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Abstract

Purpose – In the absence of previous work, this study investigates how the psychological contract (PC) influences the safety performance of construction workers in China.

Design/methodology/approach − The literature is first consulted to obtain a set of PC and safety performance measures that fits the specific situation of construction workers, which is then moderated by five construction experts. A questionnaire survey of 206 workers from 4 different construction sites is followed by a descriptive statistical analysis of the nature of the PC and level of the safety performance of the respondents. Finally, a regression analysis is used to ascertain the level of influence of the PS, and an analysis is made of the influence of PC on safety performance.

Findings − A set of PC and safety performance measures is identified that fits in the construction workers' specific situation. The PC of the respondents is found to be intact and well-performed, and their safety performance is maintained at a high level. Safety performance is highly influenced by the state of the PC, with the three dimensions of safety performance (safety result, safety compliance, and safety participation) positively correlated with the three dimensions of the PC (normative, interpersonal, and developmental).

Originality/value − Suggestions are made to improve safety production management and safety performance by providing adequate material and economic conditions, helping the workers establish good interpersonal relationships, and realize their personal values.

Keywords Psychological Contract; Safety Performance; Safety Production Management

Paper type Research paper

1. Introduction

Construction has been one of the pillar industries in national economies for a long time (National Bureau of Statistics of China, 2018; Tong *et al.,* 2021). Construction sites are labor-intensive, and their workers are often placed in a rugged environment, involving a high level of technical and

operating difficulties (Chan *et al.,* 2017). As a result, accidents occur relatively frequently. Safety management is therefore of great importance, and how to improve safety is an issue of serious concern.

Previous studies indicate individual unsafe behavior to be a major direct cause of accidents (Heinrich, 1959; Bird, 1974; Wu *et al*., 2017; Song, 2017) through the "domino effect" in triggering a chain reaction leading to an accident (Heinrich, 1959). Currently, construction workers in China and many other countries have a generally low level of education and a minimum awareness of safety precautions, largely relying on subjective experience and frequently failing to comply with safety norms (Xu *et al.,* 2021). Such behaviors easily lead to safety accidents: therefore, reducing unsafe worker behavior is the primary task of construction safety management.

One approach to this is through the *psychological contract* (PC), an important perspective that has become an increasingly popular research topic in this journal in particular over the years, including in employee career expectations (Dainty *et al*., 2000), the expectations of project managers (Dainty *et al*., 2004), improved organizational innovations (Egbu, 2004), the motivation of workers (Liu *et al.,* 2007), knowledge sharing (Wang and Shi, 2019), the efficacy of trust (Wang *et al*., 2019), construction manager burnout (Franz *et al*., 2021), and renegotiating relationships within the PPP scheme (Feng *et al*., 2022). In terms of construction safety, studies involving PC are replete, with major contributions by Newaz (2018), Newaz *et al*. (2016a, 2016b, 2018, 2019a, 2019b, 2019c, 2020a, 2020b, 2021a, 2021b), Novieto (2021) and many others.

These show that the performance of the employees' PC has a significant effect on their work attitude, behavior, and performance. Whenever workers enter their working environment, they are considered to form a PC relationship with the employer, which determines their attitude and behavior. By establishing the PC, individuals can gauge the balance of the responsibilities and obligations of both parties and then adjust their attitudes and behaviors accordingly – ultimately affecting the individual's work performance (Marques, 2011).

However, none of these studies have considered the construction safety dimensions of safety compliance and safety participation, for instance, which have been identified as being important different perceptions of the work environment and perceptions of performance related to safety (Griffin and Neal, 2000). Similarly, yet to be considered in the context of construction safety are Li's (2002) "normative", "interpersonal", and "developmental" dimensions of PC (identified in studying 796 Chinese employees). Therefore, the present study examined the relationship between the dimensions of PC and the safety of construction workers through a questionnaire survey of 206 construction workers on four different construction sites in Foshan, Qingyuan, and Guangzhou in southeast China. Two hypotheses were tested − that *the employees' PC has a significant effect on safety performance as a whole* and that *there is a positive correlation between different dimensions of PC and different dimensions of safety performance*.

