

# Impact of Environmental Uncertainty on Depression and Anxiety Among Chinese Workers: A Moderated Mediation Model

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**Purpose:** Environmental uncertainty has reached unprecedented levels in recent years. While there is substantial knowledge about the connection between environmental uncertainty and organizational outcomes, limited attention has been devoted to investigating its impact on employees' depression and anxiety symptoms. Grounded in job demands-resources theory, this study aims to explore the relationship between environmental uncertainty and employees' depression and anxiety symptoms, and it further investigates the mediating role of work pressure and the moderating role of union practices.

**Methods:** In September 2022, we undertook a cross-sectional survey study, gathering data from 1081 employees across various enterprises situated in Liaoning, China. Throughout this timeframe, notable global occurrences heightened the awareness of environmental uncertainty. Following the exclusion of participants who did not provide information on the main variables, the final valid sample comprised 940 employees. To test all hypotheses, a series of confirmatory factor analyses and path-analytic procedures were conducted using Mplus 7.0.

**Results:** Our results confirm that environmental uncertainty, as a high job demand, increases employees' work pressure, thereby elevating rates of anxiety and depression; the indirect relationship between environmental uncertainty and employees' anxiety and depression through work pressure is stronger when union practices are lower.

**Conclusion:** Our findings indicate the detrimental impact of environmental uncertainty on employees' mental health, and highlight the roles of work pressure and union practices. In light of this, organizations should take steps to mitigate employees' perceptions of environmental uncertainty and establish mental health programs, in cooperation with union practices, to protect employees' mental well-being.

**Keywords:** environmental uncertainty, anxiety, depression, union practices, work pressure

## Introduction

The World Uncertainty Index highlights an unprecedented surge in environmental uncertainty in recent years, primarily driven by factors such as the COVID-19 pandemic, heightened trade competition, and economic recessions,<sup>1</sup> all with the potential for prolonged impact. Amid these circumstances, uncertainty and its ramifications have become prominent issues across a variety of fields, including economics,<sup>2,3</sup> organizational behavior,<sup>4,5</sup> and public health.<sup>6-9</sup> Although this work has generated important insights, researchers maintain that there is little evidence concerning a more sophisticated understanding of the different forms and meanings of uncertainty, signalling a pressing need for deeper theoretical and empirical investigation.<sup>10</sup> In the current research, we posit that paying attention to environmental uncertainty is of particular significance, since how it is managed has significant implications for the survival of organizations and the well-being of employees amidst this era of unparalleled challenges.

Researchers have noted that the topic of environmental uncertainty has been studied less often, and rarely from the perspective of employees.<sup>11,12</sup> Most studies have focused on the effects this uncertainty has on organizations.<sup>13–17</sup> In the face of this macro-level uncertainty and unpredictability, organizations are grappling with an increased sense of crisis or urgency. This heightened awareness prompts proactive measures, encompassing organizational cost-cutting,<sup>18</sup> the pursuit of innovative strategies,<sup>19</sup> and the adoption of a diverse range of performance metrics,<sup>20</sup> to meet changing performance requirements and effectively respond to the globally perceived uncertainty. Yet, there is a noticeable gap in the research concerning how environmental uncertainty affects employees. This area is deemed significant for further exploration. Given the interconnectedness of an organization's external and internal environments, fluctuations in the external environment inevitably impact all employees. Moreover, the organizational response is inherently a collective response from its members, as it is the individuals within the organization who authentically perceive environmental stimuli and shape responses accordingly.<sup>21</sup> Therefore, our research aims to delve into the impact of environmental uncertainty from the employees' viewpoint, which not only underscores the importance of understanding how external changes influence the perceptions and reactions of individuals within organizations but also adds to the existing body of literature.

Within the workplace, environmental uncertainty is defined as “employees' perceived inability to predict their organization's environment accurately”.<sup>22</sup> This definition characterizes environmental uncertainty as a perceptual phenomenon and, thus, is inherently “in the eye of the beholder”.<sup>19</sup> Previous studies often consider uncertainty as a trigger for various negative mental health outcomes.<sup>23–25</sup> However, very few studies have delved into the in-depth association between environmental uncertainty and mental health, especially amid the period of macro-level uncertainty and unpredictable change. Given that mental health problems stand out as a leading cause of disability among the working population, imposing substantial financial costs,<sup>26,27</sup> we believe it is imperative to investigate the relationship between environmental uncertainty and employees' mental health.

