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Work Design and Mental Health: Mediating Role of Job Satisfaction

ABSTRACT

This study examines how work design influences employee mental health and job satisfaction within the Job Demands-Resources (JD-R) framework, incorporating a biopsychosocial perspective. Data were collected from 306 employees (228 women, 78 men) using the Polish adaptations of the Work Design Questionnaire (WDQ; Hauk, 2014) and the Satisfaction with Job Scale (SWJS; Zalewska, 2003), alongside the Symptom Checklist-27-plus (SCL-27-plus; Hardt, 2008; Kuncewicz et al., 2014) for mental health outcomes. Correlation and regression analyses revealed that ergonomic conditions, autonomy, and feedback were the strongest predictors of job satisfaction. Mediation analyses further indicated that job satisfaction fully mediated the relationship between ergonomics and both depressive and pain symptoms, while effects on vegetative, agoraphobic, and sociophobic symptoms were weaker and largely nonsignificant. These findings highlight the pivotal role of well-structured and supportive work environments – particularly physical conditions – in fostering job satisfaction and protecting

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mental health. The results provide practical guidance for organizations aiming to enhance employee well-being, emphasizing ergonomics, autonomy, feedback, and social support as key resources in contemporary work design.

KEYWORDS: work design; job satisfaction; mental health

INTRODUCTION

Mental health in the work context

The growing social awareness of employee mental health, especially in the context of the COVID-19 pandemic, has contributed to an intensification of research on the predictors and consequences of mental disorders in the workplace (Shoss, 2021). Mental health is a fundamental element of an individual's overall well-being, encompassing not only the absence of mental disorders but also the ability to cope with everyday stressors, function effectively in society, and realize one's potential (World Health Organization [WHO], 2022). Contemporary research emphasizes that mental health is a dynamic process that can change under the influence of biological, psychological, and social factors (Smith & Alloy, 2009).

Mental health in the workplace

Employee mental health is an increasingly important area of scientific research and human resource management practice. According to the World Health Organization (WHO, 2022), mental health is an integral part of overall health and affects individuals' functioning both in private and professional spheres. In the workplace context, mental health refers to employees' ability to manage job demands, maintain job satisfaction, and realize their personal and professional potential (Harvey et al., 2017). A mentally healthy person is characterized by a coherent and resilient sense of self, the ability to maintain interpersonal relationships, and the

capacity to endure solitude without suffering. Key traits of mental health include trust, competence, emotional resilience, a sense of humor, and the ability to transform psychological suffering into personal growth (Higher Education Authority [HEA], 1997). According to the Mental Health Foundation (MHF, 2008), mental health also depends on how an individual perceives themselves, responds to stress, and functions across different life domains — professional, social, and familial. Moreover, mental and physical health are strongly interconnected and mutually influence each other. Mental health can be described as a state of dynamic equilibrium in which the individual remains in harmony with themselves, is able to fulfill basic and higher-order needs, and functions effectively in society (HEA, 1997). Positive functioning includes emotional regulation, psychological resilience, and the ability to form and maintain satisfying interpersonal relationships.

Biopsychosocial model

The literature describing the links between mental health and work refers to the biopsychosocial model. Mental health represents a holistic approach, assuming that an individual's psychological well-being results from the interaction of three main factors: biological, psychological, and social (Engel, 1977). In the context of working conditions, this model helps to understand that an employee's mental health depends not only on the nature of the work performed but also on complex interactions among physical health status, psychological characteristics, and social relationships in the workplace.

Biological factors refer to somatic health, genetic predispositions, and physiological processes occurring in the body. Important workplace aspects include ergonomics, fatigue, and circadian rhythm disturbances, especially in shift work, which can negatively affect cognitive functioning and psychological resilience (Åkerstedt, 2003; Caruso, 2014). Chronic fatigue and

somatic complaints, such as musculoskeletal pain, can reduce stress coping abilities and increase the risk of mental disorders.

Psychological factors include emotional and cognitive processes and stress coping mechanisms. Pressure related to task completion, tension caused by unclear expectations, or a sense of lack of control over work are key stressors affecting psychological well-being (Lazarus & Folkman, 1984; Karasek, 1979). Low stress tolerance or deficits in coping strategies may lead to burnout, reduced motivation, and development of anxiety disorders (Maslach & Jackson, 1981).

The third important dimension includes social factors, which cover interpersonal relationships, social support, and organizational culture. Studies show that positive relationships with supervisors and coworkers, as well as clear organizational rules and values, foster a sense of security and job satisfaction, which translates into better mental health (Bakker & Demerouti, 2007; Schaufeli & Bakker, 2004). Conversely, interpersonal conflicts, bullying, or lack of recognition pose serious threats to employees' psychological well-being (Einarsen et al., 2011).

Job demands-resources model (JD-R)

Another model describing the links between mental health and work is the job demands-resources model (JD-R), a universal and comprehensive tool used to analyze employee well-being and factors affecting their mental health and job performance. This model assumes that two groups of factors exist in the work environment: job demands and job resources, which differently affect employee well-being and professional functioning (Demerouti et al., 2001). Job demands refer to aspects requiring continuous physical and/or psychological effort, such as time pressure, high workload, difficult interpersonal relationships, or responsibility, which can lead to fatigue and stress. Job resources are elements of the work environment that help cope with demands, support per-

sonal development, motivation, and job satisfaction. These include support from supervisors and coworkers, autonomy in action, role clarity, and opportunities for skill development (Bakker & Demerouti, 2007). The key thesis of the model is that an excess of job demands combined with a lack of resources leads to burnout, reduced engagement, and deteriorated mental health. Conversely, adequate job resources can not only mitigate the negative effects of high demands but also increase motivation and employee engagement, translating into better organizational outcomes (Bakker et al., 2004). The model highlights the importance of a balance between demands and resources, which is essential to maintain high levels of energy, engagement, and job satisfaction.

