

An Investigation into the Influence Mechanism of Employee Initiative on Safety Production Behavior in Industrial Enterprises

Jingyuan Li*, Nan Yang

School of Economics and Business Administration, Heilongjiang University, Harbin, Heilongjiang, China

**Corresponding Author*

Abstract: Taking the employees of industrial enterprises as the object of investigation, questionnaire survey method was adopted to collect the relevant information of ordinary employees and managers. After screening, based on 399 valid questionnaires, SPSS and Amos were used to analyze the relationship between employee initiative and production safety behavior. At the same time, the factors affecting production safety behavior are explored, and the mediating effect of employee safety awareness on employee initiative and employee safety production behavior is found, and the pressure perception factors in the environment are added to analyze. The results show that: employee initiative has a significant positive impact on work safety behavior; The mediating effect of employee's safety awareness on employee's initiative on safe production behavior is also significant; The perception of pressure can reduce the production of employees' safety behavior by influencing employees' initiative. The research results are conducive to exploring the influence mechanism of employee initiative on safety behavior from the cognitive level, constructing the theoretical framework of the influence mechanism of employee initiative on safety behavior, enriching the management theory of safety behavior, and providing a new perspective for future safety management practice.

Keywords: Initiative; Safe Production Behavior; Safety Awareness; Pressure Awareness

1. Introduction

According to the latest data of the National Bureau of Statistics, in 2022, the added value of the industrial industry will reach 40,164.43 billion yuan, accounting for 33.2% of the total,

which is the largest industry in the composition of the added value of the sub-industries. Among them, the total profit of industrial enterprises above the national scale is 8,403.85 billion yuan. Although the profit has declined compared with last year, the upstream and downstream profit structure of industrial enterprises has continued to improve, there are still many unstable and uncertain factors at home and abroad, the pressure of enterprises is still large, and the recovery of industrial enterprises' efficiency still faces many challenges. At the same time with the development of The Times, the quality of employees in China's industrial enterprises is also constantly improving, but because there are more dangerous elements in the working environment of industrial enterprises, employees, especially front-line employees, have low safety awareness, large flow, and low level of safety management, safety accidents occur frequently in industrial enterprises. In 2022, a total of 20,963 people died in various types of production safety accidents in China, and the safety situation is still grim. It is of great significance to identify safety problems in industrial enterprises, as well as to raise the safety awareness of employees in industrial enterprises.

From the reflection of safety production accidents, people begin to seek to implement differentiated management for different proactive individuals. Safety accident is the operation object of safety production behavior, and safety accident often has a certain randomness, causality and preventability, but in theory, any safety accident in industrial enterprises can be prevented [1]. For example, the low technical content of employees, inadequate safety training, safety evaluation system is not perfect and other reasons caused by safety accidents. These reasons show that most of the unsafe factors in the work of industrial enterprises are directly or indirectly

related to personnel, so it is necessary to pay attention to the individual in the enterprise to prevent accidents [2]. The individual is the foundation of the study of human accident attribution, which can be generally divided into high initiative and low initiative individuals. Highly proactive individuals have spontaneity and foresight, can take the initiative to change the environment in order to achieve organizational goals, have the courage to make suggestions and innovations, and can actively participate in organizational affairs. Low proactive individuals, on the contrary, are more passive in work, pursue stability, and need the promotion of external forces. It has been more and more recognized to improve safety performance by studying individual trait behavior to solve occupational safety and health problems. Therefore, to study the safety behavior of employees in industrial enterprises, seek ways to make full use of this initiative to promote human safety behavior, explore the antecedents that affect employee safety behavior and the influence effect of employee initiative, and add human cognitive and emotional factors to study the influence mechanism of initiative on safety behavior. By studying the characteristics of different proactive individuals to design a matching safety management mechanism and guide employees' safety production behaviors towards the direction of safety results and safety management, it is an important issue that all sectors of society should pay attention to and be solved.

2. Theoretical Background and Hypotheses

Proactive behavior Bateman proposed that active behavior is an active rather than a reactive process, a process of transcendence rather than acquiescence, a means of primary control rather than secondary control, and an agent rather than a passive behavior [3]. Employees with active behavior can jump out of the limitations and constraints of the established work, formulate challenging work goals that meet their own abilities, and take the initiative to improve the existing environment or create new roles. Instead of passively adapting to the current working environment, they take the initiative to challenge difficulties. Bateman et al. perfected the proactive behavior in 1999, arguing that the real proactive behavior should make things better in the expected direction, and be able to create changes rather than just predict [4]. Employees

