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Can Occupational Stress be Reduced by Gamification? A Study of Newcomers

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Abstract. Starting a new position often brings significant stress. Amidst the adjustment to a new job, the increasing prevalence of gamification has revealed mixed effects on work-related factors, notably presenting an unclear impact on employee stress levels. Therefore, this article aims to explore the connection between gamification and occupational stress among new employees. The study involved 575 employees from various fields living in the United Kingdom or the United States who have been working in their new jobs for no longer than one year. The study utilized the Perceived Occupational Stress (POS) scale by Marcatto and colleagues (2021) and a questionnaire based on the GAMEFULQUEST model (Högberg, Hamari, and Wästlund, 2019) to evaluate the overall gameful experience in the work environment. Participants were also given descriptions of eight gamification elements and were asked to assess how frequently they encountered and engaged with these elements in their new roles. The obtained results showed that new employees' limited interaction with gamification, marked by a low number of gamification elements, rare encounters, and low engagement, contributes to a prediction of higher stress experience. This trend was also observed with perceived challenges and competition in the workplace environment. Finally, gameful experiences related to guidance, social connectedness, accomplishments, and playfulness predicted lower stress scores.

Keywords: occupational stress, gamification, newcomers.

Ar žaidybinimas gali sumažinti darbinį stresą? Naujų darbuotojų tyrimas

Santrauka. Naujo darbo pradžia neretai yra streso kupinas laikotarpis. Nepriklausomai nuo prisitaikymo naujoje pozicijoje iššūkių, naujokai darbinėje aplinkoje taip pat gali susidurti ir su populiarėjančiu žaidybinimu reiškiniu, kurio taikymas yra siejamas su nevienareikšmiais padariniais, įskaitant ir dviprasmišką poveikį darbiniam stresui. Atsižvelgiant į tai, šiuo tyrimu yra siekiama įvertinti sąsajas tarp žaidybinimo ir naujų darbuotojų streso lygio. Tyrime dalyvavo 575 darbuotojai iš Jungtinės Karalystės ir Jungtinių Amerikos Valstijų, savo naujame darbe dirbantys neilgiau nei vienerius metus. Tyrime buvo panaudota suvokto darbinio streso (POS) skalė (Marcatto et al., 2021) ir šiam tyrimui sukurtas klausimynas pagal GAMEFULQUEST modelį (Högberg et al., 2019) žaidiminių patirčių darbo aplinkoje vertinimui. Tiriamiesiems taip pat buvo pateikti 8 žaidybinimo elementų aprašymai, kurie turėjo būti įvertinti pagal susidūrimo su jais naujame darbe dažnumą ir įsitraukimo lygį. Gauti rezultatai parodė, kad darbuotojų minimali sąveika su žaidybinimo elementais, t. y. susidūrimas su mažesniu jų skaičiumi bei retesnis ir mažesnis įsitraukimas į juos, prognozuoja aukštesnį darbinio streso lygį. Ši tendencija buvo pastebėta ir suvokiant savo darbo aplinką kaip keliančią iššūkius ir tarpusavio varžymąsi. Galiausiai, tokios žaidiminės patirtys kaip kryptingumas, socialinis sutelktumas, pasiekimai ir žaismingumas nuspėjo žemesnius streso įverčius.

Raktažodžiai: darbinis stresas, žaidybinimas, nauji darbuotojai.

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Introduction

Beginning a new position can be a difficult and stressful time. New employees must not only handle their tasks well but also comprehend their work role, establish relationships with their coworkers and superiors, and familiarize themselves with the workplace and its cultural norms (Feldman, 1976). Those who effectively adjust demonstrate greater work performance, are more committed to their organization and are less likely to quit (Bauer et al., 2007).

Various stressors in the workplace can affect the adjustment of new employees, including the way in which work processes are organized. The recent rise of gamification demonstrates that many types of work processes can be enriched with the addition of game elements. Most commonly, it is done with the premise that this supplementation can increase employee motivation and engagement (Nah et al., 2019). However, scientific research provides ambiguous results, demonstrating both the positive (e.g., Cardador et al., 2016; Landers & Marin, 2021) and negative (e.g., Algashami et al., 2019; Nyström, 2021) significance of gamification for work-related factors. This also includes assumptions that highlight the potential for either intensifying (e.g., Hammedi et al., 2021) or alleviating stress among employees (e.g., Hussain et al., 2018). Organizations should be concerned with integrating new staff as soon as possible; however, stress can hinder this adjustment (e.g., Laschinger et al., 2016; Rudman et al., 2014). Therefore, it is important to assess how gamification, with its ambiguous outcomes, might contribute to this newcomers' stressful period. This article aims to investigate the link between gamification and occupational stress in a sample of new employees.

Newcomers stress

The experiences of new employees are most commonly examined from an organizational socialization perspective. This is the process through which a person obtains the information, skills, attitudes, and behavioral patterns required to adjust to a new work role (Wanberg, 2012). Generally, transitioning into a full-fledged organization member is considered a challenging and stressful process (Saks & Gruman, 2012), as employees face much anxiety and uncertainty in a new environment.

When analyzing the consequences of socialization, a distinction is made between proximal and distal outcomes. Long-term changes in the newcomer's behavior and attitudes are typically viewed as distal organizational socialization outcomes, and stress is considered a factor of this group (Ellis et al., 2015). Occupational stress is defined as "harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker" (Hurell, 2011, p. 296). Therefore, it is reasonable to assume that better socialization can help reduce the occurrence of such mismatches, thereby lowering the instances of occupational stress.

Recently, there has been a growing trend toward assessing the stress experienced by new hires (e.g., Ellis et al., 2015; Frögéli et al., 2022). This is because socialization

experiences for new employees are closely associated with tension and burnout, making them highly relevant to their overall well-being (Ellis et al., 2015). Additionally, studies show that new employees who experience high stress at the beginning of a new job report lower levels of job satisfaction (Laschinger et al., 2016) and higher turnover intentions (Rudman et al., 2014). To effectively manage this stress, it is essential to understand the specific aspects of socialization that can reduce stress, such as social support from coworkers (Taormina, 1997).

