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Proactive Performance of Employees in Polish Higher Education Institutions: Determinants and Implications

ABSTRACT

This study examines factors associated with proactive performance, as conceptualized by Griffin et al. (2007), among employees in Polish higher education. Drawing on a job performance framework (Hauk, 2025), rooted in the Job Characteristics Model (Hackman & Oldham, 1980) and its extensions, this research integrates motivational, social, and contextual job characteristics with two core psychological states – sense of meaningfulness and sense of responsibility and knowledge of results – and tests the moderating role of psychological safety.

A survey was conducted among 378 academic and administrative staff members from 26 Polish higher education institutions. The study assessed direct, indirect, and moderated pathways between work characteristics and three forms of proactive performance: doing a task individually, as a team member, and as a member of an organization.

As for the results, psychological safety moderated the indirect effects: meaningfulness served as a mediator under low to moderate levels of safety, whereas responsibility and knowledge of results played a stronger mediating role under moderate to high levels of safety.

These findings advance understanding of proactive performance in academia and highlight the importance of cultivating psychologically safe and supportive

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work environments. Thus, they hold particular significance for higher education institutions in Central and Eastern Europe.

KEYWORDS: proactive performance; proactivity; higher education; work characteristics; work design; psychological safety

INTRODUCTION

The construct of proactivity has received significant scholarly attention over the past decades as organizations have become increasingly turbulent, uncertain, and interdependent. In dynamic organizational environments, traditional models of performance – centered on predictable, routine tasks – are insufficient for sustaining effectiveness (Griffin et al., 2007; Ilgen & Pulakos, 1999). Consequently, the capacity of staff to generate self-initiated, future-oriented action, i.e. proactivity, has emerged as a critical dimension of work effectiveness essential for navigating uncertainty and initiating change (Griffin et al., 2007; Pulakos et al., 2000).

These insights resonate strongly in the higher education sector. Universities in Central and Eastern Europe (particularly in Poland), as highlighted by Kwiek (2003), Górska et al. (2022) and Trow (2007), have faced profound transformational pressures: mass higher education, diversification of student populations, intensifying international competition, and growing performance expectations, among others. Such complexity challenges traditional academic roles and governance structures.

Hence, proactivity becomes a crucial behavioral resource: academic staff and administrators must craft roles dynamically, respond to fast-changing demands, and engage in anticipatory behaviors that sustain both teaching and research productivity. Considering the information outlined below, the aim of this study is to advance knowledge of proactive performance in the context of higher education.

Theoretical background

Proactivity and proactive performance

Proactivity is broadly understood as a change-oriented behavior that originates from the individual rather than being externally mandated (Grant & Ashford, 2008; Griffin et al., 2010). It manifests in diverse forms, such as taking charge to initiate change (Morrison & Phelps, 1999), exercising personal initiative to enhance work methods (Frese & Fay, 2001), crafting one's job to reshape role boundaries (Wrzesniewski & Dutton, 2001), speaking up and actively seeking feedback (Ashford et al., 2003). Synthesizing 1,708 studies, Ahmed et al. (2024) demonstrated that proactivity is not a single construct but rather encompasses a range of distinct forms. Until now, scholarly attention has clustered around several dominant themes: voice (30%), proactive behavior (24%), job crafting (22%), proactive personality (4%), with smaller literatures on feedback seeking and personal initiative.

A central debate concerns whether proactivity should be conceived as a dispositional trait or as a behavioral construct. Bateman and Crant (1993) advanced the concept of a proactive personality – a stable tendency toward initiating environmental change. In contrast, Grant and Ashford's (2008) integrative review argued that trait-based approaches provide limited insight into observable proactive actions. They emphasized instead the construct of personal initiative (Frese & Fay, 2001), defined by self-starting, persistent, and future-oriented behaviors. This conceptual shift positioned proactivity more firmly as a behavioral phenomenon, aligning it with broader constructs of contextual and adaptive performance (Borman & Motowidlo, 1993; Crant, 2000).

Parker and Collins (2010) offered an influential taxonomy, distinguishing three domains of proactive behavior: (1) person–environment fit behaviors (e.g., feedback seeking, job crafting),

aimed at enhancing alignment between individuals and their environments; (2) proactive work behaviors (e.g., taking charge, problem solving, innovation), focused on improving internal processes; and (3) proactive strategic behaviors, directed at adapting organizations to external change. This framework situates proactivity as a multilevel construct with implications for individual, team, and organizational outcomes. Griffin et al. (2007) further articulated three levels of proactive action: individual task proactivity (enhancing one's own methods or role), team member proactivity (shaping collective processes and interactions), and organizational member proactivity (contributing to systemic change). They also identified proficiency and adaptivity as complementary behavioral domains. Taken together, these three behaviors – proficiency, adaptivity, and proactivity – intersect with three levels of role engagement (individual, team, organizational), yielding nine distinct types of work roles.

Empirical evidence consistently indicates the value of proactivity. Longitudinal and meta-analytic studies link proactivity with higher performance and career advancement (Seibert et al., 2001; Fuller & Marler, 2009; Spitzmuller et al., 2015), as well as with psychological well-being and occupational satisfaction (Uygun & Murat, 2024). At the organizational level, proactivity is associated with innovation (Glaub et al., 2014; Hakanen et al., 2008), more effective processes (Parker & Collins, 2010), profitability (Baer & Frese, 2003), and overall firm success (Koop et al., 2000). Yet its sustainability appears context-dependent – Strauss et al. (2015) found that employees with high job satisfaction maintained proactive behaviors over time, whereas dissatisfied employees did not, highlighting the importance of supportive environments alongside individual dispositions.

In the context of higher education, where structural reforms, massification, and shifting expectations have redefined academic work-understanding, proactivity has become essential.

Synthesizing the diverse perspectives discussed above, this study explicitly adopts a behavioral definition of proactivity, viewing it as a set of actions rather than a personality trait (Bateman & Crant, 1993). While some forms of proactivity (such as job crafting or voice) are extremely interesting and should be explored in the context of HEIs, these specific constructs were omitted from the current operationalization. In the context of higher education, where roles are structurally complex, measuring the overall effectiveness of proactive behavior across different organizational layers appears to be crucial (compared to specific tactics, such as voice, or personal adjustments, such as job crafting).

This study adopts Griffin et al.'s (2007) multidimensional framework to examine the antecedents of proactive performance and to identify strategies for fostering academic environments that enable both academic and administrative staff to actively shape and adapt to evolving institutional demands. This model was selected as the empirical basis because it uniquely captures the interdependence of academic work. Unlike single-dimension constructs, Griffin's model distinguishes among three necessary levels of contribution: (1) individual task proactivity, reflecting the solitary nature of research and teaching preparation; (2) team member proactivity, addressing the increasing need for collaboration within departments and research groups; and (3) organization member proactivity, capturing engagement in broader institutional reforms. This multi-level structure provides an accurate mapping of the modern academic environment.

Work characteristics as central dimensions of the work environment

Work design refers to the way jobs, tasks, and roles are structured, implemented, and modified, while considering their impact on individuals, teams, and organizations (Grant & Parker, 2009; Güntert, 2015). Its intellectual roots can be traced to classical organizational theory and the principles of scientific management

advanced by Taylor. Since then, the field has evolved through a wide range of conceptual frameworks and empirical studies (Hackman & Oldham, 1980; Hauk, 2020). Across decades of research, scholars have underscored the importance of job enrichment and deliberate job structuring-principles that remain foundational. Among the various models, Hackman and Oldham's (1980) Job Characteristics Model (JCM) continues to hold a central position in work design research.

The JCM identifies three critical psychological states necessary for motivation, satisfaction, and performance: a sense of meaningfulness, a sense of responsibility, and awareness of results. These states are activated when a job incorporates five core characteristics: skill variety, task identity, task significance, autonomy, and feedback.

However, the fast and deep transitions in work environments since the model's introduction (Hackman & Oldham, 1976) have expanded the scope of work design. Contemporary approaches emphasize not only traditional task features but also community-related characteristics, such as workplace relationships and interpersonal interactions, and contextual elements related to broader working conditions (Hauk, 2020; Humphrey et al., 2007; Morgeson & Humphrey, 2006; Oldham & Hackman, 2010; Wegman et al., 2018). Modern work design frameworks therefore adopt a multi-layered perspective that goes beyond individual jobs, incorporating team and organizational dimensions to remain effective in today's dynamic contexts.

