



Research on the Impact of Work Stress on Unsafe Behaviors of Construction Workers with Different Working Years

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Abstract. To further strengthen the management of workers' unsafe behaviors and reduce construction accidents, this research took construction workers with different lengths of service as the research subjects to analyze the relationship between work pressure, safety motivation, work experience and unsafe behaviors. Based on literature research, hypotheses were proposed and a model is constructed. A questionnaire survey was conducted in construction enterprises, and data statistical analysis was carried out using SPSS 27.0 and AMOS 26.0 software. The results showed that work pressure had a significant positive impact on unsafe behaviors; safety motivation mediates the relationship between work pressure and unsafe behaviors, and it was a partial mediator for workers with shorter service lengths and a full mediator for those with longer service lengths; work experience can moderate the impact of work pressure on unsafe behaviors, and it had a significant moderating effect for workers with shorter service lengths, but this moderating effect was not significant for those with longer service lengths. The final research results can provide certain references for construction enterprises to strengthen safety management and prevent the occurrence of workers' unsafe behaviors.

Keywords: work pressure, safety motivation, work experience, unsafe behaviors, workers with different years of service

1 Introduction

As a labor-intensive and resource-intensive industry, the construction industry's production safety has always been the focus of global attention. In the causes of construction safety accidents, more than 90% are caused by people's unsafe behavior. Other studies have found that work pressure will lead to resistance and easily produce unsafe behaviors ^[1], which shows the importance of work pressure's influence on workers' unsafe behaviors.

Empirical research shows that safety motivation ^[2] mediates workers' safety behaviors, and occupational stress of workers with different working ages is significantly different. With different levels of work pressure ^[3], workers with different levels of work experience ^[4] will have different levels of unsafe behaviors, and work experience ^[5] is taken as a moderating factor. The influence of important factors on unsafe behavior can be adjusted.

Therefore, based on the perspective of seniority difference, this paper establishes a theoretical model of the relationship between work stress and unsafe behavior of construction workers, and analyzes the mechanism of action between the two. By analyzing and examining the mediating effect of safety motivation and the moderating effect of work experience on the above relationship, the formation mechanism of unsafe behavior in different working years is deeply discussed, and the internal logic of the influence of work stress on workers' safety behavior through psychological and physiological mechanisms is revealed. The conclusion of this study has practical significance for improving the safety performance of construction workers, and can provide a basis for formulating differentiated safety management strategies, and help prevent unsafe behaviors of workers of different working ages in daily work.

2 Research Hypothesis

2.1 Work Stress and Unsafe Behavior

Research shows that different types of work pressure can induce unsafe behavior of construction workers. Under high-intensity pressure, such as long working hours, too much work intensity and other physiological stressors, workers will feel tired and increase the probability of unsafe behavior, physiological source pressure such as depressed working environment, disharmonious interpersonal relationship, and organizational pressure such as overly harsh management system and lack of safety culture will also induce unsafe behavior of workers. Construction workers have long been exposed to complex and changeable construction site environment, working conditions are uneven, such as high temperature, high altitude, noise and other harsh factors accompanied for a long time ^[6]. Construction tasks are often faced with tight deadlines, great work intensity, and staffing is sometimes unreasonable, and there is often a shortage of manpower, forcing workers to work excessively long hours and undertake multiple tasks. Moreover, some project management lacks humanization and ignores the practical difficulties and pressure demands faced by workers in the work process, thus making construction workers bear greater work pressure. The greater the work pressure, the higher the job insecurity ^[7]. Based on the above analysis, hypothesis is proposed:

H1: Work stress positively affects unsafe behavior, and its influence is different among workers of different working age.