Several theoretical frameworks address employee stress, each providing unique perspectives and implications. Among these, a prominent theory categorizes stressors into two dimensions based on employees' experiences of stress. These two dimensions are known as challenge stressors and hindrance stressors (LePine et al., 2005). Challenge stressors are considered beneficial and include job demands like high workloads, time pressure, and significant responsibilities. The successful resolution of these challenges can lead to a sense of accomplishment, increased willingness to integrate and learn, and positive job performance (Rodell & Judge, 2009; Tang et al., 2022). On the other hand, hindrance stressors are considered detrimental and include factors like role ambiguity, organizational policies, and hassles. These stressors can reduce motivation and negatively affect job performance (Boswell et al., 2004).

Another comprehensive framework, the Job Demands-Resources (JD-R) model (Demerouti et al., 2001), provides a dual perspective on occupational stress. It states that every job has specific stress-related risk factors. Despite their uniqueness, these factors can be grouped into two categories: job demands and job resources (Bakker & Demerouti, 2007). Job demands are aspects that require continuous physical or psychological effort, leading to potential physiological or psychological expenses. These are not innately negative but can morph into stressors if employees do not recover adequately. On the other hand, job resources help in accomplishing work objectives, decreasing job demands and related costs, and encouraging personal advancement, learning, and development.

The job demands and resources perspective can be considered to be more relevant from the perspective of a newcomer's socialization due to its comprehensive nature. Resources are advantageous beyond their ability to alleviate occupational stress. Typically, they aid the new employee in learning their occupational role, forming relationships with coworkers, and adapting to the new environment (Saks & Gruman, 2012; Ellis et al., 2015). The theme of resources is pertinent to this research paper, as it is hypothesized that job resources leading to positive work outcomes can be identified in games as well (Herzig et al., 2015).

Gamification and Gameful Experience in the Workplace

Gamification is defined as the use of game elements in nongame contexts (Deterding et al., 2011). One such context could be the work environment, where various gamification elements like points, badges, leaderboards, leveling systems, and more can be integrated into numerous work processes (Nah et al., 2019). For example, gamification can be used

to elicit challenges and interactivity, which could foster employee development, problem-solving abilities, and a sense of achievement. At the same time, gamification elements can facilitate social connectivity or competition that could be used as an attempt to enhance teamwork, motivation, and overall performance (Nah et al., 2019).

The application of gamification in the workplace carries mixed outcomes and perspectives. Landers and Marin (2021) explore gamification through the lenses of job performance and job design, suggesting it as a potential method to enhance work-related skills and motivation, thus possibly impacting employee performance positively. These suggestions align with the observations of Khodabandelou and others (2023), highlighting the favorable impacts of gamification on organizational learning and employee participation in the short term. Despite these potential benefits, the empirical evidence on gamification outcomes remains diverse and occasionally conflicting. For example, while Hussain and others (2018) present data supporting the enhancement of employee engagement, commitment, and retention through gamification, other studies (e.g., Hamza and Tóvölgyi, 2022) do not find a direct link between gamification and work-related outcomes. These inconsistencies indicate the complex and multifaceted nature of gamification's effects on the workplace, suggesting that its impact might be contingent on specific contextual factors related to job design and employee characteristics. Moreover, the implementation of gamification is not without potential drawbacks. Hammedi and others (2021) note that the improper introduction of gamification elements, without a focus on enhancing the employee experience, might inadvertently contribute to increased workplace stress and decreased job satisfaction. This concern is complemented by ethical considerations regarding potential exploitation and privacy infringement, adding further complexity to the deployment of gamification in organizational settings (Nyström, 2021).

Undoubtedly, all mentioned outcomes in the workplace do not emerge merely from the introduction of gamification elements but rather from employees' interaction with these elements. This interaction can be referred to as the engagement and activities of individuals with game-like features integrated into nongame contexts. It can be measured in ways such as the frequency of interaction with gamification elements or the overall time spent engaging with them (e.g., Puig, 2023). Current research not only explores interaction with these elements but also emphasizes the diverse experiences they elicit (e.g., Huotari & Hamari, 2017; Högberg et al., 2019). These experiences are referred to as gameful experiences and are defined as subjective perceptions of the value or benefit users derive from interacting with gamification elements within a digital service (Huotari & Hamari, 2017).

The concept of a gameful experience is multi-dimensional (Landers et al., 2019). As such, concentrating on just one aspect of this experience is not adequate. Preliminary findings indicate that gameful experiences involve various psychological aspects. These include fulfilling personal needs, experiencing emotional arousal, and reaching different levels of consciousness through deep engagement with the gamified environment (Eppmann et al., 2018).

Despite attempts to conceptualize gameful experiences (e.g., Eppmann et al., 2018), the most comprehensive model proposed is the GAMEFULQUEST model by Högberg,

Hamari, and Wästlund (2019). According to this model, gameful experiences consist of seven dimensions: *Accomplishment* (embodies the demand or drive for successful performance and progress), *Challenge* (characterizes the demand for a significant effort to be successful, putting the individual's abilities to the test), *Competition* (involves rivalry towards one or more actors to gain a scarce, desired outcome), *Guided* (pertains to being directed on performing and improving target behavior), *Immersion* (represents a state of complete attention and absorption in the activity, with a sense of detachment from the real world), *Playfulness* (involvement in voluntary and pleasurable behaviors driven by imagination or exploration), and *Social experience* (the presence of people or service-created social actors, emphasizing the social aspect of the experience).

There is limited research regarding gameful experience and work-related outcomes. Pereira and others (2022) found that a gameful experience positively mediates task performance and employee engagement in the digital gig workforce, although the evaluation used general statements, obscuring specific impactful experiences. Schmidt, Manke, and Flatten (2023) revealed a positive link between gamified competition within a sales application and perceptions of an innovative workplace culture. This connection is fully mediated by employees' perception of a gameful experience.