consciously decide whether to enter or exit certain situations. To change things intentionally or directly by creating a new environment or actively changing the existing environment. These scholars regard initiative as a behavioral tendency, and it is forward-looking and transformational. Individuals can take the initiative to improve the current environment or create a new environment, which is a challenge to the status quo rather than a passive adaptation [5]. When employees try to change themselves or the environment in their work, it can be seen that the proactive behavior is transformative, predictive and spontaneous. They can adjust the behavior in time by predicting the environment, make behavioral judgment and stick to it until the change occurs [6]. This kind of spontaneous and predictive behavior with a purpose to change or improve the situation was also referred to as a kind of behavioral syndrome leading to goal achievement in later studies. As work becomes more and more dynamic and complicated, employees no longer need to simply follow orders and instructions from superiors when facing problems at work. Instead, they need to analyze problems, make their own judgments and actions, and take the initiative to deal with and solve difficulties, thus showing initiative. Based on the existing research results, this paper defines employee initiative as employees have more spontaneous and proactive behaviors in the work process, and they will persevere and make changes in the face of difficulties to ensure the realization of goals.

Safe production behavior The science of safe behavior grew out of behavior-based safety (BBS), which was proposed by Gene Earnest and Jim Palmer in 1979 [7]. Safety behavior is divided into a broad sense of safety behavior and a narrow sense of safety behavior, and safety behavior in production is a broad sense of safety behavior, and the safety behavior studied in this paper refers to the safety behavior in production or safety behavior in production. Griffin defined the concept of safety behavior as employees' safety-related work behavior performance, namely safety compliance and safety participation, by analyzing the relationship between safety atmosphere and safety performance [8]. Safety compliance refers to the behaviors within the job role, such as complying with safety rules and regulations, wearing safety protective equipment and reporting relevant safety incidents during the execution of

organizational tasks. Safety participation refers to the voluntary implementation of safety behaviors during the execution of tasks, such as voluntary participation in safety activities, safety training and proactive assistance to employees in safety tasks, which can reflect the initiative of employees. With the continuous development and improvement of safety behaviors, some scholars have added safety communication into the dimension of safety behaviors [9]. At the same time, Liu Suxia studied the evolution of safety participation behaviors of employees in small and medium-sized enterprises by combining the theories and methods of evolutionary economics, and revealed the influence of different individual strategy choices on group behaviors [10]. Some scholars have also analyzed and studied issues such as employees' safety compliance behavior and psychological safety. Yan, Xu et al. made an empirical analysis of the correlation between job insecurity, quality of work life and unsafe behavior by using the mediation effect method [11]. However, in general, most scholars use the definition, classification or measurement scale of safety behavior proposed by Griffin and Neal when studying employee safety behavior, and this definition is also adopted in this paper [8].

2.1 The Relationship between Employee Initiative and Safe Production Behavior

Employee initiative plays an important role in predicting organizational performance. Highly proactive employees will actively participate in interpersonal interactions, especially exchanges with leaders [12-13]. At the same time, highly proactive individuals will actively try to influence and change the stressful environment, and proactive performance will have a buffer effect on the negative impact of stressors [5]. Proactive behavior will bring employees more opportunities, more attention to learn and update professional knowledge, and lay the knowledge and ability foundation for improving performance [14]. Many previous studies have shown that organizational socialization is an important and antecedents affecting employee performance, and high proactive behavior will more easily establish a relationship network, make individuals more easily integrate into the organization, and then affect employee performance. Indeed, in uncertain situations, active control of the environment can improve organizational performance more than passive

waiting and coping [8]. Proactive behavior can positively predict individual's positive attitude and behavior, win positive evaluation from leaders and gain rich rewards, and reduce task conflicts in organizations and improve organizational performance [15]. The performance of proactive behavior will also be influenced by employees' autonomous motivation, which will further affect work performance [16]. And employee safety behavior is job-related behavior performance, so employee initiative is closely related to employee behavior performance.

Individual initiative is in direct proportion to safety performance. The influencing factors of safety performance mostly focus on the influence of safety atmosphere, safety culture, safety attitude and behavior on safety performance [17]. Research on the influence of behaviors on safety performance includes leadership behaviors and employee behaviors. Employee behaviors often occur in the last link before an accident and are the most important factor leading to workplace accidents. The safety effect of an organization is directly determined by employee behaviors [18]. And employee safety behavior is an important employee performance, which refers to the behavior that employees show in line with safety standards in order to ensure the safety of production activities and avoid accidents and dangers in the production process [19]. From the perspective of causes of accidents, the main causes of unsafe behavior are the unsafe behavior of people and the unsafe state of things. The control level of safety accidents directly depends on the safety production behaviors of the operators and managers involved in the project construction [20]. Among them, the determination of the human factors of unsafe behavior is divided into unintentional and intentional, that is, to distinguish whether the employees have the ability to carry out safe activities or choose unsafe behaviors intentionally, or the unintentional unsafe behaviors caused by their inability to identify safety factors and lack of knowledge and ability, thus leading to the occurrence of accidents [21]. In the determination of human factors, personal characteristics play an important role. Employees with high initiative tend to choose positive coping strategies, which have a positive impact on organizational citizenship behavior [22]. Therefore, in an industrial enterprise, when