The paper is organized as follows. First, a brief literature review is presented to provide background to the study and form an initial set of PC and safety measures to fit the specific situation of construction workers. Then, the two hypotheses are proposed, followed by a description of the method used to test them. The results are then presented and discussed, along with suggested practical implications for management practice.

2. Literature review

2.1 The psychological contract

There are many different interpretations of the PC. The term was first used by Argyris and Ditz (1960) as a result of interviewing workers and supervisors in factories to describe the perception and embedding of values held by both parties (organizations and individuals) in the employment relationship. He found that when the supervisor guarantees and respects the informal culture of employees, such as by encouraging them to work independently and providing them with adequate wages and job security, they tend to maintain high productivity and make fewer complaints. At first, the PC was defined as a non-written contract reflecting the expectations of organizations and

employees of each other (Levinson et al., 2013): it is an implicit and unexpressed expectation of a future relationship that has been formed before the formal employment relationship. Argyris and Ditz (1960) and Levinson et al's (2013) PC has two perspectives: individual and organizational. However, it is impractical to compare the expectations of different perspectives. Finding someone who can represent the organization to elaborate on the contract from an organizational perspective is almost impossible. As a result, based on previous studies, Rousseau (1990) proposed a narrower definition, in that involving the contract should focus on an individual perspective of the *employees'* perception of their mutual responsibility to *employers*. While some studies supported this, many also held that the contract embodies a belief of the employees' mutual responsibility with the organization: it is based on their subjective understanding of commitment, but these beliefs are not necessarily realized by the organization (Morrison and Robinson, 1997).

The PC involves thousands of aspects that are difficult to summarize comprehensively. Therefore, studies usually divide it into two-, three-, or even multi-dimensions, categorizing the content of similar attributes into the same dimension. For the *two-dimensional* version, Rousseau (1990), for example, analyzed a situation involving 129 MBA graduates about to start their jobs in three weeks, using a questionnaire to investigate their perceptions of both the employer and employee's responsibilities. A correlation analysis obtained two pairs of typical variables, comprising a "transaction contract" and a "relationship contract". The "transaction contract" includes the exchange of interests between employees and employers. Employees hope to obtain a high remuneration, bonuses, and development opportunities by working hard and taking on jobs beyond their remit. The "relationship contract" includes the exchange of emotions between employees and employers, the organization providing employees with adequate job security, and, in exchange, employees being loyal to the organization and wanting to work in the organization for a long time. Chen *et al*.'s (2004) principal component analysis of a survey of 642 employees from different industries found that both the employer and employee's responsibility contain the two factors of "realistic responsibility" and "developmental responsibility". For *the organization*,

realistic responsibility refers to protecting its employees' normal lifestyle by paying reasonable wages and bonuses. In contrast, development responsibility refers to employee development opportunities, such as creating promotion opportunities and long-term performance returns. For *employees*, realistic responsibility means they maintain the normal operation of the organization, such as striving to create benefits for the organization, being loyal, and constantly improving work skills, while development responsibility means they help the organization's future development, including accepting transfers, combining personal development with organizational development, and making suggestions for organizational development.

For the *three-dimensional* structure, Rousseau and Tijoriwala (1996), for instance, proposed an extra "team dimension" – stressing the importance of team cooperation – based on their study of U.S. registered nurses. Lee and Tinsley (1999) also extracted the transaction, relationship, and team factors in investigating and analyzing the employer and employee responsibilities of work teams in Hong Kong and the United States - finding that employees place a different emphasis on the PC structure because of their different social cultures. The United States employees pay more attention to transaction factors. In comparison, Hong Kong employees pay more attention to team factors – attributed to the extra importance of interpersonal contact and help during working hours in the context of Chinese culture. Li (2002), on the other hand, identified "normative", "interpersonal", and "developmental" dimensions in studying 796 employees. Here, *normative* responsibility is related to economic interests: it includes employers providing employees with a reasonable salary, and stable job security, and employees creating a performance for the organization; *interpersonal* responsibility is related to the development of interpersonal relationships, including the organization providing humanistic care and a harmonious interpersonal environment for employees, with employees, in turn, creating a good interpersonal environment for the organization; while *developmental* responsibility includes the organization providing training, promotion opportunities for employees, and the employees taking the initiative to undertake additional work.