Adopting the principles of job demands-resources (JD-R) theory, we aim to provide insights into this issue. According to JD-R theory,<sup>28</sup> job characteristics can be classified into job demands and job resources; job demands are aspects of the job that require continuous physical or mental effort (costs), which may evolve into job stressors, eliciting negative outcomes; job resources are aspects of the job that help accomplish work goals, encourage personal development and growth, and can buffer the adverse effects of job demands. Applying this logic to our research setting, we argue that environmental uncertainty can be considered a high job demand that intensifies work pressure for employees, thereby contributing to their poor mental health by increasing levels of depression and anxiety. Considering that trade unions in the majority of organizations in China often provide moderate and trustworthy resources to employees and play a crucial role in protecting employees' interests,<sup>29,30</sup> we propose that union practices are an effective resource that could mitigate the effects of environmental uncertainty on work pressure and poor mental health.

## Theory and Hypotheses

### The Mediating Role of Work Pressure

Environmental uncertainty arises when employees recognize their inability to predict changes in the organizational environment or its components.<sup>22</sup> This uncertainty can manifest in several ways, including technological uncertainty regarding the future direction and application of technology in current development projects for products and services;<sup>22,31</sup> the inability to accurately predict government policy or regulatory changes; economic uncertainty stemming from macro phenomena such as global financial crises, changing consumer preferences, political turmoil and international oil price shocks;<sup>32,33</sup> the changing social norms and expectations regarding product and service preferences, among others.<sup>4,34</sup> Researchers maintain that environments perceived as highly uncertain and turbulent are characterized by rapid change, high risk, a lack of assurance, and a need for greater flexibility and dynamic responsiveness,<sup>35</sup> where even a few mistakes could lead to significant consequences. Obviously, environmental uncertainty can be seen as a high job demand and would tend to elicit employees' higher level of work pressure. And in these environments, employees find it challenging to plan and work by relying on established routines and habitual actions. Instead, they may strive or be coerced to enhance their sensitivity and response ability to environmental changes in an attempt to complete production tasks and work assignments for organizational competitive advantages. Due to the lack of information about future

environmental events, employees attempt to invest significant time and energy in vigilantly monitoring the environment for signals or cues, effectively synthesizing information, quickly refreshing their cognitive knowledge of frequently changing tasks, and responding rapidly to changes.<sup>4,22,36</sup> This process can drain employees' psychological and physical energy, consequently contributing to higher work pressure.

Work pressure is a product of "the subjective assessments of any situation beyond one's psychological and physiological conditions".<sup>37</sup> Researchers maintain that work pressure is a highly individualized response to one's unique circumstances,<sup>38</sup> illustrating it as a form of hardship or adversity that depletes an individual's coping mechanisms, supports, and available resources.<sup>39</sup> Lu, Yu, Zhao, and Jenkin point out that work pressure encompasses mental, physical, emotional and attitudinal fatigue.<sup>40</sup> Specifically, faced with high intensity and workload pressure, individuals often engage in speeding up, multitasking, working overtime and micromanaging their schedules as coping strategies. While such strategies may be temporarily effective, they ultimately lead to physical exhaustion and the erosion of mental health resources.<sup>41–43</sup> Moreover, these strategies also hinder opportunities to engage in essential restorative practices, such as leisure activities and park walks, inhibiting the replenishment of crucial resources and causing a significant depletion of psychic energy.<sup>42,44–46</sup> With sustained high work pressure, employees' mental health deteriorates, manifesting in heightened levels of depression and anxiety. Previous studies have demonstrated the association between work pressure and an increased risk of depression and anxiety.<sup>6,40,47,48</sup> Thus, we propose:

H1: Work pressure mediates the relationships between environmental uncertainty and employees' depression and anxiety.

## The Moderating Role of Union Practices

There is widespread agreement that Chinese unions play a crucial role as a vital bridge and connection between employees and enterprises, aiming primarily to foster harmonious coexistence and ensure mutual gains for both parties.<sup>49–53</sup> In China, union practices encompass three primary functions: coordinating labour relations, caring for employees' lives, and carrying out recreational activities.<sup>30</sup> For employees, unions are seen as pivotal in championing their interests and providing essential institutional support,<sup>49,50,52–55</sup> acting as valuable resources that mitigate the impact of environmental uncertainty on work pressure.

More specifically, coordinating labour relations emphasizes cooperation for the common development of employees and the enterprise through a wide range of activities, such as supervising the implementation of labour laws, promoting communication among employees and the enterprise, and encouraging employees to consciously participate in production and management to meet business objectives,<sup>49,50</sup> which is conducive to creating a transparent working environment.<sup>49</sup> In this context, employees may obtain clearer information about their organization's external environment and relevant strategic decisions. Consequently, they spend less time scanning and synthesizing information, resulting in lower work pressure. Furthermore, unions adopt a paternalistic approach to care for employees' lives, addressing aspects such as health, welfare and family support.<sup>49,56,57</sup> Despite their seemingly trivial nature, these practices, such as providing assistance to families in difficulties and offering mental health consultations,<sup>30,56,57</sup> play a crucial role in improving employees' subjective well-being and enhancing their personal energy.<sup>49,57</sup> This, in turn, equips them to better cope with environmental uncertainty. Additionally, by organizing a variety of cultural, artistic, recreational activities, including sports competitions and a series of lectures on skills training, unions foster a sense of camaraderie and enhance employees' capabilities. This supportive network and improved skill set empower employees to more effectively manage work tasks and challenges posed by environmental uncertainties, thereby reducing perceived work pressure.