an employee is characterized by high initiative, his attitude towards safety and psychological cognition are positive, which will have a positive impact on the employee's safe production behavior. Based on the above analysis, the following hypothesis is proposed:

Hypothesis 1: Employee initiative in industrial enterprises has a significant positive impact on safety production behavior.

2.2 The Mediating Effect of Safety Awareness on Employees' Initiative and Safe Production Behavior

There is a close relationship between employee initiative and safety awareness. The production of safety consciousness is mainly affected by two conditions, one is the individual's own physiological conditions, the other is the individual's own psychological conditions. For the same objective process or the same object, there are differences in the reflection of different security subjects. For example, the speed of reflection is not the same, the amount of reflection is not the same, and the depth of reflection degree is not the same. On the other hand, Bateman proposed in 1999 that proactive behavior makes things change for the better in the expected direction, and can create changes rather than just predict. Oneself consciously decides whether to enter and exit certain situations, and changes things intentionally or directly by creating new environments or actively changing existing ones. Employees with high initiative will be happier, more likely to give feedback to leaders, increase their sense of individual identity, and show higher cognitive ability [23-24]. The research of safety awareness can be translated into the evaluation of production staff's cognition and attitude towards safety [25]. Proactive individual behavior is often transformative, predictive and spontaneous. Foreseeability can positively affect safety consciousness. Strong foreseeability indicates a high level of development of safety consciousness. The foreseeability of security awareness has two bases, one is experience and the other is advanced understanding of security, both of which work simultaneously. At the same time, employee initiative has a positive impact on work attitude, learning ability, positive attitude, career goal and ability judgment, indicating that the characteristics of individual initiative will affect employees' cognitive ability and attitude [26]. Therefore, when employees

show high initiative, they tend to have higher foresight, which promotes the generation of safety awareness.

Safety awareness promotes safety behavior of employees. Consciousness can make people have the ability of self-control, that is, it can take the initiative to adjust their behavior and psychological activities [27]. Safety consciousness can be divided into subconscious and conscious consciousness. Under the guidance of conscious consciousness, employees can move towards their own goals and promote the generation of safety behaviors. And after a certain amount of training, reminding, urging, education, supervision, you can transform the subconscious into conscious consciousness, and constantly strengthen the stimulation of conscious consciousness, so as to achieve the state of conditioned reflex of this consciousness, so as to promote the habituation and active consciousness of safety behavior [28]. Safety awareness refers to the cognitive ability of employees for risk factors in the actual task process. The stronger the ability to identify danger, the easier it is to prevent safety accidents, so as to promote the production of employees' safety behaviors. At the earliest, scholars studied safety awareness from the perspective of attitude and behavioral tendency, and believed that employees with strong safety awareness would be more cautious in attitude and more controllable in behavior. Safety awareness and safety behavior influence each other, and people's safety psychological motivation is the direct cause of their safety behavior [27]. J, S et al. pointed out that the root cause of people's unsafe behavior is their inadequate safety awareness [29]. The functions of safety awareness mainly include the memory of safety knowledge, the feeling of safety situation and the control of actions. The attitude of safety behavior refers to the reaction of the brain to the stimulation after the employees accept the external stimulus, the judgment of the safety situation, and the prompt people to implement the rules and regulations. Through the improvement of safety awareness, employees' memory of safety knowledge, cognition of safety situation and judgment of behavior results will be improved, which will cause employees to have a tendency of safety behavior attitude, and then affect their behavior intention. Safety awareness determines safety attitude, and safety attitude determines safety behavior. According

to planned behavior theory, intention is the key factor affecting behavior, and behavior attitude positively affects behavior intention. Attitude plays an intermediary role between consciousness and behavior. A person's safety awareness will eventually be reflected in his attitude towards safety, and his attitude towards safety will eventually be reflected in his safety behavior. Based on the above analysis, the following hypothesis is proposed:

Hypothesis 2: Safety awareness mediates the positive relationship between employee initiative and safety production behavior

Hypothesis 2a: Employee initiative has a significant positive impact on employee safety awareness

