

From Job Boredom to Procrastination: A Serial Mediation Analysis of Job Crafting and Cyberloafing

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Abstract: This research investigates how job boredom relates to workplace procrastination among Saudi Arabian healthcare workers, with job crafting serving as a sequential mediator of the relationship between job boredom and cyberloafing. Both Job Demands-Resources (JD-R), which serves as the central theoretical lens, and Conservation of Resources (COR), which supports a secondary theoretical account of resource-building and resource-conservation processes, are used to guide this investigation. Using cross-sectional survey data from 394 hospital staff and through Structural Equation Modeling (SEM), the results indicate that job boredom negatively predicts job crafting and positively predicts cyberloafing. In turn, job crafting reduces both cyberloafing and procrastination, whereas cyberloafing increases procrastination. The direct effect of job boredom on procrastination is not significant; instead, its influence operates fully through indirect pathways. Specifically, job crafting and cyberloafing function as sequential mediators, indicating that reduced proactive resource-building behaviors increase reliance on avoidance behaviors, ultimately leading to task delay. These findings advance a process-based understanding of employee disengagement by showing how job crafting and cyberloafing sequentially connect job boredom to workplace procrastination within a unified explanatory framework. The results highlight the adverse associations between job boredom and work-related results. Practically, the results underscore the importance of fostering job crafting and managing cyberloafing to mitigate procrastination and enhance performance in high-pressure work settings.

Keywords: Job boredom; job crafting; cyberloafing; workplace procrastination; healthcare sector; serial mediation; Saudi Arabia.

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1. Introduction

Job boredom has become an important focus in psychology as researchers increasingly recognize that it could be a major psychological threat to workers in today's fast-paced organizational environment. Boredom in the workplace is a widespread problem that negatively affects both individual workers and the organization (van Hooff and van Hooff, 2023). If ignored, job boredom may lead to decreased employee motivation and job satisfaction, and an increased tendency toward maladaptive behaviors in jobs that require ongoing commitment and accountability, including many healthcare jobs (Harju et al., 2016). Digital connectivity is also increasing in the workplace as many organizations adopt technology to make workflows more

efficient (Chatterjee et al., 2023). A typical reaction to job-related boredom is to engage in cyberloafing. Lim (2002), Doost and Zhang (2024), and Çınar et al. (2025) defined cyberloafing as the use of internet-based resources during work hours for purposes unrelated to work. Two primary viewpoints have emerged in research examining why employees engage in this activity. One perspective views cyberloafing as a form of negative deviance (Elrehail et al., 2021; Lim, 2002), an example of a counterproductive work behavior. The alternative perspective views cyberloafing as a form of emotional regulation and demand management for employees experiencing aversive workplace conditions (Mercado et al., 2017; Pindek et al., 2018). Moreover, workplace procrastination, characterized as the deliberate postponement of job-related duties, has been associated with workplace boredom (Metin et al., 2018). Both behaviors may provide short-term relief from psychological discomfort but are associated with poorer long-term work outcomes (Jian et al., 2024). In healthcare settings, especially in Saudi Arabia, where high levels of worker productivity are required to deliver optimal patient care, such behavior could adversely affect service quality and organizational effectiveness. Job Crafting has been investigated as one possible way to help prevent negative work behavior. This is defined by an employee making their own choices to alter their tasks, interactions with coworkers or how they view their work. This can potentially enhance the employee's sense of job meaning and involvement at work (Cheng et al., 2016). The research indicates that job crafting may protect employees against workplace boredom and be associated with a decreased likelihood of procrastination and cyberloafing (Khan et al., 2024). The main theoretical framework for this study is the JD-R model, which describes how low job resources or lack of challenge can reduce employee motivation, resulting in withdrawal or proactive attempts to change the work environment (Demerouti et al., 2001; Bakker and Demerouti, 2007). Workplace boredom may, therefore, lead to reactions such as job crafting or cyberloafing. This perspective is augmented by COR theory, which posits that employees attempt to protect, restore, or create psychological resources when they are threatened (Hobfoll, 1989). Thus, job crafting can be a resource-building response, and cyberloafing can be a resource-conservation response. Although there is a substantial body of literature on job boredom, job crafting, cyberloafing, and workplace procrastination, recent studies have largely focused on individual relationships among these factors. Although considerable prior research has examined the effects of job boredom on employee work outcomes, job crafting as a factor influencing employee engagement, and the effects of cyberloafing on worker performance, little focus has been paid to the joint effect of adaptive and maladaptive behavior in response to job boredom that could explain the tendency of individuals to procrastinate. However, limited evidence explains how these adaptive and maladaptive responses operate sequentially in healthcare settings. This gap is particularly relevant to the increasingly digitalized healthcare sector in Saudi Arabia. This study adds to the current body of literature in various ways. First of all, the study formulates and empirically confirms the applicability of a serial mediation model, which demonstrates how the effect of job boredom on workplace procrastination is mediated by factors such as job crafting and cyberloafing. Second, by taking into account both adaptive and maladaptive behavioral reactions to boredom, the study enriches current knowledge in the field compared with previous approaches that consider only one type of response to boredom. Finally, the research aids in broadening the JD-R model in the healthcare field by employing COR theory as an additional framework. The research analyzes both the direct and indirect connections between workplace boredom and procrastination, focusing on the recognized gap in existing studies. Therefore, this research aims to examine the direct and indirect relationships between job boredom and procrastination at work, and to investigate the mediating roles of job crafting and cyberloafing among healthcare professionals. This study explores the following questions:

RQ1: What is the direct relationship between job boredom and workplace procrastination among healthcare employees?

RQ2: How does job crafting mediate the relationship between job boredom and workplace procrastination?

RQ3: How does cyberloafing mediate the relationship between job boredom and workplace procrastination?

RQ4: How do job crafting and cyberloafing sequentially mediate the relationship between job boredom and workplace procrastination?

This research fills this void by examining the serial mediating functions of job crafting and cyberloafing in the connection between job boredom and procrastination. Therefore, this study examined the direct and indirect paths from job boredom to procrastination at work among healthcare employees working in hospitals in Saudi Arabia. More specifically, the role of job crafting as a mediator of the relationship and cyberloafing as a counter-productive behavior, i.e., its separate and sequential effects, was investigated. With respect to providing a comprehensive model of individuals' responses to boredom in high-stress environments, such as those found in many healthcare settings, this study seeks to develop a model of behavioral responses to boredom in Saudi healthcare. The remainder of this document will be organized as outlined below. The following section provides an overview of the current literature and outlines the hypotheses to be examined. This will be succeeded by a discussion on the research methodology applied in this study, followed by a discussion of the empirical findings.