Environmental, organizational, and individual factors

Research indicates that a wide range of factors influence mental health in the workplace, which can be divided into environmental, organizational, and individual factors. Key environmental factors include excessive workload, time pressure, unclear job roles, and lack of social support from coworkers and supervisors (Schaufeli & Bakker, 2004). Chronic stress resulting from these factors leads to the development of a symptom cluster known as burnout, which — according to Maslach, Schaufeli, and Leiter (2001) — comprises three dimensions: emotional exhaustion, depersonalization, and reduced professional efficacy. At the individual level, personality traits such as high neuroticism, low self-efficacy, and deficits in stress coping skills may predispose to worsening mental health (Lazarus & Folkman, 1984). Organizational factors, such as an organizational culture promoting openness and support, clear procedures, and opportunities for professional development, act protectively on employee mental health (Nielsen et al., 2015).

Consequences of poor mental health

The negative consequences of mental health problems at work are multidimensional and affect both individuals and entire organizations. Employees suffering from chronic stress and burnout experience reduced motivation, lower job satisfaction, and poorer task performance quality (Schaufeli et al., 2006). Moreover, mental disorders increase the risk of sickness absence, leading to higher costs for employers (Kessler et al., 2008). From an organizational perspective, mental health problems are also associated with increased employee turnover and deterioration of organizational climate (Harvey et al., 2017). Mental health in the workplace is a crucial factor determining not only the well-being of individual employees but also the effectiveness of entire organizations.

Work design

Work design has emerged as a foundational concept in organizational psychology, shaping not only the structure of jobs but also the experiences, behaviors, and well-being of employees. It is broadly defined as "the content and organization of tasks, activities, relationships, and responsibilities at work" (Parker, 2014, p. 662), and its influence extends across various organizational outcomes, including job satisfaction, performance, and employee retention (Parker, Van den Broeck, & Holman, 2017). As modern workplaces continue to evolve in complexity and interdependence, understanding the changing nature and impact of work design has become more relevant than ever.

Historical approaches

Early approaches to work design were primarily focused on identifying core job features that could predict motivation and performance. The seminal Job Characteristics Model (JCM) developed by Hackman and Oldham (1976) remains one of the most

influential frameworks in this domain. According to the model, five central job characteristics—skill variety, task identity, task significance, autonomy, and feedback from the job—contribute to three critical psychological states: experienced meaningfulness, experienced responsibility, and knowledge of results. These states, in turn, lead to outcomes such as intrinsic motivation, job satisfaction, improved work quality, and reduced absenteeism and turnover.

Simultaneously, Karasek's (1979) demand-control model introduced the interplay between job demands and decision-making autonomy. The model posits that while high job demands may lead to psychological strain, their negative effects are mitigated when employees also have high control over their work. Jobs characterized by both high demands and high autonomy – referred to as "active jobs" – are believed to not only reduce strain but also facilitate learning and development. This perspective laid the groundwork for later models such as the Job Demands-Resources (JD-R) framework (Demerouti et al., 2001), which expanded the concept of control to include a broader range of personal and organizational resources.

Modern approaches

Over time, research on work design has moved beyond its original motivational focus to encompass a wider array of psychological and organizational outcomes. Scholars have emphasized the role of work characteristics in promoting learning, adaptability, and professional growth (Frese & Zapf, 1994; Taris & Feij, 2004; Wall et al., 1992). Parker (2014) further advanced this idea by proposing a developmental model of work design that integrates learning and skill development as key outcomes. Similarly, Karasek and Theorell (1990) introduced the "active learning hypothesis," which suggests that high-autonomy, high-demand jobs do not merely protect workers from stress but actively promote

cognitive engagement, mastery, and continuous development. In a systematic review of studies on work design and learning, Wielenga-Meijer et al. (2010) concluded that enriched work characteristics are generally associated with better learning outcomes. Parker et al. (2017) synthesized this evidence in a comprehensive model emphasizing the developmental potential of well-designed work. These insights underscore a growing recognition that work design is not only about immediate task performance, but also about fostering long-term employee growth and organizational adaptability.

As the nature of work has transformed – with more emphasis on teamwork, knowledge-based tasks, and dynamic environments–traditional models have been complemented by more integrative frameworks. One such approach was introduced by Morgeson and Humphrey (2006), who proposed a multidimensional taxonomy of work characteristics that extends beyond the motivational features emphasized in the JCM. Their Work Design Questionnaire (WDQ) classifies job attributes into four broad dimensions: task, knowledge, social, and contextual characteristics.

Task characteristics include features such as autonomy, task significance, and task identity, which relate to how work is performed and structured. Knowledge characteristics refer to the cognitive demands of a job, such as information processing, problem-solving, and skill variety. Social characteristics encompass interpersonal aspects, including social support, interdependence, and feedback from others. Finally, contextual characteristics cover environmental elements such as physical working conditions, ergonomics, and the use of equipment.

Empirical studies have validated the significance of these job features across diverse organizational contexts. For instance, Morgeson and Humphrey (2006) found that task, knowledge, and social characteristics were strong predictors of job satisfaction in a sample of 540 employees from 243 job roles. Similarly, Meyerding (2015) identified positive associations between job

characteristics and satisfaction among German employees, and Hsu and Liao (2016) observed similar patterns among foreign workers in Thailand. Across studies, job autonomy has consistently emerged as one of the strongest predictors of employee satisfaction.

These findings suggest a robust link between enriched work characteristics and positive employee outcomes. The more enriched and engaging the job, the higher the levels of satisfaction and performance it tends to generate. As Parker et al. (2017) note, work design functions not only as a direct predictor of organizational outcomes (e.g., productivity, satisfaction) but also as a mediator between other variables, such as leadership and employee performance, and even as an outcome of employee-initiated processes like job crafting.

The practical implications of these insights are substantial. Organizations aiming to foster high performance and well-being must consider how managerial decisions and formal job structures influence the quality of work design. Although employees can shape their roles informally through job crafting, it is often managerial choices that lay the foundation for meaningful and sustainable work environments (Parker et al., 2017). Finally, the established relationship between employee happiness and productivity (Wright & Cropanzano, 2000) continues to motivate research into how organizations can cultivate both. Work design theory offers a valuable roadmap, linking structural job features to both motivational and developmental outcomes. By designing work that is psychologically, socially, and physically enriching, organizations can not only enhance employee satisfaction but also strengthen organizational resilience and innovation.