The *multi-dimensional* structure was also proposed by Rousseau (2002), dividing the PC into *seven* dimensions: stability, loyalty, short-term transactions, limited liability, dynamic performance, and internal and external development. These were all validated by a questionnaire survey of 630 employees in Singapore and the United States.

2.2 Psychological safety

Psychological safety, which has a history that can be traced back to the 1960s (Schein and Bennis, 1966), focuses on people's perceptions of the consequences of taking interpersonal risks in the workplace (Edmondson and Lei, 2014). The studies of psychological safety can be divided into three groups at the individual, team, and organizational levels. From the perspective of individuals, psychological safety refers to an individual subjective perception of the impact on their image, personal status, and career (Khan, 1990). A higher level of psychological safety can enhance the employees' work enthusiasm and increase their willingness to express themselves in the workplace. Psychological safety is the shared cognition of team members of whether they will be punished for the interpersonal risks they are involved in at the team level (Edmondson, 1999). For a work team, a higher psychological safety degree is constructive to the interpersonal relationships within the team and helps form a team-friendly atmosphere. For organizations, psychological safety is related to their members' support for organizational management, self-positioning, and the atmosphere of expression (Brown and Leigh, 1996). Compared to the individual level, team and organization psychological safety emphasizes the environmental characteristics felt by members.

Considering the inherent dangerousness of the construction industry (Idrees et al., 2017), construction worker safety is recognized as a major concern at construction sites, and their psychological safety is given special attention in the literature (Feng et al., 2015). Shen et al. (2015b) developed a conceptual framework for forming a desired psychological safety climate from structural, perceptual, interactive, and cultural perspectives. Shen et al. (2015a) also investigated the factors contributing to a favorable psychological safety climate on construction

sites from the individual perspective. They built a multi-perspective framework based on the responses to a construction project personnel questionnaire. Larsson et al. (2008) found reliable relationships between construction workers' perceptions of psychological climate, work outcomes, and safety behaviors.

2.3 Safety performance

Safety performance is an important indicator of the effectiveness of safety production management and has become a popular topic for researchers. It has several definitions due to different considerations and applications. For example, Borman and Motowidlo (1997) point out that the two main components of performance are task performance and relationship performance. Based on this, safety performance has been defined as safety *compliance* and *participation*, corresponding with task and relationship performance, respectively (Griffin and Neal, 2000). In contrast, Sawacha *et al*. (1999) define it as the degree of injury caused by safety accidents, including organization and individual aspects; Zohar (2000) defines it as the incidence of minor injuries requiring medical treatment and rest; while it is the accident rate and occupational injury for Siu et al. (2004). Christian *et al*. (2009) found the different definitions to be based on two completely different concepts, either referring to the safety *results* of organizations (such as the number of accidents per year) or individual safety *behavior*, arguing that both should be included in the definition of safety performance.

As with the PC, safety performance is often divided into a two-, three-, and multi-dimensional structure. For the *two-dimensional* version, as noted above, Griffin and Neal (2000) identify safety compliance and safety participation. The former denotes the key safety activities that individuals must perform to maintain workplace safety, while the latter concerns individual voluntary participation in safety improvement activities, such as safety activities or safety meetings. Christian *et al*. (2009) focus on safety behavior and safety results. Further dividing safety behavior into safety compliance and participation provides a *three-dimensional* structure of safety performance. Meanwhile, for the *multi-dimensional* structure, Wu (2005) has divided safety

performance into six dimensions: safety organization and management, safety facilities and measures, safety training, safety training evaluation, accident investigation, and accident data.