By way of contrast, when employees perceive unions as ineffective in addressing their needs and safeguarding their rights and interests, it often indicates that workplace union organizations are either "empty-shell unions" lacking substantive effectiveness or "bosses unions" wholly dominated by management.<sup>58–60</sup> Alternatively, it may reflect a general lack of participation in union activities. Under these circumstances, in response to environmental uncertainty, employees experience greater uncertainty and a sense of powerlessness due to the lack of useful resources from a lower level of union engagement,<sup>61</sup> making them more likely to perceive higher work pressure. Therefore, we propose:

H2: Union practices moderate the relationship between environmental uncertainty and work pressure such that the relationship is stronger when union practices are lower.

## Integrated Model

From the above analysis, we thus construct a moderated mediation model in which union practices moderate the relationship of environment uncertainty with depression and anxiety through work pressure (see Figure 1). Employees experiencing high levels of union practices tend to better understand their organization's external environment and tackle work tasks and challenges more adeptly. When confronted with environmental uncertainty, they have access to numerous resources that help alleviate work pressure, resulting in fewer symptoms of anxiety and depression. Conversely, those with limited involvement in union practices, due to a scarcity of resources, are more vulnerable to the impacts of environmental uncertainty. They are likely to endure higher levels of work pressure, culminating in more severe symptoms of depression and anxiety. We propose:

H3: Union practices moderate the indirect relationship between environmental uncertainty and employees' anxiety and depression through work pressure, such that the indirect relationship is stronger when union practices are lower.

## Methods

### Participants

In September 2022, we conducted a cross-sectional survey study, collecting data from 1081 employees in several enterprises located in Liaoning, China. During this period, the management of COVID-19 prevention and control in China intensified due to an increased risk of localized outbreaks and the potential for cases to spread across regions. To address these challenges, China's central government enacted a range of restrictive measures. While crucial for public health, these actions inadvertently slowed economic growth. Additionally, global factors such as trade disputes and economic recessions have injected a new level of uncertainty and volatility into society, significantly influencing various aspects of daily life and organizational development. Amid these conditions, environmental uncertainty emerged as a paramount concern. It becomes pertinent, therefore, to investigate how this uncertainty is perceived by employees and its effects on their mental well-being. The choice of Liaoning Province for our study was strategic, utilizing a convenience sampling technique. The province hosts a diverse array of enterprises, including large state-owned companies, renowned international corporations, private firms, and public institutions. This variety ensures a rich diversity in our sample and enhances the relevance and applicability of our survey findings.

Ethical approval for the survey (No. 202205310061) was granted by the ethics committee. Before distributing the survey questionnaire, staff from the trade union of each company randomly selected and organized employees from state-owned enterprises, foreign enterprises, private enterprises and public institutions to participate in our survey. At the survey's commencement, all individual participants in our research provided verbal informed consent. We informed them of our research aims, assured them that their responses would be used exclusively for our research, and emphasized the importance of providing truthful answers. After excluding participants who failed to provide information on the main variables, the final valid sample consisted of 940 employees.

Within this sample, employment distribution showed that 21.0% of the participants were employed in state-owned enterprises, 51.4% were affiliated with foreign companies, 14.8% worked in private enterprises, and 12.8% were part of public institutions; the gender distribution was 44.1% male and 55.9% female; regarding age, 0.2% were 20 years or younger, 14.0% fell within the 21–30 age bracket, 45.0% were aged 31–40, 34.4% were in the 41–50 age range, and

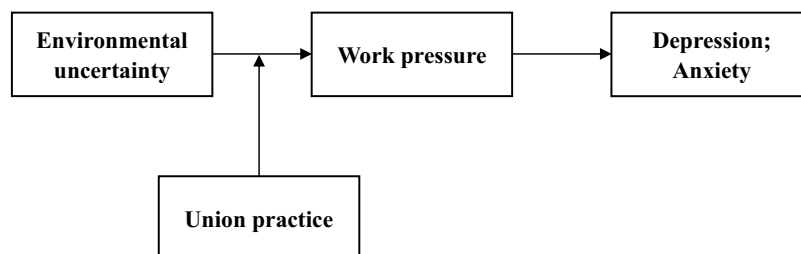


Figure 1 Theoretical model.