2.2 The Mediating Role of Safety Motivation

Through the in-depth study of the mechanism of unsafe behavior, it is found that work stress can affect the safety motivation of construction workers, affect their choice of safe behavior, and ultimately lead to the emergence of unsafe behavior^[8]. Because the safety motivation of workers with short working years is relatively weak, it is easy to collapse quickly under high working pressure, which leads to unsafe behavior. Despite the strong safety motivation of workers with long service life, once the safety motivation defense line is broken under the action of long-term continuous work pressure, their unsafe behaviors may be more hidden and harmful due to their rich work experience and high work autonomy. Based on the above analysis, hypothesis is proposed:

H2: The mediating effect of safety motivation on work stress and unsafe behavior is different among workers of different working age.

2.3 The Moderating Effect of Work Experience

Construction workers of different working ages have different feelings and reactions to work pressure because of their work experience, ability to cope with pressure and psychological capacity^[9]. The amount of work experience significantly affects the perception and coping mode of construction workers to work pressure, and then has a moderating effect on the occurrence of unsafe behavior. In high-pressure environments, experienced workers can quickly plan plans with rich experience, advance the construction process in an orderly manner, and effectively avoid unsafe behaviors caused by panic decisions^[10]. However, due to the lack of experience, new employees have poor adaptability to work pressure, and are prone to negative emotions such as tension and anxiety, which affect safety behavior. Based on the above analysis, hypothesis is proposed:

H3: Work experience moderates the influence between work stress and unsafe behavior, and its moderating effect is different among workers of different working age.

3 Research Methods

3.1 Scale Design

When studying the influence of work stress on unsafe behavior of construction workers of different working ages, the design of the scale is based on the mature scale to ensure the reliability and validity of the measurement scale. This study mainly includes 4 scales of work stress (WS), safety motivation (SM), work experience (WE) and unsafe behavior (UB). All the maturity scales selected have significant logical correlation with the corresponding study variables, and have been effectively verified in terms of reliability and validity. At the same time, the scale has been modified for the matching of this paper.

3.2 Data Acquisition

The data for this study was obtained through online questionnaires issued by construction companies to their employees, which were filled out anonymously to filter out unqualified survey objects. The 351 valid questionnaires were collected from Guangzhou, Ningde, Xiamen, Fuzhou, Chengdu, Nanping and other Chinese cities. Male accounted for 90.03%; most of them were under 40 years old, accounting for 86.89%; proportion of junior college and above is 56.98%; the proportion of working years less than 10 years is 63.73%, the other part accounted for 36.27%. It can be concluded that this data conforms to the basic characteristics of general construction workers

4 Data Results and Analysis

4.1 Reliability and Validity Test

In this research, SPSS27.0 software was used to analyze the validity and reliability of the obtained data. According to the statistical results, the overall validity KMO value was 0.895, which reached the analysis standard; Cronbach's α of each dimension variable is greater than 0.7; the component reliability CR is greater than 0.7; the average variance extraction values AVE were all greater than 0.5. The index values of each observed variable meet the requirements of analysis, and the internal consistency and convergence validity of the scale meet the standards.

4.2 Correlation Analysis

In this research, the total sample was divided into two groups of working age: less than ten years and more than ten years, and they were named as the group with shorter working age (G1) and the group with longer working age (G2). Based on the correlation analysis of all variables, the results are shown in Table 1. In G1 and G2, there was a significant positive correlation between WS and UB; a significant negative correlation between WS and SM, and a significant negative correlation between SM and UB.

Table 1. Correlation analysis

Samples	Variables	WE	SM	WS	UB
G1(n=209)	WE	1			
	SM	0.114	1		
	WS	-0.140*	-0.620**	1	
	UB	-0.527**	-0.609**	0.744**	1
G2(n=142)	WE	1			
	SM	-0.051	1		
	WS	-0.020	-0.404**	1	
	UB	0.095	-0.815**	0.363**	1

4.3 Model Path Analysis

AMOS26.0 software was used to construct structural equation models for the two groups. In G1 and G2, χ^2/df were both between 1 and 3, indicated that the fit were both up to the standard, GFI, NNFI, IFI and CFI were all greater than 0.9, AGFI were both greater than 0.8, it showed that the fitting indexes of the two groups met the above criteria, and the fitting degree of the model were good. The standardized path regression coefficients of each model are shown in Table 2. In G1 and G2, the path coefficients and P-values were different, and the significance of the path from work pressure to unsafe behavior in the group with G1 ($P < 0.01$) was greater than G2 ($P = 0.635$), indicating that the degree of influence between different working years was different. Then H1 was established.

