



Unrestricted challenging ability turn out to high sports performance through presenteeism: The moderating role of physical activity

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ABSTRACT

Athletes in China feel more social pressure to compete while injured and are more likely to avoid rest and trivialize pain. The present study contributes a novel lens on this problem by integrating presenteeism into a highly competitive setting. Physical activities can be adopted to establish more target-specific health preventive strategies for athletes. Drawing on the broaden-and-build theory, the current study proposes challenge stressors as a precursor to sports performance. As an intervening variable, presenteeism represents the practice of playing while in pain. Elite athletes frequently use medications and hide their injuries from teammates to play while injured, show commitment to the game, and take this stress as a challenge. Furthermore, the study proposes that physical activity moderates the relationship between challenge stressors and presenteeism. A two-wave questionnaire was conducted with 430 valid responses from basketball players. Our findings show that challenge stressors were positively linked to sports performance and presenteeism. In addition, the study found that presenteeism significantly mediated the relationship between challenge stressors and sports performance. Moreover, the study confirms that high levels of physical activity strengthen the direct effect of challenge stressors on presenteeism and the mediating effect of challenge stressors on sports performance. The findings exhibit positive and significant associations among all variables. Practical implications and future directions are discussed.

1. Introduction

Researchers have been most interested in investigating three main areas of sports to understand the psychology of participants in China: competitive sports psychology, physical exercise psychology, and the psychology of physical education (Bali, 2015; Evans et al., 2012). Competitive sports psychology has often received significant funding for study and practice, since the Chinese government emphasizes competitive sports. Thus, competitive sports psychology has been the subject of the amplest literature and results among the three issues. However, physical exercise and physical education psychology have begun to attract greater attention as health concerns have grown in importance and become critical social and societal concerns (Zhang et al., 2021). The current study combines the competitive, psychological, and physical aspects of athletics and their challenges in sports.

As the fusion of psychology with sports is becoming more ubiquitous, various sports researchers and instructors are now concerned about optimally reducing stress by using coping mechanisms and maximizing recovery from stress to improve sports performance (Zhang et al., 2021). Since exposure to bullying, biases, and mental health disorders have become more common, sports federations have strengthened their efforts to safeguard athletes' health, safety, and well-being. To highlight the broad spectrum of difficulties athletes encounter in a stressful environment, the contributors to this study shed light on these and other problems that endanger the physical, emotional, psychological, social, and spiritual wellness of athletes of all ages. As a prerequisite to creating a safer, more moral sports environment, this article also discusses approaches to the athlete and physical activities under sports management.

The primary goal of our research is to clarify the widely accepted

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illusion of athletic performance. In doing so, we add to the body of literature that outlines how job stress affects sports performance rather than concentrating on variables that affect the intensity and direction and the association between the predictor and the outcome variable. Although challenge stressors lead to confronting numerous psychological stressors, they have a brighter side for individuals, like exploring new avenues of learning (Kubicek et al., 2023). Despite limited resources, individuals perceive these challenge stressors as quite beneficial for protecting their identity and lucrative opportunities for growth (see, e.g., O'Brien & Beehr, 2019).

Presenteeism is characterized as dedication to a sporting event, following the team's interest, and the desire for work that benefits society (Scott & Pandey, 2005). Presenteeism has gained popularity in different cultures and regions due to its uncontroversial necessity for organizations (Johns, 2010; Lu, Cooper, & Lin, 2013; Lu, Lin, & Cooper, 2013; Vänni, 2018). It is equally ubiquitous in developed and developing countries to respond to more challenging job demands with enthusiasm, perseverance, and commitment to work (Aronsson et al., 2021; Ma et al., 2018). Exploring the notion of presenteeism in a collectivist country like China expedites getting captivating results that can be generalized to other organizations. This allows investigation of the multifaceted phenomenon of presenteeism and the antecedents and consequences of its motivational aspect.

Through this study, we make manifold contributions. First and foremost, this study draws scholars' attention to the precise mix and layout of the broaden-and-build theory. Secondly, the mechanism by which challenge stressors lead to maximum performance is investigated in the collectivistic culture of China, where players put enduring efforts into challenging competitions. Thirdly, in this study, we have explored how to manage the alarming effects of playing injured (presenteeism) with physical fitness and good exercise.

2. Literature review and hypothesis development

2.1. Supporting theory

According to the broaden-and-build theory of positive emotions (Fredrickson, 2001) encounters with pleasant emotions help people to expand their instantaneous thinking and behavioral repertoires, which, in turn, helps them to develop their long-term personal resources, which can include everything from cognitive and physical capabilities to psychological and social resources. Athletes are better equipped to use their judgment to view the game situation differently when they believe enough resources support them. The broaden-and-build hypothesis postulates that by enforcing positive feelings, a person's psychological thought patterns and behavior will eventually grow (Fredrickson et al., 2003). The individual analyzes the situation critically and proposes solutions to solve the problem and win the competition.