6.4% were 50 years or older; in terms of education background, 38.2% had attained a high school education or less, 24.9% had completed a college diploma, 34.1% held a bachelor's degree, and 2.8% had obtained a master's degree or higher; in terms of job tenure, 3.7% had been in their current position for less than 2 years, 4.8% for 3–5 years, 14.1% for 6–10 years, 19.6% for 11–15 years, 26.3% for 16–20 years, and 31.5% had tenure of more than 21 years.

## Measures

The survey items were originally in English except for the union practices scale. We translated the scale items from English to Chinese following the standard back-translation procedure. All questionnaire items can be found in [Appendix 1](#).

### Environmental Uncertainty

We measured environmental uncertainty with 4 items from Jung et al to assess participants' perceptions of environmental uncertainty in terms of economic, technological, political/regulatory and social factors.<sup>34</sup> The measure has been used and validated in China.<sup>4</sup> Each item was rated on a 7-point scale (from 1 = very stable to 7 = very dynamic). Four items were aggregated and averaged to derive the perception of environmental uncertainty, where higher scores reflect an elevated level of perceived environmental uncertainty. In the present study, the Cronbach's alpha was 0.94.

### Union Practices

We used the 13-item scale developed by Zhang et al to measure union practices in the Chinese context.<sup>30</sup> This measure has excellent reliability and possesses a high level of validity.<sup>49</sup> Each item was rated on a 7-point scale (from 1 = strongly disagree to 7 = strongly agree). The variable of union practices was determined by averaging all items, where higher scores signify greater support for employees from the union. Cronbach's alpha for the present study was 0.98.

### Work Pressure

Work pressure was assessed with a 4-item measure developed by Bakker,<sup>62</sup> which has been used in previous research investigating work pressure.<sup>63,64</sup> Each item was rated on a 5-point scale (from 1 = never to 5 = very often). All the items were summed and averaged to obtain the level of work pressure, with a higher score indicating a greater level of work pressure. Cronbach's alpha for the current study was 0.88.

### Depression

We used the 9-item Patient Health Questionnaire (PHQ-9) developed by Kroenke et al and added up responses of all items to assess depressive symptoms.<sup>65</sup> Employees were asked to rate how often symptoms bothered them in the past 2 weeks (from 0 = not at all to 3 = nearly every day). Several studies have used this scale that has been shown to have good reliability and validity.<sup>66–68</sup> The overall score is calculated by summing the scores of each item, where a higher score indicates a higher level of depression. Cronbach's alpha in our study was 0.87.

### Anxiety

We adopted the 7-item Generalized Anxiety Disorder (GAD-7) tool developed by Spitzer et al and added up the scores of each item to assess anxiety symptoms in the past 2 weeks.<sup>69</sup> GAD-7 has been widely used with good psychometric property.<sup>70–72</sup> Each item was rated on a 4-point scale (from 0 = not at all to 3 = nearly every day). The summed score ranges from 0 to 21 and the higher the total score, individual's anxiety symptoms are more serious. Cronbach's alpha for the present study was 0.92.

### Control Variables

We controlled for participants' gender, age, education, and organizational tenure.

## Analytic Strategy

We adopted three different tests to estimate the common method variance utilizing Mplus7.0 and SPSS20.0. Then, we conducted a series of confirmatory factor analyses (CFAs) with Mplus7.0 to examine the distinctiveness of the variables measured in the study. Finally, path-analytic procedures were performed to test all hypotheses using Mplus7.0.

## Results

### Assessment of Common Method Bias

Initially, we employed Harman Single Factor technique,<sup>73</sup> revealing that the single factor accounted for 34.93% of the variance, which is less than the 50% threshold commonly used to suggest a significant bias. Subsequently, we applied common latent factor analysis, following the methodology proposed by Eichhorn<sup>73</sup> and further supported by prior studies.<sup>74–76</sup> This approach involved creating a new latent variable linked to all manifest items, with all paths to be equal and the variance of the new latent variable to be one. The results indicated that the common latent factor explained 5.76% of variances. Furthermore, we assessed the goodness-of-fit statistics of the single factor model, yielding the following results:  $\chi^2 = 17,002.44$ ,  $df = 629$ , comparative fit index (CFI) = 0.50, non-normed fit index (NNFI) = 0.47, root-mean square error of approximation (RMSEA) = 0.166, standardized root-mean square residual (SRMR) = 0.203, indicating that the single factor model did not good fit with the data. Given the outcomes of these three analytical procedures, we conclude common method bias does not pose a significant concern in our study.

### Confirmatory Factor Analyses

We conducted confirmatory factor analyses to test the measurement model specifying environmental uncertainty, work pressure, union practices, depression and anxiety as separate factors. As shown in Table 1, the hypothesized five-factor model [ $\chi^2 = 4367.80$ ,  $df = 619$ , CFI = 0.89, NNFI = 0.88, RMSEA = 0.080, SRMR = 0.038] fit the data better than other models. The CFA results indicate support for the hypothesized five-factor model and, therefore, the distinctiveness of the variables in this study.