Hypothesis 2b: Safety consciousness has a significant positive impact on employees' safety production behavior

2.3 The Mediating Effect of Employee Initiative on Stress Perception and Employee Safety Behavior

High employee initiative is more sensitive to the perception of pressure, and when the perception of pressure is greater, it will inhibit the active behavior. The essence of work pressure is the physiological and psychological tension and discomfort caused by the working environment, tasks, requirements, expectations and other withstand intensity beyond individual ability. Work pressure can be manifested in environmental pressure, operational pressure, management pressure. In the process of assessing stress, employees often have the interaction of individual characteristics and the environment. Highly proactive individuals have a strong sense of pressure in the environment [30], and the strong sense of pressure has a greater fluctuation on behavior. Employees' pressure perception also has an impact on creativity due to different psychological resilience [31]. The emotional resilience of psychological resilience also has a certain predictive effect on perceived psychological stress, and initiative can enhance and regulate this predictive effect [30]. In other words, employees' perception of pressure is closely related to their proactive performance. Different individuals will have different coping styles to work pressure due to their differences in psychological perception ability. At the same time, employees' perceived organizational support and team initiative character

composition ease the play of individual initiative personality [32]. Perception of work pressure is a kind of employees' perception of the environment. Therefore, when employees' perceived pressure is high, individual initiative will be affected.

When the actual control conditions are sufficient, the perceptual awareness directly determines the action, and the perceived pressure determines the behavior of employees. Safety atmosphere will affect work pressure and thus risk perception, and employees' risk perception ability will also affect their judgment on safety obstacles, and ultimately affect unsafe behavior. In combination with the theory of planned behavior, the subjective norm is the social pressure perceived by an individual when deciding whether to carry out a certain behavior, and it reflects the influence of significant others or groups on the individual's behavior decision. This is closely related to interpersonal relationship, family environment and pressure organization system among work stressors. Perceived behavioral control is the degree to which an individual perceives the ease or difficulty of performing a certain behavior. It reflects the individual's perception of the factors that promote or hinder the performance of the behavior. The pressure of job responsibilities, working environment and career development source is closely related to individual characteristics, which are expressed and measured by employees' subjective feelings [33]. At the same time, job stress can be divided into challenging stress and blocking stress in the study, and the stable characteristics of employees also have an impact on the attitude to deal with stress. Challenging stress is more able to activate employees' intrinsic motivation and make them more able to follow their work goals, while blocking stress will make employees lack intrinsic motivation and even adopt avoidance coping methods [34]. When employees show a passionate and bold focus tendency, they will feel a higher level of challenging stress, while when employees have a more conservative and cautious focus tendency, they will feel a higher level of blocking stress [35]. When perceived pressures are considered to be surmountable, individuals tend to adopt positive coping strategies, such as workload, job scope and responsibilities, and job complexity, etc., while individuals tend to react negatively to obstructive pressures, such as role ambiguity and

conflict, job insecurity, etc., which have different effects on employees' creativity [36]. Challenging stress and blocking stress can exist at the same time, but only one perception of pressure is dominant [37]. Individual stress perception will not only affect behavioral performance, but also affect individual initiative. Therefore, this paper introduces stress perception into the research on the influencing mechanism of employees' work safety behaviors, and conducts a survey according to the classification of stressors, and proposes the following hypothesis:

Hypothesis 3: Employee initiative mediates the negative correlation between stress perception and employees' work safety behavior

Hypothesis 3a: Pressure perception has a significant negative impact on employees' proactive trait performance

Hypothesis 3b: Pressure perception has a significant negative impact on employees' work safety behavior

Assume the model is as shown in Figure 1.

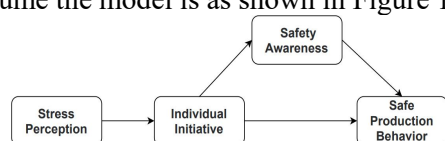


Figure 1. Theoretical Model

3. Research Design

3.1 Data Sources

The sample of this study was selected from the relevant units of industrial enterprises across the country, and a total of 449 questionnaires were sent out by means of online questionnaire distribution. 50 discarded questionnaires were eliminated, such as inconsistency with the reality, missing answers of items, obvious cheating and identical answers, and finally 399 were valid, with an effective rate of 88.9%. The respondents of the questionnaire are employees (familiar with safety production process) and managers (engaged in safety production management for a long time and familiar with safe production operation and management of enterprises) in heavy industry (oil mining, coal mining, metal mining, non-metal mining and wood harvesting, etc.) and light industry enterprises (food manufacturing, beverage manufacturing, cultural, educational and sporting goods, chemical manufacturing, etc.). Have accumulated certain experience in production safety management). Among them, 7% are below 25, 52.6% are 26-35,