In recent years, studies have shifted their focus from concept definition to empirical research in different fields. In terms of PC and psychological safety, their impact on employees' work performance has become a research hotspot. However, most studies focus on teachers, knowledge workers, or white-collar workers in other professions, and fewer on front-line workers. Regarding safety performance, the psychological factors influencing safety performance have been explored, while only some studies include PC as a factor in the safety performance of construction workers.

3. **Hypotheses**

Examining the literature suggests two likely and fundamental hypotheses:

H1: The employees' PC has a significant effect on safety performance as a whole.

H2: There is a significant positive correlation between different dimensions of PC and different dimensions of safety performance.

The following sections are concerned with testing these hypotheses and considering the implications of the results.

4. **Method**

4.1 Questionnaire development

A three-dimensional structure is used to divide both PC and safety performance constructs. The specific reasons are as follows:

(1) For a PC, the "team dimension" better reflects the characteristics of team-based organizations, especially in Chinese enterprises, which take measures to cultivate a traditional harmonious atmosphere and encourage cooperation between employees to achieve business goals.

(2) For safety performance, the "safety outcome" dimension is an important index for measuring the achievement of safety production management. It therefore reflects the whole connotation of safety performance more comprehensively than the two-dimensional structure.

A structured questionnaire is adopted here as a robust tool for a detailed academic inquiry involving a large population of construction personnel. Based on Maslow's (1943) Hierarchy of Needs and Social Exchange, an initial design was conditioned by a wide-ranging literature review identifying the items likely to be related to PCs and safety performance at construction sites. The questionnaire items developed this way were revised by interviews with six experts comprising an associate professor and five employees from different construction enterprises, four of whom were working on construction sites. All had sufficient industry experience and a good understanding of the situation of construction workers. The revisions included: (1) deleting items with a similar connotation and can be regarded as repetitive, (2) deleting items that do not conform to the actual situation of construction workers, and (3) using more straightforward item descriptions to enable construction workers to grasp their meaning easily. Table I summarises the final items included in the questionnaire, with 15 items from three dimensions of the PC (normative, interpersonal, and developmental) and 14 items from three dimensions of safety performance (safety result, safety compliance, and safety participation).

--- insert Table I here ---

Two hundred fifty questionnaires were distributed to workers on four different construction sites in Foshan, Qingyuan, and Guangzhou, and 238 were returned. After eliminating invalid questionnaires (mainly because of unanswered questionnaires and the items for PC and safety performance all checked as “fully agreed”), 206 valid questionnaires remained – an effective response rate of 82.4%.

4.2 Statistical analysis

SPSS 19.0 and AMOS 20.0 are used to test the reliability and validity of the questionnaire data and conduct linear regression and correlation analysis. Cronbach's alpha test is commonly used in

questionnaire validation studies (Bujang et al., 2018), and used here to assess the whole and the dimensions of the PC and safety performance constructs. The expert interviews used in designing the questionnaire ensure it has good content validity, and factor analysis is used to test its structural validity. The average score of each item for the three PC and safety performance dimensions are used to measure the levels of the respondents. Linear regression is a statistical analysis method to determine the quantitative relationships between two or more variables, and correlation analysis is used to study the correlation relationship between two variables (Eberly, 2007). Linear regression tests the effect of PC on safety performance and correlation analysis between different PC and safety performance dimensions.

5. **Results**

5.1 Reliability and validity assessment

Table II shows the results of the reliability and validity test, indicating that, with all Cronbach alpha values over 0.80, reliability is very good.

--- insert Table II here ---

Table III gives the results of the pre-analysis tests, indicating that, with KMO between 0.8 and 0.9 and Bartlett's spherical test significance less than 0.05, the correlation between variables is strong enough for factor analysis.

