Job characteristics and work-to-home interference among university music teachers in Guangdong Province, China: The mediating role of job burnout

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ABSTRACT

This study aims to explore the relationship between job characteristics, job burnout, and work-to-home interference, particularly focusing on the influence mechanisms within the group of music teachers in universities in Guangdong Province, China. Based on the Job Demands-Resources (JD-R) model and the work-to-home interference theory, this study proposes and tests how job characteristics, such as job demands, decision latitude, supervisor support, and colleague support, influence work-to-home interference through emotional exhaustion and disengagement. A structured questionnaire survey was conducted, yielding 591 valid samples, and the relationships between variables were analyzed using Structural Equation Modeling (SEM). The results indicate a significant positive correlation between high job demands and emotional exhaustion, disengagement, and work-to-home interference. In contrast, decision latitude, supervisor support, and colleague support significantly mitigate emotional exhaustion and disengagement, thereby reducing work-to-home interference. Furthermore, emotional exhaustion and disengagement play important mediating roles in the relationship between job demands, decision latitude, supervisor support, colleague support, and work-to-home interference. The study's conclusions provide theoretical foundations and practical insights for optimizing job characteristics in the education sector, supporting teachers' mental well-being, and developing work-life balance policies. The study's limitations include the regional sample restrictions and the cross-sectional design. Future research could expand the sample scope and adopt a longitudinal design to explore causal relationships.

Keywords: Job characteristics, job burnout, work-to-home interference, emotional exhaustion, disengagement, structural equation modeling.

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INTRODUCTION

In the modern organizational environment, employees increasingly face the pressures of balancing work and family life. Post-pandemic workplaces have seen widespread attention on the "burnout" crisis. A global survey shows that as many as 92% of employees experience some form of job burnout, which is often characterized by severe emotional exhaustion and a sense of disengagement from work. Meanwhile, excessive job demands leading to work-to-home interference are also deemed unsustainable. In recent years, the relationship between job characteristics, job burnout, and work-to-home interference has garnered extensive attention, particularly in the education sector. Su and Jiang (2023) examined the impact of

work-to-home conflict on job engagement among university teachers in China based on the Job Demands-Resources (JD-R) model; Chen et al. (2025) explored the impact of the professional mission on job burnout among Chinese teachers, proposing that job adaptability and work engagement mediate the relationship between professional mission and burnout, emphasizing the importance of enhancing teachers' adaptability to alleviate burnout. Guo and Yang (2025) focused on the career well-being of music teachers in China, finding that job characteristics are closely related to career well-being, thus providing empirical support for understanding the relationship between job characteristics and burnout in music teachers. Finally, Zhao and Wang (2024) investigated the relationship between work-to-home conflict and job burnout. Currently, management studies increasingly focus on how work environment factors (such as job demands, decision latitude, and supervisor and colleague support) influence emotional exhaustion, disengagement, and other burnout symptoms, and how these burnout symptoms further lead to work-to-home interference. This study reviews the relationship between these variables, drawing on academic literature post-2020, and examines the mediating roles of emotional exhaustion and disengagement in the context of organizational behavior and career management.

In the JD-R model, job demands refer to aspects of work that require employees to exert continuous physical, psychological, emotional, or cognitive effort. These demands can result in physiological or psychological costs, such as stress, emotional exhaustion, or burnout. Demerouti and Bakker (2022) expanded the JD-R model, suggesting that job demands during crises can lead to both physiological and psychological costs and how leadership and organizational support can mitigate these effects. Naidoo-Chetty and du Plessis (2021) studied the job demands faced by academic staff in higher education, including publication pressure, time constraints, and work-life balance issues, exploring their effects on work engagement and well-being. Additionally, Bakker and Demerouti (2021) systematically reviewed the job demands within the JD-R model, emphasizing the relationship between high job demands (such as high workload and role conflict) and physiological and psychological costs. These studies provide a theoretical basis for understanding the multidimensional nature of job demands and their impact on employee health, well-being, and job performance, particularly in higher education and crisis contexts.

Decision latitude refers to employees' autonomy in deciding the content, methods, and pace of their tasks, originating from Karasek's Job Demands-Control Model, which highlights that the combination of high demands and low control can lead to higher psychological stress and health issues. Recent studies show that decision latitude plays a crucial role in alleviating work stress, improving employee well-being, and enhancing job performance. Gynning et al. (2024) found that decision latitude was key in alleviating work stress and improving well-being among healthcare professionals in Sweden. Portoghese et al. (2025) used latent variable analysis to reveal that the combination of high decision latitude and low job demands was associated with higher job engagement and lower emotional exhaustion. Bakker and Demerouti (2023), in reviewing the JD-R model, emphasized the importance of decision latitude as a work resource, highlighting its positive effects on employee health and performance in high-demand environments. These studies indicate that increasing decision latitude not only helps reduce work stress but also boosts job satisfaction and efficiency, especially in high-demand environments.

Supervisor Support refers to the emotional, informational, and resource support provided by supervisors in the workplace, including behaviors such as recognition, feedback, guidance, and care. Studies have shown that supervisor support has a positive impact on employees' work engagement, job satisfaction, mental health, and innovative behavior. Swanzy (2020) found that supervisor support significantly improves employees' mental health and well-being by reducing work-to-home conflict and enhancing job satisfaction. Tarek et al. (2025) explored how supervisor support enhances employees' sense of work meaningfulness, which in turn boosts their well-being and work engagement. Sanjaya et al. (2025) demonstrated that supervisor support not only promotes work engagement but also enhances employees' innovative behavior, particularly in government statistical work environments. These studies emphasize the important role of supervisor support in promoting employees' mental health, improving job performance, and fostering innovation, especially in complex and high-pressure work environments.

Colleague Support refers to the emotional, informational, and tangible assistance provided by colleagues in the workplace, including behaviors such as listening, offering advice, collaborating, and encouraging. Research indicates that colleague support plays a crucial role in improving job satisfaction, reducing burnout, enhancing work engagement, and promoting mental health. Haynes and Blom (2020) found that colleague support positively influences work-family outcomes by improving the work environment and reducing burnout. Buonomo et al. (2024) explored how colleague and leadership support in remote work environments contribute to work-life balance by enhancing job satisfaction. Adriyanto (2021) demonstrated that colleague support fosters better communication and collaboration, thereby increasing job satisfaction and team cohesion. These studies suggest that colleague support not only enhances work performance but also promotes employees' mental health and overall

well-being, particularly in complex and high-pressure work environments.

Job burnout is a career phenomenon caused by long term, unmanaged work-related stress, typically manifesting as emotional exhaustion (Emotional Exhaustion, EE), depersonalization (Depersonalization, DIS), and reduced personal accomplishment. Emotional exhaustion refers to individuals feeling emotionally drained by their work, and lacking energy; depersonalization manifests as a cynical or dehumanized attitude toward work subjects (e.g., patients, students); and reduced personal accomplishment refers to a decline in self-evaluation of one's work abilities and achievements. In recent years, research on job burnout has deepened. Ghasemi Kooktapeh et al. (2023) conducted a systematic review and meta-analysis on the impact of COVID-19 on nurse burnout, finding that the pandemic significantly exacerbated emotional exhaustion and professional detachment among nurses. Additionally, Trinkenreich et al. (2023) proposed a theoretical model of developer burnout, emphasizing the role of organizational culture, job satisfaction, and team atmosphere in alleviating burnout. These studies show that job burnout not only affects individuals' mental health but can also lead to decreased work efficiency and organizational performance. Therefore, organizations should focus on the work environment and employee well-being, implementing effective measures to prevent and intervene in job burnout.