First, one broadens one's thinking, gathers information from the surroundings by critically analyzing the rivals, adopts stress-relieving techniques, and connects them to potential future benefits and appreciation (Lu et al., 2015). Basketball players are constantly under pressure to maintain their level of excellence due to the fear of losing games, the desire to please the audience, and the need to uphold the country's reputation and trust. The pleasure of handling complex events in a challenging way aids in controlling the contrasting effects of unpleasant emotions.

This procedure begins the second stage of building persistent cerebral capacities that assist resiliency, zeal, general health, and a sense of well-being (Saleem et al., 2020). Building personal resources improves supporting actions within the team and protects one's reputation. Athletes get the self-assurance necessary to accept challenging roles and take calculated risks, promoting success and self-development and broadening the scope of extra-role activities (Campo et al., 2019).

2.2. Challenge stressors and sports performance

The literature on work-related stress has wide-ranging consequences (Webster et al., 2010). Since organizations have to face losses totaling millions of dollars due to stress-related activities, such as loss of performance and medical costs, it has remained a vital field of research in management and psychology (Driskell et al., 1999). To some extent, exerting control over one's internal state is one of the main goals of every sports participant who aims for top performance. The competent performer seeks to achieve a psychological state that will support maximum performance, whether it be through relaxation, autohypnosis, or any other self-regulation approach. There are, of course, numerous factors at play that might modify the performer's psychological state from the optimum for a specific kind of performance or even stop them from reaching that condition in the first place. These influences, which might cause stress and the potential for poor performance, are called "stressors."

Patmore (1986) took an intriguing stance on the connection between stress and sports. Most studies have concentrated on the downside side of stress (Podsakoff et al., 2007; Yao et al., 2015). However, research has shown that some aspects of stress may also have an advantageous influence on personnel and organizational outcomes. Challenge stressors refer to "work-related demands or circumstances that, although potentially stressful, have associated potential gains for individuals" (Cavanaugh et al., 2000). Performance graphs go up when stress is well managed. Pressure and expectations, for example, might promote a better stress response and, as a result, greater degrees of achievement. For instance, a basketball player may feel pressure from the crowd, close scores, and challenging competitors, which motivates them to run faster and make a three-point shot (Bali & Health, 2015). Considering the above facts, we proposed the first hypothesis as.

Hypothesis 1. Challenge stressors are positively related to sports performance.

2.3. Challenge stressors and presenteeism

Given the belief that the desired consequence would materialize if the demands were satisfied, challenge stressors increase motivation because they urge everyone toward goal completion. Motivations guide our emotions and behaviors. According to LePine et al. (2005), positive emotions significantly regulate the link between challenge stressors and productivity. Challenge stressors encourage a person's innate drive, encourage a goal-targeting attitude, and increase presenteeism (Yang et al., 2017). However, sickness presenteeism becomes a burden that saps people's energy and excitement, making them unable to finish activities and decreasing presenteeism (Caverley et al., 2007).

Chinese athletes generally come from challenging backgrounds and forgo traditional schooling to compete in the sports system. Their life experience includes multiple situations in which they prefer to work through health issues. They have striven to become part of a team by hook or by crook, and they take sport- and health-related stress as a challenge and play with full enthusiasm in bad health.

Athletes can be grouped into levels such as junior, mid-career, and elite, using criteria like years of competitive experience, league participation, or achievements to distinguish these stages. This breakdown allows for a deeper understanding of how challenge stressors and presenteeism may affect athletes at different points in their careers. For example, early-career athletes might experience more pressure to prove themselves, influencing their response to stressors, while elite athletes may have more experience managing stress and burnout. Therefore, the current study aimed to provide demographic data and descriptive statistics to ensure transparency in the categorization process. If the breakdown were not as detailed, the study could acknowledge this as a limitation, suggesting that future research refine these categories for a more precise analysis.

According to the broaden-and-build theory, when resources are believed to meet or surpass needs, a person views the circumstance as challenging (Cohn & Fredrickson, 2006). This motivating stress leads them to decide whether to stay out of the team or play with health issues. Positive emotions generate positive energies, and playing injured will no longer be distressing for them. Presenteeism is problematic if it relates to productivity loss (Humayun et al., 2022). However, challenge stressors induce positive psychological behaviors, and literature has shown that self-efficacy and emotional stability are positively associated with presenteeism (Lu, Cooper, & Lin, 2013; Lu, Lin, & Cooper, 2013). So, we proposed the following hypothesis as.

Hypothesis 2. Challenge stressors are positively related to presenteeism.