### Descriptive Statistics

Table 2 presents the means, standard deviations, and zero-order Pearson correlations for all key variables in this study. Environmental uncertainty was positively correlated with work pressure ( $r = 0.18$ ,  $p < 0.01$ ), anxiety ( $r = 0.24$ ,  $p < 0.01$ ) and depression ( $r = 0.27$ ,  $p < 0.01$ ); work pressure was positively correlated with anxiety ( $r = 0.26$ ,  $p < 0.01$ ) and depression ( $r = 0.25$ ,  $p < 0.01$ ). These results provided initial support for our hypotheses.

### Hypothesis Testing

Then, we conducted path-analytic regression to test H1, that is, work pressure mediates the effects of environmental uncertainty on depression and anxiety. In support of H1, the results indicate that the indirect relationship between environmental uncertainty and outcomes via work pressure was significant (for depression, indirect effect = 0.10, with a 95% CI of [0.05, 0.16]; for anxiety, indirect effect = 0.10, with a 95% CI of [0.05, 0.17]).

**Table 1** Results of Confirmatory Factor Analyses

Models	$\chi^2$	$df$	CFI	NNFI	RMSEA	SRMR
<b>The hypothesized model:</b> Five factors	4367.80	619	0.89	0.88	0.080	0.038
<b>Four factors model:</b>						
Combined depression and anxiety	4714.86	623	0.87	0.87	0.084	0.041
Combined environmental uncertainty and work pressure	7911.10	623	0.78	0.76	0.112	0.111
Combined work pressure and depression	6138.81	623	0.83	0.82	0.097	0.063
Combined work pressure and anxiety	6157.99	623	0.83	0.82	0.097	0.064
<b>Three factors model:</b>						
Combined work pressure, depression and anxiety	6502.16	626	0.82	0.81	0.100	0.060
Combined environmental uncertainty and work pressure, combined depression and anxiety	8253.85	626	0.77	0.75	0.114	0.112
<b>One factor model:</b> Combined all	17,002.44	629	0.50	0.47	0.166	0.203

Note:  $N = 940$ .



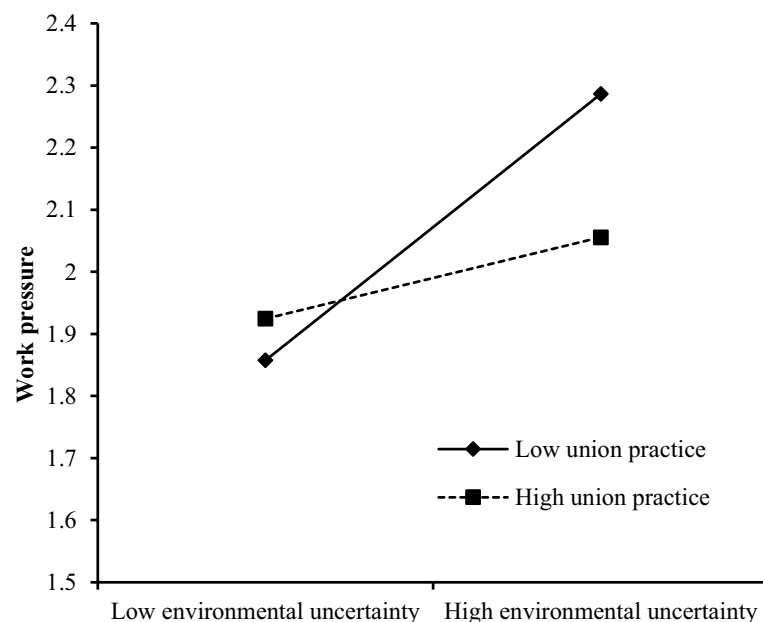
**Table 2** Means, Standard Deviations and Correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. Gender	1.56	0.50	1								
2. Age	3.33	0.80	0.03	1							
3. Education	2.01	0.91	-0.06	-0.13**	1						
4. Tenure	4.54	1.38	0.14**	0.76**	-0.25**	1					
5. Environmental uncertainty	2.74	1.41	-0.03	-0.05	0.08*	-0.01	(0.94)				
6. Union practice	5.28	1.46	-0.02	0.04	0.01	0.02	-0.38**	(0.98)			
7. Work pressure	2.72	0.91	0.08*	0.00	0.08*	0.06	0.18**	-0.11**	(0.88)		
8. Anxiety	4.06	3.98	0.02	-0.09**	0.13**	-0.06	0.24**	-0.24**	0.26**	(0.92)	
9. Depression	5.63	4.17	0.02	-0.09**	0.06	-0.03	0.27**	-0.27**	0.25**	0.78**	(0.87)

**Notes:**  $N = 940$ . Gender: 1 = male, 2 = female; age: 1 = less than 20 years, 2 = 21–30 years, 3 = 31–40 years, 4 = 41–50 years, 5 = over 50 years; educational: 1 = a high school or below, 2 = a college diploma level, 3 = a bachelor's degree, 4 = a master's degree or above; and tenure: 1 = less than 2 years, 2 = 3–5 years, 3 = 6–10 years, 4 = 11–15 years, 5 = 16–20 years, 6 = more than 21 years. Alpha internal consistency reliability coefficients appear on the main diagonal. \* $p < 0.05$ , \*\* $p < 0.01$  (two-tailed).