--- insert Table III here ---

Tables IV and V show the results of the confirmatory factor analyses. With constituent reliability (CR) all higher than 0.6, the internal consistency of each item is good, while the average variances extracted (AVE) are all 0.500, also indicating good convergence validity. Therefore, the two constructs' reliability and convergence validity meet the requirements of factor analysis.

--- insert Table IV here ---

--- insert Table V here ---

5.2 PC state of construction workers

Table VI shows that the average score of each PC item is above 4.5, which indicates that the respondents perform well in the PC. The interpersonal PC has the highest average dimension score of 4.74, with "communication between superiors and subordinates is smooth and obtains a harmonious relationship", "treat each employee sincerely", and "have a harmonious colleague relationship" being its highest scoring items. This can be interpreted as showing that the organizations create a harmonious interpersonal atmosphere, the hierarchical boundaries between superiors and subordinates are not overly strict, workers and superiors can communicate equally, organizations have a sincere attitude to workers, and the relationship between workers is harmonious. Next is the developmental PC, with an average score of 4.68. Here, the *lowest* scoring item is “create career development and promotion space”, which suggests that the workers are less career-minded or, more likely, the incentives provided by organizations in this respect are insufficient. The average score of normative PCs is the least; in particular, the lowest score is for the item "provide reasonable wages", again suggesting that monetary rewards and incentives are less than expected.

--- insert Table VI here ---

5.3 Safety performance state of construction workers

Table VII above shows that the average score of each safety performance item is also above 4.5, which indicates that the safety performance level of the respondents is also high. Safety compliance has the highest average dimension score of 4.78, indicating that the workers perform better in abiding by safety rules and regulations and carrying out safety operations according to regulations. A close second is the safety participation dimension (4.76), followed by the safety result (4.63). Here, the *lowest* score is 4.53 for the item "rate of safety accidents in construction sites is low”, which may be due to some workers experiencing safety accidents and thus scoring this item lower.

--- insert Table VII here ---

5.4 Regression analysis

The linear regression analysis of PC as the independent variable with safety performance as the dependent variable has a coefficient of determination, R, of 0.734, showing a strong relationship between variables. The R^2 of 0.539, between 0.5 and 0.8, denotes a general goodness of fit of the estimated model to the observed values. The variance analysis has an F value with 0.000 significance, indicating the model has strong explanatory power. Residual plots and the Durban-Watson and VIF statistics indicate no significant non-linear or non-additive, autocorrelation, multicollinearity, or heteroskedasticity features of the data.

Finally, Table VIII gives the analysis results showing that, with a coefficient of 0.923 (t=15.437, p=0), the strength of the PC has a massive effect on safety performance, and therefore H1 stands unrefuted.

--- insert Table VIII here ---

5.5 Correlation analysis

Table IX indicates a highly positive correlation between PC and safety performance of 0.845, with the correlation between different PC dimensions and safety performance dimensions all significant at the 1% level. H2, therefore also stands unrefuted.

--- insert Table IX here ---

6. Discussion

The findings show the employees' PC have a significant positive effect on and safety performance in the construction industry. This was also found in the study of Wang et al. (2021), which attributed this to the mediating mechanisms of PC making employees feel safety responsibility and safety-specific trust in supervisors at construction sites. PC was recognized as one of the determinants of employees' safety perception, which then affected their safety performance behaviors (Newaz et al., 2019c). The indirect impact of PC on safety performance was found to be more significant than that on accident-coping behaviors (Liang et al., 2022). Furthermore, Newaz

et al. (2021a) found a positive association between the fulfillment level of PC mutual obligations for employees and employers and safety performance, suggesting that the PC's fulfillment level also mattered in decreasing accidents in construction settings. Newaz et al. (2016b) held that construction workers' safety behavior could be shaped by PC and verified the mediated relationship between safety climate and safety performance by PC.

