



The Influence of Workplace Ostracism on Employees' Unsafe Behavior in the Post-epidemic Era: A Conditional Process Model

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Abstract. To explore the mechanism and boundary of the influence of workplace ostracism on unsafe behavior in the post-epidemic era, to effectively curb employees' unsafe behavior and reduce the occurrence of safety accidents. A conditional process model was constructed using 261 grassroots employees in high-risk industries as respondents, with workplace alienation as the mediating variable and environmental uncertainty as the moderating variable. The standardized regression equations were obtained: $Y = 0.245X + 0.076W + 0.052XW$, $M = 0.216X + 0.262W + 0.178XW$. The results of data analysis show that: workplace rejection positively influences unsafe behavior, work alienation plays a mediating role between workplace ostracism and unsafe behavior, and environmental uncertainty can not only positively regulate the relationship between workplace ostracism and work alienation, but also positively regulate the mediating role of work alienation in workplace ostracism and unsafe behavior. Effective management of workplace ostracism, work alienation, and environmental uncertainty can reduce unsafe behavior and the occurrence of safety accidents.

Keywords: Unsafe behavior · Workplace ostracism · Work alienation · Environmental uncertainty · Post-epidemic era · The conditional process model

1 Introduction

The National Conference on Emergency Management was held in Beijing on 5 January 2022, which pointed out that the number of safety accidents and fatalities in the country decreased by 11% and 5.9%, respectively, in 2021. It can be seen that with the gradual improvement of the conditions of unsafe facilities in China, the overall safety situation in China has significantly improved. Still, accidents do occur from time to time [1], and the casualties and economic losses caused by safety accidents still cannot be ignored. Surveys show that about 80% of safety accidents occur due to unsafe behavior, and only 10% are caused by unsafe conditions [2]. For example, the “4.9” poisoning and asphyxiation accident in Erenhot Municipal Community sewage lifting pump station and the “1.20” falling accident in Chemical branch of Zhongtianhechuang Energy Co., Ltd.

Were all caused by employees' unsafe behaviors. Reducing the occurrence of unsafe behavior is conducive to effectively curbing the event of safety accidents [3]. Therefore, it is of great theoretical significance and practical value to explore how to reduce the unsafe behavior of employees to effectively reduce the occurrence of safety accidents and ensure the safe production of enterprises.

Current research on employees' unsafe behavior focuses on individual characteristics, psychological factors, and leadership styles, while there are relatively few researches on interpersonal factors in the workplace. As we all know, workplace ostracism is a common interpersonal conflict within organizations, mainly in Chinese organizations that emphasize 'subtlety' and 'invisibility'. Workplace ostracism is a form of cold violence in which employees feel ignored, excluded, or isolated by other members of the workforce [4]. It was first proposed by Williams in 1997. In 2010, Wu Longzeng and Liu Jun confirmed the existence of workplace ostracism in Chinese organizations through a survey of internet users [5]. Since this concept was proposed, scholars at home and abroad have paid extensive attention to it. Ferris et al. pointed out that workplace ostracism negatively affects employees' work attitudes [4] and satisfaction [6]. Zhang et al. [7] suggest that workplace ostracism can increase stress and emotional exhaustion. Domestic scholars have also explored the harmful effects of workplace ostracism on employees' innovative [8] and proactive behaviors [9]. The negative impact of workplace rejection on employees' attitudes, behaviors, and performance has been recognized by academics. However, a review of the literature reveals that few scholars have explored the impact of workplace rejection on employees' unsafe behavior, and the mechanisms and boundaries between the two need to be further clarified. Therefore, we propose hypothesis 1(H1): Workplace ostracism positively affects employees' unsafe behavior.

Work alienation is a psychological state in which employees are separated from work because the work situation does not meet their needs. Previous research has shown that when employees experience workplace ostracism, low-quality interpersonal relationships and work that do not allow for self-expression are most likely to lead to feelings of work alienation [10]. Work alienation will reduce work resources (including interpersonal resources and knowledge acquisition resources), resulting in lower work satisfaction [11] and counterproductive work behavior. Thus, work alienation may play a mediating role in the relationship between the two. Although the literature has revealed the role of workplace ostracism in influencing work alienation [12], little literature has applied work alienation to the study of unsafe behavior. Therefore, in exploring the relationship between workplace ostracism and unsafe behavior, the introduction of work alienation as a mediating variable has some research implications. From this, we propose hypothesis 2(H2): Work alienation mediates between workplace ostracism and unsafe behavior.