In conclusion, work design is a dynamic and multifaceted construct with enduring relevance. From its early focus on motivation and autonomy to its current integration of learning, relational, and contextual aspects, work design theory has evolved in step with the changing world of work. As workplaces continue to

adapt to technological, social, and economic shifts, the ability to design effective and fulfilling jobs remains a cornerstone of organizational success.

Job satisfaction

Job satisfaction has long been a central topic in organizational psychology and human resource management. It is broadly conceptualized as "the attitudes and feelings people have about their work. If they experience positive and favorable attitudes towards the job, they are said to be experiencing job satisfaction. On the other hand, negative and unfavourable attitudes towards the job indicate job dissatisfaction" (Armstrong, 2006, p. 264). Numerous empirical studies have demonstrated that job satisfaction significantly affects both individual and organizational outcomes. High levels of job satisfaction are consistently associated with increased productivity, lower absenteeism, reduced turnover, stronger organizational commitment, and higher levels of motivation and life satisfaction (Iliescu et al., 2015; Nyberg & Ployhart, 2013; O'Keefe, 2014; Stavrova et al., 2014).

Determinants of job satisfaction

The determinants of job satisfaction are diverse and multifaceted. Griffin and Baterman (1986) in a seminal meta-analysis identified six broad categories influencing job satisfaction: job characteristics and work design, goal setting, compensation and reward systems, organizational features, leadership, participatory decision-making, and demographic variables. Among these, work design has been particularly influential in shaping the overall job satisfaction of employees. Specifically, characteristics such as autonomy, task identity, feedback, and social support have been repeatedly linked to higher satisfaction (Morgeson & Humphrey, 2006; Parker et al., 2017).

The notion that a global measure of job satisfaction may be more predictive than facet-specific measures has also been supported in the literature. Dolbier et al. (2005) concluded that while facet-level analyses provide diagnostic information, global job satisfaction scores tend to better capture the employee's overall evaluative stance toward their work.

Empirical evidence across sectors

Recent research has emphasized the role of employability and job insecurity as important factors influencing employee attitudes and behaviors. For example, studies show that employability tends to strengthen organizational commitment, partly by enhancing perceptions of control and job satisfaction (Urbanavičiūtė et al., 2015). Conversely, job insecurity is often associated with lower job satisfaction and reduced commitment, although the strength of this relationship may vary depending on employment context and contract type (De Cuyper et al., 2009). These findings are consistent with the principles of Social Exchange Theory (Blau, 1964), which suggests that when employees perceive organizational support – such as opportunities for development and recognition – they are more likely to reciprocate with greater satisfaction and loyalty.

Additional insights come from the healthcare and educational sectors, where job satisfaction has been extensively studied. Radlović and Safiye (2025) found that extrinsic motivation is a significant predictor of job satisfaction among healthcare workers, suggesting that external rewards and employment stability play a crucial role in fostering satisfaction in high-stress environments. In parallel, Nguyen and Ha (2023) highlighted the importance of internal communication and employee engagement as predictors of job satisfaction in higher education institutions. Their research supports the view that satisfaction is not merely a result

of tangible job features but also of relational and communicative dynamics within the organization.

Moreover, Mothema et al. (2025) reported a strong positive correlation between job satisfaction and work engagement among administrative employees in the public sector. Their findings reinforce the idea that job satisfaction contributes to higher levels of attention, enthusiasm, and involvement in work roles, which in turn enhance organizational performance.

In summary, job satisfaction is a complex and multi-dimensional construct shaped by structural, psychological, and social variables. It remains a critical outcome variable in work design theory and an essential target for organizational interventions aimed at improving employee well-being and performance. As work environments continue to evolve, understanding the nuanced drivers of job satisfaction – and their interaction with constructs such as employability, communication, and engagement – will be key to fostering sustainable organizational success.

Mediating role of job satisfaction

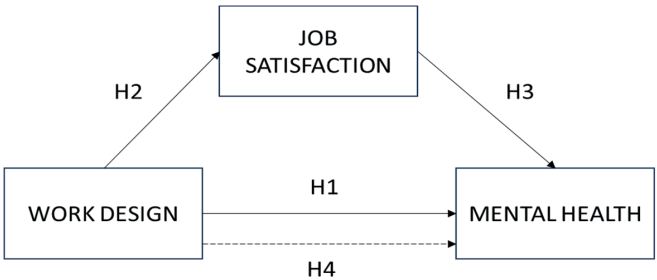
Recent research highlights job satisfaction as a key mediating factor linking job design to employee mental health within the Job Demands-Resources (JD-R) framework (Bakker & Demerouti, 2017). Specifically, enriched job characteristics – such as autonomy, feedback, and social support – enhance job satisfaction, which in turn lowers the risk of mental health problems like depression, anxiety, and somatic complaints (Komase et al., 2021; Lesener et al., 2018). Job satisfaction acts as a psychological buffer, mitigating the harmful effects of high job demands and occupational stressors (Xue et al., 2022). Empirical studies suggest that well-designed jobs increase employees' sense of competence, motivation, and emotional resilience, fostering better mental health outcomes (Parker & Jorritsma, 2021). Moreover, job satisfaction contributes to reducing psychological distress and burnout by fulfilling basic psychological needs and enhancing work engagement (Bakker &

Demerouti, 2017). Consequently, job satisfaction represents a vital psychological resource that mediates the relationship between structural job features and employee well-being, underscoring its crucial role in promoting occupational mental health (Koroglu & Özmen, 2022).