Current study

The stress experienced by newcomers can be mitigated with suitable resources that aid in their adaptation to a new work environment (Saks & Gruman, 2012). For example, these resources might encompass social capital resources that promote integration through interpersonal and social means or work-related resources that focus on enhancing job performance and proficiency (Saks & Gruman, 2012). Gamification elements can also act as organizational resources. They help ensure the precision and clarity of assigned tasks, provide immediate feedback for accomplishments or actions taken, and offer support from a dedicated social community (Koivisto & Hamari, 2019). This leads to a possible inference that gamification could be a strategy to reduce the stress of newcomers.

On the other hand, gamification might also contribute to heightened work demands, potentially becoming stressors themselves. For instance, gamification elements might intensify competitiveness within teams (Algashami et al., 2019). Research has shown that a competitive work atmosphere can elevate stress levels (Fletcher et al., 2007).

Gamification can be viewed as a complex concept, the nature and underlying processes of which still require comprehensive exploration, especially within the workplace context. Even though research (e.g., Hammedi, 2019) connects gamification with heightened employee stress levels, these studies did not focus on newly hired staff. Employees inevitably encounter various stressors and challenges as they adapt to and explore a new working environment. The effect of navigating this transition alongside gamified work processes remains unclear. Literature offers diverse outcomes related to this interaction, further emphasizing the need for detailed investigation.

A study that not only examines the typical interactions with gamification elements but also includes gameful experiences would provide the most clarity to this complex issue. However, gameful experiences are often studied in isolated systems, such as gamified apps. Given this, it would be challenging to evaluate the gameful experiences newcomers have in a work environment where there might be multiple sources of gamification. Another concern is that gameful experiences might not only arise from gamification elements but can also be amplified by external factors (Högberg et al., 2019). For instance, the feeling of accomplishment in a gamified health app might not solely result from the challenges set by the system but from the improvement in an individual's health (Högberg et al., 2019). Therefore, in this research paper, the proposed term *gameful experience in the work environment* will be referred to as the psychological state where employees engage with their workplace in a way reminiscent of how players engage with games. This definition encompasses both explicit gamification elements and other implicit, contextual factors that contribute to the gameful experiences of employees.

In conclusion, it has been determined that gamification, as a broad concept, can be perceived as either a contributor to job demands or job resources. These factors are important for newcomers as they can either facilitate or hinder their adjustment. Therefore, the purpose of this study is to examine how the interaction of new employees with gamification elements and gameful experiences in the workplace is related to occupational stress.

Method

Study procedure

The research study utilized the *Prolific* platform for participant recruitment. Of the 120,260 active users during the study, a prescreening was conducted to select individuals who matched the desired characteristics. Emphasis was placed on choosing native English speakers from the United Kingdom and the United States, working in large organizations (with more than 250 employees) and with a maximum employment duration of 12 months in their current organization. Although there's no universally accepted duration for the socialization of new employees, it is generally believed that the socialization of new employees unfolds over one year (Ellis et al., 2015). It is noteworthy that the most significant transitions in this process occur during the first month of employment (Ellis et al., 2015). However, considering that stress is seen as a distal socialization outcome, it is appropriate to include employees working up to 1 year. Of the final candidate database of 2,010 users, 641 were randomly selected to receive the questionnaire. The final sample size amounted to 613 participants after accounting for incomplete responses. Before administering the survey, participants were provided an informed consent form detailing the study's objectives and procedures, ensuring clarity and agreement before proceeding. Additional scrutiny was applied during the questionnaire, incorporating control questions to verify the accuracy and attentiveness of the participants. After extensive control checks, data from 575 participants were considered valid and included in the final analysis. Those who completed the questionnaire were compensated a predetermined fee.

Participants

The sample comprised 282 males (49.0%) and 293 females (51.0%), with an average age of 32.87 years (SD = 10.20). The majority of respondents (83.0%) were from the United Kingdom. Around 63% held a Bachelor's degree or higher. The main occupational sectors among the participants included IT (15.0%), customer service (13.0%), and education (11.5%). On average, participants had been at their current workplaces for 6.92 months (SD = 3.21). A significant majority (95.8%) had previous work experience, signifying that their current job was not their first employment. Nearly half (47.5%) of respondents reported having over ten years of work experience. 77.4% of participants work full-time in their current workplace.

Measures

Occupational Stress

To assess the stress levels of new employees, the study employed the Perceived Occupational Stress (POS) scale developed by Marcatto and others (2021). This scale is composed of four items whose cumulative scores reflect the extent of stress experienced, with a higher score signifying increased stress levels. Participants were required to evaluate the given items using a five-point Likert scale, where 1 corresponds to "Strongly disagree" and 5 to "Strongly agree." An example of an item on this scale is "My work is stressful." The internal consistency of the scale items yielded positive results (Cronbach's $\alpha = .893$).

Interaction with gamification elements

Participants initially received definitions of eight distinct gamification elements. Upon reviewing these, participants had to note whether they had encountered any of these elements in their current work (Yes or No question). The research study included the following gamification elements: "Points, point systems," "Leaderboards," "Badges, trophies," "Levels, level systems," "Progress tracking, progress bars," "Chat channels, clans, guilds," "Challenges," "Competitions, contests." For ease of reference, these elements will be referred to as *points*, *leaderboards*, *badges*, *levels*, *progress bars*, *guilds*, *challenges*, and *contests*. An example of the definition of a gamification element is as follows: Contests refer to activities, either individual or team-based, with the objective of outperforming other individuals or teams. If participants noted the presence of a specific gamification element in their workplace, they were prompted to rate the frequency of their encounters and their level of engagement with this element on a 6-point scale. This assessment was mandatory for each gamification element the participants identified in their workplace. In the subsequent analysis, the average frequency and engagement with gamification elements were calculated separately by

summing the scores of these interaction factors and dividing them by the number of encountered gamification elements.

When analyzing the characteristics of new employees and their interaction with gamification elements in the work environment, it was determined that more than half (60.52%) of the study participants identified encountering at least one gamification element from a list provided to them in the study. The participants' most commonly encountered gamification elements were guilds and progress bars, constituting 20.00% and 19.97% of all encounters, respectively (a detailed distribution is provided in Table 1). On average, participants reported encountering 2.18 (SD = 1.35) gamification elements in their work environment.