This shift has resulted in directing greater attention to the concept of job crafting (Wrzesniewski & Dutton, 2001), which emphasizes proactive, employee-initiated modifications of work. Job crafting involves small but meaningful adjustments to the way tasks are performed, relationships are managed, and work is interpreted. It is commonly described across three domains: task crafting (altering the scope, type, or number of tasks), relational crafting (changing the nature and quality of interactions

with others at work), and cognitive crafting (reframing how one perceives the significance and meaning of work). Unlike classical job design, which is externally imposed, job crafting is inherently self-directed and often occurs without managerial awareness.

The above approaches have been recognized as important in the context of enhancing motivation, satisfaction, and performance. They are also strongly associated with practices aimed at fostering adaptability and proactive behaviors.

Critical psychological states

As mentioned above, in their Job Characteristics Model, Hackman and Oldham (1980) emphasized three psychological conditions as critical for outcomes such as satisfaction, motivation, and performance. First, a sense of meaningfulness emerges when employees perceive their work as valuable and aligned with their personal values. Second, a sense of responsibility reflects the belief that one is personally accountable for work outcomes. Third, knowledge of results refers to awareness of how effectively one is performing. These states were originally conceptualized as mediators between job characteristics and outcomes. Yet subsequent studies indicate that job characteristics may also exert direct effects on satisfaction, engagement, and performance, without necessarily operating through these states (Allan et al., 2019; Hauk, 2020; Humphrey et al., 2007).

Psychological safety

The concept of psychological safety captures the degree to which individuals feel comfortable expressing themselves openly and authentically within a given role or context (Edmondson, 1999). It reflects expectations about whether colleagues or leaders will react with acceptance to mistakes, new ideas, or risk-taking. At its core, it concerns whether a workplace fosters trust and sup-

port, particularly in situations involving error management and innovation.

Although psychological safety is often discussed as a collective belief shared within teams or organizations, it can also be experienced at the individual level. A large body of research has examined its antecedents, mediating and moderating roles, as well as its outcomes (Edmondson & Lei, 2014). Evidence consistently shows its positive association with engagement, job satisfaction, voice behaviors, and multiple dimensions of performance at the individual, team, and organizational levels (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017; Petrov et al., 2023), linking psychological safety also to contextual performance, reinforcing its significance for contemporary organizations.

Study aim and hypothesis

Understanding proactive performance in higher education institutions requires an integrated perspective that goes beyond examining isolated job features. While traditional research on the work environment and performance has emphasized direct effects of specific job characteristics, this study adopts a broader approach, recognizing that employee behavior results from a dynamic interplay between work design and psychological processes.

To address this complexity, the research is based on a job performance model described in more detail by Hauk (2025), which is an adaptation and extension of Hackman and Oldham's (1980) original framework, integrating multiple variables, including work characteristics, critical psychological states, and psychological safety (see Figure 1). The model expands the classical framework by incorporating motivational, social, and contextual job characteristics (Hauk, 2020; Humphrey et al., 2007) and by integrating psychological safety as a key moderating factor. In this approach, job design is viewed not only as a source of performance and motivation but also as a catalyst for proactive

behaviors that are particularly vital in higher education settings undergoing rapid change.

Consistent with prior empirical evidence, the three psychological states originally proposed by Hackman and Oldham were consolidated into two empirically validated dimensions: a) sense of meaningfulness, and b) a combined factor of responsibility and knowledge of results. This decision aligns with the findings of Fried and Ferris's (1987) meta-analysis and the validation studies by Hauk (2014), which demonstrated that these states are closely related and can be purposefully integrated. In the present model, these two states operate as mediators linking work characteristics with job performance outcomes.

At the same time, psychological safety – conceptualized at the individual level – was introduced as a moderator of these relationships. Following Kahn's (1990) definition, psychological safety reflects an individual's belief that one can express thoughts, ask questions, or admit mistakes without fear of negative consequences. Although Edmondson (1999) originally examined this construct at the team level, subsequent research (e.g., Newman et al., 2017) supports its application as an individual perception. This study therefore focuses on the personal experience of safety as a condition that shapes how employees respond to the demands and opportunities embedded in their work.

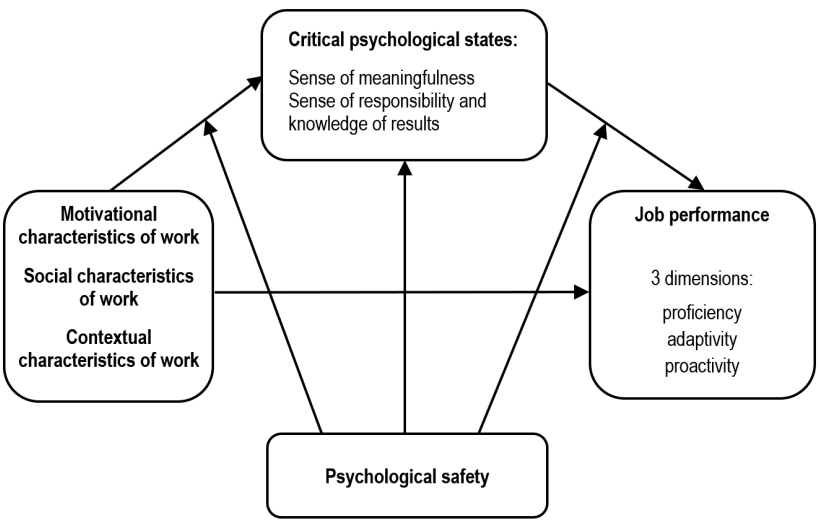
Classical moderators such as growth need strength or work experience were excluded due to their inconsistent empirical support (Fried & Ferris, 1987; Johns et al., 1992). In contrast, psychological safety offers a theoretically stronger and contextually relevant explanation of variance in performance (Frazier et al., 2017).

The type of employment (administrative vs. academic) and institutional type (public vs. private, university vs. polytechnic, etc.) may play an important role in modifying the relationships tested in the model. However, the primary aim of this study was to examine the proposed extended model originally developed

by Hackman and Oldham, and therefore, other contextual factors were beyond the main scope of analysis. Nonetheless, during the preliminary phase, the potential effects of employment type and institutional type were examined.

Overall, this extended JCM framework introduces a new perspective on understanding job performance, especially proactivity at the individual, team, and organizational levels (Griffin et al., 2007), in academic environments. For that reason, the study tested a set of hypotheses, proposing both the direct effects and primarily the indirect effects of work characteristics on proactive performance (via psychological states), contingent upon the level of individual psychological safety. Due to the model's complexity and the increasing emphasis on proactivity (as noted at the beginning of the article), the focus was placed solely on proactive performance, while results related to other performance dimensions will be reported in separate publications.

Figure 1. The modified model of job performance: the role of work traits and critical psychological states with the moderation of psychological safety



The following groups of hypotheses were proposed:

Group I

H 1.1 Motivational work characteristics are expected to be positively related to proactive performance in (a) ITPA (individual task proactivity), (b) TMPA (team member proactivity), and (c) OMPA (organisation member proactivity).
H 1.2 Social work characteristics are proposed to be positively related to proactive performance in (a) ITPA, (b) TMPA, and (c) OMPA.
H 1.3 Contextual work characteristics are supposed to be positively related to proactive performance in (a) ITPA, (b) TMPA, and (c) OMPA.

Group II

H 2.1 The motivational characteristics of work are expected to be most strongly associated with ITPA.
H 2.2 The social characteristics of work are proposed to be most strongly associated with (a) TMPA and (b) OMPA.
H 2.3 The context characteristics of work are supposed to be most strongly associated with (a) TMPA and (b) OMPA.

Group III

H 3.1 Psychological safety (PSS) is expected to moderate the indirect effect of work characteristics on ITPA through (a) sense of meaningfulness and (b) combined sense of responsibility and knowledge of results. Specifically, these mediating effects are anticipated to be stronger for individuals reporting moderate to high levels of PSS.
H 3.2 PSS is proposed to moderate the indirect relationship between work characteristics and TMPA via (a) sense of

meaningfulness and (b) combined sense of responsibility and knowledge of results. Specifically, these mediating effects are anticipated to be stronger for individuals reporting moderate to high levels of PSS.

H 3.3 PSS is expected to moderate the indirect link between work characteristics and OMPA through (a) sense of meaningfulness and (b) combined sense of responsibility and knowledge of results. Specifically, these mediating effects are anticipated to be stronger for individuals reporting moderate to high levels of PSS.

METHOD

The preregistration of this study was submitted to the Open Science Framework prior to starting data collection (https://archive.org/details/osf-registrations-89ehf-v1).

Nevertheless, certain divergences from the preregistered protocol were introduced. Although the initial registration emphasized the proficiency dimension of performance, the present article focuses exclusively on proactivity. In light of the numerous variables incorporated in the model and the growing scholarly recognition of proactivity as a critical construct, analyzing this dimension separately appeared both justified and timely.