H2 proposed that union practices moderate the relationship between environmental uncertainty and work pressure. To examine this hypothesis, we adopted path-analytic regression. The results revealed that the interaction of environmental uncertainty and union practices was significantly related to work pressure ( $\beta = -0.04$ ,  $p < 0.05$ ). To better understand the nature of the moderating effect, we plotted the interaction using Aiken and West's procedure of computing slopes one standard deviation above and below the mean of union practices.<sup>77</sup> Figure 2 shows that the interaction pattern is consistent with our hypothesis; that is, the relationship between environmental uncertainty and work pressure was stronger when union practices were lower (simple slope = 0.15,  $p < 0.001$ ) than when it was higher (simple slope = 0.05, *n.s.*). Thus, H2 was supported.

Path analysis was performed to test H3 (moderated mediation). As shown in Table 3, the indirect effect of environmental uncertainty on outcome variables via work pressure varied significantly across levels of union practices. Specifically, the indirect effect of environmental uncertainty on outcome variables via work pressure was stronger when union practices were low than when it was high. Hence, H3 was supported.

**Figure 2** Interaction of Environmental Uncertainty and Union Practice in Predicting Work Pressure.

**Table 3** Conditional Indirect Effects of Environmental Uncertainty on Outcomes

Outcome Variables	Moderator: Union Practices	Environmental Uncertainty (X)→Work Pressure (M)→Outcomes (Y)				
		Stage		Effect		
		First ( $P_{MX}$ )	Second ( $P_{YM}$ )	Direct ( $P_{YX}$ )	Indirect ( $P_{MX} P_{YM}$ )	95% CI of Indirect Effect
Depression	High (+1SD)	0.05 (0.03)	0.92*** (0.17)	0.68*** (0.11)	0.04 (0.03)	[-0.01, 0.10]
	Low (-1SD)	0.15*** (0.03)	0.92*** (0.17)	0.68*** (0.11)	0.14** (0.04)	[0.06, 0.22]
	Difference	-0.11* (0.05)	0.92*** (0.17)	0.68*** (0.11)	-0.10* (0.05)	[-0.20, -0.01]
Anxiety	High (+1SD)	0.05 (0.03)	0.92*** (0.16)	0.55*** (0.11)	0.04 (0.03)	[-0.01, 0.10]
	Low (-1SD)	0.15*** (0.03)	0.92*** (0.16)	0.55*** (0.11)	0.14** (0.04)	[0.06, 0.23]
	Difference	-0.11* (0.05)	0.92*** (0.16)	0.55*** (0.11)	-0.10* (0.05)	[-0.19, -0.01]

**Notes:** N = 940. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$  (two-tailed).  $P_{MX}$ : path from environmental uncertainty to work pressure;  $P_{YM}$ : path from work pressure to outcomes; and  $P_{YX}$ : path from environmental uncertainty to outcome variables. Table values are unstandardized regression coefficients and standard errors from the estimated model.  $\pm 1$  SD distinguishes high from low levels of union practices.

## Discussion

Building upon JD-R theory,<sup>28</sup> our study delved into the impact of environmental uncertainty on employees' work pressure and mental health (specifically, depression and anxiety) and further investigated the moderating role of union practices. The results indicated that environmental uncertainty has the potential to elevate employees' work pressure, consequently heightening the risk of depression and anxiety; union practices emerge as a valuable resource capable of preventing mental health from worsening. These insights hold significant implications for both theoretical understanding and practical applications.

## Theoretical Implications

First, this study extends the environmental uncertainty literature by foregrounding the ways employees' perceptions of environmental uncertainty can jeopardize their mental health. Previous research<sup>11,12</sup> has largely overlooked environmental uncertainty and has mainly concentrated on its connection with organizational outcomes at a macro level, ignoring its influence on employees' lives. In the current age of hyper-uncertainty, characterized by volatility, uncertainty, complexity, and ambiguity, it becomes imperative to deepen our understanding of environmental uncertainty's effects on individuals, particularly concerning mental health. From this perspective, our research contributes to the academic discourse by introducing a comprehensive conceptual framework that delineates the psychological mechanisms and contextual factors influencing how employees' perceptions of environmental uncertainty impact their mental health. Specifically, the results reveal that environmental uncertainty could elicit higher work pressure and thereby result in depression and anxiety among employees, in which union practices could weaken the relationship, providing new empirical evidence in support of the fact that employees' mental health is affected by environmental uncertainty. While there is robust evidence linking uncertainty to mental health issues, knowledge of the impact of environmental uncertainty on mental health remains relatively limited.