The present study

Building on extensive theoretical frameworks and empirical findings linking work design, job satisfaction, and mental health, the present study aims to investigate these relationships within a comprehensive model grounded in the Job Demands-Resources (JD-R) framework. While prior research has separately highlighted the potential of work design to contribute to employee well-being and job satisfaction, and the possible protective role of job satisfaction for mental health, there remains a need to clarify the pathways through which these variables may be connected. This study (Figure 1) hypothesizes that well-structured work design may lead to improvements in mental health by reducing symptoms related to psychological distress and enhancing overall well-being (H1). Additionally, it proposes that work design may lead to higher job satisfaction (H2), which in turn may lead to better mental health outcomes (H3). Crucially, the model suggests that job satisfaction may mediate the relationship between work design and mental health, acting as a psychological resource that can buffer against occupational stress (H4). Testing these hypotheses will deepen our understanding of how organizational factors can potentially contribute to employee mental health and offer insights for creating healthier workplace environments.

Figure 1. Research model and hypotheses.



METHOD

Participants and procedure

The survey was conducted between May and June 2024 using a convenience sampling method. Due to the considerable effort required from participating organizations, it was difficult to recruit entities willing to fully participate. To improve the response rate, personal contacts were used. Respondents received a message containing a link to the electronic survey questionnaire. In total, 306 fully completed questionnaires were collected.

The study group consisted of 228 women (74.5%) and 78 men (25.5%). Participants were predominantly young adults, with an average age of 32.33 years (SD = 10.41). Most respondents had higher education, and the majority lived in cities with more than 100,000 inhabitants. Detailed demographic characteristics, including age, gender, place of residence, education, income, current occupation, and work experience, are presented in Table 1.

Table 1. Descriptive table of the study group.

Variable	Category	%
Gender	Female	74.5
	Male	25.5
Total		100.0
Place of residence	Village	13.7
	City up to 50,000	6.9
	City 51,000–100,000	8.5
	City 100,000–500,000	45.1
	City above 500,000	21.2
Total		100.0
Education	Primary	1.0
	Vocational	1.0
	Secondary	36.5
	Higher	61.5
Total		100.0
Income	≤ 4000 zł	14.0
	4001–6000 zł	29.5
	6001–10000 zł	28.3
	> 10000 zł	27.2
Total		100.0
Current job tenure (months)	0–12	24.3
	13–60	34.0
	61–120	19.8
	> 120	21.9
Total		100.0
Overall work experience (years)	0–5	28.0
	6–10	23.7
	11–20	25.7
	> 20	22.6
Total		100.0

Variable	Category	%
Occupation / Profession (grouped)	Administration / Office	14.1
	Education	11.4
	Medicine / Care	8.8
	IT / Technology	3.6
	Trade / Sales / Gastronomy	11.4
	Construction / Production / Logistics	3.3
	Arts / Media / Entertainment	2.6
	Law / Finance / Consulting	3.9
	Uniformed services / Military	1.0
	Self-employed / Freelancer	2.0
	Other	37.9
Total		100.0

Measures

Work designs

Following Morgeson and Humphrey's model, work characteristics can be categorized into four general dimensions: task, knowledge, social, and work context characteristics. To measure these characteristics, we used the Polish version (Hauk, 2014) of the Work Design Questionnaire (Morgeson & Humphrey, 2006). Responses were given on a five-point Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). Based on the Polish adaptation, the following dimensions were assessed, with internal consistency (Cronbach's α) calculated for the present sample: work complexity (12 items, α = .84), physical demands and work conditions (5 items, α = .88), feedback from the job (4 items, α = .74), autonomy (4 items, α = .79), ergonomics (4 items, α = .91), feedback from others (3 items, α = .81), equipment used (3 items, α = .74), interdependence among workers (5 items, α = .63), interactions

outside the organization (2 items, $\alpha = .47$), social support – friendships in the organization (2 items, $\alpha = .79$), and job significance (2 items, $\alpha = .61$). For each dimension, scores were computed as the mean of the respective items.

Job satisfaction

The Satisfaction with Job Scale (SWJS; Zalewska, 2003) is based on the Satisfaction with Life Scale (SWLS) developed by Diener et al. (1985). It measures the cognitive aspect of job satisfaction, which involves forming value judgments rather than emotional states, based on conscious reflection and various comparisons (e.g., with others or one's situation). The scale is unidimensional and consists of five items rated on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The reliability coefficient for the SWJS in the present study was $\alpha = 0.87$. The overall job satisfaction score was computed as the mean of the five items.

Psychopathological symptoms

The Symptoms Checklist-27-plus (SCL-27-plus) is a comprehensive screening tool for various emotional disorder symptoms and pain (Hardt, 2008; Kuncewicz et al., 2014). The instrument comprises five subscales, with Cronbach's α calculated for the present sample: pain ($\alpha = .82$), depressive symptoms ($\alpha = .89$), agoraphobic symptoms ($\alpha = .83$), sociophobic symptoms ($\alpha = .84$), and vegetative symptoms ($\alpha = .81$). The overall reliability of the questionnaire in this study was excellent ($\alpha = .93$). For each subscales, scores were computed as the mean of the respective items.

Plan of analysis

Analyses were performed in IBM SPSS 29 using the PROCESS 4.2 plug-in (Hayes, 2022). As a first step, a correlation analysis was performed between the variables tested in the self-report

study to confirm their feasibility in the mediation models. In the next step, a stepwise linear regression analysis was calculated to verify the strongest predictor of job satisfaction. Model 4 was then calculated in PROCESS with all work design dimensions as predictors in parallel. The main independent variable was ergonomics. According to the indications of Hayes (2022), with multiple predictors, the remaining variables should be entered as covariates, because each such model will give the same effect. The mediator was job satisfaction, while the dependent variable was mental health symptoms: pain, depressive, agoraphobic, sociophobic, and vegetative symptoms, which were included in separate models. The adequacy of this procedure for multiple predictors was verified by the author of PROCESS (Hayes, 2022). The statistical significance of the correlations between the direct and indirect effects was evaluated by means of 1,000 bootstrap samples to create bias-corrected confidence intervals (95% CI).

RESULTS

Descriptive statistics and normality

Descriptive statistics (*M*, *SD*) and Shapiro–Wilk tests are shown in Table 2. Several variables, including most work design and mental health measures, significantly deviated from normality ($p < .05$). Therefore, non-parametric analyses (Spearman's ϱ) were applied for all correlations.