Table 1

Encounter frequency with gamification elements by type

Frequency of gamification elements by type	N (Percentage of all cases)
Guilds	152 (20.00%)
Progress bars	150 (19.74%)
Badges	103 (13.55%)
Contests	103 (13.55%)
Levels	83 (10.92%)
Leaderboards	65 (8.55%)
Points	62 (8.16%)
Challenges	42 (5.53%)

The participants were divided into separate clusters based on the number of encounters with gamification elements, the average frequency of interaction with them, and the level of engagement. The Two-Step cluster analysis tested 2, 3, and 4 cluster models. The 2-cluster model classified the data best, with the highest average silhouette index (0.5). The first cluster (N = 196) was characterized by a relatively higher number of encounters with gamification elements (M = 2.77, SD = 1.47), more frequent interaction (M = 4.25, SD = 0.92), and greater engagement with them (M = 3.99, SD = 1.01). The second cluster (N = 152) was characterized by a relatively lower number of encounters with gamification elements (M = 1.43, SD = 0.63), less frequent interaction (M = 2.50, SD = 0.92), and lower engagement with them (M = 2.60, SD = 1.01). These clusters will be referred to as "Higher interaction" and "Lower interaction," respectively. The remaining study participants (N = 227), who did not encounter gamification elements in their work environment from the provided list, were termed the "Undetected interaction" group. Taking into account that the participants were exposed to a limited set of gamification elements and were required to conduct their own subjective comprehension assessment, coupled with the implicit nuances of a gameful experience, this group will be included in the overall calculations.

Gameful experience in the workplace

To assess the gameful experiences encountered by new employees in their workplaces, the study employed the GAMEFULQUEST model (Högberg et al., 2019). This model outlines seven dimensions of gameful experiences, including *playfulness*, *social experience*, *guided*, *immersion*, *challenge*, *competition*, and *accomplishment*. Although the GAMEFULQUEST model and the accompanying survey were initially designed to assess user experiences with individual gamified systems like mobile apps, this study adapted them for a broader context. A customized questionnaire based on the GAMEFULQUEST model was created to scrutinize the overall gameful experiences of employees in their work environment. It acknowledges the workplace's intricate nature and recognizes that gameful experiences can stem from multiple sources or factors unrelated to gamification, not just a single gamified system (Högberg et al., 2019). Participants rated three items for each of the seven dimensions on a 5-point Likert scale, with 1 representing "Strongly Disagree" and 5, "Strongly Agree." All items began with the phrase "My work environment...", such as "My work environment allows me to be playful" for the playfulness dimension or "My work environment creates a feeling that I have to win against others" for the competition dimension. The combined score for each dimension's items was calculated to assess the level of expression for each dimension, with a higher score indicating a more prominent gameful experience. A psychometric evaluation of the scale revealed adequate internal consistency across all seven dimensions, with Cronbach's α values between .730 and .860. A confirmatory factor analysis confirmed the scale's seven factors' structure, showing $\chi^2 = 505.139$, $df = 168$, $p < .001$; RMSEA = .059, CFI = .952, TLI = .940. Standardized factor loadings range from .617 to .851 ($p < .05$).

Control variables

In this study, sociodemographic and work-related variables were used as control variables. The sociodemographic variables included respondents' age, gender, and education. Participants were grouped into two categories: those who have academic degrees (N = 391) and nonacademic degree holders (N = 184).

Work-related variables included whether it was the employees' first job (initial job status), the size of the workgroup they are working in, workload status (full-time or part-time) at the current workplace, and their overall work experience. All respondents who had worked for less than ten years were combined into one group (N = 302). Workgroup sizes were categorized as individual workers (N = 24), small groups (2–5 employees; N = 201), medium groups (6–10 employees; N = 202), and large groups (more than ten employees; N = 148).

Data analysis

Data analysis was conducted using the SPSS 24.0 software. Descriptive statistics (means, standard deviations, and response rate percentages) were utilized for comprehensive data

reporting. The study data was normally distributed. The Pearson correlation coefficient was employed to ascertain the correlation between variables. The Student t-test or univariate variance analysis (ANOVA) was used to assess group differences. Hierarchical regression analysis was employed to assess the interdependence among the variables. According to Čekanavičius and Murauskas (2014), suitable regression models include $R^2 \geq .02$, and independent variables' VIF (Variance Inflation Factor) is < 4. Lastly, Two-Step clustering was utilized to identify patterns of interaction with different gamification elements in the dataset. The Average Silhouette Width, ranging from .5, signifies a reasonable cluster structure (Kaufman & Rousseeuw, 1990).

Results

The averages, standard deviations, and correlations of the interval variables used in the study are presented in Table 2. The data suggests that almost all gameful experience dimensions have a positive relationship with one another, with strength ranging from weak to relatively strong (coefficient r ranges from .139 to .795). When examining the relationship between gameful experience dimensions and occupational stress, it appears that, in some cases, they share a negative correlation. Increased levels of playfulness, social experience, guidance, and a sense of accomplishment in the workplace are linked to reduced stress. Conversely, the dimensions of competition and challenge show a different trend: a greater presence of these experiences is associated with heightened stress. However, it is important to note that the observed relationships between gameful experience dimensions and occupational stress are relatively weak (coefficient r ranges from -.263 to .194).