Table 2. Standardized path coefficients for each model

	Normalized regression coefficient		Significance comparison
	G1	G2	
WS→UB	0.661**	0.022 (0.635)	G1>G2
WS→SM	-0.744**	-0.464**	Both are significant
SM→UB	-0.198**	-0.868**	Both are significant

4.4 The Mediating Role of Safety Motivation

In this research, SPSS27.0 software was used to analyze the mediating effect based on the bias correction method, and the role of mediating variables in this relationship was studied. The specific results are shown in Table 3. According to the data, in G1, the 95% confidence intervals for the direct effect (DE) and indirect effect (IE) were [0.940, 0.641] and [0.295, 0.100] respectively, and the interval did not contain 0, indicating that safety motivation played a partial mediating role. For G2, the 95% confidence intervals of the direct and indirect effects were [0.161, -0.073] and [0.481, 0.205], respectively, and the confidence interval of the direct effect included 0, indicating a complete mediating effect, which meant that safety motivation played a complete mediating role between work stress and unsafe behaviors. These results support hypothesis H2.

Table 3. Mediating Effect Test

Path	Model	Effect type	Effect size	Confidence interval of 95%		
				Upper limit	lower limit	p
WS→UB	G1	DE	0.791	0.940	0.641	0
		IE	0.198	0.295	0.100	0
	G2	DE	0.044	0.161	-0.073	0.455
		IE	0.355	0.481	0.205	0

4.5 The Moderating Effect of Work Experience

In order to explore whether work experience played a moderating role in work stress and unsafe behavior, this research also used SPSS27.0 software for statistical analysis, and the data results are shown in Table 4. In G1, the interaction coefficient $\beta=-0.195$, $P<0.01$, had a significant negative impact on unsafe behavior, that was, the increase of work experience could weaken the positive impact of work stress on unsafe behavior among employees with short working years. However, in G2, the interaction coefficient $\beta=-0.198$, $P>0.05$, indicating that the negative effects of work experience on work stress and unsafe behavior were not significant. Therefore, it showed that the adjustment effect was different due to the different work experience of construction workers, and H3 is assumed to be valid.

Table 4. Regression analysis of the moderating effect of work experience

Variables		G1			G2		
		M1	M2	M3	M1	M2	M3
Independent	WS	0.987**	0.906**	0.839**	0.388**	0.388**	0.387**
Moderating	WE		-0.543**	-0.585**		0.129	0.113
Interaction term	WS*WE			-0.195**			-0.198

5 Conclusions

The research conclusions of this paper are as follows:

Work stress positively affected the unsafe behavior of construction workers. Compared with shorter workers and longer workers, the former had a more significant effect. Therefore, cognitive reconstruction training, such as stress scenario simulation training and safety decision tree analysis, can be implemented for the new generation of workers to improve their risk perception ability.

Safety motivation mediated work stress and unsafe behavior. For workers with short working experience, safety motivation played a complete mediating role, while for workers with long working experience, this factor played an indirect mediating role. Therefore, it is necessary to strengthen the training and guidance of construction workers' safety motivation, and formulate targeted safety incentive measures according to the characteristics of workers with different working experience, so as to reduce the influence of work pressure on unsafe behaviors.

Among workers with short working years, work experience could negatively regulate the relationship between work stress and unsafe behavior, while this variable had no effect on workers with long working years. Therefore, workers with short working years should pay attention to the accumulation of work experience. Construction enterprises should provide more opportunities and platforms for workers to accumulate experience, and workers with long working years should not ignore the positive guiding role of safety training. Thus reduce the occurrence of unsafe behavior of all construction personnel.

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