Table 2. Descriptive statistics and Shapiro–Wilk test for normality.

No.	Variable	*M*	*SD*	Shapiro–Wilk
1	Job complexity	3.63	0.67	0.964*
2	Physical demands and working conditions	2.49	1.13	0.936*
3	Feedback from work	2.17	0.75	0.962*
4	Autonomy	3.76	0.88	0.953*
5	Ergonomics	3.66	1.07	0.915*
6	Feedback from others	3.41	0.96	0.968*
7	Used equipment	3.25	0.98	0.974*
8	Interdependence of employees	3.03	0.76	0.986
9	Interactions outside the organization	3.06	1.11	0.957*
10	Social support – friendships in the organization	3.50	1.14	0.927*
11	Job significance	3.27	1.04	0.955*
12	Depressive	0.62	0.72	0.826*
13	Vegetative	0.54	0.60	0.843*
14	Agoraphobic	0.37	0.58	0.709*
15	Sociophobic	0.59	0.62	0.854*
16	Pain	0.83	0.61	0.949*
17	Job satisfaction	4.50	1.24	0.980*

* Significant deviation from normality ($p < .05$)

Correlation analysis findings

Table 3 presents Spearman's rank correlation coefficients and 95% bootstrapped confidence intervals for work design dimensions, job satisfaction, and mental health outcomes. Job satisfaction was significantly correlated with multiple work design dimensions and health outcomes. Correlations ranged from weak (ϱ = 0.1622100320.28), moderate (ϱ = 0.30–0.46), to strong (ϱ = –0.53). Depressive symptoms were negatively correlated with job complexity (ϱ = –0.14), feedback from work (ϱ = –0.22), autonomy (ϱ = –0.30), ergonomics (ϱ = –0.28), feedback from others (ϱ = –0.23), equipment used (ϱ = –0.30), and social support, i.e.

Table 3. Spearman's rank correlation coefficients and 95% confidence.

Variables	1	2	3	4	5	6	7	8
1. Job complexity								
2. Physical demands and working conditions	0.13* [0.01;0.25]							
3. Feedback from work	-0.29** [-0.40;-0.18]	-0.08 [-0.20;0.04]						
4. Autonomy	0.38** [0.27;0.48]	-0.05 [-0.17;0.07]	-0.31** [-0.41;-0.20]					
5. Ergonomics	0.11* [-0.01;0.23]	-0.41** [-0.51;-0.30]	-0.29** [-0.40;-0.18]	0.31** [0.19;0.42]				
6. Feedback from others	0.04 [-0.07;0.15]	-0.02 [-0.13;0.10]	-0.49** [-0.59;-0.39]	0.13* [0.01;0.25]	0.32** [0.20;0.43]			
7. Used equipment	0.41** [0.29;0.51]	0.17** [0.04;0.27]	-0.28** [-0.38;-0.18]	0.25** [0.14;0.36]	0.15* [0.03;0.27]	0.20** [0.08;0.31]		
8. Interdependence of employees	0.06 [-0.06;0.18]	0.10 [-0.02;0.21]	0.03 [-0.08;0.15]	-0.05 [-0.17;0.07]	-0.05 [-0.17;0.07]	0.07 [-0.05;0.19]	0.12* [0.00;0.23]	
9. Interactions outside the organization	-0.15* [-0.26;-0.02]	-0.11 [-0.22;0.02]	0.11 [-0.01;0.22]	-0.11 [-0.22;0.01]	0.03 [-0.09;0.15]	-0.04 [-0.16;0.08]	-0.11 [-0.22;0.01]	0.09 [-0.03;0.21]
10. Social support – friendships in the organization	0.25** [0.15;0.36]	0.03 [-0.09;0.15]	-0.27** [-0.37;-0.16]	0.20** [0.09;0.31]	0.06 [-0.06;0.18]	0.25** [0.13;0.36]	0.15** [0.03;0.27]	-0.02 [-0.14;0.10]
11. Job significance	0.43** [0.33;0.52]	0.20** [0.08;0.31]	-0.21** [-0.32;-0.10]	0.16** [0.04;0.28]	-0.03 [-0.15;0.09]	0.01 [-0.11;0.13]	0.14* [0.02;0.26]	0.09 [-0.03;0.21]
12. Depressive symptoms	-0.16** [-0.27;-0.05]	0.02 [-0.10;0.14]	0.33** [0.22;0.43]	-0.32** [-0.43;-0.21]	-0.24** [-0.36;-0.12]	-0.29** [-0.40;-0.18]	-0.20** [-0.32;-0.08]	0.10 [-0.02;0.22]
13. Vegetative symptoms	-0.02 [-0.14;0.10]	0.08 [-0.03;0.19]	0.10 [-0.02;0.22]	-0.09 [-0.21;0.04]	-0.22** [-0.34;-0.11]	-0.18** [-0.30;-0.06]	-0.11 [-0.23;0.01]	0.03 [-0.09;0.15]
14. Agoraphobic symptoms	-0.16** [-0.28;-0.05]	0.05 [-0.07;0.16]	0.18** [0.06;0.29]	-0.21** [-0.33;-0.09]	-0.23** [-0.35;-0.12]	-0.13* [-0.25;-0.01]	-0.12* [-0.24;-0.01]	0.06 [-0.06;0.18]
15. Sociophobic symptoms	-0.18** [-0.29;-0.06]	0.00 [-0.12;0.12]	0.28** [0.16;0.39]	-0.26** [-0.37;-0.14]	-0.19** [-0.31;-0.07]	-0.20** [-0.32;-0.08]	-0.20** [-0.32;-0.08]	0.05 [-0.07;0.17]
16. Pain symptoms	-0.12* [-0.24;-0.01]	0.19** [0.08;0.29]	0.13* [0.01;0.25]	-0.13* [-0.25;-0.01]	-0.25** [-0.37;-0.13]	-0.16** [-0.28;-0.04]	-0.08 [-0.20;0.04]	0.09 [-0.03;0.21]
17. Job satisfaction	0.35** [0.25;0.45]	-0.03 [-0.16;0.09]	-0.53** [-0.61;-0.44]	0.44** [0.35;0.54]	0.46** [0.36;0.56]	0.43** [0.32;0.53]	0.33** [0.22;0.42]	-0.04 [-0.16;0.08]