Table 2

Descriptive statistics of interval variables and their correlations

	M	SD	1	2	3	4	5	6	7	8
1. Occupational stress	10.66	4.21	–	-.209**	-.263**	-.235**	-.076	.194**	.104*	-.177**
2. Playfulness	9.14	3.02		–	.558**	.498**	.523**	.183**	.443**	.465**
3. Social experience	10.49	2.84			–	.742**	.624**	.073	.558**	.704**
4. Guided	10.59	2.63				–	.637**	.139**	.644**	.795**
5. Immersion	8.50	2.83					–	.350**	.642**	.624**
6. Competition	6.06	3.15						–	.304**	.153**
7. Challenge	10.12	3.07							–	.734**
8. Accomplishment	10.94	2.88								–

Note. ** p < .01, * p < .05

In order to ascertain whether the appraisals of occupational stress and gameful experience dimensions within the research sample differ, a comparative analysis was conducted based on control variables. The results indicated that men (M = 6.57, SD = 3.28) per-

ceive their work environment as more competitive than women (M = 5.58, SD = 2.93); t(573) = 3.82, p < .001. Also, respondents with academic degrees (M = 10.95, SD = 4.17) experience more stress than individuals with lower levels of education (M = 10.03, SD = 4.24); t(573) = -2.453, p = .014. When assessing respondents based on their employment status, it was observed that full-time new employees (M = 10.93, SD = 4.23) experience more stress than part-time ones (M = 9.71, SD = 3.99); t(573) = -2.921, p = .004. Additionally, this difference was noted in two gameful experience dimensions – challenge and competition. Full-time new employees (M = 10.34, SD = 3.02) not only perceive their work environment as more challenging than part-time employees (M = 9.32, SD = 3.09), t(573) = -3.385, p < .001, but also report a greater experience of workplace competition, compared to part-time employees (M = 6.21, SD = 3.19 vs. M = 5.56, SD = 2.97; t(573) = -2.069, p = .039). The significance of the workgroup size variable was particularly evident only when evaluating the social experiences of new employees. Specifically, new employees who were not affiliated with any team (M = 8.75, SD = 3.34) reported a lower sense of mutual connectedness than their counterparts who belonged to medium-sized (M = 10.51, SD = 2.72) or large workgroups (M = 10.76, SD = 2.82); F(3, 571) = 3.098, p = .026.

Table 3

Intergroup differences in variables according to the characteristics of interaction with gamification elements

	A	B	C			
	Undetected interaction	Lower interaction	Higher interaction	F[1]	p	Post Hoc Bonferoni[2]
	M (SD)	M (SD)	M (SD)			
Occupational stress	10.19 (4.12)	10.81 (4.13)	11.16 (4.39)	2.590	.076	–
Playfulness	8.82 (3.20)	9.60 (2.75)	9.00 (3.02)	3.732	.025	B>A
Social experience	10.12 (3.02)	10.88 (2.70)	10.51 (2.68)	3.810	.023	B>A
Guided	10.13 (2.84)	11.07 (2.44)	10.66 (2.44)	6.822	.001	B>A
Immersion	8.31 (2.92)	9.04 (2.87)	8.10 (2.54)	5.697	.004	B>A, C>A
Competition	5.43 (2.92)	7.06 (3.41)	5.72 (2.81)	16.153	<.001	B>A, C>A
Challenge	9.42 (3.23)	10.72 (2.91)	10.38 (2.81)	10.478	<.001	B>A, C>A
Accomplishment	10.28 (3.01)	11.55 (2.64)	11.14 (2.8)	11.143	<.001	B>A, C>A

Note. [1] df = 2, 572. [2] The mean difference is significant at the .05 level.

After comparing the interaction with gamification elements clusters with the interval variables used in the study, it was found that they did not differ among themselves in terms of the amount of stress experienced, but they significantly differed in all gameful experience dimensions (Table 3). The "Lower interaction" group had higher scores than the "Undetected interaction" group regarding all gameful experience dimensions. A

similar trend was partially observed with the "Higher interaction" group, but it did not significantly differ from the "Undetected interaction" group regarding playfulness, social experience, and guided dimensions.

In order to determine how the variables used in the study can predict the stress levels of new employees, hierarchical regression analysis was applied (Table 4). The first regression model included only control variables, while the second model was supplemented with gamification-related variables. Only the control variables could not predict the experienced stress of new employees, as the constructed regression model was not significant. The second model's independent variables could explain 28.3% of the data variation of the dependent variable. Based on the results, only such control variables as age and education can predict the stress levels of new employees. This means that older new employees with academic degrees are likely to face a higher stress level in a new position. Additionally, almost all gameful experience dimensions, except immersion, can predict occupational stress in the research sample. However, some differences are noted here. Although higher scores of dimensions such as playfulness, social experience, guided, and accomplishment are associated with lower stress scores, perceptions of a competitive and challenging workplace environment increase new employees' stress levels. Finally, regarding the interaction of new employees with gamification elements, it was found that the "Lower interaction" group significantly positively predicted the stress level. Hence, employees who encounter fewer gamification elements and interact with them less frequently and less engagingly also experience more stress. This result differs from the previous analysis, which did not show any differences in stress levels between interaction with gamification elements groups.

Table 4

Occupational stress prognostic factors

Independent variables	Model 1				Model 2			
	ß	t	p	VIF	ß	t	p	VIF
Gender	.015	.363	.717	1.047	.072	1.933	.054	1.087
Age	.069	1.175	.241	1.995	.116	2.276	.023	2.031
Education[1]	.079	1.825	.069	1.094	.095	2.509	.012	1.111
Initial job status[2]	.040	.938	.349	1.064	.029	.772	.441	1.073
Work experience[3]	-.070	-1.188	.235	2.012	-.082	-1.593	.112	2.036
Workload size[4]	.115	2.599	.010	1.134	.059	1.512	.131	1.186
Medium workgroup[5]	-.010	-.212	.832	1.307	-.011	-.271	.787	1.321
Large workgroup[5]	.023	.493	.622	1.303	.037	.893	.372	1.316
Playfulness					-.174	-3.820	<.001	1.616
Social experience					-.155	-2.511	.012	2.953
Guided					-.243	-3.628	<.001	3.494
Immersion					.036	.624	.533	2.629
Individual work[5]	-.004	-.097	.923	1.119	-.022	-.577	.564	1.163

Independent variables	Model 1				Model 2			
	ß	t	p	VIF	ß	t	p	VIF
Challenge					.511	8.618	<.001	2.726
Accomplishment					-.230	-3.274	.001	3.838
Lower interaction[6]					.084	2.029	.043	1.314
Higher interaction[6]					.058	1.380	.168	1.359
R^2	.027				.283			
F	1.723				12.207			
df	9, 565				18, 556			
p	.081				<.001			

Note. [1]Academic degree holders are coded as 0, nonacademic degree holders – 1. [2]Participants whose current job is their first are coded as 0, nonfirst – 1. [3]Participants with less than ten years of work experience are coded as 0, more than ten years – 1. [4]Part-timer workers are coded as 0, full-time workers – 1. [5]In this regression model, employees working in small groups were not included (this was a referent group); participants belonging to a specific-sized work group are coded as 1, and those not belonging are coded as 0. [6]In this regression model, participants in the "Undetected interaction" group were not included (this was a referent group); 1 – refers to belonging to a specific interaction group, while 0 – not belonging.