Work-to-Home Interference (WHI) refers to the negative impact of work-related stress, tasks, or emotions on family life, typically manifested by extended working hours, unfinished tasks, and work-related emotional exhaustion that intrude into family life, leading to role conflict and stress. This phenomenon is becoming increasingly prominent in modern work environments, particularly with the widespread adoption of remote work and flexible work arrangements. Al Riyami et al. (2023) found that remote work indirectly affects employees' work-life balance by increasing work-family conflict (Work-Family Conflict, WFC) and work motivation (WM). This study suggests that work-family conflict plays a mediating role between remote work and work-life balance. Additionally, Björk Brämberg et al. (2023) conducted a cohort study in Sweden and found that high work-to-home interference was associated with delays in employees' full return to work after sick leave due to common mental disorders (CMDs). This indicates that work-to-home interference can extend the time employees take to fully recover from sick leave. These studies highlight the impact of work-to-home interference on employee health, job performance, and quality of life, particularly in the context of remote work and flexible work arrangements. Organizations should focus on managing work-to-home interference to promote employees' overall well-being and work efficiency.

LITERATURE REVIEW

Research theory

Work-to-Home Interference (WHI) originates from the Work-Family Conflict Theory, first proposed by Greenhaus and Beutell (1985), one of the most influential classical theories in this field. The Work-Family Conflict Theory posits that when individuals struggle to balance their roles between work and family, resource allocation conflicts (such as time, energy, and emotions) create tension. The theory highlights that high job demands (such as long working hours or emotional labor) can undermine individuals' ability to fulfill family responsibilities, and conversely, family burdens can affect work performance. Recent studies indicate that work-to-home interference not only impacts employees' mental health and well-being but can also lead to decreased job satisfaction, increased turnover intentions, and intensified job burnout (Chen et al., 2021; Nohe and Sonntag, 2022). Additionally, variables such as organizational support, leadership styles, and flexible systems have been shown to alleviate this conflict (Zhang et al., 2023; Huang et al., 2024). Some scholars have further distinguished between negative spillover from work to home (W→H conflict) and interference from family to work (H→W conflict), emphasizing the dynamic, interactive, and bidirectional nature of this relationship (Almeida et al., 2022). Overall, Work-Family Conflict Theory provides a critical theoretical foundation for understanding employee stress and role balance in modern workplaces and holds significant practical relevance for organizational policy development.

Job Burnout Theory, primarily developed by Maslach and Jackson, views burnout as a psychological syndrome resulting from long-term, unmanaged work-related stress, characterized by emotional exhaustion, depersonalization (dehumanization), and reduced personal accomplishment. In recent years, scholars have expanded this model, suggesting that burnout is not only an individual psychological state but also reflects an imbalance between the organizational environment and work resources. According to Demerouti et al. (2020), burnout is primarily caused by high job demands (e.g., long hours, emotional labor) and low resource support (e.g., managerial support, decision autonomy). The impact of burnout on employees is widespread, including declining mental health, lower job satisfaction, and increased turnover intentions (Bianchi et al., 2021). Burnout is especially severe in high-emotional labor professions, such as in education, healthcare, and service industries. For instance, among university teachers in China, burnout has been shown to be significantly related to work overload, promotion pressure, and lack of support (Li et al., 2022). Recent studies have also emphasized that individual traits, such as psychological resilience and a sense of work

meaningfulness, can mitigate the effects of burnout (Zhou et al., 2023). Job burnout theory has evolved from a "result-oriented" perspective to a process model that encompasses the multidimensional interaction of individuals, organizations, and environments, providing a theoretical foundation for improving employee well-being.

Job Characteristics Theory, proposed by Hackman and Oldham, emphasizes the impact of core job characteristics on individual motivation and performance. In recent studies, this theory has been further developed and integrated into the Job Demands-Resources (JD-R) model, becoming an essential foundation for understanding employee stress and motivation. Specifically, job demands (JDS) refer to the psychological, physical, and emotional demands employees face when completing tasks. If these demands exceed individual resources, stress and burnout are likely to occur (Bakker and Demerouti, 2023). Decision latitude (DLE) reflects employees' control over task content and processes at work, which can effectively reduce work stress and enhance intrinsic motivation (Schaufeli et al., 2021). Additionally, supervisor support (SST) and colleague support (CST), as key social resources, help employees cope with challenging situations and enhance team cohesion and emotional resilience (Zhou et al., 2022; Li and Sun, 2023). Research shows that in high-demand work environments, when employees feel a sufficient sense of autonomy and support, work burnout can be significantly reduced, and job satisfaction and organizational commitment can be enhanced (Wang et al., 2024). Consequently, modern organizations increasingly focus on optimizing job characteristic design to promote a win-win outcome for employee well-being and organizational performance.

Research hypotheses

Researchers have widely explored the impact of high job demands (Job Demands, JDS) on employees' mental states and family life. Multiple empirical studies have confirmed that high job demands significantly increase emotional exhaustion (Emotional Exhaustion, EEN). Under long-term overload, time pressure, and role conflict, employees are more prone to sustained energy depletion and emotional exhaustion (Zhang and Zhu, 2022), indicating a positive correlation between JDS and EEN. Furthermore, high job demands have also been found to be positively correlated with disengagement (Disengagement, DIS). When employees perceive a lack of control and feedback at work, and when there is an imbalance between effort and reward, they tend to gradually distance themselves from their work roles, showing indifference and reduced engagement (Wang et al., 2023), suggesting a positive correlation between JDS and DIS. Further research has found that excessively

high job demands significantly exacerbate work-family conflict (Work-Family Conflict, WHI). Especially in high-responsibility professions such as education and healthcare, employees face WHI issues due to work pressures squeezing family time and emotional overload spilling over (Liu et al., 2021; Chen and Fang, 2024), indicating a positive correlation between JDS and WHI. Therefore, the current literature provides a solid foundation for exploring the relationships between job demands, employee burnout, and family conflict. Based on this, the researcher proposes the following hypotheses:

H1a: There is a positive correlation between job demands (JDS) and emotional exhaustion (EEN).
H1b: There is a positive correlation between job demands (JDS) and disengagement (DIS).
H1c: There is a positive correlation between job demands (JDS) and work-to-home interference (WHI).

Scholars have conducted in-depth research on the impact of decision latitude (Decision Latitude, DLE) on employee mental health and family life. Empirical studies have shown that increasing decision latitude effectively alleviates emotional exhaustion (EEN). When employees have greater control over decision-making, they can better adjust their work tasks and pace, reduce emotional burdens and decrease the risk of emotional exhaustion (Bakker and Demerouti, 2023). Thus, there is a negative correlation between DLE and EEN. Additionally, research has found that higher decision latitude is negatively correlated with disengagement (DIS). When employees have more autonomy in their work decisions, they become more engaged and less likely to experience indifference or detachment from their work roles (Zhou et al., 2022). Therefore, there is a negative correlation between DLE and DIS. Further studies suggest that enhancing decision latitude helps reduce work-family conflict (WHI). When employees can freely adjust their work schedules and hours, they are better able to balance work and family life, reducing conflict between the two (Chen and Fang, 2024). Therefore, there is a negative correlation between DLE and WHI. In summary, the existing literature provides strong theoretical support for exploring the relationship between decision latitude, emotional exhaustion, disengagement, and work-to-home interference. Based on this, the researcher proposes the following hypotheses:

H2a: There is a negative correlation between decision latitude (DLE) and emotional exhaustion (EEN).
H2b: There is a negative correlation between decision latitude (DLE) and disengagement (DIS).
H2c: There is a negative correlation between decision latitude (DLE) and work-to-home interference (WHI).