Environmental uncertainty refers to the unpredictability of changes in the organizational environment and includes environmental dynamics and complexity. In the post-epidemic VUCA era, environmental uncertainty is highly dynamic and complex [13]. According to dynamic competency theory [14], in a simple and stable work environment, employees can use standard processes or existing knowledge to complete tasks [15]. In a complex and dynamic work environment, organizations re-quire employees

to acquire new knowledge, change work processes [16] and work together more collaboratively to cope with difficult and emotional changes in the environment. Unfortunately, when employees suffer from workplace ostracism, the conflict will arise between employees instead of working together to cope with the dynamic environment [17]. On this basis, employees facing a dynamic environment will develop a stronger sense of work alienation, which can easily lead to operational errors. Thus, environmental uncertainty may impact the relationship between the two in the relationship between workplace ostracism and unsafe behavior. However, from the research on the factors influencing employees' unsafe behavior, most focus on internal organizational factors, such as leadership style and intra-organizational risks. At the same time, environmental uncertainty is paid less attention to, an extra-organizational situational factor. Therefore, it is necessary to introduce the variable of environmental uncertainty into the path of the effect of workplace ostracism on unsafe behavior for exploration. Thus, we propose hypothesis 3(H3): Environmental uncertainty moderates the positive relationship between workplace ostracism and employees' work alienation. The higher the organizational environmental uncertainty, the stronger the positive effect of workplace ostracism on employees' work alienation.

Combining hypotheses H1, H2, and H3, the relationship between workplace ostracism and unsafe behavior can be modeled as a moderated mediation model. That is, workplace ostracism will indirectly influence unsafe behavior through the mediating role of work alienation, and the organizational environmental uncertainty moderates this mediating role. Specifically, when the organizational environmental uncertainty is high, organizational managers require cooperative learning among employees to deal with unexpected events. On this basis, the stronger the impact of workplace ostracism on employees' work alienation, which often leads to task negligence and operational errors, increasing the probability of unsafe behavior. On the contrary, when the organizational environment is low in uncertainty, employees can complete their tasks without too much communication and collaboration with other organization members. This phenomenon reduces the impact of workplace rejection on employees. It inhibits the emergence of a sense of alienation so that employees' ability to operate safely can be guaranteed and unsafe behavior can be reduced. Thus, we propose hypothesis 4(H4): Environmental uncertainty moderates the mediating role of work alienation in workplace ostracism and unsafe behavior. The higher the environmental uncertainty, the stronger the mediating role of work alienation between workplace ostracism and unsafe behavior. Conversely, the weaker it is.

Figure 1 shows the hypothetical model for this study.

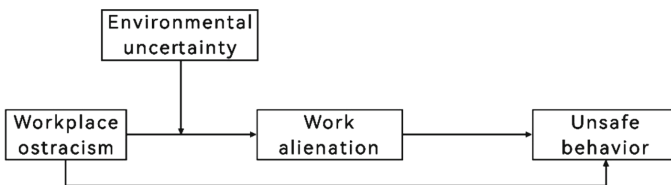


Fig. 1. Hypothetical Model.

In summary, starting from empirical research and literature review, this study constructed a “conditional process model” to explore the influence of workplace ostracism on unsafe behaviors of employees in the post-epidemic era, the mediating role of work alienation and the moderating role of environmental uncertainty, so as to investigate the mechanism of workplace exclusion on unsafe behaviors of employees in high-risk positions. In order to better reduce the staff unsafe behavior and reduce the occurrence of security accidents to provide a reference path of governance.

2 Materials and Methods

2.1 Sample and Data Collection

The sample for this study was drawn from 10 large and medium-sized enterprises in high-risk industries in Liaoning and Shandong, China, mainly in the coal, construction, and hazardous materials industries. As the leading province of the old industrial base in the northeast, Liaoning has many heavy industrial enterprises, such as the coal industry, construction industry, machinery manufacturing, and other high-risk industry enterprises. However, there are problems, such as confusion in their internal safety management system, which is of research significance in reducing the problem of unsafe behavior. To increase the sample size and reduce regional differences, we additionally selected enterprises located in Shandong by relying on alumni relations. The research population was the grassroots employees of enterprises in high-risk industries. The study set the corresponding sampling ratio according to the research enterprises' size and selected the sample frame for the study according to the principle of random sampling, with a total of 336 respondents. To ensure questionnaire quality, we conducted a pre-survey before the formal survey and adjusted the content presentation of some questions in the questionnaire according to the pre-survey results.