Discussion

Starting a new job brings various stressors and pressures, affecting employee well-being and job performance (Ellis et al., 2015). Today's employees additionally navigate gamified work environments, adding complexity to their adaptation process. This study explores the link between gamification and stress in new employees, revealing various connections. Despite some correlational relationships, these are considered weak, and the regression model explains only a minor dispersion of stress scores, leading to a cautious interpretation of the results.

First and foremost, the study delineated three groups regarding interaction with gamification elements. Although the intergroup analysis did not show that these three groups would experience different stress levels in the new job, the regression analysis revealed that when other factors were included, belonging to the low interaction with the gamification group was associated with an increased stress level. To explain these results, several assumptions can be made. Firstly, initial intergroup analysis might have obscured the true relationship between group membership and stress levels. The analysis of averages does not reveal the dispersion of the independent variable and its correlation with the dependent variable. Therefore, in a regression equation, different independent variables with similar averages may behave very differently. When factors like gameful experience and control variables were included in the regression model, a more distinct relationship was unveiled. This underscored the predictive capability of lower interaction with gamification as a determinant of stress levels. The group with lower interaction reported higher gameful experience scores than both the undetected interaction group

and, at times, the higher interaction group. This suggests that, when accounting for other variables in the model, the level of gameful experience by newcomers is indeed associated with an increased likelihood of occupational stress. For example, even if the interaction with gamification elements is minimal, a high perception of challenges in the work environment could still lead to increased stress. However, it is important to analyze further why this phenomenon occurs in this particular way. Gamification elements can be applied purposefully, and the appropriate gamification element can be used to achieve multiple goals (Nah et al., 2019). If numerous gamification elements are present, they can likely induce a broad spectrum of psychological effects (both positive and negative) for the employee, leading to diverse work-related outcomes, including varied expressions of stress. Conversely, fewer gamification elements may result in a narrower range of consequences. For instance, encountering only elements aimed at boosting competition may have a significant impact on work-related variables. This idea is potentially backed by the study results, showing differences in intergroup interactions across all gameful experience dimensions. The same logic can explain the subtle differences between undetected and high interactions with gamification elements: the multifaceted nature of gamification diminishes the overall gameful experience. Another explanation could be related to low engagement in gamification. It is possible to assume that low engagement indicates a lack of interest in gamified activities or viewing them as a burden or unwelcome chore. Hammedi and others (2021) showed that involuntary participation in gamification can lead to decreased job satisfaction. It could be reasonable to assume that such results could also be extended to the effects on stress.

The research also revealed connections between gameful experience and stress. Almost every gameful experience dimension, excluding immersion, showed correlational and regression links with stress. Playfulness had a negative effect on occupational stress. The results suggest that engaging in imaginative and spontaneous behavior, driven by one's motivation in a professional environment, can reduce stress. This also supports the assumptions of other authors. For instance, Hussain and others (2018) assert that gamification is positively correlated with employee mental health, proposing that playfulness at work ensures lower manifestations of stress. Social experience also had a negative impact on stress levels. It can be concluded that the gamification-induced experience of interpersonal connectedness and communal belonging within a professional setting reduces stress. This result is not surprising considering that coworker support is considered a crucial factor in the socialization of new employees because it acts as a buffer against stress (Taormina, 1997). Finally, two additional gameful experience dimensions – accomplishment and guided – similarly influence stress. This indicates that attaining clearly defined goals, achieving recognized standards of excellence, and receiving directional clarity and evaluative feedback can diminish stress within a professional context. It could be argued that the accomplishment of explicit and acknowledged goals enhances employees' self-efficacy, and clear guidance and constructive feedback further aid employees in understanding their responsibilities, expectations, and performance standards, collectively contributing to potential stress reduction. Supporting this, Frögéli and others (2022) discovered that

an increase in task mastery and role clarity for newcomers correlated with decreased stress levels.

Opposite results were observed when analyzing the competition and challenge dimensions. A greater experience of being stimulated to push personal boundaries and abilities and the experience of rivalry and competitive dynamics within a professional context were associated with increased stress. These results do not seem very surprising. Nah and others (2019) argue that various gamification-related challenges provide growth, learning, and development opportunities by fostering problem-solving and creativity. However, it is important to note that if the level of difficulty is too high, it can lead to anxiety or frustration, while if it is too low, it can result in boredom and apathy. In addition, Hammedi and others (2021) study found that when gamification elements are used without the goal of inducing playful experiences for employees, tasks and awards are seen as an external control tool that hinders workers' well-being by adding to their stress. However, stressors related to challenges positively impact employee performance and motivation (LePine et al., 2005). At this point, it can be concluded that although, in this study, the experience of challenges in the workplace was associated with a higher level of stress, its significance can also be conditional, dependent on other work environment and gamification-related factors. Therefore, when it comes to newcomers who already face their own adjustment challenges, it is essential to consider the consequences that the addition of extra challenges might bring. As for competition, a competitive psychological climate can be associated with greater stress (Fletcher et al., 2007). Therefore, gamification practices that foster competitive outcomes may be harmful to newcomers. This would affirm the assumptions of Algashami and others (2019) regarding the notion that competitiveness associated with gamification can lead to a negative effect on teamwork. Nonetheless, there is research (e.g., Schmidt et al., 2023) that demonstrates the positive outcomes gamification-related competition brings to an organization. However, it would likely be challenging to apply this to new employees who are still learning about their place within the organization.