2. Literature Review and Hypotheses Development

2.1. Job Boredom and Job Crafting

Boredom at work is usually caused by repetitive tasks or insufficient challenge (Meister and Stavskaya, 2023). It affects an employee's willingness to take an active role in "job crafting", which is when an employee decides to make changes to their current job, so it has more meaning, challenge and involvement. Although some studies suggest that boredom may prompt employees to make proactive changes to their work (van Hooff and van Hooff, 2014; van Hooff and van Hooff, 2023), most evidence indicates that workplace boredom is negatively associated with employee proactivity and job crafting

(Harju et al., 2016; Striler and Jex, 2023). More specifically, prior studies indicate that job boredom is associated with a reduced willingness to seek new challenges and resources through job crafting (Harju et al., 2016; Striler and Jex, 2023). In summary, based on existing literature, while job crafting could possibly help reduce feelings of boredom at work due to increased autonomy, increased creativity and the ability to create opportunities for growth within the workplace, many times boredom will hinder the use of job crafting (Harju et al., 2016; Oprea et al., 2019; van Hooff and van Hooff, 2023). As stated above, this relates directly to the JD-R model, which posits that decreased motivation is associated with reduced positive organizational outcomes (Bakker and Demerouti, 2007; Demerouti et al., 2001). Accordingly, this research develops its first hypothesis, shown below:

H1: Job boredom is negatively related to job crafting.

2.2. Job Crafting and Cyberloafing

Cyberloafing has become increasingly relevant as employees' access to workplace technology has expanded (Mercado et al., 2017; Tandon et al., 2022). Cyberloafing refers to when an employee engages in personal, rather than work-related, online activities while at work (Mercado et al., 2017). Job crafting is being studied as a method to address this problem, as it involves proactively aligning job tasks with one's skill set and interests. Recent studies indicate a negative association between job crafting and cyberloafing (Hai et al., 2024; Weng and Chen, 2025). Studies demonstrate that individuals who engage in job crafting exhibit a better "person-job-fit" (Elrehail et al., 2021), which includes higher levels of motivation and engagement and lower levels of cyberloafing (Hai et al., 2024). Recent research also indicates that job crafting serves as a direct means of preventing cyberloafing through organizational support and/or job crafting initiatives (Weng and Chen, 2025). Additionally, job crafting serves as a preventive measure by reducing the need for employees to engage in avoidant behaviors such as boredom or disengagement. Specifically, job crafting reduces an employee's propensity to rely on avoidance behaviors when feeling underqualified or bored (Khan et al., 2024). In addition, consistent with the JD-R model, improved motivation and available resources reduce an employee's propensity to engage in counterproductive work behaviors (Bakker and Demerouti, 2007; Demerouti et al., 2001). Given this research, the second hypothesis is shared below:

H2: Job crafting is negatively related to cyberloafing.

2.3. Cyberloafing and Procrastination at Work

The two forms of employee misconduct are generally referred to as "Cyberloafing" and "Workplace Procrastination". Cyberloafing is described by Lim and Chen (2012) as the 'hidden' nature of deviant work behavior, involving personal online activity during paid work hours. Workplace procrastination, also known as task delay or task avoidance, is defined by Metin et al. (2016) as the intentional delay of work tasks through engagement in nonessential activities. The common theme in both behaviors is self-regulatory failures stemming from a preference for instant gratification, which manifests as work avoidance. Research indicates a growing need to study the effects of cyberloafing on specific work-related behaviors, including procrastination (Tandon et al., 2022). While the research provides preliminary support for the relationship, it is still in early stages. For instance, Çınar et al. (2025) found a positive relationship between cyberloafing and procrastination among students in academic settings. Similarly, O'Neill et al. (2014) found comparable associations between cyberslacking and task procrastination in workplace settings, though these results have not been examined across different work contexts. Nonetheless, the existing evidence provisionally backs the assertion that:

H3: Cyberloafing is positively related to procrastination at work.

2.4. Job Boredom and Cyberloafing

Although research on workplace boredom has been limited until recent years, scholars have identified workplace boredom as an important aspect of the work experience, which negatively impacts employee outcomes such as job satisfaction, intention to leave, employee well-being, and task performance (Harju et al., 2016; Pindek et al., 2018; Striler and Jex, 2023; van Hooff and van Hooff, 2014; Hooff and van Hooff, 2023). Research also examines the influence of technological advancements and cyberloafing (Aghaz and Sheikh, 2016; Lim, 2002), characterized by utilizing the internet for aims other than those for which an employee is employed. There are two views of what cyberloafing is: as either a counter-productive work behavior which results in decreased productivity (Lim, 2002; Doost and Zhang, 2024), or as an adaptive coping mechanism used by employees to deal with boredom and emotional exhaustion (Ma et al., 2024; Andel et al., 2019; Pindek et al., 2018). Despite the role of cyberloafing, substantial evidence indicates that it is positively associated with workplace boredom (Pindek et al., 2018; Andel et al., 2019). This relationship may be further strengthened by associated factors like burnout (Aghaz and Sheikh, 2016; Mercado et al., 2017). The JD-R model suggests that low motivation and insufficient resources may be associated with disengagement and counterproductive work behaviors (Bakker and Demerouti, 2007; Demerouti et al., 2001). As a result, workplace boredom may be associated with negative affective states, reduced motivation, employee disengagement, and cyberloafing. Therefore, the fourth hypothesis is formed:

H4: Job boredom is positively related to cyberloafing.

2.5. Job Crafting and Procrastination at Work

Despite extensive research on procrastination at the individual level, relatively few studies have examined procrastination in organizational settings, where it is associated with negative consequences for individuals and the organization (Metin et al., 2016; Metin et al., 2018). Self-regulation mechanisms have recently been identified as an important means by which

employees craft their jobs to align with their capabilities, interests and values. As such, they can significantly reduce negative behavioral responses among employees (Song et al., 2025). Research demonstrates that job crafting is empirically associated with lower levels of procrastination, as it increases employee motivation and engagement (Metin et al., 2018). Crafting that creates high demand for employees and provides them with high levels of job resources is linked to greater task interest and, subsequently, less procrastination (Wang et al., 2025). The findings of Lichtenthaler and Fischbach's (2018) meta-analysis provide empirical evidence for a dual-pathway approach to job crafting. Promotion-focused job crafting will boost motivation and productivity by enhancing engagement. On the other hand, prevention-oriented job crafting might lead to less favorable outcomes due to burnout. Certainly, job crafting can be regarded as a strategic reaction of redirecting resources previously conserved for delay into productive behavior (Song et al., 2025). In line with the JD-R framework, higher levels of motivation and greater availability of resources to employees result in fewer adverse work behaviors (Bakker and Demerouti, 2007; Demerouti et al., 2001). Accordingly, the fifth hypothesis is developed:

H5: Job crafting is negatively related to procrastination at work.