The questionnaire for this study lasted for about two months, from the beginning of March 2022 to the end of May 2022, using a combination of offline and online questionnaires. The survey returned 300 questionnaires, and finally, 261 valid questionnaires were obtained based on the quality of the respondents' responses, excluding invalid questionnaires. The questionnaire's effective recovery rate is 87%. The basic information of the data is as follows: about 55% of the respondents are male, the average age of all the respondents is 32.13 years old, and the average working year is 2.5 years. Approximately 88% had a bachelor's degree or less.

2.2 Measures

Workplace ostracism.

Workplace ostracism was measured using a scale developed by Ferris et al. with 10 items [4]. The representative items include “colleagues/leaders in the organization often avoid contact with me” and “colleagues/leaders in the organization often ignore me.” In this research, Cronbach's α coefficient for this scale was 0.704.

Work alienation.

Work alienation was measured using a scale developed by Korman, with 7 items [18]. The representative items include “Facing my daily tasks makes me feel miserable

and bored” and “Over the years, I have become frustrated with my job.” In this research, Cronbach’s α coefficient for this scale was 0.741.

Environmental uncertainty.

Environmental uncertainty was measured using a scale developed by Waldman, with 5 items [19]. The representative items include “The work environment in our organization is challenging” and “My work requires me to learn new things constantly.” In this research, Cronbach’s α coefficient for this scale was 0.672.

Unsafe behavior.

Unsafe behavior was measured using a scale developed by Wang Dan, with 9 items [20]. The representative items include “I often do not follow safety rules” and “Rarely participate in safety meetings or activities.” In this research, Cronbach’s α coefficient for this scale was 0.789.

3 Results

3.1 Common Method Bias

In this research, experts were invited to revise the questionnaire to ensure its reliability and that not all employees participating in the questionnaire were from a single province to control for common method bias. However, because of the sizeable subjective factor in the completion of the questionnaire by the subjects, it was necessary to add statistical controls. Firstly, the Harman single-factor method was used to test for common method bias, and the unrotated first factor explained a coefficient of 16.37% (less than 40%). Secondly, the five-factor model’s goodness of fit was calculated by adding the common method factor and comparing it with the model’s goodness of fit in this study. This research found that the five-factor model ($\chi^2 = 591.88$, $df = 452$, $CFI = 0.967$, $TLI = 0.958$, $RMSEA = 0.035$), compared with the original model ($\chi^2 = 765.43$, $df = 486$, $CFI = 0.933$, $TLI = 0.923$, $RMSEA = 0.047$), the improvement of CFI and TLI is within 0.05 and the improvement of RMSEA is within 0.02. It can be seen that the five-factor fit is not much better than that of the four-factor model. In summary, this research has no serious common method bias problems.

3.2 Confirmatory Factor Analysis

The discriminant and convergent validity of the four variables of workplace ostracism, work alienation, environmental uncertainty, and unsafe behavior were examined. The discriminant validity is shown in Table 1. This study’s original model (four-factor) had better-fit indicators than the other three models and therefore had good discriminant validity. Concerning convergent validity, workplace ostracism ($CR = 0.74$, $AVE = 0.363$), work alienation ($CR = 0.76$, $AVE = 0.414$), unsafe behavior ($CR = 0.84$, $AVE = 0.503$), environmental uncertainty ($CR = 0.73$, $AVE = 0.362$), the CR of the variables met the criteria (>0.7). The AVE was within the acceptance threshold (greater than 0.36), and the convergent validity of the study could be judged to be attained.

Table 1. Confirmatory Factor Analysis Results (N = 261).

Model	χ^2/df	CFI	TLI	IFI	RMSEA
Four-Factor Model: (WO, WA, EU, UB)	1.57	0.933	0.923	0.934	0.047
Three-Factor Model: (UB + EU, WO, WA)	3.73	0.679	0.633	0.684	0.103
Two-Factor Model: (WO + WA, UB + EU)	4.61	0.572	0.516	0.579	0.118
Single-Factor Model: (WO + EU + WA + UB)	4.81	0.547	0.489	0.553	0.121

Note WO, workplace ostracism; WA, work alienation; UB, unsafe behavior; EU, environmental uncertainty

Table 2. Results of Correlation Analysis (N = 261).