Scholars have extensively studied the impact of supervisor support (Supervisor Support, SST) on employees' mental health and work-family balance. Empirical research has shown that supervisor support can effectively reduce emotional exhaustion (EEN). When employees feel supported and cared for by their supervisors, they can better cope with work stress and reduce emotional fatigue (Zhang and Liu, 2023). Thus, there is a negative correlation between SST and EEN. Supervisor support has also been found to be negatively correlated with disengagement (DIS). High levels of supervisor support can enhance employees' work engagement, reducing indifference and detachment from work. When supervisors provide feedback and guidance, employees feel more valued and connected, which reduces disengagement (Liu et al., 2022). Therefore, there is a negative correlation between SST and DIS. Further research has shown that supervisor support plays a positive role in alleviating work-to-home interference (WHI). When employees receive support from their supervisors, they can better manage the role conflicts between work and family, especially in high-pressure work environments. Supervisor support helps employees find a better balance between family responsibilities and work tasks (Chen and Fang, 2024). Therefore, there is a negative correlation between SST and WHI. In summary, the existing literature provides strong evidence for exploring the relationship between supervisor support, emotional exhaustion, disengagement, and work-to-home interference. Based on this, the researcher proposes the following hypotheses:

H3a: There is a negative correlation between supervisor support (SST) and emotional exhaustion (EEN).
H3b: There is a negative correlation between supervisor support (SST) and disengagement (DIS).
H3c: There is a negative correlation between supervisor support (SST) and work-to-home interference (WHI).

Scholars have widely studied the impact of colleague support (Colleague Support, CST) on employees' mental health and work-family balance. Studies have shown that colleague support effectively reduces emotional exhaustion (EEN). When employees receive support and cooperation from colleagues, they can better share the pressure, alleviate excessive energy depletion, and thereby reduce the occurrence of emotional exhaustion (Wang et al., 2023). Therefore, there is a negative correlation between CST and EEN. Moreover, colleague support is negatively correlated with disengagement (DIS). High levels of colleague support help enhance employees' work engagement and reduce alienation and indifference at work. When employees feel the help and understanding of their colleagues, they are more likely to maintain a positive work attitude, avoiding disengagement (Zhou et al., 2022). Therefore, there is a

negative correlation between CST and DIS. Further research indicates that colleague support plays an important role in alleviating work-to-home interference (WHI). When employees receive support from colleagues, they can more effectively coordinate conflicts between work and family life, especially in high-pressure environments, where teamwork and mutual assistance help alleviate employees' family-related stress (Liu et al., 2021). Therefore, there is a negative correlation between CST and WHI. In summary, existing literature provides strong evidence for exploring the relationship between colleague support, emotional exhaustion, disengagement, and work-to-home interference. Based on this, the researcher proposes the following hypotheses:

H4a: There is a negative correlation between colleague support (CST) and emotional exhaustion (EEN).
H4b: There is a negative correlation between colleague support (CST) and disengagement (DIS).
H4c: There is a negative correlation between colleague support (CST) and work-to-home interference (WHI).

In recent years, studies have shown that there is a significant positive correlation between emotional exhaustion (Emotional Exhaustion, EEN) and work-to-home interference (Work-Family Conflict, WHI). When employees are under high-pressure conditions for long periods and experience emotional exhaustion, they often struggle to effectively manage the demands of their family roles, leading to increased conflict between work and family life (Bakker et al., 2023). Emotional exhaustion can leave employees with insufficient energy to deal with family responsibilities, further intensifying WHI issues. Additionally, disengagement (Disengagement, DIS) is positively correlated with work-to-home interference (WHI). When employees feel disengaged and lose motivation at work, they tend to exhibit low involvement in both family and work, causing greater work-to-home interference (Li et al., 2022). Disengagement may stem from high job demands, lack of support, or low autonomy, which makes it difficult for employees to balance family and work. Research shows that as disengagement increases, employees are more likely to feel that their family life is negatively impacted by work pressure, thereby exacerbating WHI. In conclusion, both emotional exhaustion and disengagement can increase conflict between work and family life by depleting employees' energy and motivation, providing strong theoretical support for future research. Based on this, the researcher proposes the following hypotheses:

H5: There is a positive correlation between emotional exhaustion (EEN) and work-to-home interference (WHI).
H7: There is a positive correlation between disengagement (DIS) and work-to-home interference (WHI).

Researchers have also examined the role of emotional exhaustion (EEN) as a mediator in the relationship between job demands (Job Demands, JDS) and work-to-home interference (WHI). Existing studies suggest that when job demands are high, employees' emotional exhaustion levels significantly increase, further intensifying the conflict between work and family (Bakker et al., 2023). Emotional exhaustion (EEN) mediates the relationship between job demands (JDS) and work-to-home interference (WHI). High job demands lead to increased emotional exhaustion, which, in turn, causes more conflict in managing work and family roles. Similarly, decision latitude (Decision Latitude, DLE), as a work resource, has also received significant attention regarding its impact on emotional exhaustion. When employees have more autonomy and control in their work, they can effectively reduce work stress and emotional exhaustion, thereby decreasing work-to-home interference (Chen & Fang, 2024). Therefore, emotional exhaustion (EEN) mediates the relationship between decision latitude (DLE) and work-to-home interference (WHI). Furthermore, supervisor support (Supervisor Support, SST) plays an important role in reducing emotional exhaustion. High levels of supervisor support can enhance employees' motivation and emotional resilience, thus mitigating work-family conflict (Zhang and Liu, 2023). Based on this, emotional exhaustion (EEN) also mediates the relationship between supervisor support (SST) and work-to-home interference (WHI). Lastly, colleague support (Colleague Support, CST) has been shown to have a positive effect on reducing work stress and enhancing employee well-being. When employees receive support and understanding from colleagues, they can more effectively manage work and family life, reducing emotional exhaustion and work-family conflict (Liu et al., 2021). Therefore, emotional exhaustion (EEN) also mediates the relationship between colleague support (CST) and work-to-home interference (WHI). In summary, emotional exhaustion, as a mediator, plays a crucial role in the relationship between job demands, decision latitude, supervisor support, colleague support, and work-to-home interference. Based on this, the researcher proposes the following hypotheses:

H6a: Emotional exhaustion (EEN) mediates the relationship between job demands (JDS) and work-to-home interference (WHI).
H6b: Emotional exhaustion (EEN) mediates the relationship between decision latitude (DLE) and work-to-home interference (WHI).
H6c: Emotional exhaustion (EEN) mediates the relationship between supervisor support (SST) and work-to-home interference (WHI).
H6d: Emotional exhaustion (EEN) mediates the relationship between colleague support (CST) and work-to-home interference (WHI).