2.6. Job Boredom and Procrastination at Work

Although procrastination is a common workplace problem, Metin et al. (2016) noted many potential organizational and employee-related problems associated with it. Procrastination in the workplace, defined as the deliberate evasion of job-related responsibilities through non-job-related activities, may result in reduced employee productivity and diminished well-being (Jian et al., 2024; Metin et al., 2016). Job boredom, typically seen when a person feels a deficit of engagement and an overall sense of disinterest or discontent regarding their workplace, has been evidenced to lead to adverse impacts on employees, including job dissatisfaction, depression and other forms of counterproductive behaviors (Oprea et al., 2019; van Hooff and van Hooff, 2014; van Hooff and van Hooff, 2023). Because of the relationship between boredom and negative worker outcomes, studies indicate that boredom may contribute to the onset of procrastination as a coping strategy for the stress of working in a boring job. Research supports this idea by showing a link between being prone to experience boredom and engaging in procrastinatory behaviors (Li et al., 2025; Steel, 2007). Consistent with COR theory (Hobfoll, 1989), procrastination can serve as a behavioral tactic to preserve employees' resources and avoid a loss spiral. Thus, the sixth hypothesis is given below:

H6: Job boredom is positively related to procrastination at work

2.7. Mediating Roles of Job Crafting and Cyberloafing

Job crafting, a form of employee-driven job modification, provides individuals with an opportunity to match their work requirements to their skills and values, thereby supporting formal organizational design procedures (Lichtenthaler and Fischbach, 2018; Striler and Jex, 2023). In addition, because job crafting is a proactive initiative, it is also significant for providing employees experiencing boredom with increased autonomy and the ability to modify tasks to enhance those experiences (Oprea et al., 2019; Song et al., 2025). Research studies provide empirical evidence for the mediating role of job crafting in linking work-related boredom to adverse workplace outcomes. However, even though employees can use job crafting to decrease boredom, this process varies with personal factors such as character traits and self-discipline (Oprea et al., 2019; van Hooff and van Hooff, 2023). In line with the JD-R model, workers might react to a lack of job resources and insufficient challenge by taking the initiative to modify certain elements of their roles. COR theory enhances this explanation by framing job crafting as a means of regaining resources, control, and meaning when employees experience boredom (Hobfoll, 1989; Jian et al., 2024). This should help reduce the likelihood of procrastination. Based on this, the seventh hypothesis is shown below:

H7: Job crafting mediates the relationship between job boredom and procrastination at work.

Cyberloafing, in contrast, represents a maladaptive coping response to job boredom. As a resource-depleting emotional state, Boredom might lead employees to use the internet for non-work activities to manage their negative feelings, which, in turn, disrupts task engagement and increases task procrastination (Andel et al., 2019; Hobfoll, 1989; Li et al., 2025). Consequently, the eighth hypothesis is developed:

H8: Cyberloafing mediates the relationship between job boredom and workplace procrastination.

Building on the above mechanism, job crafting and cyberloafing could be used as sequential (first adaptive, then maladaptive) responses to boredom. As an employee experiences a reduction in resources due to a lack of engagement in proactive crafting, that employee will likely turn to cyberloafing, which will further increase procrastination. The sequential nature of resource-building and resource-conserving behaviors reflects how adaptive and maladaptive processes can occur simultaneously under COR theory (Hobfoll, 1989). This leads us to the ninth hypothesis:

H9: Job crafting and cyberloafing serially mediate the relationship between job boredom and workplace procrastination.

The research framework is demonstrated in Fig. 1.

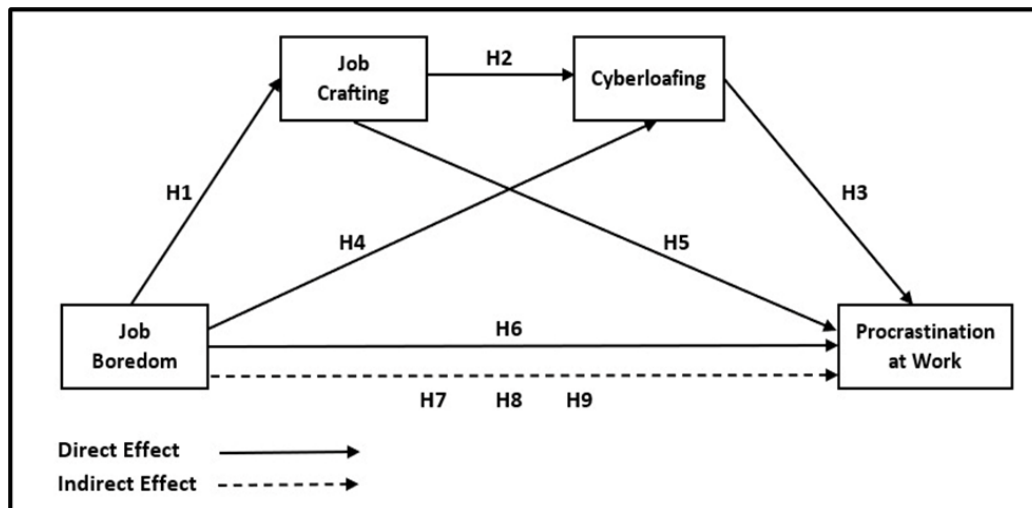


Fig. 1. The Research model

3. Research Methodology

3.1. Measures

To enhance the content validity of the study's measurements, all construct translations were performed with close attention to detail and informed by prior research. The English scales most commonly used were translated into Arabic, and then those Arabic scales were back-translated into English using Brislin's (1970) process. Three professionals who have expertise in Human Resources reviewed and tested the survey instrument as part of the validation process. Based on their input, ambiguous and/or poorly worded questions/constructs were revised, and the new version of the survey instrument was finalized for data collection. All constructs assessed through reflective indicators were rated on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The boredom scale for jobs created by van Hooff and van Hooff (2014) is an adaptation of a 5-item assessment of employee boredom and its associated emotional and cognitive disengagement. An example item consists of "I often get bored with my job." The reliability of this scale is high, and it has been applied within several studies (Jian et al., 2024). As for assessing job crafting, the 6-item short version proposed by Leana et al. (2009) was adapted/reworded to fit the healthcare environment, with a focus on employees' proactive efforts to adjust both task assignments/responsibilities. A sample item includes: "On my own, I change minor work procedures that I think are not productive." The reliability of this scale is high, and it has been applied within previous studies within service environments (Cheng et al., 2016). The cyberloafing scale was adapted from the 12-item cyberloafing behavior scale developed by Lim and Chen (2012), which was derived from the initial cyberloafing behavior scale established by Lim and Teo (2005). Based on Lu et al. (2024), to streamline the original scales, several items with similar content were combined, reducing the scale to six items. A sample of these items includes "During work hours, receiving, checking, or sending personal emails." Lu et al. (2024) showed that the reliability coefficient for this scale was Cronbach's $\alpha = 0.881$ and composite reliability (CR) = 0.887. Workplace procrastination is measured through a six-item scale, initially created by Kühnel et al. (2016) as part of their development of a procrastination behavior scale, which was also derived from Tuckman's (1991) scale. Items on this scale include "I promised myself I'll do something and then dragged my feet." This scale demonstrates high reliability and is widely referenced in the literature (Jian et al., 2024).