Variables	1	2	3	4	5	6	7	8
1 Gender	–							
2 Education	0.106	–						
3 Age	0.010	0.004	–					
4 Work experience	0.068	0.031	0.136*	–				
5 WO	0.108	0.136*	0.030	0.112	–			
6 WA	0.015	0.006	–0.073	0.101	0.308**	–		
7 UB	0.120	0.110	0.070	0.116	0.311**	0.384**	–	
8 EU	0.126*	0.038	0.127*	0.071	0.303**	0.314**	0.306**	–
Mean	1.728	2.621	2.724	2.874	3.371	3.414	3.322	3.490
SD	0.446	0.821	0.808	0.767	0.716	0.994	0.847	0.728

Note * $p < 0.05$, ** $p < 0.01$

3.3 Descriptive Statistics

SPSS 26.0 was used to analyze the correlations between the four variables of workplace ostracism, work alienation, environmental uncertainty, and unsafe behavior. The correlation between each variable is shown in Table 2. Workplace ostracism is significantly positively correlated with work alienation ($r = 0.308, p < 0.01$). Workplace ostracism correlates significantly positively with unsafe behavior ($r = 0.311, p < 0.01$). Workplace ostracism positively correlates with environmental uncertainty ($r = 0.303, p < 0.01$). Work alienation is significantly positively correlated with unsafe behavior ($r = 0.384, p < 0.01$). Work alienation positively correlates with environmental uncertainty ($r = 0.314, p < 0.01$). Environmental uncertainty positively correlates with unsafe behavior ($r = 0.306, p < 0.01$).

4 The Impact of Workplace Ostracism on Unsafe Behavior: A Conditional Process Model

Based on the Bootstrap mediation effect test method and the conditional process model proposed by Andrew F. Hayes, the following two equations were constructed:

$$M = i_1 + a_1X + a_2W + a_3XW + e_M \tag{1}$$

$$Y = i_2 + c'_1X + c'_2W + c'_3XW + bM + e_Y \tag{2}$$

Among them, X, Y, W and M respectively represent workplace ostracism, unsafe behavior, environmental uncertainty and work alienation. Based on Table 3, the standardized regression equation is as follows:

$$\hat{M} = 0.216X + 0.262W + 0.178XW \tag{3}$$

$$\hat{Y} = 0.182X + 0.29M \quad (4)$$

Combined with the two, the overall prediction equation is:

$$\hat{Y} = 0.245X + 0.076W + 0.052XW \quad (5)$$

Next, use hierarchical regression analysis to test each hypothesis through SPSS26.0.

The main effect test.

Firstly, unsafe behavior was set as the dependent variable for this research. Secondly, the aforementioned demographic variables were placed in the regression model, and the regression results are shown in Table 3, M1. Finally, workplace ostracism was placed in the independent variable bar box, and the results are shown in Table 3, M2. From M2, it can be seen that workplace ostracism has a significant positive effect on employee unsafe behavior ($\beta = 0.263$, $p < 0.001$). Therefore, H1 was verified.

The mediating effect test.

This research tested the mediating role of work alienation in four main steps. Specifically, firstly, the main effect was tested (see model M2), and the results were supported by H1. Secondly, the relationship between workplace ostracism and work alienation was tested. The results are shown in model M6 in Table 3, where workplace ostracism significantly positively affected work alienation ($\beta = 0.28$, $p < 0.001$). Thirdly, the relationship between work alienation and employees' unsafe behavior was tested. The results are shown in Table 4, Model M4, where employees' unsafe behavior was significantly positively affected by work alienation ($\beta = 0.342$, $p < 0.001$). Finally, based on the obtained models M1 and M2, work alienation was added to the regressions, as presented in model M3 in Table 4. Workplace ostracism had a significant positive effect on employee unsafe behavior ($\beta = 0.182$, $p < 0.01$), and work alienation had a significant positive effect on employee unsafe behavior ($\beta = 0.29$, $p < 0.001$), which indicated that work alienation played a partially mediating role. Therefore, hypothesis H2 was verified.

The moderating effect test.

This research used hierarchical regression to test for moderating effects, where the interaction term was the product of workplace ostracism and environmental uncertainty after the decentration of each. The specific steps were as follows: firstly, put work alienation into the dependent variable bar, and add the control variables of this research in the independent variable bar layer by layer, and the regression results are shown in Model M5 in Table 3. Secondly, add the independent variable workplace ostracism of this study in the independent variable bar, and the results are shown in Model M6 in Table 3. Thirdly, add the moderating variable environmental uncertainty, which shows the results in Model M7 in Table 3. Finally, the interaction term between workplace ostracism and environmental uncertainty was added to the regression model. The results are shown in model M8 in Table 3. The interaction term's coefficient is significant ($\beta = 0.178$, $p < 0.01$), which confirms that environmental uncertainty positively moderates the relationship between workplace ostracism and work alienation. In addition, this research plots the relationship between workplace ostracism and work alienation at the mean plus or minus one standard deviation (\pm SD) level of environmental uncertainty (shown in

Table 4. Mediating Effects of Different Levels of Environmental Uncertainty (N = 261).