2.4. Presenteeism and sports performance

The problem of going to work when feeling unwell has garnered significant attention in recent health studies. Ill people's choice to either go to work or stay absent has many consequences for organizations (Baker-McCleary et al., 2010). Presenteeism is a multilevel phenomenon with many facets and diverse outcomes (Cooper et al., 2016; Johansen et al., 2014). The first conceptualization is sickness absenteeism, which is primarily evident in research and has adverse outcomes. It is defined as an individual not attending work due to illness (Muchinsky, 1977). This is a form of withdrawing behavior from work but is not sure to lead to withdrawal intention. Factors behind sickness absenteeism that have been discussed in the literature as predictors include group cohesiveness, self-esteem, employee fitness programs, job situations, work stress, etc. (Breugh, 1981; Čikeš et al., 2018; Kerr, 2020).

From the theoretical perspective, presenteeism has two ideologies. One is the "consequence ideology," which is led by North American scholars who are more inclined to figure out the behavioral outcome of presenteeism. The main agenda is to know the performance and economic losses due to presenteeism (Zhang et al., 2015). The other is "behavioral ideology," which was more accepted by European practitioners and was grounded in the behavior of presenters "attending work while ill" rather than consequences and motivation (Halbesleben et al., 2014). This phenomenon was investigated in the public health sector and the medical industry through recovery theory. Later on, in the job demands-resources model, this notion is extensively applied in different contexts and organizations to cross-examine how individuals respond to challenging demands. Some workers decide to be present at work in bad health, as they are certain that they will be able to handle the discomfort and remain faithful to their responsibilities, coworkers, and game, displaying presenteeism (Fig. 1).

We demonstrate that presenteeism in sports is a highly complicated phenomenon that can take numerous forms, has multiple linked reasons, and is associated with observer-dependent repercussions by considering results from other work contexts. To capture these intricacies, we created a comprehensive framework for comprehending athlete presenteeism in sports organizations. Maintaining social function despite health issues is a regular phenomenon in the emerging sports literature. Playing hurt, playing despite the pain, and competing injured are all terms for social behaviors that have just recently been connected to wider presenteeism debates in sports management and health sciences (Mayer & Thiel, 2018). Accordingly, we proposed:

Hypothesis 3. Presenteeism is positively related to sports performance.

2.5. The mediating role of presenteeism

Years back, the notion of presenteeism was proposed as "being at work when you should be at home either because you are ill or because you are working such long hours that you are no longer effective" (Cooper, 1996 p, 15). While presenteeism has been shown to affect productivity and financial performance negatively, its advantages haven't received much attention in the literature (Lu, Lin, & Cooper, 2013). The ideology of presenteeism investigated in the current study reflects the motivational perspective that controls employees' behavior in challenging situations. Motivational presenteeism, or voluntary presenteeism, is a sign of a person's high internal enthusiasm and feeling relaxed, even with injuries or playing injured (Mayer & Thiel, 2018). Expressing a preference for presenteeism may lead people to remarkable performance. Presenteeism partially serves as a mechanism for an athlete to confirm their own needs, which is advantageous for both the player and the team. In the end, acknowledgment creates uplifting sentiments to combat the dangers posed by playing injured (Buckley et al., 2021). Presenteeism mediates the relationship between challenge stressors and athletic performance by compelling players to persist in training or competition despite physical or mental exhaustion. Challenges, such as intense training or competitive events, are often viewed as opportunities for growth, motivating athletes to continue their endeavors. Presenteeism enables athletes to refine their skills, maintain physical conditioning, and enhance their emotional investment in their sport, thereby positively impacting performance. However, it may also lead to physical fatigue and cognitive overload, which could impair performance if not properly managed. Its effectiveness depends on factors such as physical resilience, recovery strategies, and support systems that help athletes balance the positive and negative effects of presenteeism on their performance. In a nutshell, we conclude that

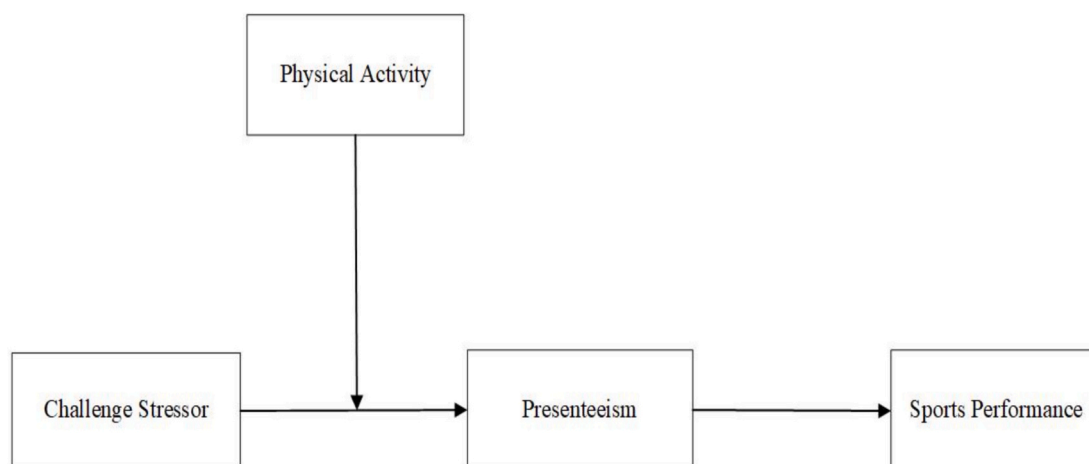


Fig. 1. Conceptual framework.