Due to the particularity of the construction industry in China, the country's construction workers face greater work pressure, and their operating processes involve higher safety risks. Therefore, the workers' unsafe behavior will cause serious consequences for themselves and their organizations, which makes the management of construction workers' safety behavior of great importance. The PC perspective can provide new ideas for standardizing workers' unsafe behavior. Accordingly, three suggestions for improving safety production management and enhancing safety performance in the construction industry are proposed.

(1) Sufficient material and economic conditions need to be provided for workers to maintain the balance of normative PC, which mainly involves providing employees with a reasonable salary, welfare, stable job security, and other related material and economic benefits. These basic needs of individuals need to be satisfied for workers to be motivated to improve safety performance. In practice, this includes providing sufficient wages to meet the needs of the workers' lives; paying wages on time; creating opportunities for promotion and salary increases; providing bonuses according to the workers' performance; not dismissing workers at will; and providing stable living and work security. Having a balanced normative PC helps workers work safely and be motivated to improve their safety performance.

(2) Workers need to be helped to establish good interpersonal relationships and create a harmonious interpersonal atmosphere. Introducing measures to meet the workers' emotional and belonging needs helps maintain the interpersonal PC at a high level. Chinese construction workers usually work in groups and live together; therefore, building good interpersonal relationships can help improve safety performance. To do this in practice includes: breaking

down the communication barriers between superiors and subordinates, creating smooth communication channels between superiors and subordinates; carrying out various types of off-the-job leisure activities; building a platform for workers' leisure; creating a harmonious living atmosphere and improving the relationship between colleagues; strengthening the workers' sense of emotional belonging; providing sincere concern and help to workers; and actively paying attention to the workers' work and life problems and preventing psychological dissatisfaction caused by these problems.

(3) Various ways need to be adopted to help workers realize their personal values and prevent the developmental PC from breaking down. Specific practical measures include: providing professional and technical training for workers so that their technical operation level can be improved; providing timely guidance to workers to help them accomplish their tasks better; providing a variety of challenging jobs that can enable workers to fully develop their potential; creating opportunities and channels for workers to be promoted; and enabling workers to have the opportunity to rise to high-level positions. Attending to the developmental PC of construction workers indicates the organization values them, encourages professional training to continuously improve their skills, obtain external support and help from the organization to achieve individual goals, and provides a stronger incentive to improve safety performance.

7. Conclusion

This study investigates how the PC influences the safety performance of construction workers through a questionnaire survey of workers from 4 different construction sites in China's Foshan, Qingyuan, and Guangzhou. The questionnaire comprises a set of questions (items) for each construct (the PC and safety performance), identified in an extensive literature review and validated by a group of five construction experts. The analysis of the 206 valid responses indicates the PC to be intact and generally well-performed, and their safety performance is maintained at a

high level. Cronbach's alpha, KMO, Bartlett's test, and an exploratory factor analysis indicate that the questionnaire items have good empirical reliability and validity.

The regression analysis confirms a highly significant relationship between the two constructs. In contrast, the correlation analysis shows that the three dimensions of safety performance (safety result, safety compliance, and safety participation) are positively correlated with PC dimensions (normative, interpersonal, and developmental). Therefore, when the workers' PC is good and the state is relatively balanced, their safety performance will be maintained at a high level. Hypothesis H1, that *the employees' PC has a significant effect on safety performance as a whole,* is therefore supported. Hypothesis H2, that *there is a significant positive correlation between different dimensions of PC, and different dimensions of safety performance,* is also very much supported.

Moreover, it is found that a subtle change in any PC item will influence safety performance, meaning that, in safety production management practice, all three PC dimensions need to be closely attended to at the same time. Based on exploring the relationship between PC and safety performance, the present study proposes targeted suggestions to help improve the safety production management and safety performance of the construction industry from the perspective of PC. This not only enriches the research fields of PC, psychological safety, and safety performance but also has practical significance for safety performance management of the construction industry.