Practical implications

Organizations seeking to implement gamification strategies must proceed with caution, particularly concerning new employees who are already navigating the challenges of adaptation. The study's findings emphasize the significance of mindful gamification application, considering its diverse impact on employee stress levels. Companies should aim to enhance the gameful experience by focusing on dimensions that have been shown to decrease stress, such as playfulness, social experience, accomplishment, and guidance experiences. On the other hand, equally important is the careful integration of challenges and competition within the gamified work environment. The research highlights the potential increase in stress levels associated with the implementation of competition and challenges for newcomers.

Limitations and Future Studies

Certain limitations of this research are acknowledged, that must be taken into account when interpreting the results. One significant limitation stems from its cross-sectional design, which captures data at a single point in time. Future studies should consider employing a longitudinal design to enhance the comprehensiveness of the research in this domain. This approach would allow for observing the evolving effects of gamification on new employee stress over various time points, providing a more in-depth understanding of the dynamics and causality in this relationship.

Furthermore, the study explored a limited number of gamification elements. There might be other gamification elements that have contributed to these results. Also, the study allowed participants to identify gamification elements by themselves, which may have led to potential inconsistencies and subjective interpretations. Future research could involve a more structured and defined process for identifying and classifying gamification elements to ensure more reliable data.

Finally, this study did not examine the effects of singular gamification elements. Future research could investigate individual gamification elements and their impact on new employee stress. This analysis could provide more specific recommendations, allowing organizations to tailor their gamification strategies effectively.

Conclusion

This study underlines the complex relationship between gamification and stress among new employees. It was revealed that low interaction with gamification elements is relatively linked to increased stress levels, possibly due to the narrower range of psychological consequences or perception of the elements as obligatory tasks.

Additionally, while gameful experience dimensions such as playfulness, social experience, guided, and accomplishment potentially diminish stress levels, competition and challenge may have a capacity to elevate stress, highlighting the need for a balanced and thoughtful implementation of gamification elements in the workplace.

References

Algashami, A., Vuillier, L., Alrobai, A., Phalp, K., & Ali, R. (2019). Gamification risks to enterprise teamwork: Taxonomy, management strategies and modalities of application. *Systems*, *7*(1). https://doi.org/10.3390/systems7010009

Bakker, A. B., & Demerouti, E. (2007). The Job Demands-Resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309–328. https://doi.org/10.1108/02683940710733115

Bauer, T. N., Bodner, T., Erdogan, B., Truxillo, D. M., & Tucker, J. S. (2007). Newcomer adjustment during organizational socialization: a meta-analytic review of antecedents, outcomes, and methods. *Journal of Applied Psychology*, *92*(3), 707–721. https://doi.org/10.1037/0021-9010.92.3.707

Boswell, W. R., Olson-Buchanan, J. B., & LePine, M. A. (2004). Relations between stress and work outcomes: The role of felt Challenge, job control, and psychological strain. *Journal of Vocational Behavior, 64*(1), 165–181. https://doi.org/10.1016/S0001-8791(03)00049-6

Cardador, M., Northcraft, G., & Whicker, J. (2016). A theory of work gamification: Something old, something new, something borrowed, something cool? *Human Resource Management Review*, *27*(2), 353–365. https://doi.org 10.1016/j.hrmr.2016.09.014

Čekanavičius, V., & Murauskas, G. (2014). *Taikomoji regresinė analizė socialiniuose tyrimuose*. Vilniaus universiteto leidykla.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining "gamification". In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9–15). Association for Computing Machinery. https://doi.org/10.1145/2181037.2181040

Ellis, A. M., Bauer, T. N., & Erdogan, B. (2015). New-employee organizational socialization: Adjusting to new roles, colleagues, and organizations. In. J. E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization theory and research* (pp. 301–322). The Guilford Press.

Ellis, A. M., Bauer, T. N., Mansfield, L. R., Erdogan, B., Truxillo, D. M., & Simon, L. S. (2015). Navigating uncharted waters: Newcomer socialization through the lens of stress theory. *Journal of Management*, *41*(1), 203–235. https://doi.org/10.1177/0149206314557525

Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful experience in gamification: Construction and validation of a gameful experience scale [GAMEX]. *Journal of interactive marketing*, *43*(1), 98–115. https://doi.org/10.1016/j.intmar.2018.03.002

Feldman, D. C. (1976). A practical program for employee socialization. *Organizational Dynamics*, *5*(2), 65–80. https://doi.org/10.1016/0090-2616(76)90055-3

Fletcher, T. D., Major, D. A., & Davis, D. D. (2008). The interactive relationship of competitive climate and trait competitiveness with workplace attitudes, stress, and performance. *Journal of Organizational Behavior*, *29*(7), 899–922. https://doi.org/10.1002/job.503

Frögéli, E., Annell, S., Rudman, A., Inzunza, M., & Gustavsson, P. (2022). The importance of effective organizational socialization for preventing stress, strain, and early career burnout: An intensive longitudinal study of new professionals. *International Journal of Environmental Research and Public Health*, *19*(12). https://doi.org/10.3390/ijerph19127356

Hammedi, W., Thomas, L., Poncin, I., & Alkire, L. (2021). Uncovering the dark side of gamification at work: Impacts on engagement and well-being. *Journal of Business Research*, *122*, 256–269. https://doi.org/10.1016/j.jbusres.2020.08.032

Hamza, I., & Tóvölgyi, S. (2022). Empirical analysis of the influence of gamification on employees' behaviour. *Dynamic Relationships Management Journal*, *11*(2), 71–78. https://doi.org/10.17708/DRMJ.2022.v11n02a05

Herzig, P., Ameling, M., & Schill, A. (2015). Workplace psychology and gamification: Theory and application. In T. Reiners & L. Wood (Eds.), *Gamification in Education and Business* (pp. 451–471). Springer. https://doi.org/10.1007/978-3-319-10208-5_23

Högberg, J., Hamari, J., & Wästlund, E. (2019). Gameful experience questionnaire (GAMEFULQUEST): an instrument for measuring the perceived gamefulness of system use. *User Modeling and User-Adapted Interaction*, *29*, 619–660. https://doi.org/10.1007/s11257-019-09223-w

Huotari, K., & Hamari, J. (2017). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*, *27*, 21–31. https://doi.org/10.1007/s12525-015-0212-z

Hurrell, J. J. (2011). Occupational stress. In L. S. Baron, R. K. Sokas, B. S. Levy, & D. H. Wegman (Eds.), *Occupational and Environmental Health: Recognizing and Preventing Disease and Injury* (pp. 296–312). Lippincott Williams & Wilkins.