Scholars have also focused on the role of disengagement (DIS) as a mediator in the relationship between job demands, decision latitude, supervisor support, colleague support, and work-to-home interference (WHI). Research has shown that high job demands (Job Demands, JDS) lead to disengagement, further exacerbating conflict between work and family (Zhou et al., 2022). When employees lose their investment and motivation under high work pressure, they typically show detachment from family responsibilities, which makes disengagement (DIS) mediate the relationship between job demands (JDS) and work-to-home interference (WHI). Similarly, decision latitude (DLE) plays an important role in employees' work attitudes and work-family conflict. When employees have more decision-making authority, they are more likely to remain engaged at work and reduce disengagement, which in turn lowers work-family conflict (Bakker et al., 2023). Therefore, disengagement (DIS) mediates the relationship between decision latitude (DLE) and work-to-home interference (WHI). Furthermore, supervisor support (SST) usually reduces disengagement and work pressure, enhancing employees' commitment to work, and thus alleviating conflict between work and family (Zhang and Liu, 2023). Based on this, disengagement (DIS) also mediates the relationship between supervisor support (SST) and work-to-home interference (WHI). Finally, colleague support (CST) can effectively alleviate emotional pressure on employees, prevent disengagement and negative emotions, and thus reduce work-family conflict (Liu et al., 2021). Therefore, disengagement (DIS) mediates the relationship between colleague support (CST) and work-to-home interference (WHI). In conclusion, disengagement plays a crucial mediating role in the relationship between job demands, decision latitude, supervisor support, colleague support, and work-to-home interference. Based on this, the researcher proposes the following hypotheses:

H8a: Disengagement (DIS) mediates the relationship between job demands (JDS) and work-to-home interference (WHI).
H8b: Disengagement (DIS) mediates the relationship between decision latitude (DLE) and work-to-home interference (WHI).
H8c: Disengagement (DIS) mediates the relationship between supervisor support (SST) and work-to-home interference (WHI).
H8d: Disengagement (DIS) mediates the relationship between colleague support (CST) and work-to-home interference (WHI).

Conceptual framework

The research model focuses on exploring how work environment factors influence employees' work-life

balance through psychological mechanisms. The model includes four independent variables: Job Demands (JDS), Decision Latitude (DLE), Supervisor Support (SST), and Colleague Support (CST). These variables represent the sources of stress and resource support that employees face in the workplace. The model also sets two mediating variables: Emotional Exhaustion (EEN) and Disengagement (DIS), which reflect the psychological response process of employees.

Ultimately, the model uses Work-to-Home Interference (WHI) as the dependent variable to measure the extent to which work roles interfere with family responsibilities. This model aims to reveal how workplace stressors and resources indirectly influence family life conflicts through employees' psychological states, providing significant theoretical and practical implications, especially for management optimization and employee support policy development in high-load professions like education.
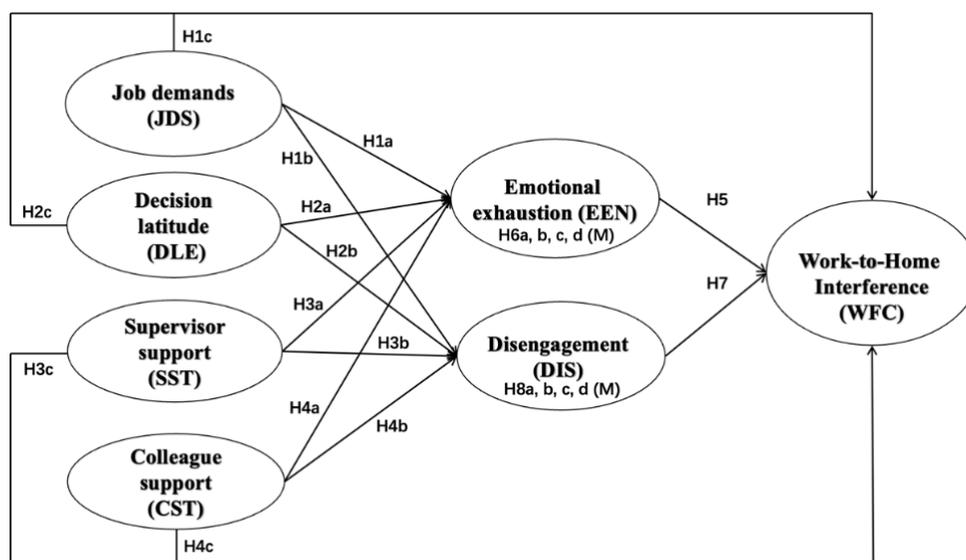

Figure 1. Conceptual framework. Source: Design by the researcher (2025).

RESEARCH METHODOLOGY

Research method

This study adopts a quantitative research method, aiming to collect data and perform statistical analysis through a structured questionnaire to explore the relationships among job characteristics, job burnout, and work-to-home interference. The quantitative research method allows for the systematic collection of large amounts of data, ensuring the objectivity and scientific rigor of the study while deriving meaningful conclusions from the data analysis. Specifically, this study uses a self-report questionnaire, employing a Likert five-point scale to measure the variables. The questionnaire includes questions related to job demands, decision latitude, supervisor support, colleague support, emotional exhaustion, disengagement, and work-to-home interference. The quantitative analysis uses Structural Equation Modeling (SEM) to test the hypothesized model

and analyze the causal relationships among the variables. This approach allows the study to quantify the impact of various factors on work-to-home interference and reveal potential mediating effects, thereby providing scientific evidence for the optimization of work environments and improvements in employee support measures.

Research design

This study adopts a stratified random sampling method to ensure the representativeness of the sample and the reliability of the data. When conducting sampling, the sample is first stratified according to the basic characteristics of the research subjects (such as gender, age, marital status, educational background, and monthly income), and then a certain proportion of samples are randomly selected from each stratum. Stratified sampling helps ensure that each subgroup has a sufficient sample

size, thereby improving the external validity of the study's results. This method effectively avoids sampling bias, allowing the study to better reflect the overall situation. By using stratified random sampling, employees from different work environments and job types are analyzed, ensuring that the results are more generalizable. Additionally, stratified sampling ensures a balanced sample size across groups, which enhances the precision of exploring and analyzing relationships among different variables. The research design aims to ensure data diversity and comprehensiveness through systematic sample selection, thereby obtaining more accurate and comprehensive research results.

Research sample

The questionnaire consisted of 46 items, so the minimum sample size should be to address potential limitations and improve the accuracy of the research results, an additional 240 samples were included, resulting in a total of 700 respondents. A total of 624 questionnaires were collected, with 591 valid responses. The valid response rate was 94.7%, ensuring the high quality and reliability of the sample data. The number of valid questionnaires exceeded the initial sample size requirement, further enhancing the representativeness of the research results and the reliability of statistical analysis. The sample included employees from different genders, ages, and

educational backgrounds, ensuring diversity and breadth. The distribution of the sample allows the study to encompass differences in work characteristics, emotional exhaustion, disengagement, and other aspects, providing valuable insights into work-to-home interference. Furthermore, to ensure the validity of the questionnaire data, all returned questionnaires were screened to exclude incomplete or erroneous responses. Through careful sample selection and questionnaire collection processes, this study ensured the representativeness of the data and the accuracy of the results.

DATA ANALYSIS

Descriptive analysis

This study focuses on the impact of job characteristics and job burnout on work-to-home interference, using Chinese university-applied piano teachers as an example. Therefore, the target population for this study is music teachers in Chinese universities. The questionnaire contains 46 items, and the minimum sample size should be 460. To compensate for potential shortcomings and improve the accuracy of the study results, 240 additional samples were included, resulting in a total of 700 samples. A total of 624 questionnaires were collected, with 591 valid responses.

Table 1. Basic sample information.