Ethical approval for the project was granted by the institutional Ethics Committee before data collection commenced. Recruitment was carried out via a combination of direct and indirect methods: the author distributed email invitations, while unit secretariats, institutional offices, and key figures (e.g., chancellors, institute directors, department heads) assisted in outreach. Additionally, the study was promoted through the author's social media channels (Facebook, LinkedIn) and disseminated in relevant online communities, including the Facebook groups, e.g. "Scientific Research, Organizers, and Participants," "Scientific Conferences".

Sample and sampling procedure

The target sample size was set at 350, estimated with G*Power analysis (α = .01, power = .99, medium effect size, 14 predictors). All in all, 378 respondents met the inclusion criteria (minimum age of 18 and employment in higher education). On average, participants reported 13.77 years of professional experience and 7.85 years in their current role. They represented 26 Polish institutions and held a diverse range of positions across teaching, research, and administrative roles. The sample was predominantly female (78.6%) with a mean age of 44.05 years.

Measures and procedure

Outcome measures

Proactive performance was evaluated using the Polish version of the Work Role Performance Questionnaire (WRPQ; Griffin et al., 2007; adapted by Grobelny et al., 2025). The instrument comprises 27 items covering nine distinct performance dimensions, with each dimension captured through three statements reflecting behaviors exhibited during the previous month. Participants rated their responses on a seven-point Likert scale ranging from *never* to *always*. The measure demonstrated strong internal consistency across all subscales (α > .83). In the present study, analyses focused on three subdimensions: Individual Task Proactivity (ITPA), Team Member Proactivity (TMPA), and Organization Member Proactivity (OMPA).

Predictors

Work characteristics were assessed using the Work Design Questionnaire (Hauk, 2014), which consists of 44 items across 11 factors, grouped into three categories: (1) motivational (e.g., work complexity, feedback from work), (2) social (e.g., feedback

from others, interdependence), and (3) contextual (e.g., physical demands, ergonomics). Internal consistency for the scales varied from α = .60 for work significance to α = .92 for work complexity, with an overall reliability of α = .87. Participants responded using a five-point Likert scale, ranging from *strongly disagree* to *strongly agree.*

Mediating variables

Critical psychological states. The Questionnaire for Measuring Critical Psychological States (Hauk, 2014) was employed to evaluate two dimensions: a sense of meaningfulness (six items; α = .94) and a combined sense of responsibility and awareness of results (four items; α = .65). Participants indicated their responses on a five-point Likert scale, ranging from *strongly disagree* to *strongly agree.*

Moderating variable

Psychological safety was measured using the Psychological Safety Scale (Retowski et al., 2022). The instrument consists of seven items rated on a seven-point Likert scale, demonstrating acceptable internal consistency (α = .70).

Overall, all measurement instruments applied in the study showed satisfactory reliability within the analyzed sample (see Table 1). However, a few exceptions were observed. Specifically, the "significance of work" scale (α = .664), "interactions outside the organization" (α = .555), "significance of work" (α = .452), and the "sense of responsibility and knowledge of results" (α = .643) exhibited lower-than-expected reliability. Lower reliability may attenuate observed relationships and reduce the generalizability of findings.

Table 1. Scale-level descriptive statistics

	Scale	Descriptive statistics					Reliability	
		M [95% CI LL, UL]	*SD*	Kurt.	Skew.	K-S	α	ω
1	Individual task proactivity	15.44 [15.10, 15.76]	−.01	.31	−.46	.087 ***	.843	.846
2	Team member proactivity	13.36 [12.89, 13.81]	−.01	−.289	−.39	,092 ***	.933	.936
3	Organization member proactivity	12.83 [12.35, 13.33]	−.01	−.58	−.29	,085 ***	.909	.910
4	Work complexity	48.30 [47.74, 48.88]	5.57	.77	−.85	.098***	.800	.960
5	Physical demands and working conditions	19.21 [18.77, 19.66]	4.23	.13	−.67	.101 ***	.768	.762
6	Feedback from work	14.18 [13.86, 14.50]	3.18	−.17	−.24	.081***	.708	.711
7	Autonomy	16.16 [15.88, 16.44]	2.79	.68	−.77	.159***	.745	.749
8	Ergonomics	14.50 [14.08, 14.90]	4.02	−.37	−.56	.114***	.883	.883
9	Feedback from others	9.47 [9.18, 9.75]	2.98	−.68	−.16	.096***	.813	.840
10	Equipment used	1.60 [1.28, 1.91]	3.07	−.86	−.27	.112***	.819	.823
11	Interdependence of workers	11.71 [11.41, 12.03]	3.08	−.28	.02	.067***	.664	.659
12	Interactions outside the organization	5.33 [5.14, 5.54]	2.05	−.79	.18	.136***	.555	—
13	Social support	7.01 [6.75, 7.26]	2.48	−.82	−.53	.171***	.911	—
14	Significance of work	6.10 [5.87, 6.25]	1.86	−.43	.03	.131***	.452	—
15	Sense of meaningfulness	19.24 [18.72, 19.72]	5.03	.35	−.94	.166***	.960	.961
16	Sense of responsibility and knowledge of results	15.39 [15.11, 15.64]	2.70	.37	−.56	.127***	.643	.684
17	Psychological safety	31.58 [3.89, 32.29]	6.80	−.60	−.5	.073***	.688	.680

Note. ***$p > .001$.

Data analysis approach

The study used a correlational, single-timepoint design. Hayes' (2022) Macro PROCESS Model 59 was employed to test the proposed model, with 5,000 bootstrap samples and bias-corrected 95% confidence intervals to estimate indirect effects (a method recognized for its robustness and accuracy, particularly with non-normally distributed data). Analyses were conducted in SPSS (PS Imago Pro 10) with Macro PROCESS (v4.2 beta).

Preliminary analyses

Common method bias was minimal, with one factor explaining 17.1% of the variance. Variable distributions showed significant Kolmogorov–Smirnov tests, but skewness and kurtosis were within acceptable ranges (Field, 2018). Given the sample size, parametric tests were considered appropriate.

RESULTS

As can be seen in Table 1, the descriptive statistics indicate that mean levels of proactivity and work characteristics were moderate overall. Individual task proactivity showed the highest mean score ($M = 15.44$), exceeding both team proactivity ($M = 13.36$) and organization member proactivity ($M = 12.83$), which suggests that respondents perceive themselves as more proactive in their own task domain than in team or organizational contexts.

For work characteristics, respondents reported relatively high levels of work complexity ($M = 48.30$) and autonomy ($M = 16.16$), as well as substantial feedback derived from work processes ($M = 14.18$) and from others ($M = 9.47$). In contrast, physical demands and working conditions yielded lower mean scores ($M = 19.21$), indicating that the majority of participants functioned in stable, non-strenuous work environments.

Participants also reported a comparatively strong sense of meaningfulness (M = 19.24) and responsibility or knowledge of results (M = 15.39), alongside moderate levels of psychological safety (M = 31.58). Taken together, these results reflect a generally positive and supportive organizational climate within the sampled HEIs.

To evaluate the proposed first and second groups of hypotheses, correlation analysis and multiple linear regression models were utilized. Table 2 presents the correlations between variables indicated in a model.

The three proactivity dimensions were strongly intercorrelated-individual task proactivity (ITPA) correlated with team member proactivity (TMPA; r = .54, p > .001) and organizational member proactivity (OMPA; r = .50, p > .001), while TMPA and OMPA were highly associated (r = .72, p > .001).

ITPA was positively related to work complexity (r = .19, p > .001), autonomy (r = .20, p > .001), feedback from work (r = .19, p > .001), feedback from others (r = .15, p > .001), equipment used (r = .27, p > .001), work significance (r = .14, p > .001), sense of meaningfulness (r = .17, p > .001), sense of responsibility and knowledge of results (r = .23, p > .001), and psychological safety (r = .13, p > .001). It was negatively associated with physical demands (r = –.18, p > .001).

TMPA correlated positively with work complexity (r = .25, p > .001), interactions outside the organization (r = .26, p > .001), autonomy (r = .15, p > .001), feedback from work (r = .19, p > .001), sense of meaningfulness (r = .16, p > .001), sense of responsibility and knowledge of results (r = .19, p > .001), and psychological safety (r = .13, p > .001).