presenteeism is an intervening mechanism that boosts sports performance by managing stress. Hence, we hypothesized:

Hypothesis 4. Presenteeism mediates the relationship between challenge stressors and sports performance.

2.6. The moderating role of physical activity

Physical activity is “any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen et al., 1985) above resting (basal) levels (Manley, 1996). Physical Activity broadly encompasses exercise, sports, and physical activities as part of daily living, occupation, leisure, and active transportation” (Garber et al., 2011). This description also includes the implication that physical activity is a form of physical stress but not always unpleasant. The association between physical activity and stress has traditionally been examined from the standpoint of enhancing mental well-being through exercising (Norris et al., 1992). Exercisers are less likely to experience sadness, psychological distress, and anxiety (Martin & Wade, 2000). Moreover, physical activity and exercise can improve a person's mental health and capacity to deal with stressful situations (Jackson, 2013; Paluska & Schwenk, 2000). Additionally, it appears that exercise programs can help people to escape depression (Wright & Cattani, 2009). Exercise is linked to decreased psychological stress, a result that has been shown in a wide range of cultures, including in people living with post-traumatic stress disorder and in sports competitions (Chelladurai, 1992; Tonello et al., 2014).

Challenge stressors, such as workload, time constraints, or heightened duties, are perceived by employees as possibilities for growth or accomplishment. Studies have demonstrated that these constraints often lead to presenteeism, since employees may feel compelled to expend additional effort to meet responsibilities or achieve goals, even while unwell. This behavior demonstrates a desire to show commitment or meet expectations. Research indicates that employees' physical activity levels influence their resilience and energy, hence enhancing the correlation between challenge stressors and presenteeism, as physically active employees are more capable of remaining engaged and performing effectively. Conversely, employees with low physical activity levels may lack the stamina or mental resilience to manage stressors efficiently, thus exacerbating presenteeism.

The broaden-and-build theory elucidates how pleasant emotions enhance cognitive flexibility and facilitate the development of enduring resources. This analysis elucidates the link among challenge stressors, presenteeism, and physical activity. Challenge stressors, such as workload or stringent deadlines, can evoke positive emotions, such as determination and a sense of achievement, as they are often perceived as opportunities for growth. These emotions compel individuals to persist at work despite challenges, leading to presenteeism. Physical activity enhances positive emotions by boosting energy and mood, aligning with the “broaden” aspect of the theory. Increased physical activity enhances employees' resilience and improves their ability to manage stress, hence strengthening the correlation between challenge stressors and presenteeism. Conversely, insufficient physical activity constrains emotional and physical resources, undermining this association. Consistent physical activity and effective stress management create long-term personal resources such as resilience, coping techniques, and endurance, which improve presenteeism in challenging situations.

Examining the links between physical activity and presenteeism has recently become a focus of researchers (Thøgersen-Ntoumani et al., 2017). It is assumed that members who participate in physical activities are healthier and thus less likely to get sick and tired, making them less likely to miss work and have fewer chances to perform below expectations in teams than their less active counterparts (Kruk, 2009). By evaluating how challenge stressors cluster with individual characteristics, i.e., physical activity as a resource, the current study will add something novel to the body of research that might shield athletes from

bad health and enhance performance. So, we proposed the following hypothesis:

Hypothesis 5. Challenge stressors are positively associated with presenteeism, and this relationship is stronger when physical activity is high than when it is low.

Based on the above hypotheses, we suggest that physical activity acts as a first-stage moderator that strengthens the indirect relationship between challenge stressors and sports performance via presenteeism. Therefore, we proposed a moderated mediation model.

Hypothesis 6. Physical activity moderates the indirect effect between challenge stressors and sports performance via presenteeism such that a stronger indirect effect occurs under high physical activity.