Basic information		Frequency	Percent
Gender	Male	289	48.9
	Female	287	48.6
	Prefer not to disclose	15	2.5
Age	25 years and below	251	42.5
	26-35 years	236	39.9
	43-45 years	64	10.8
	Above 45 years	40	6.8
Marital status	Single	289	48.9
	Married	287	48.6
	Widowed/Divorced	15	2.5
Education background	Undergraduate and below	31	5.2
	Master's degree	380	64.3
	Doctoral degree	180	30.5
Monthly income	Below 5500 RMB	97	16.4
	5501-7000 RMB	204	34.5
	7001-9500 RMB	173	29.3
	Above 9500 RMB	117	19.8
	Total	591	100.0

Table 2. Descriptive statistics for variables.

| Variables	Items	Mean	SD	Skewness	Kurtosis
	A1	3.528	0.802	-0.329	-0.421
	A2	3.088	1.013	0.304	-1.219
Job demands (JDS)	A3	3.396	0.882	-0.075	-0.785
	A4	3.350	0.925	-0.117	-0.999
	A5	3.095	0.948	0.444	-0.774
	B1	3.565	1.106	-0.686	0.029
	B2	3.760	1.159	-0.926	0.155
	B3	3.712	1.122	-0.845	0.191
	B4	3.538	1.001	-0.869	0.583
Decision latitude (DLE)	B5	3.535	1.039	-0.752	0.272
	B6	3.682	1.159	-0.696	-0.156
	B7	3.482	1.081	-0.596	0.042
	B8	3.513	1.130	-0.558	-0.204
	B9	3.663	1.066	-0.941	0.468
	C1	3.272	1.076	-0.034	-0.513
	C2	3.311	1.045	-0.095	-0.306
Supervisor support (SST)	C3	3.337	1.069	-0.017	-0.554
	C4	3.318	1.086	0.051	-0.622
	D1	3.636	1.026	-0.342	-0.380
	D2	3.467	0.973	-0.305	-0.160
Colleague support (CST)〉	D3	3.892	1.101	-0.603	-0.639
	D4	3.330	0.985	0.208	-0.584
	E1	2.386	1.228	0.422	-0.767
	E2	2.362	1.178	0.361	-0.759
	E3	2.081	1.193	0.864	-0.358
	E4	2.232	1.177	0.669	-0.455
Emotional exhaustion (EEN)	E5	2.054	1.246	0.899	-0.385
	E6	2.081	1.205	0.842	-0.298
	E7	2.212	1.024	0.851	0.143
	E8	2.000	1.185	1.031	0.041
	F1	2.301	0.897	0.899	1.555
	F2	2.257	1.068	0.931	0.676
	F3	2.279	0.984	1.100	1.385
	F4	2.308	0.986	1.149	1.485
Disengagement (DIS)	F5	2.428	1.066	0.538	0.167
	F6	2.059	1.112	1.116	0.832
	F7	2.249	1.039	1.310	1.587
	F8	2.022	1.019	1.576	2.467
	G1	2.541	1.029	0.408	-0.330
	G2	2.352	1.201	0.729	-0.392
	G3	2.316	1.027	0.657	0.037
	G4	2.399	1.117	0.734	-0.013
Work-to-home interference (WHI)	G5	2.496	1.114	0.424	-0.675
	G6	2.283	1.069	0.681	-0.182
	G7	2.685	1.038	0.749	0.235
	G8	2.437	0.890	1.184	1.621

Reliability analysis

This study performed a reliability analysis on the measurement items of various variables to evaluate the internal consistency of the questionnaire. The Cronbach's α coefficients for all research variables exceed 0.7, indicating good internal consistency across the variables in the questionnaire.

Table 3. Reliability analysis.

Variables	Items	Cronbach's α
Job demands (JDS)	5	0.809
Decision latitude (DLE)	9	0.938
Supervisor support (SST)	4	0.939
Colleague support (CST)	9	0.753
Emotional exhaustion (EEN)	8	0.958
Disengagement (DIS)	8	0.918
Work-to-home interference (WHI)	8	0.922

Validity analysis (CFA) - Correlation analysis

Job demands
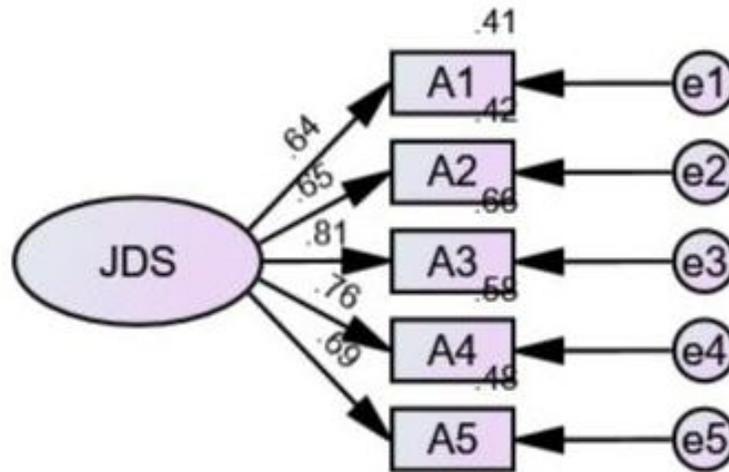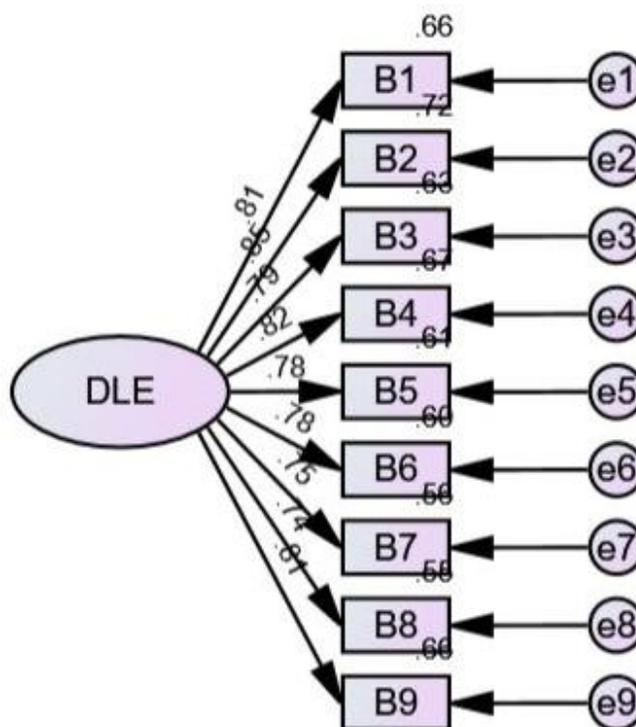

Figure 2.

Table 4. Fit indices for the job demands measurement model.

Fit index	Standard	Value	Fitting situation
χ2/df	1-3	2.833	Good
GFI	>0.8	0.990	Good
NFI	>0.8	0.987	Good
IFI	>0.8	0.991	Good
TLI	>0.8	0.983	Good
CFI	>0.8	0.991	Good
RMSEA	<0.08	0.056	Good

Table 5. Convergent validity for job demands.

| Variables	Items	Loading	CR	AVE
Job demands	A1	0.637	0.837	0.509
	A2	0.650		
	A3	0.813		
	A4	0.760		
	A5	0.692		

Decision latitude

Figure 3.

Table 6. Fit indices for the decision latitude measurement model.