OMPA showed the strongest association with work complexity (r = .28, p > .001), and also correlated with autonomy (r = .15, p > .001), feedback from work (r = .09, p > .05), sense of meaningfulness (r = .16, p > .001), and sense of responsibility and knowledge

Table 2. Correlation between proactive performance and work characteristics, psychological states and psychological safety

	WRPQ_ ITPA	WRPQ_ TMPA	WRPQ_ OMPA	WDQ_ WC	WDQ_ PDWC	WDQ_ FW	WDQ_A	WDQ_E
ITPA	1	.542**	.501**	.186**	-.183**	.188**	.202**	0.033
TMPA	.542**	1	.716**	.252**	-.219**	.186**	.148**	-0.050
OMPA	.501**	.716**	1	.283**	-.176**	0.085	.152**	0.017
WDQ_WC	.186**	.252**	.283**	1	-.238**	.297**	.248**	0.009
WDQ_ PDWC	-.183**	-.219**	-.176**	-.238**	1	0.023	-0.020	.233**
WDQ_FW	.188**	.186**	0.085	.297**	0.023	1	.339**	.230**
WDQ_A	.202**	.148**	.152**	.248**	-0.020	.339**	1	.142**
WDQ_E	0.033	-0.050	0.017	0.009	.233**	.230**	.142**	1
WDQ_FO	.149**	0.054	0.054	0.033	.110*	.485**	.186**	.323**
WDQ_EU	.274**	.194**	.188**	.472**	-.316**	.257**	.195**	.179**
WDQ_IW	0.045	.216**	.164**	0.093	-.158**	0.007	-0.065	0.003
WDQ_IOO	.134**	.257**	.146**	0.082	-0.097	.198**	0.097	0.009
WDQ_SS	0.038	.101*	0.073	0.079	0.056	0.097	0.093	.197**
WDQ_SW	.141**	.158**	.130*	.392**	-.130*	.225**	.143**	0.025
CPS_SM	.169**	.162**	.160**	.504**	-.113*	.375**	.388**	.159**
CPS_SRK	.232**	.190**	.154**	.345**	-0.030	.711**	.468**	.215**
PSS	.133**	.134**	.111*	0.090	.195**	.363**	.233**	.238**

Table 2 continued

WDQ_ FO	WDQ_ EU	WDQ_ IW	WDQ_ IOO	WDQ_ SS	WDQ_ SW	CPS_SM	CPS_ SRK	PSS
.149**	.274**	0.045	.134**	0.038	.141**	.169**	.232**	.133**
0.054	.194**	.216**	.257**	.101*	.158**	.162**	.190**	.134**
0.054	.188**	.164**	.146**	0.073	.130*	.160**	.154**	.111*
0.033	.472**	0.093	0.082	0.079	.392**	.504**	.345**	0.090
.110*	-.316**	-.158**	-0.097	0.056	-.130*	-.113*	-0.030	.195**
.485**	.257**	0.007	.198**	0.097	.225**	.375**	.711**	.363**
.186**	.195**	-0.065	0.097	0.093	.143**	.388**	.468**	.233**
.323**	.179**	0.003	0.009	.197**	0.025	.159**	.215**	.238**
1	.182**	0.074	-0.011	.148**	.147**	.211**	.436**	.444**
.182**	1	.114*	0.015	0.028	.157**	.296**	.279**	.101*
0.074	.114*	1	0.030	0.053	.105*	-0.048	0.001	-0.038
-0.011	0.015	0.030	1	0.054	.114*	.241**	.208**	.119*
.148**	0.028	0.053	0.054	1	.126*	.211**	.147**	.127*
.147**	.157**	.105*	.114*	.126*	1	.390**	.225**	.143**
.211**	.296**	-0.048	.241**	.211**	.390**	1	.489**	.155**
.436**	.279**	0.001	.208**	.147**	.225**	.489**	1	.323**
.444**	.101*	-0.038	.119*	.127*	.143**	.155**	.323**	1

Note. ***$p > .001$.

ITPA = individual task proactivity; TMPA = team member proactivity; OMPA = organization member proactivity; WDQ_WC = work complexity; WDQ_PDWC = physical demands and working conditions; WDQ_FW = feedback from work; WDQ_A = autonomy; WDQ_E_ ergonomics; WDQ _FO = feedback from others; WDQ_EU = equipment used; WDQ _IW = interdependence of workers; WDQ_ IOO = interactions outside the organization; WDQ_SS = social support; WDQ_SW = significance of work; CPS_SM = Sense of meaningfulness; CPS_ SRK = Sense of responsibility and knowledge of results; PSS = Psychological safety.

of results (r = .15, p > .001). It was negatively related to physical demands (r = –.18, p > .001).

Finally, psychological safety correlated positively with most work traits, particularly feedback from others (r = .44, p > .001), feedback from work (r = .36, p > .001), and both psychological states (rs = .16–.32, p > .001).

The next step in the analysis was to identify predictors for the dependent variables. Preliminary tests of the regression assumptions revealed no issues with heteroskedasticity (based on the scatterplot of residuals versus predicted values), no violations of linearity, no autocorrelation (Durbin–Watson statistics), and no multicollinearity (all VIF values were below 5). These results allowed for proceeding with further analyses.

At the preliminary stage, I examined whether employment type (administrative vs. academic) and institution type (public vs. private) related to the dependent variables. The results indicated that employment type did not significantly predict any dimension of proactive performance: individual task proactivity, $F(1,376) = 0.36$, p = .55; team member proactivity, $F(1,376) = 0.12$, p = .73; organizational member proactivity, $F(1,376) = 2.11$, p = .15. Similarly, institution type showed no significant effect on any of the proactive performance indicators: individual task proactivity, $F(1,376) = 2.13$, p = .15; team member proactivity, $F(1,376) = 1.35$, p = .25; organizational member proactivity, $F(1,376) = 0.04$, p = .85. Thus, they were omitted from further analyses, particularly because the primary aim was to test the model and examine the role of work characteristics and psychological states. Future research should include larger and more diverse samples to better evaluate their potential roles as moderators or covariates.

A multiple regression was conducted to examine the relationship between various predictors (work traits and psychological states) and proactive performance at all three levels (see Table 3). For ITPA, the overall model was significant, $F(14, 363) = 4.25$, p > .001, and explained approximately 11% of the variance in

ITPA, $R^2 = .14$, adjusted $R^2 = .11$. Significant predictors included WDQ_PDWC ($\beta = -.12$, $p = .036$) and WDQ_EU ($\beta = .19$, $p = .002$). All other predictors were nonsignificant.

For TMPA, the overall model was significant, $F(14, 363) = 6.67$, $p > .001$, and accounted for approximately 20% of the variance, $R^2 = .21$, adjusted $R^2 = .17$. Significant predictors were WDQ_PDWC ($\beta = -.13$, $p = .017$), WDQ_IW ($\beta = .18$, $p > .001$), WDQ_IOO ($\beta = .20$, $p > .001$), PSS ($\beta = .11$, $p = .045$), and WDQ_WC ($\beta = .13$, $p = .050$). All other predictors were nonsignificant.

For OMPA, the overall model was significant, $F(14, 363) = 4.35$, $p > .001$, explaining approximately 14% of the variance, $R^2 = .14$, adjusted $R^2 = .11$. Significant predictors included WDQ_WC ($\beta = .23$, $p > .001$), WDQ_IW ($\beta = .13$, $p = .014$), and WDQ_IOO ($\beta = .11$, $p = .033$). Other predictors were nonsignificant.

Table 3. Linear regression model: Work traits, psychological sates and proactive performance dimensions

		B	SE	β	t	p	95 CI LL	95 CI UL
ITPA	(Constant)	9.596	2.076		4.623	.000	5.514	13.678
	WDQ_WC	.002	.039	.004	.064	.949	-.074	.079
	WDQ_PDWC	-.092	.044	-.119	-2.109	.036	-.178	-.006
	WDQ_FW	-.015	.076	-.015	-.200	.842	-.165	.134
	WDQ_A	.125	.067	.106	1.859	.064	-.007	.256
	WDQ_E	-.028	.045	-.034	-.623	.534	-.116	.060
	WDQ_FO	.071	.070	.065	1.025	.306	-.066	.209
	WDQ_EU	.197	.065	.185	3.055	.002	.070	.325
	WDQ_IW	-.002	.054	-.002	-.032	.974	-.108	.104
	WDQ_IOO	.146	.083	.092	1.757	.080	-.017	.310
	WDQ_SS	.007	.067	.005	.106	.916	-.125	.140
	WDQ_SW	.091	.098	.051	.925	.356	-.102	.284
	CPS_SM	-.025	.043	-.039	-.583	.560	-.111	.060
	CPS_SRK	.103	.095	.085	1.091	.276	-.083	.290
	PSS	.027	.028	.057	.986	.325	-.027	.082