3. Materials and methods

3.1. Sampling procedures

The data was gathered from southwestern Chinese basketball players. Primarily, the southwest region includes the following cities: Chengdu, Chongqing, Yibin, Suining, and Mianyang. The players were informed about the purpose of the research and had the right to withdraw from the survey at any time. Additionally, the study collected the data in two different waves to eliminate bias issues. At time 1 (T1), the researchers carried out a survey to collect data on demographic characteristics, which included each player's gender, age, education, and occupation, and their ratings regarding challenge stressors and presenteeism. At T1, we distributed the questionnaires to 550 participants, and 480 respondents filled out the surveys. A specific time frame was given to each individual to fill out the surveys. At time 2 (T2), we disseminated a second survey to the 480 individuals who had filled out and submitted the T1 survey. In this survey, participants were evaluated on their level of physical activity and sports performance. After eliminating the incomplete and invalid responses, we received 430 valid responses with an effective response rate of 78.18 %. The data were kept confidential to ensure the participants' anonymity. The final sample included 55.8 % male players and 44.2 % female players.

3.2. Measurement of constructs

The study used a six-point Likert scale (1 = strongly disagree, 6 = strongly agree) to measure all the studied constructs.

3.2.1. Challenge stressors

To measure challenge stressors, a 20-item scale developed by Cavanaugh et al. (2000) was adopted. A sample item was, “I have to complete a great deal of work on this game.” The internal reliability for this construct is $\alpha = 0.91$.

3.2.2. Presenteeism

The Stanford Presenteeism Scale (SPS), comprising six items developed by Koopman et al. (2002), was adopted to measure this construct. One of the sample items was, “Despite having my (physical difficulties), I felt energetic enough to complete all my work.” The reliability coefficient for this scale was $\alpha = 0.87$.

3.2.3. Physical activity

Physical activity was assessed using a seven-item scale developed by Matsudo et al. (2001). For example, one item was, “During the last 7 days, how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?” The alpha coefficient of the scale item was $\alpha = 0.95$.

3.2.4. Sports performance

To measure the individuals' sports performance, we incorporated a

six-item scale developed by Nahum (2017). A sample item includes “Overall, to what extent are you satisfied with your sporting performance this week?” The Cronbach alpha for this scale was $\alpha = 0.94$.

3.3. Control variables

The study primarily adopted gender, age, occupation, and education as control variables. Based on previous empirical investigations (Nahum, 2017), gender was classified into two categories: 1 = male and 2 = female. Career level was classified into three categories: early-stage career, middle-stage career, and late-stage career individuals (the detailed criteria used for classification in the study are reported in Appendix A).

3.4. Analytical strategy

This research incorporated the path analytical approach to explore the associations in the hypothesized framework. Initially, to assess Hypotheses 1 and 2, the study regressed sports performance on challenge stressors and presenteeism. Additionally, to examine Hypothesis 3, we regressed presenteeism on challenge stressors. Further, the study investigated the mediating mechanism by integrating 10,000 bias-corrected bootstrap samples in line with the recommendations of Little et al. (2007). Besides, the study ran the model to examine the interactive effects by drawing 10,000 bootstrapped samples. The value of the simple slope was also calculated at ± 1 standard deviation by following Aiken et al.'s (1991) guidelines. To calculate the values of interactive terms, the study means centered on the challenge stressor and presenteeism.

3.5. Construct validity

The research conducted a series of confirmatory factor analyses to investigate the exclusivity of the study variables, such as challenge stressors, presenteeism, physical activity, and sports performance, using Mplus 8.0. As predicted in Table 1, the study's four-factor model fit the data well: χ^2 (644) = 1789.762, CFI = 0.92, TLI = 0.90, and RMSEA = 0.06, which was significantly better than all other tested models, including a three-factor model [$\Delta\chi^2$ (Δdf) = 646.96(11), $p < 0.001$], a two-factor model [$\Delta\chi^2$ (Δdf) = 526.36(2), $p < 0.001$], and a one-factor model [$\Delta\chi^2$ (Δdf) = 1102.64(4), $p < 0.001$]. The details concerning each tested model are clarified in Table 1.

Table 1
Results of confirmatory factor analysis.

Models	χ^2	d.f.	$\chi^2 / d.f.$	CFI	TLI	RMSEA
Four-factor model: Challenge Stressor, Presenteeism, Physical Activity, Sports Performance	1789.76	644	2.77	0.92	0.90	0.06
Three-factor model: Challenge stressor and presenteeism combined	2436.72	655	3.72	0.87	0.85	0.07
Two-factor model: Challenge stressor. Presenteeism and physical activity combined	2963.08	657	4.51	0.83	0.81	0.08
One-factor model: All variables combined	4065.72	661	6.15	0.75	0.72	0.10

Note: χ^2 = chi- squared value; d.f. = degrees of freedom; CFI-Comparative Fit Index, TLI = Tucker-Lewis.
Index; RMSEA = Root mean square error of approximation, SRMR = Standardized Root Mean Square Residual.

4. Results

Table 2 reveals the means, standard deviations, reliabilities, and correlations of all study variables.