Additionally, there is a consensus that further research is needed to explore the nuances of the relationship between uncertainty and mental health. This necessitates examining various forms and interpretations of uncertainty, as well as the psychological processes and boundary conditions that modulate this relationship.<sup>10,78</sup> Therefore, although aligning with previous research indicating that uncertainty serves as a crucial variable affecting individuals' mental health,<sup>79</sup> the finding makes a significant contribution to the uncertainty literature, expanding the understanding of how uncertainty can affect individual well-being and underscoring the need for further investigation into this pressing issue.

Second, studies on environmental uncertainty have failed to reflect the underlying explanatory mechanism primarily due to a limited focus on individuals' mental health outcomes. In our study, we considered environmental uncertainty as a higher job demand and examined and verified the mediating role of work pressure. This approach allowed us to elucidate how environmental uncertainty is intricately linked with depression and anxiety, which adds to the sparse



existing literature regarding this issue. We contend that environmental uncertainty acts as a potent stressor for employees, and its coping requires more resources and challenges employees' capacity. This, in turn, triggers the perception of work pressure and significantly contributes to mental health issues.

Third, drawing upon JD-R theory,<sup>28</sup> the present study illuminates the boundary conditions under which environmental uncertainty leads to lower work pressure and reduced levels of depression and anxiety. The results suggest that union practices, as an effective resource, can provide support and protection to members and subsequently buffer the potential influence of environmental uncertainty on work pressure, depression and anxiety, which contributes to the domain of environmental uncertainty research, underscoring the critical role of union practices. Despite the acknowledged differences between Chinese unions and their counterparts in most industrialized nations, limited research has delved into the specific activities of Chinese unions and their impact on employee outcomes.<sup>49,50,80</sup> This gap persists even as China boasts a high rate of union membership.<sup>81</sup> Thus, there is a pressing need for further research to explore how uncertainty affects employee outcomes in the Chinese context. This study not only confirms the effectiveness of Chinese unions but also enriches the body of union literature by spotlighting their beneficial role in promoting employees' mental health, particularly in dynamic, perplexing, ambiguous environments, situations, or circumstances.

Finally, this study adds to the JD-R theory literature by identifying environmental uncertainty as an elevated job demand and emphasizing the importance of framing union practices as a valuable resource. Research on job demands has focused predominantly on employees' perceptions of their organizations' internal environment, including aspects such as supervisors' behaviors,<sup>82</sup> team climate,<sup>83</sup> and overload.<sup>84</sup> However, there has been a notable gap in understanding employees' perception of the organization's external environment. Considering the interdependence of an organization's external and internal environments, this study highlights that an uncertain external environment can function as a heightened job demand, a facet often overlooked in JD-R literature. Moreover, research on job resources tends to prioritize job characteristics, personal and organizational factors, while neglecting a significant source—union practices. This oversight is vital given that unions have demonstrated their effectiveness in the workplace.<sup>49,50,56</sup> In this sense, the present study has implications for the enrichment of the JD-R theory literature.

## Managerial Implications

Our research has yielded several implications for practice. First, recognizing the association between environmental uncertainty, work pressure, and adverse mental health outcomes, organizations should take steps to mitigate employees' perceptions of environmental uncertainty. Borrowing from uncertainty management theory<sup>85</sup> and the environmental uncertainty literature, organizations can proactively manage unknown and unpredictable aspects of their organizational environment. To this end, implementing a risk management framework tailored to address environmental uncertainties is paramount. This can involve creating a dedicated team responsible for engaging with external information sources through systematic environmental scanning. Such a team would actively seek out relevant information, meticulously evaluate and amalgamate disparate and even conflicting data, and devise swift responses to shifts in the environment. These responses could include forging alliances with other entities, diversifying the spectrum of products and services offered, improving the output and quality of innovation and continuously enhancing internal supervision mechanisms. Simultaneously, enhancing the transparency and efficacy of information disclosure practices is critical. This includes the timely release of transparent information for comprehensive decision-making and adaptation to changes, and sharing information that is beneficial to the organization. Additionally, organizations should not overlook the importance of providing tangible resources and support to their workplace,<sup>86</sup> such as allowances, managerial support and health insurance, which can significantly reduce the uncertainty employees may feel due to environmental fluctuations.