Indirect effect	Variables	Level	Effect	SE	Boot95%CI
	EU	Low	0.026	0.021	(-0.01, 0.075)
		High	0.139	0.042	(0.65, 0.228)
		Difference	-0.113	-0.02	(-0.66, -0.153)

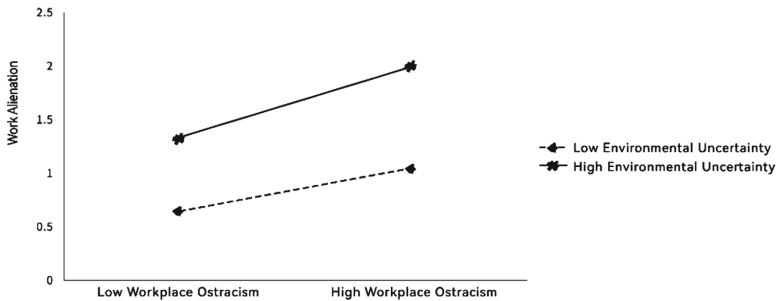
**Fig. 2.** Moderating Effect of Environmental Uncertainty between Workplace Ostracism and Work Alienation.

Fig. 2). The slope for high environmental uncertainty is greater than the line for low environmental uncertainty, indicating that the higher the environmental uncertainty, the stronger the positive effect of workplace ostracism on work alienation. Therefore, H3 was verified.

The moderated mediation effect test.

With the help of PROCESS 3.5, the moderated mediating was verified. As shown in Table 4, the mediating effect of work alienation was insignificant when environmental uncertainty was one standard deviation level below the mean ($b = 0.026$, Boot95% CI includes 0). The mediating effect of work alienation was significant when environmental uncertainty was one standard deviation level above the mean ($b = 0.139$, Boot95% CI does not include 0), and the difference in the indirect effect between the two ($b = -0.113$, Boot95% CI) does not include 0. It indicates a significant difference, and H4 was verified. To provide a more visual representation of the moderating effect of environmental uncertainty on the mediating effect, the mediating effect of being moderated is plotted. In Fig. 3, the mediating effect of job alienation emerges and gradually increases when environmental uncertainty reaches 2.921 (out of 5) or more. Therefore, H4 was verified.

5 Conclusions

This study constructs a conditional process model for the impact of workplace ostracism on the unsafe behavior of employees in high-risk industries and provides empirical data on the relationship between workplace ostracism and unsafe behavior. The findings

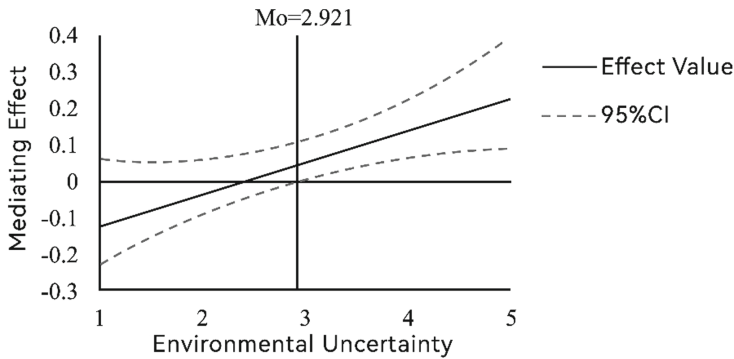


Fig. 3. Mediated Effect of Regulation.

suggest that workplace ostracism enhances employees' unsafe behavior by affecting work alienation in employees in high-risk industries. The mediating effect of work alienation is enhanced when the level of environmental uncertainty is high. This study introduces workplace ostracism into the field of safety, which not only expands the literature on workplace ostracism and unsafe behavior, but also reminds managers of high-risk industries to pay attention to the situation of employees' work alienation when environmental uncertainty is high. The study provides practical insights on how high-risk industries can reduce the negative effects of workplace ostracism and improve the unsafe behavior of employees in high-risk positions.

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