9	10	11	12	13	14	15	16
-0.03 [-0.15;0.09]							
-0.14* [-0.26;-0.01]	0.19** [0.07;0.31]						
-0.01 [-0.13;0.11]	-0.24** [-0.36;-0.12]	-0.22** [-0.34;-0.10]					
-0.14* [-0.26;-0.01]	-0.09 [-0.21;0.04]	-0.12* [-0.24;-0.01]	0.11* [-0.01;0.23]				
0.05 [-0.07;0.17]	-0.16** [-0.28;-0.04]	-0.21** [-0.33;-0.09]	0.18** [0.06;0.29]	0.09 [-0.03;0.21]			
0.03 [-0.09;0.15]	-0.17** [-0.29;-0.05]	-0.18** [-0.30;-0.06]	0.26** [0.14;0.37]	0.12* [0.00;0.24]	0.33** [0.22;0.44]		
0.03 [-0.09;0.15]	-0.10 [-0.22;0.02]	-0.15* [-0.27;-0.03]	0.14* [0.02;0.26]	0.02 [-0.10;0.14]	0.10 [-0.02;0.22]	0.21** [0.10;0.32]	
0.16** [0.04;0.28]	0.37** [0.27;0.47]	0.42** [0.32;0.52]	-0.36** [-0.46;-0.26]	-0.30** [-0.40;-0.20]	-0.21** [-0.32;-0.09]	-0.28** [-0.38;-0.17]	-0.17** [-0.29;-0.06]

friendships in the organization (ϱ = –0.19), ranging from weak to strong. Vegetative symptoms showed weak-to-moderate negative associations with feedback from work (ϱ = –0.17), ergonomics (ϱ = –0.23), and feedback from others (ϱ = –0.20). Agoraphobic symptoms were weakly-to-moderately negatively correlated with job complexity (ϱ = –0.13), feedback from work (ϱ = –0.12), autonomy (ϱ = –0.19), ergonomics (ϱ = –0.19), feedback from others (ϱ = –0.13), and social support (ϱ = –0.16). Sociophobic symptoms were negatively associated with job complexity (ϱ = –0.17), feedback from work (ϱ = –0.16), autonomy (ϱ = –0.24), ergonomics (ϱ = –0.20), feedback from others (ϱ = –0.15), equipment used (ϱ = –0.17), and social support (ϱ = –0.20), ranging from weak to moderate. Pain symptoms correlated positively with physical demands and working conditions (ϱ = 0.20) and negatively with feedback from work (ϱ = –0.16), autonomy (ϱ = –0.13), ergonomics (ϱ = –0.26), feedback from others (ϱ = –0.17), and social support (ϱ = –0.13), mostly in the weak–to-moderate range. Bootstrapped 95% confidence intervals are reported for all correlations (Table 3).

Based on the obtained results and due to lack of significant associations, the work design dimensions of interdependence of employees, interactions outside the organization, and job significance were excluded from further analyses.

Linear regression analysis

A linear regression analysis was conducted to identify the strongest predictors of job satisfaction among the work design dimensions. The overall model was statistically significant, $F(8, 297) = 39.57$, $p < .001$, and explained 51.6% of the variance in job satisfaction ($R^2 = .516$, Adjusted $R^2 = .503$). Ergonomics (β = .289, $p < .001$), feedback from work (β = .256, $p < .001$), autonomy (β = .195, $p < .001$), and feedback from others (β = .139, $p = .006$) were significant positive predictors. Physical demands, social support, and used equipment were not significant predictors. Collinearity diagnostics indicated acceptable levels of multicol-

Table 4. Linear regression analysis predicting job satisfaction, including unstandardized coefficients (*B*), standardized coefficients (β), *t*-values, *p*-values, and collinearity statistics (Tolerance and VIF).

Predictor	*B*	*SE B*	β	*t*	*p*	Tolerance	VIF
(Constant)	–1.434	0.382	—	–3.752	< .001	—	—
Job Complexity	0.227	0.090	0.123	2.508	.013	0.679	1.474
Physical Demands	0.014	0.050	0.012	0.270	.787	0.768	1.302
Autonomy	0.274	0.065	0.195	4.237	< .001	0.768	1.302
Ergonomics	0.334	0.057	0.289	5.866	< .001	0.673	1.486
Feedback from Others	0.178	0.064	0.139	2.761	.006	0.643	1.556
Used Equipment	0.086	0.059	0.069	1.457	.146	0.737	1.356
Social Support	0.092	0.047	0.084	1.939	.053	0.859	1.164
Feedback from Work	0.423	0.084	0.256	5.042	< .001	0.632	1.584

Note. $N = 306$, $R^2 = .516$, Adjusted $R^2 = .503$, $F(8, 297) = 39.57$, $p < .001$.

linearity among predictors (VIFs < 2). These results suggest that ergonomic conditions and supportive work design features are the most influential factors contributing to employees' job satisfaction (Table 4).

Mediation analysis

A series of mediation analyses was conducted to examine the effect of ergonomics on five symptom dimensions – **depressive, vegetative, agoraphobic, sociophobic, and pain symptoms** – with **job satisfaction** as a mediator. All models controlled for job complexity, physical demands, autonomy, feedback from others, used equipment, social support, and feedback from work. Across all models, ergonomics significantly predicted higher job satisfaction (B = 0.334, SE = 0.057, $t(297) = 5.87$, $p < .001$, $\beta = .289$).