Second, given the ongoing global uncertainty, it is essential for organizations to establish mental health programs that include evidence-based interventions. These programs should focus on creating a robust mental health climate and providing additional mental health resources.<sup>26</sup> Such initiatives are crucial for preventing the deterioration of mental health due to environmental uncertainty and for enhancing employees' overall well-being. For instance, the enactment of mindfulness-based interventions<sup>87</sup> provide a valuable guidance on living in the moment and accepting feeling of chronic uncertainty,<sup>86</sup> which could reduce the level of work pressure and poor mental health.

Third, since union practices can provide resources to counterbalance the challenges posed by environmental uncertainty, trade unions in China, in cooperation with management, should organize more events to coordinate labour relations, care for employees' well-being, and engage in recreational activities. Coordinate labour relations could encompass exerting pressure on enterprises to disclose essential management information, ensuring transparency and fairness in management policies and procedures, motivating employees to offer suggestions for change, and advocating for the consideration of employees' reasonable proposals. These actions are instrumental in fostering an equitable and transparent work environment and in boosting employees' trust in management, thereby diminishing their perception of uncertainty. Beyond these measures, caring for employees' well-being and engaging in recreational activities are pivotal for enhancing their coping styles and psychological capital,<sup>88,89</sup> which contributes to reduce the adverse impact of environmental uncertainty and bolstering their mental health. This includes offering welfare assistance, such as improved wages and nonwage compensation, and implementing educational and training programmes to equip employees with relevant coping skills and knowledge, among other initiatives. Additionally, unions should encourage employees to voluntarily participate in union activities, which could, in turn, invigorate union dynamics and amplify union efficacy. By adopting these approaches, trade unions, in partnership with management, can play a crucial role in navigating the complexities of environmental uncertainty, thereby ensuring a more stable and supportive work environment for employees.

## Limitations and Future Research

The findings and implications of this study should be interpreted with caution. First, our cross-sectional research design raises concerns about common method biases and limits causal inferences. To address this, future research should attempt to alleviate common method bias by incorporating multisource data, and seek to rigorously test the causal reasoning among the variables by using a longitudinal or an experimental design. Second, while the results may be applicable to another period of environmental uncertainty in China, their generalizability should be approached with caution. For example, there is a common belief that union practices in China differ in various ways from those in Western countries,<sup>50,80</sup> and employees' perceptions of uncertainty vary across countries during specific times; for instance, the 2016 Brexit vote may have created more significant uncertainty for employees in Britain. Future studies should seek to replicate these findings in various periods and in different countries, which appears quite important because the World will continue to be confronted with such uncertainty threats over a prolonged period of time. Finally, we acknowledge that there is room for improvement in studies examining the relationship between environmental uncertainty and employees' mental health and suggest that future studies contribute to enhancing our understanding of this relationship.

## Conclusion

Nowadays, environmental uncertainty has introduced unprecedented challenges for both organizations and their employees. Despite its significance, existing research has largely neglected the impact of environmental uncertainty, focusing mainly on its association with organizational outcomes at a macro level and overlooking its effects on employee outcomes. Given the interdependence of an organization's external and internal environments, it is inevitable that employees perceive an uncertain external environment, which can significantly impact their well-being. Our research aims to investigate the effects of employees' perceptions of environmental uncertainty on their mental health. Utilizing the framework of job demands-resources (JD-R) theory, we argue that environmental uncertainty can increase employees' work pressure and then disturb their mental health by increasing depression and anxiety, which is moderated by union practices, such that the indirect effect of environmental uncertainty on depression and anxiety through the mediating role of work pressure is stronger when union practices are lower. Given that environmental uncertainty has emerged as a significant concern in September 2022, we performed a cross-sectional survey study at that time, collecting data from 940 employees across various enterprises located in Liaoning, China. The findings suggest that environmental uncertainty, as a heightened job demand, is associated with adverse mental health outcomes by arousing employees' higher work pressure; union practices, serving as a source of effective resources, play a crucial role in balancing the challenges posed by environmental uncertainty and preventing a decline in mental health. Overall, this research contributes to the environmental uncertainty literature by elucidating the detrimental effects of employees' perceptions of environmental uncertainty on their mental health, thereby advancing our understanding of this critical issue.

## Data Sharing Statement

The data that support the findings of the current study are available at: [https://osf.io/c7evt/?view\\_only=cb86ad81c49b4fd5a55c5cbc6fafdbbb](https://osf.io/c7evt/?view_only=cb86ad81c49b4fd5a55c5cbc6fafdbbb).

## Ethical Approval and Informed Consent

All research involving human participants adhered to the ethical guidelines of the relevant institutional and national committees, aligning with the 1964 Helsinki Declaration and subsequent amendments or comparable ethical standards. Ethical approval for the survey (No. 202205310061) was approved by the Beijing Normal University Ethics Committee. Verbal informed consent was obtained from all individual participants in accordance with this approval.

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## Disclosure

The authors declare that they have no conflicts of interest in this work.

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