3.2. Data Collection and Sample

The survey was sent out both online and on paper to qualified hospital staff in Saudi Arabia. The target population comprised healthcare employees working in participating hospitals, including clinical, technical, and administrative staff who were directly involved in hospital operations and had sufficient familiarity with their work routines and digital work practices. The study covered twelve hospitals, including both public and private hospitals. These hospitals represented the primary geographical areas of Saudi Arabia: the Central, Western, Eastern, Northern, and Southern regions. The sample included hospitals located in major cities and regional areas such as Riyadh, Jeddah, Dammam/Al-Khobar, Qassim, Abha/Khamis Mushait, and Tabuk/Hail. The accessible population from which the sample was drawn was approximately 1,200 eligible healthcare employees. Because a complete national sampling frame of all eligible hospital employees was not available to the researchers, the study employed a non-probability purposive sampling method, supported by convenience sampling through hospital contacts. Eligibility was limited to employees currently working in participating hospitals who were directly involved in hospital work processes and voluntarily agreed to participate. This approach was considered appropriate because the study targeted respondents with sufficient knowledge of hospital work routines, job-related digital practices, and daily work behaviors relevant to job boredom, job crafting, cyberloafing, and workplace procrastination. The required sample size was determined using Cochran's formula, with a 95% confidence level, a 5% margin of error, and maximum variability assumed. This computation suggested a minimum necessary sample of around

384 participants. In addition, the adequacy of the sample was assessed in line with PLS-SEM recommendations for models with multiple predictors and mediation paths. The final sample size exceeded both the Cochran minimum threshold and the commonly recommended minimum threshold for PLS-SEM analysis. A total of 600 questionnaires were distributed. 410 questionnaires were returned, yielding a gross response rate of 68.3%. After excluding incomplete responses, straight-line responses, and response-pattern outliers, 394 usable questionnaires remained, resulting in a usable response rate of 65.7%. Demographic characteristics of the final sample are presented in Table 1, including gender, age, job title, educational attainment, monthly income, internet use at work, and marital status.

Table 1. Sample demographics

Variable	Item	Frequency (n)	Percentage (%)
Gender	Male	142	36%
	Female	252	64%
Age Group	Under 25	68	17%
	25–34	124	31%
	35–44	115	29%
	45 and above	87	23%
Job Title	Nurse	188	48%
	Administrative staff	102	26%
	Physician or specialist	62	16%
	Technician/Support	42	10%
Education Level	Diploma	91	23%
	Bachelor's degree	198	50%
	Postgraduate (Master's/PhD)	105	27%
Monthly Income (SAR)	Less than 5000	46	12%
	5000 – 9999	118	30%
	10000 – 14999	162	41%
	15000 and above	68	17%
Internet Usage at Work	Low (rarely online)	94	24%
	Moderate (some non-work use)	162	41%
	High (frequent non-work use)	138	35%
Marital Status	Single	158	40%
	Married	236	60%

3.3. Data Analysis

The model was analyzed utilizing the partial least squares structural equation modeling method in SmartPLS 4. PLS-SEM was selected because the model's complexity involves multiple direct and indirect relationships. This method is suitable for examining the study's explanatory and predictive elements. The evaluation consisted of two stages. The measurement model was first evaluated by examining indicator loadings, Cronbach's alpha, composite reliability, average variance extracted, the Fornell–Larcker criterion, and the heterotrait–monotrait (HTMT) ratio. Indicator loadings greater than 0.708, reliability coefficients ranging from 0.70 to 0.95, AVE results exceeding 0.50, and HTMT figures lower than 0.85 were considered indicators of high measurement quality (Hair et al., 2019; Henseler et al., 2015; Sarstedt et al., 2022). Secondly, the structural model was evaluated through path coefficients, bootstrap confidence intervals, coefficients of determination, effect sizes, predictive relevance, and model fit. The importance of direct and indirect effects was assessed using 5,000 bootstrap samples and 95% bias-corrected and accelerated confidence intervals. Mediating effects were validated when the respective confidence interval for the indirect effect excluded zero. The evaluation encompassed R^2 , adjusted R^2 , f^2 , Stone–Geisser Q^2 , SRMR, NFI, and PLSpredict indicators. The characteristics of the results are attributable to the cross-sectional and self-reported nature of the data.

4. Analysis and results

4.1. Reliability and Validity Test

4.1.1. Reliability test

As shown in Table 2, we assessed indicator reliability using the standard factor loadings suggested by Hair et al. (2019). We calculated the factor loadings for each item, all of which were above 0.708, confirming that the reliability of each individual item is satisfactory. To assess construct reliability, or internal consistency, we used Cronbach's alpha and Composite Reliability (CR). The Cronbach's alpha values indicated satisfactory reliability for all assessments: Job Boredom (JB) = 0.812, Job Crafting (JC) = 0.863, Cyberloafing (CB) = 0.858, and Procrastination At Work (PW) = 0.841. Each value falls within the suggested range of 0.7 to 0.9. Therefore, according to Hair et al. (2019) and Sarstedt et al. (2022), we have achieved satisfactory to good reliabilities for all four of our scales. Additionally, we used CR as an alternative reliability measure, as suggested by Hair et al. (2019). All CR values range from 0.70 to 0.95: JB (CR = 0.869), JC (CR = 0.897), CB (CR = 0.895), PW (CR = 0.883), therefore confirming that the reliability of the internal consistency of each scale is even higher than what has been described in Legate et al. (2021).

4.1.2. Validity test

Confirmatory Factor Analysis (CFA) was conducted using SmartPLS version 4.0. Henseler et al. (2016) state that CFA assesses two categories: (a) convergent validity and (b) discriminant validity. Table 2 indicates that all factor loadings from the survey exceeded 0.7 and were statistically significant. Moreover, AVE values for all four latent constructs exceeded 0.5 according to Hair et al. (2019): JB (AVE = 0.570); JC (AVE = 0.592); CB (AVE = 0.587); and PW (AVE = 0.557), indicating a high degree of convergent validity.

Discriminant validity is an important factor in assessing reflective measurement models in PLS-SEM, as noted by Sarstedt et al. (2022). The assessment of discriminant validity in this study was conducted at two levels. Initially, using the Fornell-Larcker Criterion, and subsequently through the HTMT ratio. Given that the correlation of each construct with all other constructs is less than the square root of the AVE for each construct, it can be inferred that discriminant validity has been established using the Fornell-Larcker criterion (Fornell and Larcker, 1981). Moreover, all HTMT values presented in Table 4 are below the conservative threshold of 0.85; consequently, discriminant validity was assessed using the benchmarks established by Henseler et al. (2015).

