES-9 item version by comparing the two scales (Schaufeli et al., 2019). Shortening the original version of UWES can eliminate time constraints when surveying employees.

Methodology

Research Design

The aim of this study is to examine the relationship between perceived stress and work engagement among employees working in public institutions managing European funds, with a particular focus on whether this relationship follows a linear or curvilinear (inverse U-shaped) pattern. Additionally, the study investigates the role of demographic factors such as age and gender in shaping perceived stress and work engagement. The research design is non-experimental, cross-sectional, and exploratory.

Building on the central objective of our study, we formulated the following hypotheses (H) and research questions (RQ):

- **H1: Women report higher levels of stress compared to men.** Previous studies have consistently shown that women tend to experience higher levels of stress due to a combination of biological, psychological, and social factors, including work-life balance challenges and gender role expectations (Cohen & Janicki-Deverts, 2012; Costa et al., 2021; Matud, 2004). Given these findings, we aim to test this hypothesis within the specific context of public institutions managing EU funds.
- **H2: Stress levels are negatively correlated with age.** Previous research suggests such a negative correlation, with the explanation that as individuals age, they develop better coping mechanisms, emotional regulation skills, and resilience, leading to lower stress levels over time (Cohen & Janicki-Deverts, 2012; Johnson et al., 2023). Interestingly, this trend has been also supported by research showing that older adults experienced less stress, negative affect, and depression than younger adults during the COVID-19 pandemic (Fields et al., 2021). Therefore, we aim to examine whether this pattern holds in our specific context.
- **H3: Work engagement is positively correlated with age.** Older employees often demonstrate higher work engagement, potentially due to accumulated professional experience, career identity, and job satisfaction (Kim & Kang, 2017; Mori et al., 2023). Therefore, we seek to explore whether this positive correlation can be observed in our analyzed context.
- **RQ1: Does work engagement differ between men and women?** With respect to this question, previous findings are mixed. Some studies suggest no significant gender differences in work engagement (Kováčová & Drahotský, 2022; Lee & Eissenstat, 2018). Others indicate variations influenced by cultural and organizational contexts. For instance, in collectivistic settings, men may benefit more from challenging job demands in terms of work engagement (Ghosh et al., 2019). Conversely, a study in Japan found that while higher work engagement enhances work performance for both genders, the impact is stronger among women than men (Eguchi et al., 2020). Therefore, it is interesting to explore this relationship in our specific context.
- **RQ2: What is the nature of the relationship between stress and work engagement (linear, curvilinear, or absent)?** The interaction between stress and work engagement is complex.

While some studies suggest that moderate stress can enhance engagement, excessive stress often leads to burnout and disengagement. Most research indicates a negative linear relationship, where higher stress levels generally reduce engagement (Breaugh, 2020; Cabrera-Aguilar et al., 2023; Miranda et al., 2020). However, other studies propose a curvilinear relationship, suggesting that stress can have both positive and negative effects (Guan, 2024; Hajj et al., 2023). Some findings even question the existence of a relationship, as the mixed effects of eustress and distress may cancel each other out, resulting in no clear overall impact—especially when these two forms of stress are not properly distinguished (Le Fevre et al., 2003). Given these conflicting perspectives, we aim to further examine this relationship in our study.

Based on the existing literature, we formulated hypotheses where prior research provides strong support for expected patterns. In contrast, the other two aspects remain more exploratory and are framed as research questions, with the second one being the central focus of our paper.

Data Collection, Instruments and Data Analysis

Data collection took place between November 7 and 27, 2024, through an online questionnaire (Google Forms). The survey link was distributed via email to approximately 100 public institutions in Romania, resulting in a total of 152 responses. Although the number of responses is somewhat limited due to the study's focus on a specific group – employees managing European funds within public institutions – the sample size exceeds the minimum requirement suggested by Green (1991): $n > 50 + 8m$, where m = the number of independent variables.

In this research, non-probability sampling was used as the study aimed at a specific goal and was exploratory in nature. The main method used was judgmental sampling, as participants were selected based on predefined criteria relevant to the study, namely, staff from public institutions in Romania managing European funds.