For **depressive symptoms**, job satisfaction negatively predicted symptoms (B = –0.193, SE = 0.042, $t(296) = –4.57$, $p < .001$, $\beta = –.332$). The total effect of ergonomics was significant and negative (B = 0.104, SE = 0.043, $t(297) = –2.43$, $p = .016$, $\beta = –.155$), whereas the direct effect, controlling for job satisfaction, was nonsignificant (B = –0.039, SE = 0.044, $t(296) = –0.90$, $p = .369$, $\beta = –.059$). The indirect effect through job satisfaction was significant (B = –0.065, BootSE = 0.019, 95% CI [–0.104, –0.030], $\beta = –.096$), indicating full mediation.

For **pain symptoms**, job satisfaction also negatively predicted outcomes (B = –0.111, SE = 0.039, $t(296) = –2.88$, $p = .004$, $\beta = –.224$). The total effect of ergonomics was significant (B = –0.093, SE = 0.038, $t(297) = –2.41$, $p = .017$, $\beta = –.161$), while the direct effect was nonsignificant (B = –0.056, SE = 0.040, $t(296) = –1.38$, $p = .168$, $\beta = –.097$). The indirect effect via job satisfaction was significant (B = –0.037, BootSE = 0.015, 95% CI [–0.068, –0.011], $\beta = –.065$), demonstrating a mediated effect.

For **vegetative symptoms**, job satisfaction was negatively related but nonsignificant (B = –0.072, SE = 0.039, $t(296) = –1.84$, $p = .067$, $\beta = –.148$), and the indirect effect of ergonomics through

Table 5. Total, direct, and indirect effects of ergonomics on psychological symptoms via job satisfaction.

Outcome	Effect type	*B*	*SE*	*t*	*p*	95% *CI*	β (standardized)
Agoraphobic symptoms	Total	**–0.121**	0.039	–3.136	**.002**	[–0.197, -0.046]	-0.202
	Direct	**–0.090**	0.040	–2.229	**.027**	[–0.169, -0.010]	-0.149
	Indirect (via job satisfaction)	–0.032	0.015	–	–	[–0.061, -0.005]	-0.053
Sociophobic symptoms	Total	**–0.140**	0.038	–3.656	**.000**	[–0.216, -0.065]	-0.231
	Direct	**–0.101**	0.040	–2.523	**.012**	[–0.180, -0.022]	-0.167
	Indirect (via job satisfaction)	–0.039	0.014	–	–	[–0.066, -0.014]	-0.065
Pain symptoms	Total	**–0.093**	0.038	–2.410	**.016**	[–0.168, -0.017]	-0.161
	Direct	–0.056	0.040	–1.383	.168	[–0.134, 0.024]	-0.097
	Indirect (via job satisfaction)	**–0.037**	0.015	–	–	[–0.068, -0.011]	-0.065
Depressive symptoms	Total	**–0.104**	0.043	–2.426	**.016**	[–0.188, -0.020]	-0.155
	Direct	–0.039	0.044	–0.900	.369	[–0.126, 0.047]	-0.059
	Indirect (via job satisfaction)	**–0.065**	0.019	–	–	[–0.104, -0.030]	-0.096
Vegetative symptoms	Total	**–0.089**	0.038	–2.314	**.021**	[–0.164, -0.013]	-0.158
	Direct	–0.065	0.040	–1.606	.109	[–0.144, 0.015]	-0.115
	Indirect (via job satisfaction)	–0.024	0.013	–	–	[–0.049, 0.001]	-0.043

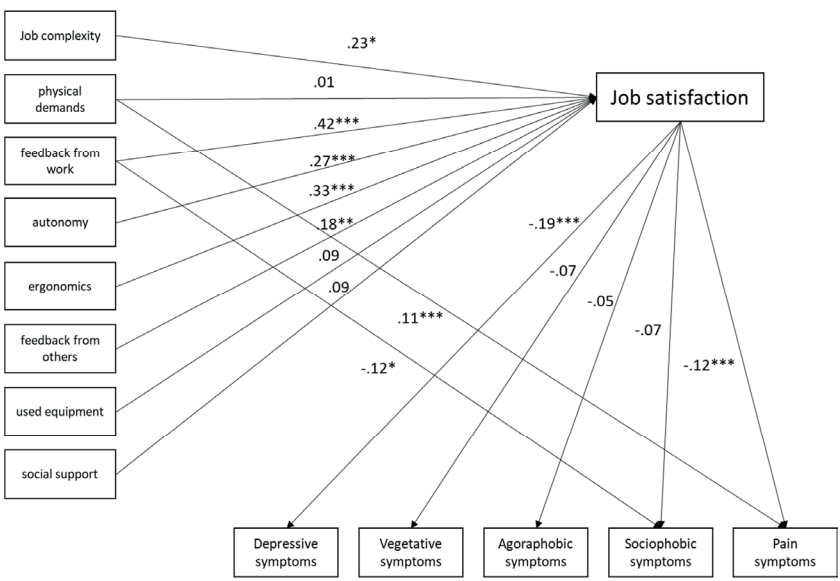
Note. $N = 306$, X = Ergonomics, M = Job Satisfaction. Effects are unstandardized (Effect), standard error (*SE*), *t*-value (*t*), *p*-value (p), 95% bootstrap confidence intervals (BootLLCI, BootULCI), and completely standardized indirect effects (c_cs or c'_cs for total and direct effects).

job satisfaction was small and nonsignificant (B = –0.024, BootSE = 0.013, 95% CI [–0.049, 0.001], β = –.043), suggesting only a marginal mediating role.

For **agoraphobic** and **sociophobic symptoms**, neither direct nor indirect effects reached significance (agoraphobic: B_indirect = –0.016, BootSE = 0.014, 95% CI [–0.043, 0.010], β = –.029; sociophobic: B_indirect = –0.022, BootSE = 0.015, 95% CI [–0.053, 0.006], β = –.038), although the pattern of coefficients suggested a potential protective effect of ergonomics via higher job satisfaction.

Overall, these results indicate that **ergonomic conditions primarily reduce depressive and pain symptoms through increased job satisfaction**, whereas effects on vegetative, agoraphobic, and sociophobic symptoms are weaker and generally nonsignificant. Mediation paths are depicted in Figure 2, and detailed effects are presented in Table 5.

Figure 2. The mediation analysis of indirect hypothesized relationships.