24.3% are 36-45, 11.3% are 46-55 and 4.8% are 56 and above, and most of the employees in the study sample are 26-35 years old. It was 50.9 percent for men and 49.1 percent for women, with an even mix of men and women. The highest education level was 1.5 percent in junior high school or below, 11.8 percent in senior high school or vocational high school, technical secondary school or technical secondary school, 19 percent in junior college, 59.1 percent in bachelor's degree, and 8.5 percent in graduate school or above. 77.4% were married and 22.6% were unmarried. It was 38.1 percent for regular workers, 58.4 percent for managers, or 3.4 and 5 percent for other positions. It was 15.3 percent with 1-3 years of service, 31.3 percent with 3-6 years, 40.4 percent with 6-15 years and 13 percent with 15 years or more. Of the industrial enterprises surveyed, 6.3 percent were under 100, 31.3 percent were 100-500, 33.8 percent were 500-1000, and 28.6 percent were 1,000 or more. State-owned enterprises accounted for 31.3 percent, private enterprises 61.2 percent and other types 7.5 percent. It was 45.1 percent for heavy industry and 54.9 percent for light industry.

3.2 Scale Design

In order to ensure the reliability and validity of the variables, the corresponding questions for each observed variable proposed in this paper are from widely recognized questionnaires in foreign literature, and then continue to refer to the question design in domestic doctoral theses and Chinese core journal articles, and finally modify and supplement the actual situation of employee safety production. The questionnaire adopts Likert 5-point scoring method, from 1 to 5, indicating "completely inconsistent" to "completely consistent" respectively. After the questionnaire was designed, experts and scholars were invited to review the questionnaire, and the teachers of human resource management were discussed, gradually modified and improved, and the formal questionnaire scale was finally determined. The questionnaire includes four factors and 30 measurement items.

Employee Initiative. We adapted a 7-item scale from M, D et al. and Seibert, KraimerJ et al. to measure subordinates' employee Initiative. Two sample items were "I'm always looking for a better way to do things," and "If I see something at work that is inappropriate, I will improve it, even if it is not a work rule" [38-39].

Safety awareness. We employed a 5-item scale adopted from Zhang and Wu, Yufang and Jifa to measure safety awareness. Example items were “I think the safety work is more important than the project schedule” and “I understand the safety risk factors of construction sites” [40-41]. Stress perception. We adapted a two-item scale from Robertson, Cooper et al. to measure the leaders’ liking of each subordinate in our sample [42]. Example items were “The working environment is dangerous and the working

conditions are hard” and “My job has a lot of temporary tasks that aren't clearly explained”. safe production behavior. We adapted a two-item scale from Griffin, Neal et al. & Wang, Curcuruto et al. to measure the leaders’ liking of each subordinate in our sample. Example items were “I will publish safety recommendations related to production activities” and “I will tell managers about the serious consequences of unsafe production” [8, 43].

Table 1. Reliability and Validity of the Questionnaire

Latent Variable	Observed variables	Standard load	Cronbach's α	CR	AVE
Individual initiative	A1	0.65	0.820	0.8242	0.4397
	A2	0.65			
	A3(deleted)				
	A4	0.67			
	A5	0.62			
	A6	0.62			
	A7	0.75			
Safety awareness	S1	0.74	0.796	0.7987	0.499
	S2	0.64			
	S3(deleted)				
	S4	0.74			
	S5	0.68			
Stress perception	P1(deleted)		0.903	0.9041	0.5414
	P2	0.68			
	P3(deleted)				
	P4	0.71			
	P5	0.71			
	P6	0.76			
	P7	0.78			
	P8	0.76			
	P9	0.71			
	P10	0.77			
Safe production behavior	C1	0.72	0.870	0.8717	0.4595
	C2	0.66			
	C3	0.68			
	C4	0.67			
	C5	0.66			
	C6	0.66			
	C7	0.66			
	C8	0.71			

3.3 Data Analysis and Results

3.3.1 Common method deviation test

Since the survey data obtained in this paper are all from the same survey sample, in order to test whether there is serious common method bias in the sample data, Harman single factor test method is used to carry out unrotated factor analysis on all measurement items, and four factors are distilled, and the first factor can

explain 36.782% of the variance. Which is lower than the critical standard of 40%, indicating that there is no significant common method bias in the sample data.