Table 3 delineates the unstandardized path coefficients of direct and indirect effects. Hypothesis 1 posits a positive association between challenge stressors and sports performance. The findings confirm that challenge stressors significantly impacted sports performance ($b = 0.20$, $s.e. = 0.08$, $p < 0.01$). Hence, Hypothesis 1 was supported. Likewise, Hypothesis 2 suggests that challenge stressors are positively related to presenteeism. Table 3 exhibits that challenge stressors significantly influenced presenteeism ($b = 0.59$, $s.e. = 0.06$, $p < 0.01$), supporting Hypothesis 2. Hypothesis 3 proposes that presenteeism is positively linked to sports performance. The results showed that presenteeism was positively associated with sports performance ($b = 0.53$, $s.e. = 0.07$, $p < 0.01$), supporting Hypothesis 3. Hypothesis 4 posits that presenteeism mediates the relationship between challenge stressors and sports performance. Table 3 demonstrates that presenteeism significantly mediated the relationship between challenge stressors and sports performance [indirect effect = 0.09, 95%CI (0.02, 0.17)]. Thus, Hypothesis 4 was supported.

Hypothesis 5 suggests that the relationship between challenge stressors and presenteeism is moderated by physical activity. As per Table 4, Model 2 explains that the interactive effect of challenge stressors and physical activity was significantly linked to presenteeism ($b = 0.28$, $s.e. = 0.06$, $p < 0.01$). The study further executed a simple slope analysis at ± 1 standard deviation and drew the graphs accordingly. Fig. 2 indicates that the simple slope of challenge stressors on presenteeism was significant when physical activity was higher ($b = 0.15$, $s.e. = 0.19$, $p < 0.01$), rather than lower ($b = -0.05$, $s.e. = 0.17$, ns), supporting Hypothesis 5.

Table 5 delineates the results of the moderated mediation effect. The mediating impact of presenteeism on the relationship between challenge stressors and sports performance was significant when physical activity was high [indirect effect = 0.015, 95 % CI (0.006, 0.026)], rather than low [(indirect effect = -0.010, 95 % CI (-0.017, -0.004)], and the indirect difference term was significant [(IDD = 0.025, 95 % CI (0.010, 0.043)], supporting Hypothesis 6.

5. Discussion

The current study aimed to explore a model that includes the relationships among research variables, focusing on four main hypothetical connections and analyzing these connections for both their direct and indirect effects. It was discovered that the anticipated pathways were crucial, since challenge stressors improved athletic performance (Patmore, 1986). The results supported presenteeism's mediating role between challenge stressors and athletic performance and demonstrated their statistically significant path estimations. Physical exercise showed a moderating effect between challenge stressors and presenteeism.

Taking stress as a challenge led to a sense of abundance with enhanced performance, according to Hypothesis 1, which showed a positive relationship between challenge stressors and athletic performance. With the aid of the broaden-and-build hypothesis, the main goal of this research was to investigate the relationship between challenge stressors and athletic sports performance. The broaden-and-build idea might be utilized to explain these findings. When a challenging game is completed successfully, positive feelings are produced. These satisfying feelings are inherently significant resources for the individual. These tools strengthen their dedication and appropriateness for the position and the team.

The results corroborated Hypothesis 2, which showed that challenge stressors are positively associated with presenteeism. These findings align with Thøgersen-Ntoumani et al.'s (2017) research, which connected challenge stressors with presenteeism. Positive feelings help athletes stay motivated and perform with greater passion and intensity.

Table 2

Means, standard deviations and correlations.

Variables	M	SD	1	2	3	4	5	6	7
1. Gender	1.44	0.49							
2. Age	23.00	5.15	0.01						
3. Career level	1.65	0.72	−0.02	0.04					
4. Challenge stressor	4.44	0.79	−0.02	−0.04	0.01	(0.91)			
5. Presenteeism	4.75	1.04	−0.01	−0.03	0.01	0.51**	(0.87)		
6. Physical activity	4.69	1.11	0.04	−0.04	0.01	0.66**	0.83**	(0.95)	
7. Sports performance	4.36	1.14	0.01	0.07	0.11*	0.38**	0.27**	0.29**	(0.94)

Note: $N = 430$; Internal reliabilities (alpha coefficients are stated along the diagonal parenthesis), ** Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).

Table 3

Bootstrapping results for unstandardized indirect effects from SEM.

Path	Coeff.	SE	95 % Lower CI	95 % Upper CI
Direct paths				
CS → SP	0.34**	0.12	0.15	0.55
CS → P	0.69***	0.11	0.49	0.89
P → SP	0.25**	0.10	0.08	0.42
Indirect paths				
CS → P → SP	0.17*	0.07	0.06	0.32

Note: $N = 430$; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; CS: Challenge stressor; P: Presenteeism; PA:

Physical Activity; SP: Sports Performance; CI (95 % Confidence Interval for bootstrapping with 10,000 subsamples).