Table 3 continued

	B	SE	β	t	p	95 CI LL	95 CI UL		B	SE	β	t	p	95 CI LL	95 CI UL
	.902	2.687		.336	.737	-4.382	6.186		-1.528	2.924		-.522	.602	-7.278	4.223
	.099	.050	.125	1.967	.050	.000	.198		.189	.055	.228	3.454	.001	.081	.297
	-.136	.056	-.130	-2.404	.017	-.246	-.025		-.117	.061	-.107	-1.904	.058	-.238	.004
	.095	.098	.068	.961	.337	-.099	.288		-.160	.107	-.110	-1.495	.136	-.371	.051
	.109	.087	.069	1.259	.209	-.061	.280		.139	.094	.084	1.470	.142	-.047	.324
	-.093	.058	-.085	-1.600	.110	-.208	.021		.006	.063	.006	.101	.920	-.118	.131
	-.050	.090	-.034	-.553	.580	-.227	.128		.030	.098	.019	.306	.760	-.163	.223
TMPA								OMPA							
	.082	.084	.057	.984	.326	-.082	.247		.038	.091	.025	.414	.679	-.141	.217
	.250	.070	.175	3.581	.000	.113	.387		.188	.076	.125	2.472	.014	.038	.337
	.426	.108	.198	3.950	.000	.214	.638		.252	.117	.112	2.146	.033	.021	.483
	.140	.087	.079	1.606	.109	-.031	.312		.066	.095	.035	.691	.490	-.121	.252
	.035	.127	.015	.274	.784	-.215	.285		-.022	.138	-.009	-.156	.876	-.293	.250
	-.043	.056	-.049	-.764	.445	-.153	.067		-.034	.061	-.037	-.562	.574	-.154	.086
	.018	.123	.011	.148	.883	-.223	.259		.095	.133	.055	.713	.477	-.167	.357
	.072	.036	.112	2.015	.045	.002	.143		.065	.039	.096	1.665	.097	-.012	.142

The next step was focused on examining whether sense of meaningfulness (CPS_SM) and sense of responsibility and knowledge of results (CPS_SRK) mediated the relationships between work characteristics and the outcome variables: *ITPA, TMPA, OMPA.* In addition, psychological safety (PSS) was included as a moderator in these relationships.

A summary of the analyses is presented below (see Table 4). More detailed results, including coefficients, standard errors, and confidence intervals for all tested relationships, can be found in the appendix (Tables A1 and A2).

Table 4. Moderated mediation: summary of key results

Work characteristic	**Outcome variable**	**Mediator 1:** Sense of Meaningfulness (significant at PSS levels)	**Mediator 2:** Responsibility & Knowledge (significant at PSS levels)
Work Complexity (WDQ_WC)	ITPA	—	medium, high
Physical Demands (WDQ_PDWC)	ITPA	low (–)	—
	OMPA	low (–)	—
Feedback from Work (WDQ_FW)	ITPA	—	medium, high
	TMPA	low (–)	—
	OMPA	low, medium	medium
Autonomy (WDQ_A)	ITPA	low	medium, high
	TMPA	—	medium
	OMPA	low, medium	—

Ergonomics (WDQ_E)	ITPA	medium	medium, high
	TMPA	medium	medium
	OMPA	medium	medium
Feedback from Others (WDQ_FO)	ITPA	low, medium	low, medium, high
	TMPA	low, medium	low, medium, high
	OMPA	low, medium	medium
Equipment Used (WDQ_EU)	ITPA	low	medium
	OMPA	low	—
Interactions Outside (WDQ_IOO)	ITPA	low, medium	medium
	TMPA	—	medium
	OMPA	low, medium	medium
Social Support (WDQ_SS)	ITPA	medium	medium
	TMPA	medium	medium
	OMPA	medium	—
Significance of Work (WDQ_SW)	ITPA	medium	medium, high
	TMPA	—	medium, high
	OMPA	low, medium	medium

Overall, significant effects were concentrated at low and medium levels of PSS, implying that psychological safety enhances the motivational effect of meaningful work primarily when it is present at moderate or limited levels, whereas its uniform presence may attenuate the mediating role of CPS_SM. This pattern indicates that PSS does not act as a universal amplifier of meaningfulness-based mechanisms across all work design dimensions (Hayes, 2022).

In terms of sense of responsibility and knowledge of results (CPS_SRK), significant indirect effects were most consistently observed at medium levels of PSS. Overall, these results suggest that CPS_SRK facilitates proactive performance primarily under moderate to high psychological safety, while low PSS constrains the mediating effect of responsibility and knowledge of results.

DISCUSSION

At the outset, it is important to note that the three dimensions of proactive performance – individual task, team member, and organizational member proactivity – were strongly interrelated. This finding is consistent with prior research (Griffin et al., 2007; Grobelny et al., 2025; Parker et al., 2019).

The first group of hypotheses proposed that motivational, social, and contextual work characteristics would be positively associated with proactive performance across all three levels (individual, team, organizational). This general assumption was partly supported. Motivational and social characteristics, such as autonomy, feedback from work and others, and interdependence – were positively related to proactive performance, particularly in the domains of team and organizational proactivity. These findings align with job design theory (Hackman & Oldham, 1976, 1980; Parker et al., 2017).

However, not all contextual characteristics functioned as expected. Specifically, physical demands were negatively associated with proactive performance across all levels, indicating that environmental strain or workload intensity may be linked to lower levels of the cognitive and emotional resources necessary for self-initiated action. This result corresponds with the job demands–resources theory (Bakker & Demerouti, 2017), according to which high demands are associated with to overload, depletion of energy resources, and consequently may be related to lower proactivity.

It is necessary to emphasize that job characteristics alone explain a relatively small percentage of the variance in proactivity across its dimensions, highlighting the need – as previously indicated – for an integrated perspective that goes beyond examining isolated job features. Such a broader approach is essential. Incorporating additional variables, such as psychological states and psychological safety, appears crucial from both theoretical (for researchers) and practical (for higher education institutions) standpoints.

The second group of hypotheses concerned the differentiated strength of associations between types of work characteristics and the three levels of proactivity. These assumptions were largely confirmed. Motivational work characteristics (e.g., autonomy, feedback from work) were most closely linked to individual task proactivity (ITPA), consistent with theories that self-determination and task-level ownership drive personal initiative. Conversely, social characteristics (e.g., interdependence, interactions outside the organization, social support) were most strongly related to team and organizational proactivity (TMPA and OMPA). This pattern suggests that collaborative work contexts create conditions for collective initiative and knowledge exchange — core elements of higher-level proactivity. Notably, work complexity emerged as a key predictor across all levels of proactivity, particularly for team and organizational outcomes. This finding

suggests that complexity may serve as both a cognitive challenge and a motivational factor, thereby stimulating employees' proactive strategies. Overall, the results provide empirical support for the differentiated nature of proactive performance antecedents, indicating that the type of proactivity (individual vs. collective) aligns with specific work traits.

The third group of hypotheses predicted that psychological safety would moderate the indirect effects of work characteristics on proactive performance via the two critical psychological states-meaningfulness as well as responsibility and knowledge of results. Specifically, stronger indirect effects were expected under moderate to high levels of psychological safety.

However, this assumption was only partially supported. Contrary to expectations, the mediation effects of sense of meaningfulness were strongest under low to medium levels of psychological safety, while at high levels, the indirect effects became nonsignificant. This finding may reflect a nonlinear relationship: when psychological safety is moderate, it provides sufficient security for exploration while preserving a sense of challenge and accountability. In contrast, excessive safety may reduce motivational tension-employees feel secure but less driven to take initiative.

For the second mediator, sense of responsibility and knowledge of results, the predicted pattern was more aligned with expectations: the strongest indirect effects occurred at medium to high levels of PSS, suggesting that safety facilitates proactivity via ownership and knowledge of results. Nevertheless, these effects were not uniform across all work characteristics. This may indicate that other unmeasured contextual factors, such as leadership style, trust in management, or organizational justice, shape how safety translates into responsibility-driven behavior.

Several factors may explain the results concerning moderated mediation effects:

1. Contextual specificity of higher education: HEIs are traditionally characterized by hierarchical structures, rigid procedures, and limited managerial flexibility. As noted by Kwiek (2003), Polish universities are in a phase of transition, often characterized by structural ambiguities. In such settings, structural constraints may override psychological resources. Drawing on the synthesis by Cai et al. (2019), it is argued that a supportive social context (like psychological safety) fuels proactivity primarily when the structure allows for discretionary behavior. In formalized HEIs, a "bureaucratic ceiling" might stifle the translation of safety into organizational proactivity – employees may feel safe to speak up, but perceive rigid procedures as making their initiative futile. Furthermore, the specific nature of academic work suggests that "meaningfulness" is often derived from professional identity (individual research/teaching) rather than organizational membership. Consequently, high meaning may direct energy toward solitary tasks rather than broader organizational concerns. Cultural characteristics – the Polish academic system, embedded in a post-socialist institutional context, may emphasize compliance and caution rather than experimentation. As a result, high psychological safety may not automatically translate into proactive action, as norms of modesty or avoidance of visibility persist.