Participation was voluntary, confidential, and uncompensated. To ensure consistency, all respondents received the same set of mandatory questions in the same order, with partial responses not being allowed. 75% of respondents expressed a desire to receive a copy of the published findings and provided their email addresses for this purpose.

The questionnaire included general identification questions (e.g., gender, age, hours worked per month on project-related activities, salary increase percentage for project tasks, job position, and institution). In addition to general questions, the survey incorporated validated psychological scales. However, this paper focuses specifically on two: the Perceived Stress Scale (PSS) and the Utrecht Work Engagement Scale - Short Version (UWES-9).

The final sample consisted of 152 respondents from 63 public institutions across Romania. Respondents' ages ranged from 24 to 66 years ($M = 44.47$, $SD = 9.16$). In table 1, we present the distribution of respondents based on their managerial role and gender.

Table 1. Distribution of Respondents by Managerial Role and Gender

Function	Female (n=107, 70.39%)	Male (n=45, 29.61%)	Total (n=152, 100%)
Managerial	19 (12.50%)	11 (7.24%)	30 (19.74%)
Non-Managerial	88 (57.89%)	34 (22.37%)	122 (80.26%)
Total	107 (70.39%)	45 (29.61%)	152 (100%)

Source: Authors' own research.

For this study, we used two scales and assessed their internal consistency using McDonald's Omega coefficient (Kalkbrenner, 2024). Thus, the 14-item Perceived Stress Scale (PSS-10) was used to assess the degree to which situations in life are perceived as stressful (Cohen et al., 1983). Participants responded on a 5-point scale ranging from 0 (never) to 4 (very often). Of the 14 items, 7 items were worded in a positive direction, so they were reverse-scored. A total Perceived Stress score was then computed by summing all item responses.

Similarly, we used the Utrecht Work Engagement Scale - Short Version (UWES-9), as described by Schaufeli et al. (2006). For this, we used a 7-point Likert scale, ranging from 0 (never) to 6 (always/daily). The overall Work Engagement score was obtained by summing the responses to all nine items. The reliability statistics are shown in table 2. Both scales had a good internal consistency, and no item was removed.

Table 2. Frequentist Scale Reliability Statistics – Coefficient McDonald's ω

Variable	Estimate	Std. Error	Lower	Upper
Perceived Stress	0.890	0.013	0.865	0.916
Work Engagement	0.919	0.010	0.899	0.938

Source: Authors' own research.

For the analysis, we used JASP software. We mainly conducted correlation analyses to examine linear relationships, along with Student's t-test and the Mann-Whitney test to assess group differences. Additionally, multiple regression, including curve estimation and polynomial regression, was applied to test for a potential curvilinear relationship. As common in literature, the threshold for statistical significance was $p < 0.05$.

Results and discussion

Descriptive Analysis

The descriptive analysis provides an overview of the key variables in our study, serving as a basis for determining the appropriate statistical tests. Thus, in table 3 we present the descriptive statistics for the analysed measures, while in table 4 we report the results of Levene's test for equality of variances.

Table 3. Descriptive Statistics of the two main variables

	Perceived Stress	Work Engagement
Mean	22.743	39.921
Std. Deviation	8.736	8.227
Skewness	-0.006	-0.329
Std. Error of Skewness	0.197	0.197
Kurtosis	-0.566	-0.714
Std. Error of Kurtosis	0.391	0.391
Shapiro-Wilk	0.988	0.969
P-value of Shapiro-Wilk	0.23	0.002
Minimum	4	20
Maximum	42	54

Source: Authors' own research.

Table 4. Test of Equality of Variances (Levene's)

	F	df ₁	df ₂	p
Perceived Stress	0.916	1	150	0.34
Work Engagement	0.999	1	150	0.319

Source: Authors' own research.

As can be observed in tables 3 and 4, both variables pass Levene's test for equal variances ($p > 0.05$). Regarding normality, only the Perceived Stress variable passes the Shapiro-Wilk test ($p > 0.05$), so we will use Student's t-test to analyze gender differences for stress. However, since Work Engagement does not meet the normality assumption, we will use the Mann-Whitney test to compare men and women.