Table 4

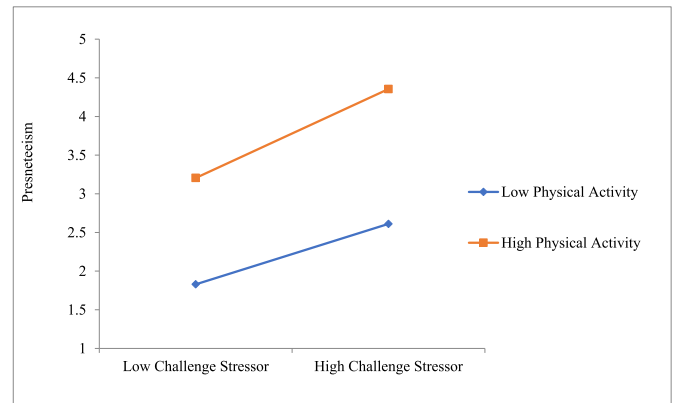
Regression results for interaction effects.

Presenteeism						
Variables	Model 1			Model 2		
	Coeff.	SE	95%CI	Coeff.	SE	95%CI
Control variables						
Gender	0.12*	0.50	[0.04, 0.20]	0.11*	0.05	[0.03, 0.19]
Age	−0.00	0.00	[−0.01, 0.00]	−0.00	0.00	[−0.01, 0.0]
Career Level	0.01	0.04	[−0.05, 0.07]	−0.02	0.04	[−0.04, −0.08]
Independent variables						
Challenge Stressor (CS)	0.45***	0.09	[0.28, 0.60]	0.48***	0.10	[0.30, 0.63]
Moderator variable						
Physical Activity (PA)	0.71***	0.05	[0.62, 0.80]	0.78***	0.05	[0.69, 0.86]
Interactive effects						
CS X PA				0.09*	0.04	[0.02, 0.16]

Note: $N = 430$; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; CI (95 % Confidence Interval for Bootstrapping with 10,000 subsamples).

The mediating mechanisms of presenteeism were foreseen by Hypothesis 3. Our findings also validated this idea, which revealed a significant and favorable path estimate. To the best of our knowledge, no study has ever examined the mediating role of presenteeism between challenge stressors and athletic performance; therefore, this addition to the literature is distinctive.

A possible mediator for the direct and indirect relationships between stressors and athletic performance was also sought in the current

**Fig. 2.** Moderating effect of physical activity.**Table 5**

Bootstrapping results for moderated mediation effect.

Challenge stressor-presenteeism-sports performance (indirect effect)				
Variable	Coeff.	SE	95 % LLCI	95 % ULCI
Indirect effects (physical activity)				
Challenge Stressor				
Indirect low (−1 SD)	−0.010	0.004	−0.017	−0.004
Indirect high (1 SD)	0.015*	0.006	0.006	0.026
Difference in indirect effect	0.025*	0.010	0.010	0.043

Note: $N = 430$, Bootstrap = 10,000; * $p < 0.05$; CI (95 % Confidence Interval for Bootstrapping with 10,000 subsamples).

investigation. In Hypothesis 4, we proposed presenteeism as a mediator between challenge stressors and sports performance. Presenteeism serves as a decisive typology that aids people in making decisions when competing in a challenging game when facing health constraints. People with good stress management skills usually employ a variety of approaches to begin new tasks and overcome professional obstacles. Some people might want to play and compete in challenging ways to give their effort more purpose and meaning.

Hypothesis 5 postulated a relationship between challenge stressors and the interaction moderating term of physical activity, which was found to be significant in the direction predicted by the hypothesis. We propose that there is a positive correlation between challenge stressors and presenteeism and that this correlation is higher when physical activity is high compared to low.

The research emphasizes China, offering significant insights into the interplay among challenge stressors, presenteeism, and athletic performance within a distinct cultural framework. Chinese culture, shaped by Confucian principles, promotes effort, tenacity, and communal responsibility, which may amplify the propensity for presenteeism. Cultural factors may strengthen the relationship between significant stressors and presenteeism, as athletes feel an increased obligation to endure in order to fulfill team goals or societal expectations.

The study's applicability may be enhanced by extending the discussion to investigate the findings' generalizability to various cultural contexts or sports. In individualistic societies, such as those in Western nations, athletes may prioritize personal well-being over presenteeism, thereby subverting the connection. Additionally, the impact of presenteeism may differ in sports with varying physical requirements (e.g., endurance sports versus team sports). Endurance sports may have a more pronounced impact due to accumulated strain, while team sports could mitigate the effect through shared responsibility. An examination of these cultural and environmental differences would provide a more comprehensive understanding of the global dynamics of challenge stressors, presenteeism, and performance.