Fit index	Standard	Value	Fitting situation
$\chi 2/df$	1-3	2.843	Good
GFI	>0.8	0.974	Good
NFI	>0.8	0.979	Good
IFI	>0.8	0.987	Good
TLI	>0.8	0.982	Good
CFI	>0.8	0.986	Good
RMSEA	<0.08	0.056	Good

Table 7. Convergent validity for decision latitude.

| Variables	Items	loading	CR	AVE
Decision latitude	B1	0.809	0.940	0.628
	B2	0.846		
	B3	0.792		
	B4	0.818		
	B5	0.781		
	B6	0.775		
	B7	0.749		
	B8	0.745		
	B9	0.810		

Supervisor support
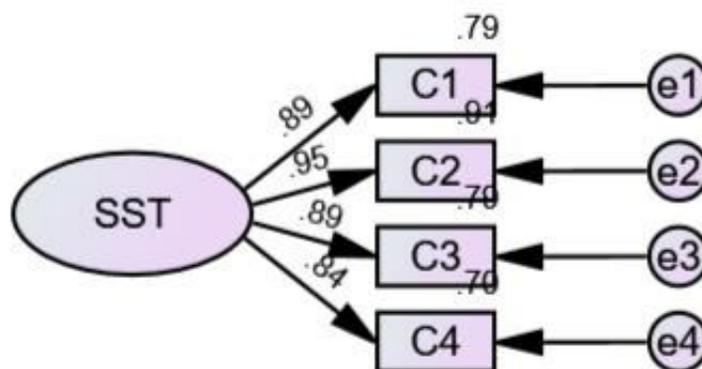
Figure 4

Table 8. Fit indices for the supervisor support measurement model.

Fit index	Standard	Value	Fitting situation
$\chi 2/df$	1-3	2.379	Good
GFI	>0.8	0.996	Good
NFI	>0.8	0.998	Good
IFI	>0.8	0.999	Good
TLI	>0.8	0.996	Good
CFI	>0.8	0.999	Good
RMSEA	<0.08	0.048	Good

Table 9. Convergent validity for supervisor support.

Variables	Items	Loading	CR	AVE
Supervisor support	C1	0.788	0.940	0.797
	C2	0.907		
	C3	0.787		
	C4	0.788		

Colleague support
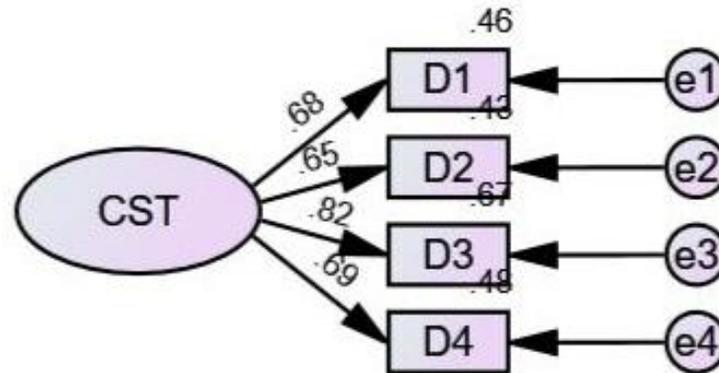
Figure 5

Table 10. Fit indices for the colleague support measurement model.

Fit index	Standard	Value	Fitting situation
χ2/df	1-3	1.957	Good
GFI	>0.8	0.997	Good
NFI	>0.8	0.995	Good
IFI	>0.8	0.997	Good
TLI	>0.8	0.992	Good
CFI	>0.8	0.997	Good
RMSEA	<0.08	0.040	Good

Table 11. Convergent validity for colleague support.

Variables	Items	Loading	CR	AVE
Colleague support	D1	0.677	0.804	0.508
	D2	0.653		
	D3	0.817		
	D4	0.692		

Emotional exhaustion

Table 12. Fit indices for the emotional exhaustion measurement model.

Fit index	Standard	Value	Fitting situation
χ2/df	1-3	2.648	Good
GFI	>0.8	0.985	Good
NFI	>0.8	0.989	Good
IFI	>0.8	0.993	Good
TLI	>0.8	0.991	Good
CFI	>0.8	0.993	Good
RMSEA	<0.08	0.053	Good
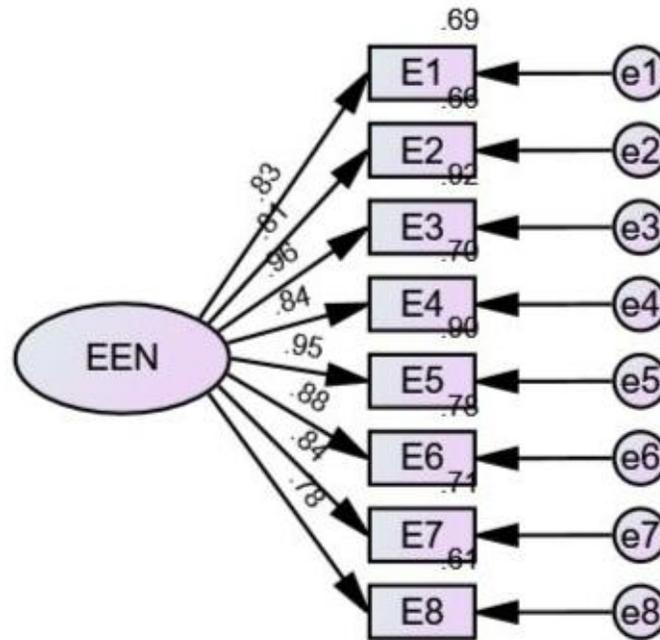
Figure 6

Table 13. Convergent validity for emotional exhaustion.

Variables	Items	loading	CR	AVE
Emotional exhaustion	E1	0.832	0.959	0.746
	E2	0.812		
	E3	0.958		
	E4	0.839		
	E5	0.950		
	E6	0.881		
	E7	0.843		
	E8	0.778		

Disengagement

Table 14. Fit indices for the disengagement measurement model.

Fit index	Standard	Value	Fitting situation
$\chi 2/df$	1-3	2.962	Good
GFI	>0.8	0.979	Good
NFI	>0.8	0.979	Good
IFI	>0.8	0.986	Good
TLI	>0.8	0.981	Good
CFI	>0.8	0.986	Good
RMSEA	<0.08	0.058	Good
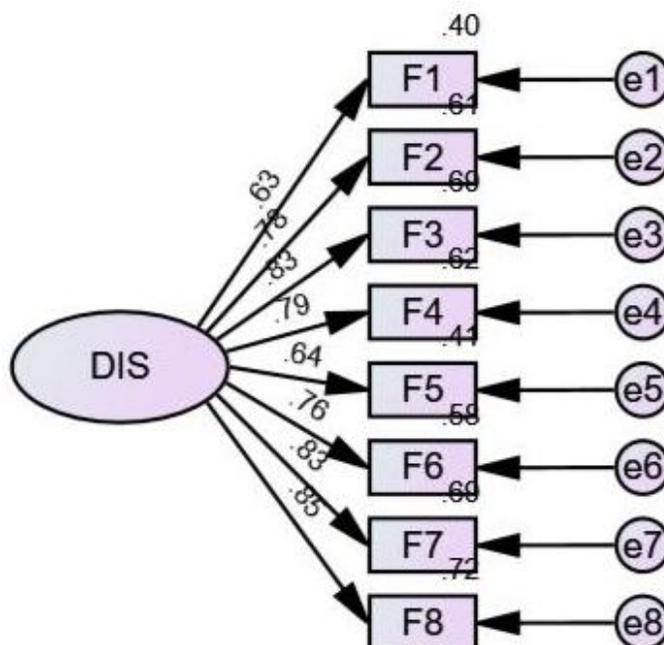
Figure 7

Table 15. Convergent validity for disengagement.