3.3.2 Reliability and validity analysis

Cronbach's α coefficient was used to test the reliability of the scale. The Cronbach's α coefficients of employee initiative, safety awareness, work pressure and safety production behavior are 0.820, 0.796, 0.903 and 0.870,

respectively, all of which are close to or above 0.8, showing good internal consistency.

At the same time, the observed variable standard load of each item is shown in the figure. The standard load greater than 0.6 is acceptable, while P3 is lower than 0.6. Therefore, this item is deleted, and the MI modification suggestion is accepted, and A3, P1 and S3 items are deleted.

The results are shown in Table 1. The AVE of safety awareness is 0.499 and close to 0.5 is acceptable. On this basis, the AVE of individual initiative and safe production behavior are both around 0.45. According to the standard of the paper of Fornell and Larcker, CR should exceed 0.6 and AVE should exceed 0.5 under ideal conditions. However, 0.36-0.5 is acceptable [44]. Therefore, all convergent validity terms are

satisfied, representing sufficient internal consistency of the dimensions. The comprehensive reliability test and validity test indicate that the reliability and validity of the questionnaire model are acceptable.

After the reliability and validity test, AMOS was used to analyze the fit index of employee initiative, safety awareness, work pressure and employee safety production behavior model. CMIN/DF was 2.234, greater than 1 and less than 3, RMSEA was 0.056, less than 0.08, CFI was 0.924, TLI was 0.916. IFI is 0.925, both of which are greater than 0.9, which indicates that the questionnaire data and the model have a good matching degree, and path analysis can be carried out on this basis.

Table 2. Results of Structural Equation Model Hypothesis Testing

Hypothesis path Testing	Estimate	S.E.	C.R.	P
Individual initiative <-- stress perception	-.537	.037	-8.487	***
Safety awareness <-- Individual initiative	.738	.094	10.140	***
Safe production behavior <-- safety awareness	.411	.072	5.428	***
Safe production Behavior <-- individual initiative	.476	.105	5.561	***
Safe production behavior <-- pressure perception	-.054	.033	-1.150	.250

Hypothesis testing

As can be seen from the results of hypothesis testing of structural equation model in Table 2, the four path hypotheses related to employee safety production behavior are significant, and the hypothesis paths H1, H2a, H2b and H3a are verified, while H3b is not significant, but has a negative effect. According to the path coefficient, safety awareness and individual initiative have a direct positive impact on employees' safe production behavior, pressure perception has a direct negative impact on employees' safe production behavior, individual initiative has a positive impact on safety awareness, and pressure perception has a negative impact on employees' individual initiative. Among them, the direct negative impact of pressure perception on employees' work safety behavior is not significant, which may be due to the fact that some sources of pressure perception do not have a great direct influence on safety behavior, and most of such influence is exerted by influencing

employees' initiative.

In this paper, AMOS 21.0 software was used to perform bootstrap 5000 times to obtain the test result, and 95% confidence region was adopted, as shown in Table 3. The results show that the total effect of individual initiative --> safety awareness --> safety production behavior is 0.372, the indirect effect accounts for 39% and the direct effect accounts for 61%. The total effect of pressure perception --> individual initiative --> safe production behavior was 0.219, the indirect effect accounted for 83%, and the direct effect accounted for 17%. In addition, the confidence interval of the two indirect effects does not contain 0, so it is assumed that the intermediary effect in the path exists significantly, and H2 and H3 are confirmed. This result also proves that the negative influence of pressure perception on work safety behavior exists, but the proportion is small and not significant.

Table 3. Mediating Effects

Path Design	Estimate	Bias-corrected Percentile		Percentile		P	Effect proportion
		Lower	Upper	Lower	Upper		
Individual initiative--> Safety awareness-->Safety production behavior	.372	.146	.649	.144	.647	.001	0.39
Direct Effects 1	.584	.277	.922	.275	.917	.000	0.61
Total effect 1	.956					.000	
Pressure perception --> Individual	-.181	-.300	-.089	-.294	-.084	.000	0.83

initiative-->safe production behavior							
Direct Effects 2	-.038	-.141	.061	-.139	.063	.445	0.17
Total effect 2	-.219					.001	