4.2. Structural Model and Direct Effects

The Structural Model was run in SmartPLS 4.0 and used bootstrapping to analyze the hypothesized associations, as shown in Table 5 and Figure 2. The findings show that job boredom (JB) has a negative relationship with job crafting (JC) ($\beta = -0.157$, $t = 3.254$, 95% CI [-0.247, -0.058]). Additionally, JB had a positive and strong relationship with cyberloafing (CB) ($\beta = 0.530$, $t = 15.142$, 95% CI [0.455, 0.593]). Furthermore, JC has a negative association with CB ($\beta = -0.260$, $t = 6.693$, 95% CI [-0.332, -0.179]) and procrastination at work (PW) ($\beta = -0.222$, $t = 5.218$, 95% CI [-0.303, -0.135]). Lastly, there exists a positive association between CB and PW ($\beta = 0.427$, $t = 7.773$, 95% CI [0.315, 0.529]), however there does exist an insignificant direct path between JB and PW, where beta was 0.056, $t = 1.032$, and 95% confidence interval was [-0.047, 0.164].

4.3. Analysis of Multiple Mediating Effects

To examine the proposed mediating mechanisms, the indirect impacts of each individual mediator were evaluated in SmartPLS 4.0 utilizing 5,000 bootstrap samples and 95% Bias Corrected and Accelerated (BCa) confidence intervals according to Henseler et al. (2016), which provides an additional layer of reliability to inferences made from such analyses by specifically considering potential biases and/or skews within the sample distributions (DiCiccio and Efron, 1996). As indicated in Table 5, job crafting (JC) mediated the relationship between job boredom (JB) and procrastination at work (PW) at a statistically significant level (JB to JC to PW: $\beta = 0.035$, $t = 2.716$, 95% CI [0.013, 0.063]) since the confidence interval did not contain zero. Similarly, Cyberloafing (CB) was found to be a statistically significant mediator between JB and PW (JB to CB to PW: $\beta = 0.226$, $t = 6.504$, 95% CI [0.158, 0.294]). Additionally, the evidence for the serial mediation pathway demonstrated that JB has a positive indirect influence on PW via JC and subsequently CB (JB to JC to CB to PW: $\beta = 0.017$, $t = 2.664$, 95% CI [0.007, 0.032]). It is noteworthy that JB had no statistically significant direct effect on PW ($\beta = 0.056$, $t = 1.032$, 95% CI [-0.047, 0.164]), indicating that JB exerts its influence on PW primarily through the above-described indirect pathways rather than through a direct connection.

4.4. Additional Explanatory Strength, Impact Magnitude, Forecasting Validity, and Model Fit Evaluation

To further address the reviewers' request, additional PLS-SEM quality criteria were examined. Table 6 presents the R^2 value for the endogenous constructs, Table 7 reports f^2 effect sizes for the structural paths, Table 8 reports available model-fit indices from the SmartPLS output, Table 9 provides the PLSpredict assessment, and Table 10 reports estimated Stone-Geisser Q^2 values. These values complement the direct and indirect effect tests reported above by showing explanatory power, relative predictor contribution, model fit, and predictive relevance.

PLSpredict evaluation was done in SmartPLS using a 10-fold cross-validation technique with 10 replications. The model's predictive performance was evaluated using Q^2_{predict} , RMSE, and MAE, along with PLS-SEM prediction errors relative to the linear model benchmarks. In general, the favorable Q^2_{predict} values for most indicators suggest predictive relevance, whereas the somewhat negative value for JC1 indicates a lack of predictive relevance for that indicator.

Table 2. Standardized factor loading, reliability, and convergent validity

Variable	Item	Standard Factor Loading	VIF	Cronbach's	CR	AVE
Job Boredom (JB)	JB1	0.761**	1.628	0.812	0.869	0.570
	JB2	0.714**	1.535			
	JB3	0.783**	1.653			
	JB4	0.741**	1.543			
	JB5	0.774**	1.641			
Job Crafting (JC)	JC1	0.793**	1.826	0.863	0.897	0.592
	JC2	0.744**	1.699			
	JC3	0.781**	1.727			
	JC4	0.766**	1.764			
	JC5	0.735**	1.644			
	JC6	0.797**	2.037			
Cyberloafing (CB)	CB1	0.726**	1.669	0.858	0.895	0.587
	CB2	0.726**	1.648			
	CB3	0.749**	1.757			
	CB4	0.730**	1.605			
	CB5	0.885**	2.938			
	CB6	0.770**	1.799			
Procrastination at Work (PW)	PW1	0.772**	1.751	0.841	0.883	0.557
	PW2	0.761**	1.692			
	PW3	0.752**	1.628			
	PW4	0.768**	1.706			
	PW5	0.713**	1.511			
	PW6	0.710**	1.534			

Note: ** indicates $p < 0.01$. Alpha represents Cronbach's alpha; CR stands for composite reliability; and AVE signifies the average variance extracted.

Table 3. Correlation matrix and discriminant validity test (Fornell-Larcker criteria)

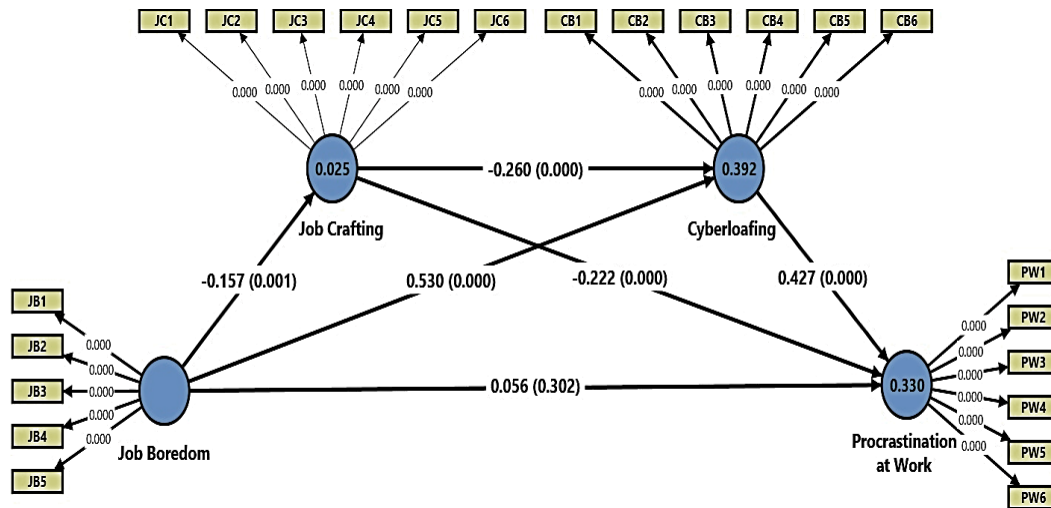
Variable	JB	JC	CB	PW
Job Boredom (JB)	(0.755)			
Job Crafting (JC)	0.157**	(0.770)		
Cyberloafing (CB)	0.571**	0.343**	(0.766)	
Procrastination at Work (PW)	0.334**	0.377**	0.535**	(0.747)

Note: ** indicates $p < 0.01$. The figures in parentheses along the diagonal signify the square root of AVE

As shown in Table 9, most $Q^2_{predict}$ were positive, indicating predictive relevance for most indicators. However, the slightly negative value for JC1 indicates that it has no predictive relevance for that specific indicator.