2. Measurement limitations: the self-report design may have introduced social desirability bias, particularly regarding psychological safety. Additionally, as noted in the limitations section, specific subscales (e.g., significance of work) exhibited lower reliability coefficients. This measurement error may result in attenuation bias, effectively masking significant relationships and limiting the statistical power to detect complex moderation effects. Future research should focus on refining existing instruments or employing alternative measures.

Taken together, these findings suggest that proactive performance in HEIs is shaped by a delicate balance between security

and stimulation, and that moderate rather than maximal psychological safety may be most conducive to proactive behavior.

The overall conclusion from these results is that psychological safety operates as a conditional facilitator rather than a linear amplifier of proactivity. Moderate levels seem optimal, balancing openness with performance pressure.

Practical implications and recommendations for universities

The study provides several actionable recommendations for universities aiming to enhance employees' proactive performance, for example:

1. Enhance psychological safety through leadership practices by:
   – training managers and supervisors to respond supportively to errors and to model openness in communication;
   – implementing regular reflective meetings or feedback sessions where staff can share ideas and concerns without fear of reprisal.
2. Strengthen feedback systems and performance transparency by:
   – supplementing student evaluations with peer and supervisor feedback to create multi-source assessment mechanisms;
   – promoting developmental feedback over evaluative approaches.
3. Foster collaborative and socially embedded work environments by:
   – encouraging cross-departmental projects and research networks to strengthen external interactions;
   – developing mentorship programs and communities of practice that support knowledge exchange.

The results also show that meaningful work may be a key correlate of proactive performance, especially when employees experience sufficient psychological safety. This suggests that institutions should place stronger emphasis on reinforcing a sense of purpose and personal significance in employees' daily tasks.

Highlighting how individual contributions support wider institutional objectives – rather than focusing primarily on publication expectations – can help cultivate a more engaged and proactive workforce.

Strengthening this sense of purpose also requires improving onboarding and internal processes. In many institutions, onboarding is still largely administrative, centered on completing required documents. What is often missing is a clear explanation of one's role, responsibilities, and the broader value of their work. Designing onboarding procedures that intentionally build clarity, connection, and meaning would help employees begin their roles with a stronger foundation.

However, creating a supportive culture is not enough. The lack of significant effects of high psychological safety and meaningfulness on organizational proactivity points to an important structural issue: building psychologically safe environment alone cannot overcome organizational inertia. Based on these findings, two additional, structure-focused recommendations can be made:

1. Reduce structural barriers and the "procedural burden" by:
   – reviewing administrative procedures: since high psychological safety not always led to stronger organizational proactivity, it is likely that excessive formalization and procedural overload limit employee initiative. Higher education institutions should systematically review internal regulations to identify procedures that unnecessarily hinder employees from implementing improvements and engaging in change-oriented activities;
   – decentralizing decision-making: for psychological safety to translate into action, universities must provide real decision-making autonomy. This requires a shift from a culture centered on formal approval to one that emphasizes responsibility for outcomes. Without such structural flexibility, psychological safety remains a passive condition rather than an active driver of organizational performance.

2. Strengthen the alignment between individual roles and the institutional mission by:
   – clarifying the contribution of individual roles to institutional goals: the findings suggest that employees may perceive their individual work (e.g.: research or teaching) as meaningful without engaging in broader organizational proactivity. Therefore, it appears justified to organize academic work in a way that includes organizational and institutional tasks as an explicit part of employees' formal responsibilities – an approach that is already present in many performance evaluation systems. However, for these activities to foster genuine engagement, they should not be treated as purely formal requirements or symbolic obligations;
   – ensuring reinforcement and equal valuation of organizational contributions: organizational engagement should be supported by concrete reinforcing mechanisms, such as financial bonuses, awards, or formal recognition. Importantly, this dimension of work should not be implicitly valued lower than individual performance indicators (e.g., publication points in the case of academic staff). Otherwise, from a rational perspective, it becomes more "profitable" for employees to focus on individual outputs rather than contributing to the institution as a whole;
   – making organizational impact visible: in addition, institutions should more explicitly communicate how individual organizational activities contribute to broader outcomes, such as the evaluation of academic units or institutional rankings. Although such links often exist in practice, articulating them more clearly and more frequently may strengthen employees' sense that their organizational engagement has tangible and meaningful consequences.

Furthermore, the study points to the importance of ensuring appropriate working conditions and access to modern equipment. Academic staff routinely manage complex tasks and long-term projects, yet in numerous public universities employees,

particularly teaching staff, continue to rely on personal devices for work-related duties. Investing in updated technology and ergonomic workspaces would reduce unnecessary strain, enhance efficiency, and better support employees as they adapt to new challenges and changing professional expectations.

Through these actions, HEIs can cultivate climates that sustain both psychological safety and proactive engagement, thereby enhancing individual, team and institutional proactivity.

Limitations and future directions

While this study provides valuable insights, several limitations should be acknowledged and addressed in future research. A primary limitation relates to the sample composition, which was restricted to Polish higher education institutions. This constraint limits the generalizability of the findings beyond similar cultural and institutional settings. Although the results may be applicable to countries with comparable administrative legacies and organizational structures in Central and Eastern Europe, subsequent studies should incorporate cross-national samples to investigate potential cultural moderators of proactivity.

Secondly, the exclusive reliance on self-reported measures introduces the risk of common method bias. The inclusion of objective performance indicators, peer evaluations, or qualitative data could improve construct validity.

A significant limitation of this study concerns the psychometric properties of certain subscales employed in the analysis. Specifically, the Cronbach's alpha coefficients for "significance of work" (α = .45), "interactions outside the organization" (α = .55), and the combined "sense of responsibility and knowledge of results" (α = .64) fell below the conventionally accepted threshold of .70. The lower reliability may have weakened the observed relationships and reduced the likelihood of detecting significant effects. Consequently, results involving these specific variables –particularly in the complex moderated mediation models–should be

treated as exploratory and requiring further validation with more robust measures in future research.

Another limitation pertains to the scope of variables included in the model. Despite building upon a modified and extended Job Characteristics Model (Hackman & Oldham, 1980), encompassing work characteristics, psychological states, and psychological safety, the study did not consider the full range of factors impacting proactive performance. Future research should broaden the variable set and examine complex interdependencies among these factors within academic environments.

Proactive performance may vary significantly depending on the type of higher education institution. Employees working within larger, public universities often encounter more rigid bureaucratic structures and administrative protocols, which can impose constraints and reduce flexibility in their roles. Conversely, personnel in smaller or privately managed institutions may benefit from more fluid and innovative work environments that actively encourage adaptability and creative problem-solving. In the current study, the sample was predominantly composed of staff from traditional universities. Additionally, the diversity in participant roles, including both academic faculty and administrative personnel, introduces additional variability that was challenging to fully control for in the analysis.

CONCLUSION

This study advances our understanding of how work design and psychological mechanisms jointly shape proactive performance in higher education. The results indicate that psychological safety, sense of meaningfulness, and sense of responsibility and knowledge of results are crucial psychological pathways linking work characteristics to proactive behaviors. In summary, promoting proactivity in HEIs requires not only procedural reforms but also

a shift in organizational culture toward openness, feedback, and empowerment. Such an approach can help academic institutions thrive amid ongoing systemic changes and uncertainties in the higher education landscape.