Variables	Items	Loading	CR	AVE
Disengagement	F1	0.629	0.919	0.590
	F2	0.783		
	F3	0.833		
	F4	0.789		
	F5	0.638		
	F6	0.759		
	F7	0.828		
	F8	0.850		

Work-to-home interference

Table 16. Fit Indices for the work-to-home interference measurement model.

Fit index	Standard	Value	Fitting situation
$\chi 2$/df	1-3	2.823	Good
GFI	>0.8	0.975	Good
NFI	>0.8	0.981	Good
IFI	>0.8	0.988	Good
TLI	>0.8	0.982	Good
CFI	>0.8	0.986	Good
RMSEA	<0.08	0.056	Good
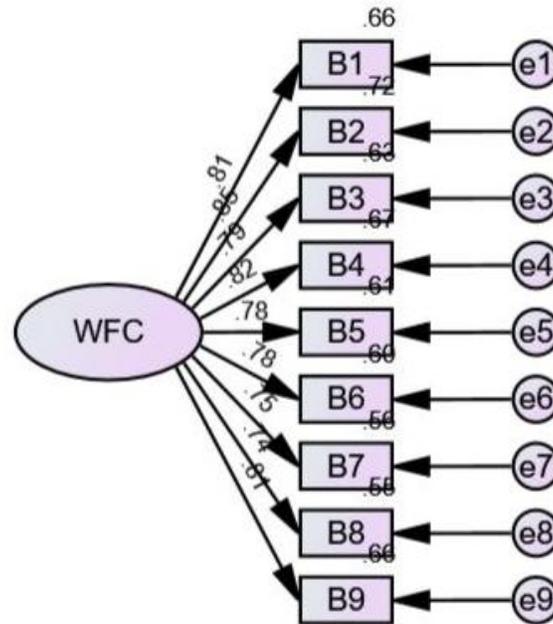
Figure 8

Table 17. Convergent validity for work-to-home interference.

Variables	Items	Loading	CR	AVE
Work-to-home interference	G1	0.754	0.924	0.606
	G2	0.744		
	G3	0.895		
	G4	0.854		
	G5	0.716		
	G6	0.799		
	G7	0.672		
	G8	0.768		

Correlation analysis and discriminant validity

Table 18 presents the correlation analysis and discriminant validity results for the study variables. The correlation coefficients are all significant and pass the test at the 0.001 level. The numbers in italics represent the reliability indicators (the square roots of AVE) for each variable.

Table 18. Correlation analysis and discriminant validity results.

Variables	JDS	DLE	SST	CST	EEN	DIS	WHI
JDS	0.712						
DLE	-0.319***	0.792					
SST	-0.213***	0.245***	0.893				
CST	-0.391***	0.343***	0.384***	0.713			
EEN	0.340***	-0.497***	-0.325***	-0.405***	0.864		
DIS	0.323***	-0.456***	-0.324***	-0.448***	0.482***	0.767	
WHI	0.347***	-0.454***	-0.343***	-0.447***	0.475***	0.657***	0.779

Structural equation modelling

The fit indices for the structural model analysis in Table 19 show that all the fit indices meet or exceed the standard requirements, indicating that the model performs well in all aspects and has a high degree of fit and explanatory power. These results demonstrate that the theoretical structure of the model closely aligns with the actual data, providing a solid foundation for the reliability of the research results.

Table 19. Structural model fit indices.

Fit index	Standard	Value	Fitting situation
χ2/df	1-3	1.888	Good
GFI	>0.8	0.878	Good
NFI	>0.8	0.912	Good
IFI	>0.8	0.957	Good
TLI	>0.8	0.954	Good
CFI	>0.8	0.957	Good
RMSEA	<0.08	0.039	Good

Path analysis

All research hypotheses were supported, with the results indicating that job demands, decision latitude, supervisor support, and colleague support all have significant effects on emotional exhaustion, disengagement, and work-to-home interference. The interrelationships among these variables further validate the model's effectiveness and provide theoretical support and data for understanding how the work environment influences teachers' psychological and behavioral states.

Table 20. Direct effect test results.

Hypothesis	Path relationship			UPC	SPC	S.E.	T-value	P	Results
H1a	JDS	→	EEN	0.275	0.145	0.077	3.550	***	Supported
H1b	JDS	→	DIS	0.132	0.125	0.045	2.937	**	Supported
H1c	JDS	→	WHI	0.116	0.081	0.055	2.101	*	Supported
H2a	DLE	→	EEN	-0.430	-0.402	0.044	-9.683	***	Supported
H2b	DLE	→	DIS	-0.205	-0.346	0.027	-7.653	***	Supported
H2c	DLE	→	WHI	-0.107	-0.132	0.035	-3.068	**	Supported
H3a	SST	→	EEN	-0.165	-0.165	0.038	-4.299	***	Supported
H3b	SST	→	DIS	-0.088	-0.159	0.022	-3.923	***	Supported
H3c	SST	→	WHI	-0.069	-0.092	0.028	-2.491	*	Supported
H4a	CST	→	DIS	-0.281	-0.207	0.058	-4.871	***	Supported
H4b	CST	→	EEN	-0.207	-0.275	0.035	-5.836	***	Supported
H4c	CST	→	WHI	-0.109	-0.106	0.043	-2.507	*	Supported
H5	EEN	→	WHI	0.087	0.116	0.031	2.782	**	Supported
H7	DIS	→	WHI	0.631	0.462	0.072	8.822	***	Supported

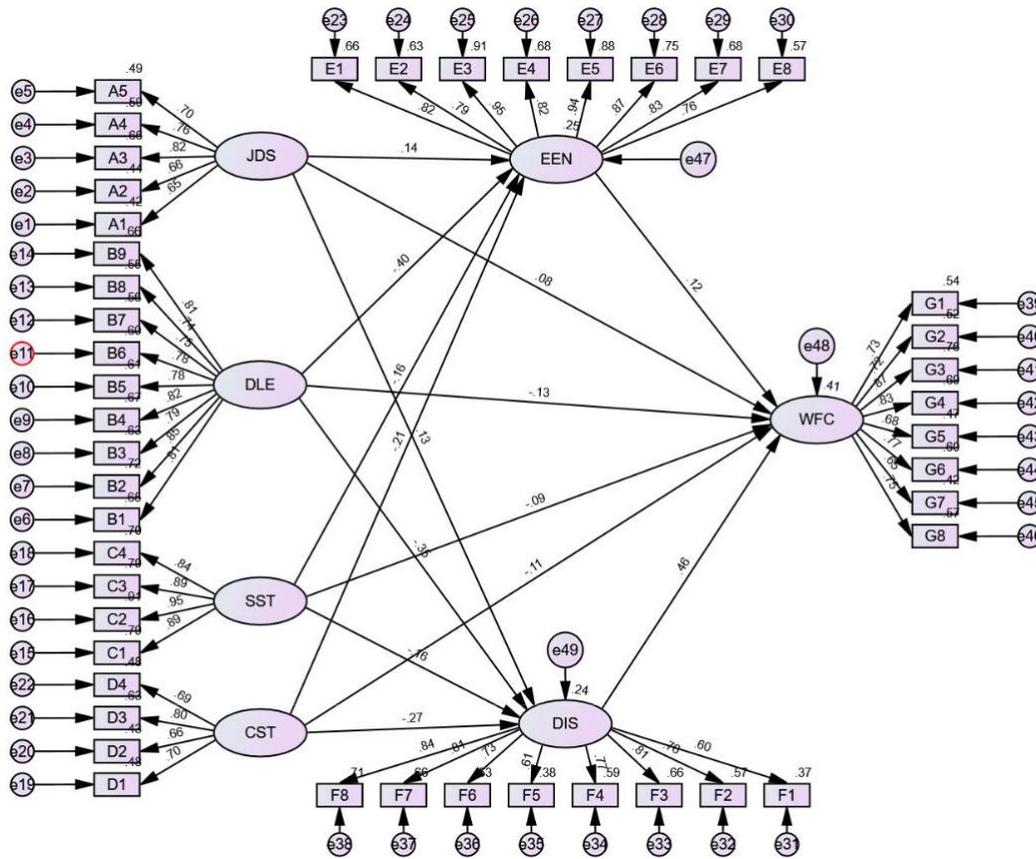Note: UPC: Unstandardized Path Coefficient; SPC: Standardized Path Coefficient.