Hussain, S., Qazi, S., Ahmed, R., Streimikiene, D., & Vveinhardt, J. (2018). Employees Management: Evidence from Gamification Techniques. *Journal of Economics*, *14*(4), 97–107. https://doi.org/10.14254/1800-5845/2018.14-4.7

Kaufman, L., & Rousseeuw, P. J. (1990). *Finding groups in data: An introduction to cluster analysis.* John Wiley & Sons.

Khodabandelou, R., Roghanian, P., Gheysari, H., & Amoozegar, A. (2023). A systematic review of gamification in organizational learning. *The Learning Organization*, *30*(2), 251–272. https://doi.org/10.1108/TLO-05-2022-0057

Koivisto, J., & Hamari, J. (2019). The rise of the motivational information systems: A review of gamification research. *International Journal of Information Management*, *45*(191), 191–210. https://10.1016/j.ijinfomgt.2018.10.013

Landers, R. N., & Marin, S. (2021). Redesigning job tasks and work itself through workplace gamification: A review, research agenda, and recommendations for practice. In M. Vesa (Ed.), *Organizational Gamification: Theories and Practices of Ludified Work in Late Modernity* (pp. 63–89). Routledge.

Landers, R. N., Tondello, G. F., Kappen, D. L., Collmus, A. B., Mekler, E. D., & Nacke, L. E. (2019). Defining gameful experience as a psychological state caused by gameplay: Replacing the term 'gamefulness' with three distinct constructs. *International Journal of Human-Computer Studies*, *127*, 81–94. https://doi.org/10.1016/j.ijhcs.2018.08.003

Laschinger, H. K., Cummings, G., Leiter, M., Wong, C., MacPhee, M., Ritchie, J., Wolff, A., Regan, S., Rhéaume-Brüning, A., Jeffs, L., Young-Ritchie, C., Grinspun, D., Gurnham, M. E., Foster, B., Huckstep, S., Ruffolo, M., Shamian, J., Burkoski, V., Wood, K., & Read, E. (2016). Starting Out: A time-lagged study of new graduate nurses' transition to practice. *International journal of nursing studies*, *57*, 82–95. https://doi.org/10.1016/j.ijnurstu.2016.01.005

LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal*, *48*(5), 764–775. https://doi.org/10.5465/AMJ.2005.18803921

Marcatto, F., Di Blas, L., Luis, O., Festa, S., & Ferrante, D. (2022). The perceived occupational stress scale: A brief tool for measuring workers' perceptions of stress at work. *European Journal of Psychological Assessment*, *38*(4), 293–306. https://doi.org/10.1027/1015-5759/a000677

Nah, F. F.-H., Eschenbrenner, B., Claybaugh, C. C., & Koob, P. B. (2019). Gamification of Enterprise Systems. *Systems*, *7*(1), Article 13. https://doi.org/10.3390/systems7010013

Nyström, T. (2021). Exploring the darkness of gamification: You want it darker? In K. Arai (Ed.), *Intelligent Computing. Lecture Notes in Networks and Systems* (Vol. 285) (pp. 491–506). Springer. https://doi.org/10.1007/978-3-030-80129-8_35

Pereira, V., Behl, A., Jayawardena, N., Laker, B., Dwivedi, Y. K., & Bhardwaj, S. (2022). The art of gamifying digital gig workers: a theoretical assessment of evaluating engagement and motivation. *Production Planning & Control*, 1–17. https://doi.org/10.1080/09537287.2022.2083524

Puig, A., Rodríguez, I., Rodríguez, Á., & Gallego, I. (2023). Evaluating learner engagement with gamification in online courses. *Applied Sciences*, *13*(3), Article 1535. https://doi.org/10.3390/app13031535

Rink, F., Kane, A., Ellemers, N., & van der Vegt, G. (2013). Team receptivity to newcomers: five decades of evidence and future research themes. *The Academy of Management Annals*, *7*(1), 245–291. https://doi.org/10.1080/19416520.2013.766405

Rodell, J. B., & Judge, T. A. (2009). Can "good" stressors spark "bad" behaviors? The mediating role of emotions in links of challenge and hindrance stressors with citizenship and counterproductive behaviors. *Journal of Applied Psychology, 94*(6), 1438–1451. https://doi.org/10.1037/a0016752

Rudman, A., Gustavsson, P., & Hultell, D. (2014). A prospective study of nurses' intentions to leave the profession during their first five years of practice in Sweden. *International journal of nursing studies*, *51*(4), 612–624. https://doi.org/10.1016/j.ijnurstu.2013.09.012

Saks, A. M., & Gruman, J. A. (2012). Getting newcomers on board: A review of socialization practices and introduction to socialization resources theory. In C. R. Wanberg (Ed.), *The Oxford handbook of organizational socialization* (pp. 27–55). Oxford University Press.

Schmidt, C. V. H., Mankse, J., & Flatten, T. C. (2023). Experience matters: The mediating role of gameful experience in the relationship between gamified competition and perceived innovation culture. *Creativity and Innovation Management,* 1–17. https://doi.org/10.1111/caim.12572

Tang, Y., Zhang, Z., Wu, S., & Zhou, J. (2022). The impact of challenge and hindrance stressors on newcomers' organizational socialization: A moderated-mediation model. *Frontiers in Psychology*, *13*, Article 968852. https://doi.org/10.3389/fpsyg.2022.968852

Taormina, R. J. (1997). Organizational socialization: A multidomain, continuous process model. *International Journal of Selection and Assessment*, *5*(1), 29–47. https://doi.org/10.1111/1468-2389.00043

Wanberg, C. R. (2012). Facilitating organizational socialization: An introduction. In C. R. Wanberg (Ed.), *The Oxford handbook of organizational socialization* (pp. 17–21). Oxford University Press.