Since the variable Work Engagement does not meet the normality assumption, to determine the correlation between age and our two variables (Perceived Stress and Work Engagement), we used Spearman's correlation for both variables to ensure consistency in reporting.

With respect to our main research question, we initially investigated the potential for a curvilinear (inverted U-shaped) relationship between Perceived Stress and Work Engagement by performing polynomial regression analysis, incorporating both linear and quadratic terms for Perceived Stress. Then, we also assessed the linear relationship between Perceived Stress and Work Engagement using Spearman's rank correlation, due to the non-normal distribution of the Work Engagement variable.

Hypothesis Testing and Research Questions

In this section, we examine the proposed hypotheses and research questions using statistical analyses. We begin by assessing gender differences in perceived stress through an independent samples t-test. Table 5 presents the results of our analysis.

Table 5. Gender differences in Perceived Stress (H1) - Independent Samples T-Student Test

	t	df	p	Cohen's d	SE Cohen's d
Perceived Stress	-2.299	150	0.023	-0.408	0.183

Source: Authors' own research.

Given the statistically significant differences observed, we further analyzed the Perceived Stress scores for both men and women, as presented in table 6.

Table 6. Perceived Stress – Group descriptives

	Group	N	Mean	SD	SE	Coefficient of variation
Perceived Stress	Men	45	20.267	9.282	1.384	0.458
	Women	107	23.785	8.321	0.804	0.35

Source: Authors' own research.

These results support ***H1***, showing that ***women report higher levels of stress than men***. This finding aligns with previous research highlighting the impact of work-life balance challenges and gender role expectations (Cohen & Janicki-Deverts, 2012; Costa et al., 2021; Matud, 2004),

suggesting that these factors may also contribute to stress disparities in public institutions managing EU funds.

In order to analyze the impact of age on the levels of stress and work engagement (H2 and H3), Spearman's rank-order correlation was conducted to assess the relationship between age and Perceived Stress. There was a positive correlation between the two variables, (Spearman's $\rho = 0.217$, $p = .007$). Similarly, a Spearman's rank-order correlation was conducted to assess the relationship between age and Work Engagement. In this case the relationship is not statistically significant ($p = .145$). The results did not support Hypotheses 2 and 3.

Contrary to **H2**, there was a positive correlation between stress levels and age, indicating that *as age increases, perceived stress also increases*. This finding contrasts with previous research suggesting that older individuals develop better coping mechanisms and experience lower stress (Cohen & Janicki-Deverts, 2012; Johnson et al., 2023). One possible explanation could be the unique demands of managing EU funds in public institutions, which may intensify with seniority (a series of extra-duties for the more experienced people).

Regarding **H3**, *the relationship between work engagement and age was not statistically significant*. This challenges prior studies that link higher engagement to greater experience and career identity (Kim & Kang, 2017; Mori et al., 2023), suggesting that other contextual factors may influence engagement levels in our sample (out of which some might be related to stress).

A Mann-Whitney U test was conducted to determine if there is a difference in work engagement levels between men and women (RQ1). Results are presented in table 7.

Table 7. Gender differences in Work Engagement (RQ1) - Mann-Whitney U test

	U	p	Rank-Biserial Correlation	SE Rank-Biserial Correlation
Work Engagement	2267.000	0.572	-0.058	0.103

Source: Authors' own research.

Therefore, regarding **RQ1**, *our analysis did not reveal a statistically significant difference in work engagement between men and women*. This finding aligns with a substantial portion of existing literature reporting no significant gender differences (Kováčová & Drahotský, 2022; Lee & Eissenstat, 2018). However, it contrasts with studies suggesting that cultural and organizational factors may shape gender differences in engagement (Ghosh et al., 2019; Eguchi et al., 2020). The absence of significant differences in our sample suggests that such contextual influences may be less pronounced in public institutions managing EU funds, potentially due to standardized work structures, regulatory frameworks, and shared professional roles that minimize gender-based variations in engagement.

Then we examined the relationship between stress and work engagement (RQ2 - key question). The potential for a curvilinear (inverted U-shaped) relationship between Perceived Stress and Work Engagement was investigated by performing polynomial regression analysis, incorporating both linear and quadratic terms for Perceived Stress. Results are presented in table 8 and table 9. Model M_1 includes Perceived Stress and Perceived Stress².