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Appendix A

Table A1

Moderated mediation: CPS_SM (mediator), work traits (independent variables) and Proactive Performance (three levels, dependent variable), with PSS as a moderator

CPS_SM	ITPA					TMPA					OMPA				
Moderator (PSS)	Indirect Effect	BootSE	95% CI LL	95% CI UL	Significance	Indirect Effect	BootSE	95% CI LL	95% CI UL	Significance	Indirect Effect	BootSE	95% CI LL	95% CI UL	Significance
	WDQ_WC					*WDQ_WC*					*WDQ_WC*				
Low (24.00)	0.0317	0.0249	-0.0139	0.0837	✗ (ns)	0.0172	0.0341	-0.0581	0.0795	✗ (ns)	0.0434	0.0337	-0.0192	0.1152	✗ (ns)
Medium (32.00)	0.0235	0.0207	-0.0159	0.0667	✗ (ns)	0.0119	0.0263	-0.0408	0.0616	✗ (ns)	0.0014	0.0233	-0.0440	0.0469	✗ (ns)
High (39.00)	0.0169	0.0297	-0.0370	0.0810	✗ (ns)	0.0077	0.0407	-0.0718	0.0902	✗ (ns)	-0.0314	0.0342	-0.1023	0.0340	✗ (ns)
	WDQ_PDWC					*WDQ_PDWC*					*WDQ_PDWC*				
Low (24.00)	-0.0323	0.0168	-0.0696	-0.0025	✓ **(significant)**	-0.0189	0.0208	-0.0636	0.0200	✗ (ns)	-0.0445	0.0239	-0.0972	-0.0040	✓ **(significant)**
Medium (32.00)	-0.0133	0.0079	-0.0302	0.0004	✗ (ns)	-0.0158	0.0109	-0.0405	0.0025	✗ (ns)	-0.0172	0.0110	-0.0421	0.0001	✗ (ns)
High (39.00)	-0.0019	0.0085	-0.0202	0.0163	✗ (ns)	-0.0039	0.0158	-0.0357	0.0304	✗ (ns)	-0.0023	0.0102	-0.0264	0.0174	✗ (ns)
	WDQ_FW					*WDQ_FW*					*WDQ_FW*				
Low (24.00)	0.0647	0.0347	-0.0003	0.1368	✗ (ns)	-0.0445	0.0239	-0.0972	-0.0040	✓ **(significant)**	0.1269	0.0475	0.0419	0.2277	✓ **(significant)**
Medium (32.00)	0.0414	0.0251	-0.0081	0.0912	✗ (ns)	-0.0172	0.0110	-0.0421	0.0001	✗ (ns)	0.0754	0.0326	0.0154	0.1435	✓ **(significant)**

High (39.00)	0.0221	0.0385	-0.0601	0.0959	✗ (ns)	-0.0023	0.0102	-0.0264	0.0174	✗ (ns)	0.0329	0.0481	-0.0643	0.1266	✗ (ns)
		WDQ_A					*WDQ_A*					*WDQ_A*			
Low (24.00)	0.0838	0.0428	0.0041	0.1732	✓ **(significant)**	0.0992	0.0601	-0.0149	0.2238	✗ (ns)	0.1663	0.0578	0.0598	0.2878	✓ **(significant)**
Medium (32.00)	0.0437	0.0283	-0.0105	0.1011	✗ (ns)	0.0691	0.0386	-0.0031	0.1482	✗ (ns)	0.0711	0.0361	0.0067	0.1487	✓ **(significant)**
High (39.00)	0.0166	0.0381	-0.0598	0.0893	✗ (ns)	0.0472	0.0538	-0.0546	0.1618	✗ (ns)	0.0081	0.0443	-0.0733	0.1052	✗ (ns)
		WDQ_E					*WDQ_E*					*WDQ_E*			
Low (24.00)	0.0116	0.0145	-0.0140	0.0454	✗ (ns)	0.0115	0.0149	-0.0146	0.0455	✗ (ns)	0.0174	0.0207	-0.0222	0.0623	✗ (ns)
Medium (32.00)	0.0167	0.0103	0.0007	0.0405	✓ **(significant)**	0.0234	0.0139	0.0014	0.0544	✓ **(significant)**	0.0224	0.0129	0.0020	0.0523	✓ **(significant)**
High (39.00)	0.0173	0.0174	-0.0129	0.0561	✗ (ns)	0.0351	0.0269	-0.0071	0.0985	✗ (ns)	0.0188	0.0208	-0.0209	0.0636	✗ (ns)
		WDQ_FO					*WDQ_FO*					*WDQ_FO*			
Low (24.00)	0.0544	0.0277	0.0066	0.1134	✓ **(significant)**	0.0566	0.0364	-0.0043	0.1379	✗ (ns)	0.0861	0.0403	0.0154	0.1714	✓ **(significant)**
Medium (32.00)	0.0270	0.0157	0.0021	0.0614	✓ **(significant)**	0.0397	0.0211	0.0051	0.0880	✓ **(significant)**	0.0403	0.0202	0.0068	0.0858	✓ **(significant)**
High (39.00)	0.0107	0.0171	-0.0136	0.0545	✗ (ns)**	0.0259	0.0276	-0.0116	0.0986	✗ (ns)	0.0140	0.0200	-0.0205	0.0630	✗ (ns)
		WDQ_EU					*WDQ_EU*					*WDQ_EU*			
Low (24.00)	0.0436	0.0257	0.0003	0.1001	✓ **(significant)**	0.0449	0.0347	-0.0144	0.1223	✗ (ns)	0.0695	0.0370	0.0109	0.1551	✓ **(significant)**

Medium (32.00)	0.0233	0.0199	-0.0136	0.0647	✗ (ns)	0.0399	0.0274	-0.0133	0.0963	✗ (ns)	0.0419	0.0263	-0.0046	0.0991	✗ (ns)
High (39.00)	0.0032	0.0324	-0.0573	0.0752	✗ (ns)	0.0348	0.0457	-0.0539	0.1294	✗ (ns)	0.0146	0.0396	-0.0565	0.1055	✗ (ns)
		WDQ_IW					*WDQ_IW*					*WDQ_IW*			
Low (24.00)	-0.0075	0.0186	-0.0515	0.0247	✗ (ns)	-0.0073	0.0194	-0.0564	0.0241	✗ (ns)	-0.0113	0.0268	-0.0735	0.0342	✗ (ns)
Medium (32.00)	-0.0068	0.0106	-0.0319	0.0099	✗ (ns)	-0.0094	0.0143	-0.0440	0.0135	✗ (ns)	-0.0095	0.0142	-0.0433	0.0140	✗ (ns)
High (39.00)	-0.0056	0.0149	-0.0468	0.0155	✗ (ns)	-0.0114	0.0259	-0.0769	0.0280	✗ (ns)	-0.0067	0.0184	-0.0553	0.0193	✗ (ns)
		WDQ_IOO					*WDQ_IOO*					*WDQ_IOO*			
Low (24.00)	0.0852	0.0422	0.0111	0.1768	✓ **(significant)**	0.0497	0.0525	-0.0504	0.1587	✗ (ns)	0.1252	0.0587	0.0276	0.2552	✓ **(significant)**
Medium (32.00)	0.0466	0.0241	0.0016	0.0975	✓ **(significant)**	0.0460	0.0314	-0.0132	0.1126	✗ (ns)	0.0606	0.0318	0.0030	0.1290	✓ **(significant)**
High (39.00)	0.0222	0.0286	-0.0337	0.0827	✗ (ns)	0.0386	0.0400	-0.0288	0.1314	✗ (ns)	0.0218	0.0347	-0.0472	0.0934	✗ (ns)
		WDQ_SS					*WDQ_SS*					*WDQ_SS*			
Low (24.00)	0.0403	0.0269	-0.0009	0.1022	✗ (ns)	0.0347	0.0268	-0.0093	0.0940	✗ (ns)	0.0552	0.0332	-0.0018	0.1263	✗ (ns)
Medium (32.00)	0.0393	0.0201	0.0065	0.0840	✓ **(significant)**	0.0469	0.0263	0.0024	0.1061	✓ (significant)	0.0506	0.0251	0.0085	0.1072	✓ **(significant)**
High (39.00)	0.0342	0.0342	-0.0256	0.1132	✗ (ns)	0.0586	0.0495	-0.0201	0.1717	✗ (ns)	0.0397	0.0397	-0.0343	0.1252	✗ (ns)
		WDQ_SW					*WDQ_SW*					*WDQ_SW*			

Low (24.00)	0.0765	0.0460	-0.0063	0.1764	✗ (ns)	0.0590	0.0588	-0.0622	0.1713	✗ (ns)	0.1244	0.0587	0.0160	0.2485	✓ **(significant)**
Medium (32.00)	0.0861	0.0426	0.0054	0.1725	✓ **(significant)**	0.1030	0.0581	-0.0094	0.2209	✗ (ns)	0.1138	0.0544	0.0110	0.2233	✓ **(significant)**
High (39.00)	0.0933	0.0745	-0.0509	0.2460	✗ (ns)	0.1501	0.1065	-0.0501	0.3712	✗ (ns)	0.0956	0.0934	-0.0842	0.2756	✗ (ns)

Table A2

Moderated mediation: CPS_SRK (mediator), work traits (independent variables) and Proactive Performance (three levels, dependent variable), with PSS as a moderator