5.1. Theoretical implications

This study expands on the knowledge of how behavioral and psychological mechanisms interact in sports environments by incorporating ideas from occupational health models, stressor frameworks, and motivation theories. It emphasizes how confronting stressors can both improve performance and boost resilience and engagement when managed with physical activity. Through the integration of sports psychology, motivation, and stress management, this advanced perspective offers a more complex understanding of optimizing athlete performance.

The study contributes to the extant literature in the following ways. First, the study adopted the broaden-and-build theory (Fredrickson, 2001) as a novel theoretical lens by displaying stress as a strength that encourages athletes to pursue ongoing self-development by playing injured (presenteeism) and engaging in forging connections with the team, which nurtures the progress of team performance. Positive feelings resulting from managing stress at games may strengthen one's sense of strong affiliation with a particular sport (Campo et al., 2019; Saleem et al., 2020). Such feelings spur one to handle trying circumstances and actively participate in a game that increases one's skill set for potential ties. Second, our study adds nuanced knowledge by identifying challenge stressors as sound predictors of sports performance. Our study is the first to support that challenging situations stimulate individuals to perform well at any cost, ultimately leading to improved sports participation. Third, our study integrates physical activity as a moderating mechanism in the relationship between challenge stressors and presenteeism. In line with earlier investigations (Cao et al., 2023), physical activity psychologically strengthens the individual's mindset by reducing the risk of potentially harmful factors such as anxiety and depression, which eventually leads them to contribute to the overall community. Therefore, we argue that high levels of physical activity are intrinsically driven and motivate individuals to take a stressor as beneficial for their performance and actively participate regardless of injury to improve their sports performance. Physical activity serves as a psychological buffer, lowering the negative consequences of stress (such as anxiety and sadness) and promoting an optimistic view. By demonstrating how physical activity acts as an intrinsic motivator and turns stresses into stimuli that improve performance rather than burdens that deplete it, this realization advances the field of health psychology.

5.2. Practical implications

Students and scholars in sports studies, coaching, psychology, performance, development, and other related fields should read this research, since it is the first to exclusively address player well-being after encountering job stress. The results show that if trainers or coaches are serious about managing participants' stress to manage talent, retain players, and lower early retirement, they should prioritize training and development plans that emphasize handling stress well. These training programs would improve players' abilities and behaviors, pushing them

to prioritize their sports by creating a climate of presenteeism.

The study could provide more specific practical implications for coaches and athletes to apply the findings effectively. For coaches, understanding the link between challenge stressors, presenteeism, and sports performance can help them design training programs that balance pushing athletes to develop their skills while preventing overexertion. Coaches could implement strategies such as monitoring athletes' physical and mental well-being, promoting regular recovery periods, and fostering open communication to ensure athletes feel supported in managing stressors without resorting to harmful levels of presenteeism. For athletes, the study highlights the importance of recognizing when persistence under stress transitions from being productive to detrimental. Practical recommendations could include encouraging athletes to develop self-awareness about their physical and mental limits; integrating recovery-focused practices such as proper sleep, nutrition, and mindfulness techniques; and leveraging physical activity to build resilience. By tailoring these strategies to specific sports and cultural contexts, the practical implications become more actionable and relevant to the target audience.

5.3. Limitations and future research

Given the paucity of study in this field, presenteeism intervention is an interesting subject for investigation in sports performance. This study examined the effects of challenge stressors on sports performance through the mediating role of presenteeism. Other mediators also need to be used to examine this relationship. Boundary circumstances need to be considered; in this regard, coaches' training should be discussed as a moderator to define the framework in which challenge stressors affect sports performance.

CRediT authorship contribution statement

Muhammad Ali Hussain: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Shazia Humayun:** Writing – original draft, Visualization, Validation, Conceptualization. **Muhammad Waleed Ayub Ghouri:** Software, Investigation, Conceptualization. **Walid Emam:** Resources, Project administration, Investigation, Funding acquisition. **Yusra Tashkandy:** Project administration, Investigation, Funding acquisition.

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

Institutional review board statement

Data was collected from athletes in public or non-private settings, focusing only on non-sensitive, non-identifiable information. The study presents minimal risk to participants and adheres to institutional criteria for exempt research. No personal or private data was recorded, ensuring compliance with ethical standards.

Declaration of competing interest

The authors declared that this article is no conflict of interest.

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Appendix A. Classification of players based on age and career stage

Career stage	Age (years)	Level of play	Characteristics
Early-stage career	18–24	Entry-level/college	Self-improvement, polishing skills and gaining experience
Middle-stage career	25–32	Professional leagues	Physically fit and effectively contributes to the team development
Late-stage career	33+	Coach/retirement	Well-trained individual capable of performing mentoring roles

Appendix B. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.actpsy.2025.104940>.

Data availability

The datasets generated during and/or analyzed during the current study are available on a reasonable request from the corresponding author.

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