Table 8. Model Summary - Work Engagement – Multiple regression

Model	R	R ²	Adjusted R ²	RMSE
M_0	0	0	0	8.227
M_1	0.479	0.229	0.219	7.271

Source: Authors' own research.

Table 9. Regression Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	39.921	0.667		59.828	< .001
M ₁	(Intercept)	50.021	3.32		15.067	< .001
	Perceived Stress	-0.435	0.305	-0.462	-1.427	0.156
	Perceived Stress ²	-3.487×10 ⁻⁴	0.007	-0.017	-0.053	0.958

Source: Authors' own research.

The analysis revealed that the coefficient associated with the squared term was not statistically significant, suggesting the absence of a curvilinear relationship between these variables. Consequently, we assessed the linear relationship between Stress and Work Engagement using Spearman's correlation coefficient, due to the violation of the normality assumption for the Work Engagement variable. There was a significant negative correlation between perceived stress and work engagement, Spearman's $\rho = -.481$, $p < .001$. Therefore, regarding **RQ2**, *our analysis indicates a substantial negative linear correlation between perceived stress and work engagement, rather than a curvilinear relationship*. This finding is in line with the majority of existing research, which suggests that increased stress generally reduces engagement (Breaugh, 2020; Cabrera-Aguilar et al., 2023; Miranda et al., 2020). The strong negative correlation observed in our sample suggests that, in the context of public institutions managing EU funds, stress predominantly acts as a barrier to work engagement rather than as a potential motivator.

Conclusion

This study examined the relationships between stress, work engagement, gender, and age among employees managing European funds in Romanian public institutions. Our main findings can be summarized as follows:

- Women reported higher stress levels than men, aligning with existing literature;
- Contrary to expectations, stress levels increased with age;
- No significant gender differences were found in work engagement;
- We found no significant gender differences in work engagement, supporting some prior studies, and conflicting with others;
- A strong negative linear relationship between stress and work engagement was identified, with no evidence of a curvilinear effect.

These findings suggest that stress management interventions may be particularly important for women and older employees. The absence of gender differences in engagement may indicate that contextual factors in public institutions help reduce potential disparities. Additionally, given the strong negative association between stress and work engagement, organizations should prioritize strategies to alleviate stress, as it clearly affects employee engagement.

Of course, our study has several limitations. First, the cross-sectional design prevents causal inferences – the “classical problem” – so we cannot determine whether stress leads to lower engagement or vice versa. Future longitudinal studies could provide deeper insights into the directionality of these relationships. Second, our sample was limited to employees managing European funds in Romanian public institutions, which may restrict the generalizability of our

findings to other sectors or countries. While we identified a significant negative correlation between stress and work engagement, future research should explore potential mediating or moderating variables, such as coping strategies, resilience, or job resources, that might influence this relationship.

Furthermore, it should be noted that this research presents the results of stress and work engagement among employees managing European funds in Romanian public institutions. These employees perform additional tasks beyond those outlined in their job description and receive additional compensation for these tasks. This particularity of their work context may influence their reported stress and engagement levels, potentially limiting the generalizability of our findings to other public institutions.

Additionally, responses collected through the questionnaire may vary depending on the respondents' state and circumstances at the time of completion. Although self-reported measures are commonly used in psychological and organizational research, they inherently carry a risk of subjectivity. To mitigate this, future studies could incorporate objective indicators of stress (such as physiological measures) or engagement (such as performance metrics). Furthermore, we intend to repeat the research with the same respondents after a certain period of time to compare the results over time. It is important to mention that the participants were informed that the study would be repeated, which may encourage more consistent responses in the future.

Finally, an important direction for future research is the differentiation between the components of eustress and distress. While our study primarily focused on the negative effects of stress, future analyses could explore whether certain aspects of stress might have a motivating or performance-enhancing role. By examining these distinct effects, we can gain a more comprehensive understanding of how stress influences work engagement – potentially identifying conditions under which stress can be beneficial rather than solely detrimental.

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