Table 4. Discriminant validity test (heterotrait–monotrait ratio)

Variable	JB	JC	CB	PW
Job Boredom (JB)				
Job Crafting (JC)	0.184			
Cyberloafing (CB)	0.681	0.394		
Procrastination at Work (PW)	0.398	0.433	0.629	

**Fig. 2.** The structural model**Table 5.** Bootstrap test results of direct and mediating effect

Effect	Path	Coefficient	T-Value	95% confidence Interval (CI)	Results
Direct effects	H1: JB to JC	-0.157**	3.254	[-0.247, -0.058]	Supported
	H2: JC to CB	-0.260***	6.693	[-0.332, -0.179]	Supported
	H3: CB to PW	0.427***	7.773	[0.315, 0.529]	Supported
	H4: JB to CB	0.530***	15.142	[0.455, 0.593]	Supported
	H5: JC to PW	-0.222***	5.218	[-0.303, -0.135]	Supported
	H6: JB to PW	0.056	1.032	[-0.047, 0.164]	Not Supported
Indirect effects	H7: JB to JC to PW	0.035**	2.716	[0.013, 0.063]	Supported
	H8: JB to CB to PW	0.226***	6.504	[0.158, 0.294]	Supported
	H9: JB to JC to CB to PW	0.017**	2.664	[0.007, 0.032]	Full mediation

Note: ** indicates $p < 0.01$, *** indicates $p < 0.001$; the word "to" indicates the hypothesized directional connection among constructs in the structural framework.

Table 6. R^2 and adjusted R^2 values for endogenous constructs

Endogenous construct	R^2	Adjusted R^2	Interpretation
Job Crafting	0.050	0.048	Low explanatory power
Cyberloafing	0.391	0.388	Moderate explanatory power
Procrastination at Work	0.506	0.502	Substantial/moderate explanatory power

Table 7. f^2 effect sizes for structural paths

Structural path	f^2	Effect-size interpretation
Job Boredom to Job Crafting	0.053	Small
Job Boredom to Cyberloafing	0.413	Large
Job Boredom to Procrastination at Work	0.011	Very small/negligible
Job Crafting to Cyberloafing	0.105	Small to medium
Job Crafting to Procrastination at Work	0.091	Small
Cyberloafing to Procrastination at Work	0.355	Large

Table 8. Available model-fit statistics from SmartPLS

Fit statistic	Saturated model	Estimated model	Comment
SRMR	0.077	0.077	Below the commonly used 0.08 threshold
d_UIS	1.355	1.355	Reported by SmartPLS
d_G	0.796	0.796	Reported by SmartPLS
Chi-square	1718.358	1718.358	Reported by SmartPLS
NFI	0.726	0.726	Reported by SmartPLS
RMS_theta	Not reported	Not reported	Not available in the exported results

Table 9. PLSpredict assessment

Target indicator	Q^2 predict	RMSE	MAE	LM_RMSE	LM_MAE
JC1	-0.002	1.183	0.925	1.190	0.934
JC2	0.002	1.119	0.850	1.124	0.859
JC3	0.015	1.156	0.891	1.166	0.902
JC4	0.001	1.150	0.877	1.159	0.892
JC5	0.051	1.001	0.750	1.003	0.748
JC6	0.048	0.976	0.719	0.982	0.725
Cyb1	0.292	0.839	0.612	0.849	0.628
Cyb2	0.268	0.864	0.644	0.867	0.651
Cyb3	0.210	0.922	0.686	0.925	0.697
Cyb4	0.206	0.902	0.684	0.877	0.675
Cyb5	0.246	0.899	0.684	0.900	0.691
Cyb6	0.271	0.900	0.688	0.897	0.686
Proc1	0.287	0.862	0.667	0.870	0.680
Proc2	0.313	0.851	0.672	0.838	0.666
Proc3	0.352	0.808	0.625	0.712	0.538
Proc4	0.477	0.758	0.563	0.598	0.352

The estimated Q^2 values were greater than zero for all endogenous constructs, suggesting predictive relevance. The value for job crafting was weak but positive, whereas cyberloafing and procrastination at work showed stronger predictive relevance. These findings validate the model's capacity to elucidate and anticipate significant behavioral results in the hospital environment.

5. Discussion and Implications

Table 10. Estimated Stone-Geisser Q² values for endogenous constructs

Endogenous construct	Estimated Q ²	Predictive relevance
Job Crafting	0.019	Weak but positive
Cyberloafing	0.249	Moderate/close to medium
Procrastination at Work	0.360	Moderate

5.1. Discussion

Healthcare workers face significant challenges and stress, particularly due to global health crises (Rakha and Amer, 2023). Boredom has become an increasingly prevalent issue of interest in organizations and research in recent years (Pindek et al., 2018). Alongside other detrimental effects, job monotony was linked to cyberloafing and procrastination in the workplace (Harju et al., 2016; Li et al., 2025; Metin et al., 2018). Cyberloafing refers to engaging in non-work-related internet activities during work hours and is one of many behaviors that have been identified as having increased in prevalence due to increasing technology usage (Doost and Zhang, 2024; Lim and Chen, 2012). This study used COR theory and the JD-R model (Bakker and Demerouti, 2007; Hobfoll, 1989) to examine the direct and indirect relationships between job boredom and procrastination in the workplace. The study examined whether job crafting and cyberloafing would serve as mediators in the connection between job boredom and procrastination in the workplace.

The study's findings validated H1. Job boredom showed a negative correlation with job crafting. As Harju et al. (2016) stated, there is a relationship between boredom and employees' willingness to seek out new resources and pursue challenging tasks, leading them to be less inclined to make changes to their jobs when they experience a lack of stimulation. In addition, Striler and Jex (2023) and van Hooft and van Hooft (2023) suggested that when workers feel bored, they may be less inclined to seek out new resources. These findings are consistent with the JD-R model, which suggests that negative emotional states can diminish a person's motivation to take proactive measures and also hinder their capacity to use their resources effectively.

H2 is supported by evidence showing that job crafting is negatively correlated with cyberloafing. As a result, employees who have modified their work roles are less inclined to participate in activities that entail digital distractions. The results of this research validate earlier studies showing that job crafting can enhance employee engagement (and subsequently diminish cyberloafing behavior) (Elrehail et al., 2021; Hai et al., 2024). Additionally, these results support the concept of job crafting's dual role as both a prevention strategy against antecedents of monotony and disengagement (Khan et al., 2024; Weng and Chen, 2025) and a direct intervention mechanism to prevent cyberloafing behaviors (in accordance with JD-R assumptions about resource enhancement).