Figure 9

Mediating effect analysis

The mediating effects for all hypotheses were supported, with results indicating that job demands, decision latitude, supervisor support, and colleague support have a significant indirect effect on work-to-home interference through emotional exhaustion and disengagement. These results further validate the model's effectiveness and provide theoretical support and data for understanding the indirect influence of the work environment on teachers' psychological and behavioral states.

Table 21. Mediating effect test results.

Hypothesis	Indirect path	Impact coefficient	SE	LLCI	ULCI	P
H6a	JDS -> EEN -> WHI	0.024	0.004	0.051	1.977	0.048
H6b	DEL -> DIS -> WHI	-0.128	-0.189	-0.077	4.436	0.000
H6c	JDS -> DIS -> WHI	0.084	0.011	0.165	2.121	0.034
H6d	CST -> DIS -> WHI	-0.130	-0.195	-0.066	4.049	0.000
H8a	DEL -> EEN -> WHI	-0.037	-0.067	-0.008	2.464	0.014
H8b	SST -> EEN -> WHI	-0.014	-0.030	-0.003	2.108	0.035
H8c	SST -> DIS -> WHI	-0.056	-0.093	-0.021	3.019	0.003
H8d	CST -> EEN -> WHI	-0.024	-0.049	-0.005	2.113	0.035

DISCUSSION

This study explored the relationships between job characteristics, job burnout, and work-to-home interference, particularly focusing on the impact within the specific group of university music teachers in Guangdong Province, China. The findings reveal that work characteristics, including job demands, decision latitude, supervisor support, and colleague support, have a significant impact on emotional exhaustion, disengagement, and work-to-home interference. These findings are consistent with existing literature and further validate the effectiveness of the Job Demands-Resources (JD-R) model and the Work-Family Conflict theory. First, the results show a significant positive correlation between job demands and emotional exhaustion, disengagement, and work-to-home interference. This is consistent with Zhang and Zhu (2022), indicating that high-intensity job demands can lead to emotional depletion and disengagement from work, thus intensifying the conflict between work and family roles. Additionally, an increase in decision latitude plays a crucial role in alleviating emotional exhaustion and disengagement, in line with the conclusions of Bakker and Demerouti (2023), suggesting that decision autonomy can reduce stress in high-demand environments, thereby decreasing work-to-home interference. Secondly, the role of supervisor support and colleague support has also been validated. Supervisor support effectively reduces emotional exhaustion and disengagement, thereby minimizing work-to-home interference. This finding aligns with Swanzy (2020) and Tarek et al. (2025), suggesting that supervisor care and feedback help employees balance work and family life. Furthermore, colleague support plays a positive role in mitigating work-to-home interference, especially in high-pressure work environments, where good teamwork helps reduce the negative impact of work stress on family life. Finally, emotional exhaustion and disengagement, as mediating variables, play a key role in moderating the relationship between job demands, decision latitude, supervisor support, colleague support, and work-to-home interference. These findings are consistent with Bakker et al. (2023), indicating that emotional exhaustion and disengagement are important psychological mechanisms in the generation of work-to-home interference.

Conclusion

Through the analysis of the relationships between job characteristics, job burnout, and work-to-home interference, this study reaches several important conclusions. First, there is a significant positive correlation between job demands, emotional exhaustion, disengagement, and work-to-home interference.

Specifically, excessive job demands lead to emotional depletion, which causes disengagement from work and intensifies the conflict between work and family life. Second, decision latitude, as an important work resource, helps alleviate emotional exhaustion and disengagement, thus reducing work-to-home interference. High decision latitude allows employees to better adjust their work pace and task allocation, reducing their sense of stress. Furthermore, supervisor support and colleague support play a positive role in mitigating job burnout and work-to-home interference. Supervisor support helps employees better cope with work stress, enhances work engagement, and reduces disengagement, while colleague support helps employees balance work and family role conflicts. Finally, emotional exhaustion and disengagement act as mediating variables, playing a crucial moderating role in the relationship between job demands, decision latitude, supervisor support, colleague support, and work-to-home interference. These conclusions provide a theoretical basis for work management and psychological support in the education sector, particularly for university teachers.

Implications

This study provides important insights for both theoretical research and practical applications. From a theoretical perspective, this study extends the Job Demands-Resources (JD-R) model and the Work-Family Conflict theory, particularly in the context of the education sector. The findings indicate that emotional exhaustion and disengagement, as mediating variables, play a critical role in the relationship between job characteristics and work-to-home interference, offering new perspectives for future research on the psychological mechanisms and relationships between job characteristics. From a practical perspective, the study reveals the profound impact of work characteristics on employees' mental health and work-life balance. University administrators can mitigate teachers' job burnout and promote better work-family balance by optimizing job demands, increasing decision latitude, and providing more effective supervisor and colleague support. Especially in high-stress environments, providing more social support and autonomy helps improve teachers' job satisfaction and well-being. Finally, based on the results of this study, policies can be formulated to optimize work environments, such as offering flexible work schedules and enhancing the support system, to help teachers effectively manage the pressure between work and family and improve overall work performance and quality of life.

Limitations and future research

Although this study provides valuable theoretical support

and practical insights for understanding the relationships between job characteristics, job burnout, and work-to-home interference, it still has several limitations. First, the study focuses solely on music teachers in universities in Guangdong Province, China, and the regional and industry limitations may affect the generalizability of the results. Future research could consider expanding the sample to include teachers from different regions, academic disciplines, and even educators from other countries to verify the broad applicability of the research findings. Second, the study used cross-sectional data, which, while revealing the correlations between variables, does not explore causal relationships. Future studies could use longitudinal research designs to further explore the dynamic changes and causal pathways between job characteristics, job burnout, and work-to-home interference. Additionally, this study primarily focused on emotional exhaustion and disengagement as mediating variables. Future research could further explore other potential mediating variables, such as psychological resilience and work meaningfulness, to uncover additional psychological mechanisms. Finally, future research could also explore how work characteristics affect employees' mental health and family-life balance in different workplaces and professions, providing more perspectives for cross-industry and cross-cultural comparative studies.

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