DISCUSSION

Mental health in the workplace is a multidimensional construct, encompassing not only the absence of mental disorders but also the capacity to cope with stress, function effectively, and realize personal and professional potential (Kelloway et al., 2023). The biopsychosocial model (Engel, 1977) emphasizes that mental health emerges from the interaction of biological, psychological, and social factors, which in a work context include physical working conditions, cognitive and emotional stressors, and the quality of social relationships (Åkerstedt, 2003; Bakker & Demerouti, 2007; Einarsen et al., 2011).

Our findings highlight the central role of work design in employee well-being, supporting frameworks such as the Job Demands-Resources (JD-R) model (Demerouti et al., 2001; Bakker & Demerouti, 2017). Spearman correlations indicated that job satisfaction was positively associated with multiple enriched work characteristics, including autonomy, task complexity, feedback, ergonomics, and social support. These results are consistent with prior studies demonstrating that autonomy and supportive work conditions enhance job satisfaction and act as protective resources against workplace stress (Morgeson & Humphrey, 2006; Parker et al., 2017; Koroglu & Özmen, 2022).

The negative associations observed between work design dimensions and mental health symptoms further reinforce these conclusions. Depressive symptoms were lower among employees experiencing higher autonomy, better feedback, and more ergonomic work conditions, aligning with research showing that enriched jobs can buffer against depression and burnout (Bakker & Demerouti, 2017; Lesener et al., 2018). Similarly, pain symptoms were reduced in the presence of ergonomic support, echoing evidence that physical work conditions are closely linked to somatic complaints and can indirectly influence psychological resilience (Åkerstedt, 2003; Caruso, 2014).

Linear regression analyses revealed that ergonomics, feedback, and autonomy were the strongest predictors of job satisfaction. This underscores the importance of both physical and psychosocial resources, supporting the notion from the JD-R model that job resources not only enhance motivation and engagement but also provide protective effects for mental health (Bakker et al., 2004). Notably, other work characteristics, such as social support and used equipment, were less predictive when considered simultaneously, suggesting that employees may prioritize control over their work and the quality of their immediate environment in shaping satisfaction.

Mediation analyses demonstrated that job satisfaction fully mediated the relationship between ergonomics and depressive and pain symptoms. This indicates that ergonomic improvements contribute to better mental health primarily by increasing satisfaction with one's job, highlighting the mediating role of job satisfaction as a psychological buffer (Xue et al., 2022; Parker & Jorritsma, 2021). For vegetative, agoraphobic, and sociophobic symptoms, indirect effects were weaker and nonsignificant, suggesting that these symptom dimensions may be influenced more by individual coping styles, personality traits, or broader organizational factors than by ergonomic conditions alone (Lazarus & Folkman, 1984; Nielsen et al., 2015).

Overall, these findings support the integrated view that physical, psychological, and social dimensions of work jointly influence employee well-being. The results align with previous research emphasizing that well-designed work environments – characterized by autonomy, feedback, social support, and ergonomics – promote job satisfaction, which in turn serves as a protective resource for mental health (Bakker & Demerouti, 2007; Komase et al., 2021). By demonstrating the central mediating role of job satisfaction, this study extends prior evidence from healthcare, educational, and administrative sectors (Radlović & Safiye, 2025; Nguyen & Ha, 2023; Mothema et al., 2025) and highlights the importance

of ergonomic considerations, which have received relatively less attention in psychosocial research.

Implications

The results have important theoretical and practical implications. From a theoretical standpoint, the study reinforces the JD-R model by highlighting the central mediating role of job satisfaction in the interplay between work design and mental health. It advances the understanding that job satisfaction is not merely an outcome but also a protective psychological resource that can mitigate stress and promote resilience.

Practically, organizations should prioritize creating jobs that balance demands with sufficient resources. This includes improving physical work environments through ergonomic interventions, enhancing job autonomy, providing regular feedback, and fostering social support networks. By doing so, companies can reduce employee psychological distress and somatic complaints while boosting satisfaction, motivation, and overall well-being.

Moreover, the significant role of ergonomics signals a need for greater attention to workplace design beyond psychosocial factors. Ergonomic improvements can enhance employees' physical comfort and reduce fatigue, indirectly supporting mental health.

Implementing these changes is likely to not only improve individual well-being but also reduce absenteeism, turnover, and healthcare costs, ultimately benefiting organizational productivity and climate (Harvey et al., 2017; Kessler et al., 2008).

Limitations and future research

While the study contributes valuable insights, certain limitations should be acknowledged. The cross-sectional design limits causal inferences; longitudinal studies are needed to clarify the directionality and temporal dynamics of the relationships among work design, job satisfaction, and mental health.

Additionally, the sample's demographic and occupational characteristics may affect generalizability. Future research should examine how variables such as age, gender, education, job tenure, and industry sector influence the relationships among work design, job satisfaction, and mental health. Considering these demographic factors may help identify potential moderators and better understand for whom and under what conditions work design is most beneficial.

Further, some work design variables such as interdependence and external interactions showed weak associations with mental health, indicating the necessity to explore potential mediators or moderators such as individual coping strategies, organizational culture, or leadership styles.

Advancements in technology and evolving work models, including remote work and gig economy roles, also demand examination to understand how these changes impact the interplay between work design, job satisfaction, and mental health.

Lastly, integrating physiological measures and more detailed assessments of physical work conditions could enrich the understanding of how ergonomics influences mental health outcomes.

CONCLUSION

This study demonstrates that well-designed work environments support employee mental health by reducing depressive and somatic symptoms and fostering job satisfaction. Job satisfaction serves as a crucial mediator, translating ergonomic and psychosocial resources into protective effects on mental health. Ergonomics, autonomy, feedback, and social support emerged as key predictors of satisfaction and well-being, emphasizing the need for holistic approaches to work design that address physical, psychological, and social dimensions. These findings advance theoretical understanding, particularly within the JD-R frame-

work, and provide practical guidance for organizations seeking to promote mental health, engagement, and sustainable performance in contemporary workplaces.

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