The findings confirm H3, thus supporting an association between cyberloafing and procrastination at work. As previously identified (Doost and Zhang, 2024; O'Neill et al., 2014), employees who engage in cyberloafing may also be more inclined to neglect completing their assignments. Like H3, H4 supports its argument by showing that job boredom was positively correlated with cyberloafing. Previous research (Mercado et al., 2017) has established this connection, and there is evidence throughout the literature of how individuals experiencing low levels of motivation or affective responses experience a decrease in engagement and an increase in counter-productive behavior (Aghaz and Sheikh, 2016; Andel et al., 2019; Lim, 2002; Ma et al., 2024; Pindek et al., 2018).

The findings support H5, indicating that job crafting was negatively associated with procrastination. Workers who actively adjust their roles are less likely to postpone assignments, consistent with findings that job crafting boosts involvement and reduces procrastination (Metin et al., 2018; Song et al., 2025). This relationship is further reinforced by research showing that increasing challenge demands and reducing hindrance demands may reduce procrastination (Lichtenthaler and Fischbach, 2018; Wang et al., 2025), in line with JD-R principles.

In contrast, H6 was not supported, suggesting that job boredom does not directly predict procrastination. This answers RQ1, which asked what the direct relationship is between job boredom and workplace procrastination. The direct relationship was not statistically significant ($\beta = 0.056$, $t = 1.032$, 95% CI [-0.047, 0.164]), indicating that job boredom was not directly associated with workplace procrastination after accounting for the mediating mechanisms. This finding diverges from prior studies (Jian et al., 2024; Li et al., 2025; Steel, 2007) and may reflect contextual constraints in healthcare settings, where high task demands limit employees' ability to overtly delay responsibilities despite experiencing boredom.

The mediation hypotheses are supported. Supporting H7, Job crafting influences the relationship between job boredom and procrastination, indicating that workplace boredom is indirectly associated with procrastination through reduced active work behavior (Jian et al., 2024; Oprea et al., 2019; van Hoof and van Hooft, 2023). This answers RQ2, which asked how job crafting mediates the relationship between job boredom and workplace procrastination. The indirect effect through job crafting was statistically significant ($\beta = 0.035$, $t = 2.716$, 95% CI [0.013, 0.063]). Thus, higher job boredom was associated with lower job crafting, which in turn was associated with greater workplace procrastination. In line with COR theory, job crafting can be seen as a resource-building strategy that reduces the negative effects of resource depletion (Hobfoll, 1989).

The hypothesis (H8) that cyberloafing mediates the relationship between job boredom and procrastination was supported by studies (Andel et al., 2019; Li et al., 2025). This answers RQ3, which asked how cyberloafing mediates the relationship between job boredom and workplace procrastination. The indirect effect through cyberloafing was statistically significant ($\beta = 0.226$, $t = 6.504$, 95% CI [0.158, 0.294]), showing that higher job boredom was associated with greater cyberloafing, which in turn was associated with greater workplace procrastination. Thus, employees use maladaptive coping behaviors to manage boredom, thereby delaying task completion. This result is consistent with COR theory, since boredom can be considered a resource-depletion state associated with compensatory behavior such as cyberloafing.

Finally, H9 is supported, showing that job crafting and cyberloafing sequentially mediate the connection between job boredom and procrastination. This answers RQ4, which asked how job crafting and cyberloafing sequentially mediate the relationship between job boredom and workplace procrastination. The serial indirect effect was statistically significant ($\beta = 0.017$, $t = 2.664$, 95% CI [0.007, 0.032]). This sequential pathway reflects the interplay between adaptive and maladaptive responses: higher boredom was associated with lower proactive resource-building behaviors (job crafting), which, in turn, were associated with greater reliance on avoidance behaviors (cyberloafing), which, in turn, were linked to procrastination. This mechanism is consistent with COR theory, highlighting a resource loss cycle that underscores the importance of promoting job crafting to interrupt the progression from boredom to task delay. Collectively, the findings indicate that the relationship between job boredom and workplace procrastination operates primarily through these indirect behavioral pathways rather than through a significant direct relationship.

5.2. Theoretical Implications

This research makes multiple contributions relevant to theory. Initially, it adds to the expanding research on workplace boredom by enhancing the job demands-resources (JD-R) model to clarify how workplace boredom relates to procrastination through a chain of adaptive and maladaptive behavioral responses. Although previous studies have tended to examine job crafting, cyberloafing and procrastination in isolation, the present study focuses on their interconnected roles in a serial mechanism between boredom and workplace procrastination.

The JD-R model is the leading theoretical framework for describing employees reactions to insufficient job resources and stimulation at work. Moreover, “Conservation of Resources (COR) theory” explains the processes of resource accumulation and conservation that might account for job crafting and cyberloafing. Our findings indicate that reduced job crafting and increased cyberloafing act as mediators in the link between workplace boredom and counterproductive behavior. The findings underscore the JD-R model's emphasis on the importance of job resources and proactive engagement in shaping employee outcomes (Bakker and Demerouti, 2007) and align with the COR theory's assertion that endangered or exhausted resources can prompt avoidance-oriented reactions (Hobfoll, 1989). These results further reinforce the JD-R model's premise (Bakker and Demerouti, 2007) that job crafting mediates the relationship between job demands and employee outcomes. Moreover, although this research confirms the propositions of both COR theory and the JD-R model, the results of this study oppose those of van Hooff and van Hooft (2023), who identified no notable connections between job boredom and job crafting. Second, this research addresses a significant gap in the procrastination literature by broadening the empirical examination of procrastination to include work settings that have remained largely unexplored. Few studies on procrastination have examined it within organizational (Metin et al., 2016; O'Neill et al., 2014) and academic (Çınar et al., 2025) settings. This research broadens the geographical and contextual limits of current studies by exploring a cohesive empirical model linking boredom to cyberloafing to procrastination, particularly within a demanding healthcare environment. Third, this research contributes to the current understanding of cyberloafing by analyzing its effects. Cyberloafing has been identified as a major problem for organizations worldwide (Mercado et al., 2017), yet its behavioral implications have received insufficient attention in prior research. Some past studies indicate links between cyberloafing and job burnout, reduced productivity, and increased levels of other counterproductive workplace behaviors (Aghaz and Sheik, 2016; Doost and Zhang, 2024; Mercado et al., 2017). This research addresses prior calls for further investigation (Tandon et al., 2022) and shows that cyberloafing mediates the relationship between employees' workplace boredom and their inclination to procrastinate. Conversely, contrary to earlier conceptualizations of cyberloafing as a means of coping with job demands or as a buffer against them (Andel et al., 2019; Pindek et al., 2018), the findings demonstrate that it plays a detrimental role in a cycle of behavior. Lastly, the current study extends job crafting theory to include proactive work redesign as an avenue for both emotional regulation and resource recovery. Despite the limited research on the relationship among employee boredom, job crafting, and outcomes (e.g., van Hoof and van Hooft, 2023), this study contributes to existing knowledge by demonstrating that job crafting constitutes a resource-enhancing investment according to Hobfoll's (1989) COR theory. Therefore, when employees proactively modify their job demands and resources, they can counteract resource loss, improve their engagement and prevent the progression to negative outcomes.