4. Conclusions

The conclusion of this study shows that: (1) employee proactive behavior can promote the production of safe production behavior. Employee's proactive behavior is always forward-looking, and employee's safe production behavior includes safety compliance and safety participation, in which safety participation is more active. This paper proves that employee's initiative can indeed increase employee's safe production behavior, pays attention to the factors of initiative in safety behavior, and provides a new perspective for future safety management. (2) Employees' proactive behavior promotes employees' safe production behavior by improving the level of safety awareness. The employee's safety awareness is the perception of the employee's safety knowledge level and safety situation, which are forward- looking, and the cognitive ability and attitude will be affected by the employee's initiative level. Therefore, the employee's proactive behavior will show the voluntary entry of some acquired knowledge, thus promoting the safety behavior. (3) When employees' perception of pressure is high, they will inhibit the occurrence of proactive behaviors, and then inhibit their safe production behaviors. Interpersonal relationship, family environment, organizational system, job responsibilities, working environment, and career development source of pressure fill the working environment of employees, and play a non-negligible role in employee initiative, which is consistent with the previous research on the impact of stress on employee behavior. Pay attention to various sources of stress in the work environment, distinguish challenging stress from obstructive stress, pay attention to the role of stress on employees' initiative, reconstruct employees' work environment and think about leaders themselves.

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References

- [1] Li, X. D., et al. "Two-factor theory and prevention of safety accidents." *Journal of Liaoning Technical University*, 2005,

22(1):1-4.

- [2] Niu L, Liu J, Li N. Study on SBM cross level model of human error driving force. *China safety science journal*, 2020, 30(12):43-51.
- [3] Bateman, T. S., & Crant, J. M. The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, 1993,14(2):103-118.
- [4] Bateman, T. S., & Crant, J. M. Proactive behavior: Meaning, impact, recommendations. *Business Horizons*, 1999, 42(3):63-70.
- [5] Parker, S. K. and C. A. Sprigg. "Minimizing strain and maximizing learning: the role of job demands, job control, and proactive personality." *Journal of Applied Psychology*, 1999, 84(6):925.
- [6] Grant A M, Ashford S J. The dynamics of proactivity at work. *Research in organizational behavior*, 2008, 28:3-34.
- [7] Earnest, G. S. Behavior-based safety management. *Professional Safety*, 1985, 30(7):18-23.
- [8] Griffin M, Neal A, Neale M. The contribution of task performance and contextual performance to effectiveness: Investigating the role of situational constraints. *Applied Psychology*, 2000, 49(3):517-533.
- [9] Su-Xia, L. and M. Qiang. "Study on Evolution Route of Workers' Safety Participation Behavior in Small and Medium-size Enterprises." *China Safety Science Journal*, 2012, 22(2):164-169.
- [10] Su-Xia, L. and M. Qiang. Study on evolution route of workers' safety participation behavior in small and medium-size enterprises. *China Safety Science Journal*, 2012, 22(2):164-170.
- [11] Hu, Y., & Xu, B. L. Job insecurity, quality of work life and safety behavior. *Journal of Safety Science and Technology*, 2014, 10(2):69-74.
- [12] Thompson and A. Jeffery. "Proactive personality and job performance: a social capital perspective." *Journal of Applied Psychology*, 2005, 90(5):1011-1017.
- [13] Zhang Z, Wang M O, Shi J. Leader-follower congruence in proactive