CPS_SRK	ITPA					TMPA					OMPA				
Moderator (PSS)	Indirect Effect	BootSE	95% CI LL	95% CI UL	Significance	Indirect Effect	BootSE	95% CI LL	95% CI UL	Significance	Indirect Effect	BootSE	95% CI LL	95% CI UL	Significance
	WDQ_WC					*WDQ_WC*					*WDQ_WC*				
Low (24.00)	0.0198	0.0135	-0.0066	0.0469	✗ (ns)	0.0186	0.0177	-0.0145	0.0567	✗ (ns)	0.0091	0.0165	-0.0204	0.0456	✗ (ns)
Medium (32.00)	0.0359	0.0133	0.0111	0.0641	✓ **(significant)**	0.0234	0.0169	-0.0087	0.0578	✗ (ns)	0.0106	0.0158	-0.0194	0.0421	✗ (ns)
High (39.00)	0.0509	0.0222	0.0131	0.1007	✓ **(significant)**	0.0279	0.0269	-0.0210	0.0863	✗ (ns)	0.0120	0.0249	-0.0353	0.0650	✗ (ns)
	WDQ_PDWC					*WDQ_PDWC*					*WDQ_PDWC*				
Low (24.00)	-0.0161	0.0117	-0.0421	0.0025	✗ (ns)	-0.0150	0.0137	-0.0483	0.0034	✗ (ns)	-0.0125	0.0131	-0.0443	0.0056	✗ (ns)
Medium (32.00)	-0.0145	0.0095	-0.0346	0.0030	✗ (ns)	-0.0142	0.0103	-0.0374	0.0024	✗ (ns)	-0.0118	0.0097	-0.0347	0.0027	✗ (ns)

High (39.00)	-0.0085	0.0166	-0.0452	0.0230	✗ (ns)	-0.0086	0.0178	-0.0483	0.0275	✗ (ns)	-0.0071	0.0155	-0.0432	0.0206	✗ (ns)
		WDQ_FW					*WDQ_FW*					*WDQ_FW*			
Low (24.00)	0.0642	0.0700	-0.0669	0.2104	✗ (ns)	0.0941	0.1056	-0.1356	0.2809	✗ (ns)	0.1684	0.1046	-0.0451	0.3712	✗ (ns)
Medium (32.00)	0.1547	0.0504	0.0559	0.2528	✓ **(significant)**	0.1113	0.0746	-0.0446	0.2468	✗ (ns)	0.1864	0.0782	0.0250	0.3350	✓ **(significant)**
High (39.00)	0.2192	0.0712	0.0744	0.3544	✓ **(significant)**	0.1226	0.1140	-0.1221	0.3186	✗ (ns)	0.1972	0.1132	-0.0429	0.4002	✗ (ns)
		WDQ_A					*WDQ_A*					*WDQ_A*			
Low (24.00)	0.0614	0.0516	-0.0372	0.1650	✗ (ns)	0.1058	0.0636	-0.0251	0.2250	✗ (ns)	0.0797	0.0627	-0.0457	0.2017	✗ (ns)
Medium (32.00)	0.0824	0.0315	0.0225	0.1474	✓ **(significant)**	0.0899	0.0454	0.0013	0.1824	✓ **(significant)**	0.0629	0.0441	-0.0241	0.1502	✗ (ns)
High (39.00)	0.0931	0.0445	0.0177	0.1905	✓ **(significant)**	0.0763	0.0614	-0.0373	0.2038	✗ (ns)	0.0498	0.0573	-0.0580	0.1677	✗ (ns)
		WDQ_E						*WDQ_E*					*WDQ_E*		
Low (24.00)	0.0200	0.0152	-0.0038	0.0547	✗ (ns)	0.0249	0.0180	-0.0047	0.0653	✗ (ns)	0.0194	0.0157	-0.0075	0.0534	✗ (ns)
Medium (32.00)	0.0277	0.0111	0.0083	0.0515	✓ **(significant)**	0.0307	0.0143	0.0068	0.0625	✓ **(significant)**	0.0242	0.0133	0.0029	0.0549	✓ **(significant)**
High (39.00)	0.0344	0.0203	0.0011	0.0792	✓ **(significant)**	0.0357	0.0251	-0.0019	0.0968	✗ (ns)	0.0283	0.0218	-0.0032	0.0799	✗ (ns)
		WDQ_FO					*WDQ_FO*					*WDQ_FO*			

Low (24.00)	0.0642	0.0350	0.0043	0.1418	✓ **(significant)**	0.0885	0.0453	0.0068	0.1864	✓ **(significant)**	0.0704	0.0435	-0.0114	0.1614	✗ (ns)
Medium (32.00)	0.0855	0.0267	0.0365	0.1400	✓ **(significant)**	0.1075	0.0369	0.0374	0.1812	✓ **(significant)**	0.0882	0.0371	0.0173	0.1626	✓ **(significant)**
High (39.00)	0.1029	0.0428	0.0312	0.1998	✓ **(significant)**	0.1230	0.0576	0.0158	0.2464	✓ **(significant)**	0.1028	0.0577	-0.0033	0.2257	✗ (ns)
		WDQ_EU					*WDQ_EU*					*WDQ_EU*			
Low (24.00)	0.0273	0.0207	-0.0027	0.0773	✗ (ns)	0.0333	0.0277	-0.0046	0.0992	✗ (ns)	0.0231	0.0251	-0.0155	0.0818	✗ (ns)
Medium (32.00)	0.0416	0.0193	0.0076	0.0831	✓ **(significant)**	0.0435	0.0253	-0.0069	0.0932	✗ (ns)	0.0354	0.0251	-0.0100	0.0883	✗ (ns)
High (39.00)	0.0565	0.0346	-0.0026	0.1345	✗ (ns)	0.0529	0.0444	-0.0397	0.1407	✗ (ns)	0.0484	0.0436	-0.0349	0.1398	✗ (ns)
		WDQ_IW					*WDQ_IW*					*WDQ_IW*			
Low (24.00)	0.0239	0.0194	-0.0114	0.0651	✗ (ns)	0.0231	0.0237	-0.0111	0.0817	✗ (ns)	0.0215	0.0223	-0.0115	0.0747	✗ (ns)
Medium (32.00)	0.0023	0.0125	-0.0242	0.0268	✗ (ns)	0.0024	0.0135	-0.0256	0.0302	✗ (ns)	0.0021	0.0119	-0.0225	0.0264	✗ (ns)
High (39.00)	-0.0317	0.0236	-0.0828	0.0095	✗ (ns)	-0.0347	0.0277	-0.0970	0.0114	✗ (ns)	-0.0291	0.0263	-0.0937	0.0086	✗ (ns)
		WDQ_IOO					*WDQ_IOO*					*WDQ_IOO*			
Low (24.00)	0.0681	0.0367	-0.0023	0.1410	✗ (ns)	0.0525	0.0440	-0.0437	0.1344	✗ (ns)	0.0561	0.0465	-0.0293	0.1556	✗ (ns)
Medium (32.00)	0.0575	0.0219	0.0191	0.1042	✓ **(significant)**	0.0491	0.0261	0.0026	0.1041	✓ **(significant)**	0.0457	0.0275	0.0009	0.1083	✓ **(significant)**

High (39.00)	0.0301	0.0308	-0.0281	0.0947	✗ (ns)	0.0269	0.0312	-0.0241	0.0976	✗ (ns)	0.0235	0.0291	-0.0220	0.0927	✗ (ns)
		WDQ_SS					*WDQ_SS*					*WDQ_SS*			
Low (24.00)	0.0272	0.0201	-0.0054	0.0723	✗ (ns)	0.0280	0.0237	-0.0073	0.0838	✗ (ns)	0.0225	0.0212	-0.0094	0.0722	✗ (ns)
Medium (32.00)	0.0318	0.0170	0.0023	0.0698	✓ **(significant)**	0.0314	0.0203	0.0006	0.0791	✓ **(significant)**	0.0267	0.0183	-0.0003	0.0705	✗ **(ns, borderline)**
High (39.00)	0.0333	0.0300	-0.0203	0.1002	✗ (ns)	0.0321	0.0339	-0.0127	0.1178	✗ (ns)	0.0281	0.0303	-0.0161	0.1023	✗ (ns)
		WDQ_SW					*WDQ_SW*					*WDQ_SW*			
Low (24.00)	0.0401	0.0285	-0.0124	0.0981	✗ (ns)	0.0424	0.0380	-0.0231	0.1282	✗ (ns)	0.0327	0.0354	-0.0289	0.1125	✗ (ns)
Medium (32.00)	0.0691	0.0279	0.0221	0.1297	✓ **(significant)**	0.0669	0.0342	0.0116	0.1440	✓ **(significant)**	0.0566	0.0335	0.0036	0.1341	✓ **(significant)**
High (39.00)	0.0922	0.0521	0.0061	0.2100	✓ **(significant)**	0.0864	0.0581	0.0023	0.2287	✓ **(significant)**	0.0756	0.0558	-0.0041	0.2093	✗ **(ns, borderline)**