5.3. Practical Implications

These findings could be useful in a number of management decision-making processes. Instead of regarding boredom, cyberloafing, and procrastination as individual issues, hospital management could use the results in their decision-making on job design, staffing, supervision, control of computer use, and employee well-being. The findings indicate that overcoming routine-based boredom, job crafting, and cyberloafing could reduce procrastination at work.

The findings of this study also offer three major recommendations for policymakers and healthcare managers within Saudi Arabia. First, the authors propose that job boredom should be viewed as an organization-wide strategic risk. Workplace boredom may contribute to disengagement and lead to negative employee behavior, such as cyberloafing and

procrastination. Early detection of low task stimulation would best be accomplished using survey data and other monitoring systems; therefore, consistent with Oprea et al. (2019), the authors suggest that organizations develop a strategic approach to job crafting. When hiring new employees for positions known to be more prone to boredom, healthcare organizations may consider selecting those with high levels of self-initiation. Furthermore, when designing jobs in these areas, they should provide the level of autonomy needed to support these new hires. Finally, after employees are hired, managers can use their knowledge to help employees craft jobs that meet their needs and reduce the likelihood of boredom.

Table 11. Managerial decision-making processes that may be informed by the findings

Decision-making process	Possible managerial consideration
Job design and work allocation	Review repetitive or low-stimulation tasks and redesign roles to include appropriate challenge, autonomy, and task variety.
Staffing and scheduling	Avoid long periods of monotonous work by rotating routine tasks and balancing clinical, administrative, and digital duties.
Supervisor intervention	Train supervisors to recognize early signals of boredom and disengagement and to coach employees in job-crafting behaviors.
Digital-use governance	Move from purely punitive internet-use controls to clear, fair, and supportive policies that distinguish harmful cyberloafing from short restorative breaks.
Performance and well-being monitoring	Add indicators of boredom, job crafting, cyberloafing risk, and procrastination to employee engagement or well-being dashboards.
Training and HR development	Implement job-crafting workshops and resource-building interventions that help employees proactively modify work methods and reduce avoidance behavior.

Second, the findings support the preventive role of job crafting in counteracting cyberloafing and procrastination. In addition, they indicate that high levels of boredom may reduce employees' motivation to participate in job tailoring. Organizations may seek to adopt proactive, resource-based interventions that address the underlying reasons for these undesirable workplace behaviors by designing less monotonous work and structuring job-crafting programs (Khan et al., 2024; Song et al., 2025; Weng and Chen, 2025). Such interventions may help improve employees' resources, reduce excessive work demands, and prevent the depletion of those same resources, which is linked to employee disengagement and counterproductive behaviors. Finally, interventions may need to be holistic and culture-specific. For example, a team-oriented and leadership-endorsed approach is critical for successful implementation in a collectivist, non-Western country such as Saudi Arabia's healthcare sector. By integrating practices such as job-crafting support and systematic assessment of employee boredom into existing operational, well-being, and workplace safety policies, interventions could shift from being viewed as an option or add-on initiative to a sustainable workforce management strategy.

5.4. Limitations and Future Research

This study has several limitations. The initial limitation concerns reliance on self-reported data, which may introduce Common Method Bias (CMB). Nonetheless, it is improbable that Common method bias alone can explain the identified associations and indirect effects (Siemens et al., 2010). Furthermore, the variance in the correlation coefficients (ranging from -0.37 to +0.57) supports the idea that CMB is unlikely to introduce substantial distortion in the results (Andel et al., 2019). The second constraint is that it uses a cross-sectional approach, which does not enable the establishment of a causal relationship or time sequence regarding the variables studied. Therefore, longitudinal and multi-source approaches are needed to better understand the dynamic interplay between job boredom, job crafting, cyberloafing and procrastination. The third limitation stems from the fact that this study is based exclusively in Saudi Arabian hospitals, and consequently, its generalizability is limited by potential cultural, institutional and sectoral contextual factors that shape how individuals perceive boredom. Therefore, future research should include comparative cross-cultural research and an investigation of diverse work environments. Fourthly, although this study highlights the adverse effects of cyberloafing (Aghaz and Sheikh, 2016; Doost and Zhang, 2024), emerging research also points out potential advantages for employees' well-being (Kwala and Agoyi, 2025); this indicates that there is a need for a more balanced comprehension of cyberloafing. Lastly, future research will be required to examine moderators such as leadership style, distinguish among different forms of cyberloafing and assess individual differences (for example, emotional intelligence, resilience and digital literacy) to refine the proposed model.

6. Conclusion

This research examines the relationship between job boredom and workplace procrastination in a healthcare setting, using a serial mediation model with job crafting and cyberloafing as mediators. The empirical evidence reveals that job boredom is not directly associated with procrastination. Instead, the results support an indirect association through job crafting and cyberloafing. Job crafting may represent an adaptive or resource-enhancing response to job boredom, whereas cyberloafing may represent a maladaptive or avoidant response. An innovative aspect of this research is the development of a dynamic, process-based theory of procrastination, rather than a static, outcome-based one. The empirical data reveal that, rather than

viewing these two behaviors as separate events, they constitute a statistically supported sequential pattern within the linkages from an employee's affective state to their subsequent behavioral patterns. These findings provide additional insight into the evolution of employee disengagement into performance-related behaviors in organizations. Additionally, because sustained concentration and productivity are important in healthcare environments, examining these relationships in such settings builds on prior research. The findings suggest that organizations may benefit from addressing employee boredom not just for employees' well-being, but also for organizational success. Practical interventions may include supporting constructive job crafting and managing problematic cyberloafing.

Author Contributions

Anjom Osman contributed to data curation, investigation and project administration. Samah Gouda contributed to formal analysis, investigation and validation. Rabaa Malik contributed to visualization, writing, review and editing. Basma Elhariry contributed to conceptualization, methodology and writing of the original draft. Mohamed Aboueldahab contributed to data curation, software and formal analysis. Ahmed Nourledeen contributed to data curation and writing of the original draft. Soliman Rakha contributed to methodology, writing, review and editing.

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Institutional Review Board Statement

The study was evaluated and approved by the Research Ethics Committee (REC) of the College of Administrative and Human Sciences, Buraydah Colleges, Kingdom of Saudi Arabia (REC Approval No. BPC-CAHS-REC-2025-XXX; Date of REC Approval: 15 September 2025). The study involved a questionnaire survey and was categorized as minimal-risk human-participant research. Participation was voluntary, and electronic informed consent was obtained from all participants before data collection. Participants were made aware of the purpose of the study, their withdrawal rights and the confidentiality and anonymity of their data.

Declaration of Artificial Intelligence (AI) Tools

No generative AI tools were used for idea generation, literature synthesis, study design, data analysis, interpretation of results, or manuscript writing. Grammarly was used solely for minor language editing and to improve readability. The authors reviewed and verified all content and take full responsibility for the accuracy and integrity of the manuscript.

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