- personality and work outcomes: The mediating role of leader-member exchange. *Academy of management journal*, 2012, 55(1):111-130.
- [14] Tang, Y. H., Zhao, C. H., Mao, J. H., & Ding, Z. K. The relationship between employees' proactive behavior and their innovation performance: The perspective of status competition. *Science Research Management*, 2021, 42(3):191-200.
- [15] Li, L. L., & Huang, G. "Advantages and disadvantages" of individual proactive behavior in organizations. *Advances in Psychological Science*, 2021, 29(8):1484-1496.
- [16] Zhang, Y., Duan, J. Y., Wang, F. X., Qu, J. Z., & Peng, X. L. "Attraction of the like": How does coworkers' proactive behavior stimulate employees' motivation and job performance? *Acta Psychologica Sinica*, 2022, 54(5):516-528.
- [17] Su-Xia, L., et al. "Literature Review on Safety Performance." *China Safety Science Journal*, 2010, 20(5):131-139.
- [18] Zhang, Y. and F. Yang. "Proactive personality: Mechanisms and future directions (in Chinese)." *Advances in Psychological Science*, 2017, 25(9):1544-1551.
- [19] Lin, X., et al. "Meta-analysis on relationship between leadership style and employee safety behavior." *Journal of Safety Science and Technology*, 2021, 17(10):5-10.
- [20] Wu M, Ye Y, Ke L, et al. Characteristics analysis and situation prediction of production safety accidents in non-coal mining. *Resources Policy*, 2023, 83:103745.
- [21] Liang Q, Zhou Z, Ye G, et al. Unveiling the mechanism of construction workers' unsafe behaviors from an occupational stress perspective: A qualitative and quantitative examination of a stress-cognition-safety model. *Safety science*, 2022, 145:105486.
- [22] Jun, X. and Y. Ming. "Active coping or avoidance? The effect of proactive personality on the relationship between workplace ostracism and organizational citizenship behavior." *Acta Psychologica Sinica*, 2016.
- [23] Mensmann, M. and M. Frese. "Who stays proactive after entrepreneurship training? Need for cognition, personal initiative maintenance, and well-being." *John Wiley & Sons Ltd*, 2019, 40(1):20-37.
- [24] Li, L. L., & Huang, G. "Advantages and disadvantages" of individual proactive behavior in organizations. *Advances in Psychological Science*, 2021, 29(8):1484-1496.
- [25] Guoquan, C. and C. Zidong. "Empirical Study on Impact of Proactive Personality on Individual Learning Capability." *Technology Economics*, 2017, 17(10):5-10.
- [26] B, Y., et al. "The relationship between proactive personality and college students' career maturity: A moderated mediation model." *Psychological Development and Education*, 2020, 36(3):304-310.
- [27] Clarke and Sharon. "The relationship between safety climate and safety performance: a meta-analytic review." *Occup Health Psychol*, 2006, 11(4):315-327.
- [28] H, Z. and F. S. "Causation analysis of seafarers' unsafe acts: An investigation on individual features and safety consciousness." *Ocean Engineering*, 2023, 286(2):115569.
- [29] J, S., et al. "Empirical study on the effect of safety atmosphere on the safety performance in the construction enterprises." *Journal of Safety and Environment*, 2014, 14(2):60-64.
- [30] Rui-Lin, C., et al. "Emotional Resilience and Perceived Stress Scale of the New Generation Rural Migrant Workers: Moderating Effects of Proactive Personality." *Journal of Agro-Forestry Economics Management*, 2014, 13(6):636-642.
- [31] Ying-Shuang, M. A., et al. "Creative Job Requirement and Employee Creativity: A Moderated Mediating Model." *Forecasting*, 2018, 37(1):8-14.
- [32] Wang Z, Zhang J, Thomas C L, et al. Explaining benefits of employee proactive personality: The role of engagement, team proactivity composition and perceived organizational support. *Journal of Vocational Behavior*, 2017, 101:90-103.
- [33] Wang C, Zhang J, Xiao X, et al. "Examining the dimensions and mechanisms of tourists' environmental behavior: A theory of planned behavior approach." *Journal of Cleaner Production*, 2020, 273:123007.
- [34] Mawritz M B, Folger R, Latham G P.

- "Supervisors' exceedingly difficult goals and abusive supervision: The mediating effects of hindrance stress, anger, and anxiety." *Journal of Organizational Behavior*, 2014, 35(3):358-372.
- [35] Dewen L, Weihe G, Liangyu M. "Challenge or hindrance? The impacts of customer participation on employees' ambidextrous innovative behavior." *Foreign Economics & Management*, 2020, 42(7):3-20.
- [36] Cavanaugh, M. A., et al. "An Empirical Examination of Self-Reported Work Stress among U.S. Managers." *Journal of Applied Psychology*, 2000, 85(1):65-74.
- [37] Gutnick, D., et al. "Creative performance under pressure: An integrative conceptual framework." *Organizational Psychology Review*, 2012, 2(3):189-207.
- [38] Morrison, E. W., and Phelps, C. C. Taking charge at work: Extrarole efforts to initiate workplace change. *Academy of Management Journal*, 1999, 42(4):403-419.
- [39] Seibert, S. E., et al. "What do proactive people do? A longitudinal model linking proactive personality and career success." *Personnel psychology*, 2001, 54(4):845-874.
- [40] Zhang, J. and C. Wu. "The influence of dispositional mindfulness on safety behaviors: A dual process perspective " *ACCIDENT ANALYSIS PREVENTION*, 2014, 70:24-32.
- [41] Yufang, S. and L. Jifa. "Research on the impact of construction workers fatigue on unsafe behaviors based on SEM." *Journal of Xi'an University of Science and Technology*, 2020, 40(04):712-719.
- [42] Robertson, I. T., et al. "The validity of the occupational stress indicator." *Work & Stress*, 1990, 4(1):29-39.
- [43] Wang Q, Curcuruto M, Mei Q, et al. Agent - Based Modeling of Employee Protection - Oriented Safety Proactivity Behaviors at Small Scale Enterprises. *BioMed Research International*, 2019(1):2471418.
- [44] Zhang, Z. and L. Zheng. "Consumer community cognition, brand loyalty, and behaviour intentions within online publishing communities: An empirical study of Epubit in China. *Learned Publishing*." *Learned Publishing*, 2021 34(2):116-127.