The study is limited by sample size, location, and the lack of a long-term follow-up survey of construction workers. Moreover, PC may change significantly due to the dynamic characteristics of the surrounding environment. Being restricted to four different construction sites in China's Foshan, Qingyuan, and Guangzhou, the number and regional distribution of selected samples should also be appropriately expanded for further studies as a check on the heterogenous capacity of the results. Likewise, while the expectation is that the results will also apply to other similar regions of the world, further studies would reveal how much this is the case. Finally, an further elaboration could involve distinguishing the working years, types of work, and other

characteristics of the respondents, together with a long-term follow-up survey focusing on the dynamic changes and the factors impacting on workers' PC.

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Tables

Table I
Final items

Construct	Dimension	No.	Item
Psychological contract	Normative	P1	Provide reasonable wages
		P2	Provide social welfare (vacation, medical insurance, labor insurance)
		P3	Provide stable job security
		P4	Provide adequate resources
	Interpersonal	P5	Communicate smoothly between superiors and subordinates and obtain a harmonious relationship
		P6	Fully respect and trust employees and support them
		P7	Concern about employees' life and ideological problems
		P8	Care for the personal growth and development of employees
		P9	Obtain a harmonious colleague relationship
		P10	Treat each employee sincerely
	Developmental	P11	Provide training opportunities
		P12	Provide timely job guidance
		P13	Able to show skills in the work
		P14	Create career development and promotion space
		P15	Variety of challenging jobs
Safety performance	Safety result	S1	The rate of safety accidents in construction site is low
		S2	There are basically no safety accidents on site
		S3	Economic loss from safety accidents is low
		S4	Generally, site safety conditions are good
	Safety compliance	S5	I always follow the correct safety rules when I work
		S6	I abide by the safety rules and regulations of the enterprise
		S7	I work in the safest possible state
		S8	I always use all the necessary safety facilities when I work
		S9	I work safely even if the foreman does not supervise
	Safety participation	S10	I will participate in the safety risk assessment of the company
		S11	I will take the initiative to correct my colleagues' wrong actions or ideas
		S12	I will take the initiative to demonstrate to my colleagues the correct method of operation
		S13	I will make suggestions for improving safety in production
		S14	I volunteer to take part in activities to improve workplace safety

Table II

Reliability analysis results

Dimension	Cronbach's alpha	N
Normative	0.806	4
Interpersonal	0.817	7
Developmental	0.802	4
Psychological contract	0.910	15
Safety result	0.838	4
Safety compliance	0.811	5
Safety participation	0.808	5
Safety performance	0.899	14

Table III

KMO and Bartlett's spherical test results of the psychological contract and safety performance items

Test		Psychological contract	Safety performance
KMO		0.886	0.886
Bartlett's spherical test	Approximate chi-square	1579.143	1297.058
	df	105	91
	Sig.	.000	.000

Table IV

Validity analysis results of the psychological contract items

Dimension	Item	R	C.R.	CR	AVE
Normative	P1	0.798	10.487	0.798	0.500
	P2	0.557	7.432		
	P3	0.678	9.002		
	P4	0.717	/		
Interpersonal	P5	0.612	8.089	0.875	0.500
	P6	0.619	8.173		
	P7	0.696	9.113		
	P8	0.691	9.057		
	P9	0.646	8.510		
	P10	0.685	8.982		
	P11	0.685	/		
Developmental	P12	0.689	6.868	0.799	0.500
	P13	0.63	6.529		
	P14	0.601	6.348		
	P15	0.524	/		

Table V

Validity analysis results of the safety performance items

Dimension	Item	R	C.R.	CR	AVE
Safety Result	S1	0.883	9.769	0.797	0.500
	S2	0.702	8.393		
	S3	0.799	9.240		
	S4	0.635	/		
Safety Compliance	S5	0.508	6.601	0.831	0.500
	S6	0.541	7.000		
	S7	0.667	8.415		
	S8	0.731	9.901		
	S9	0.658	/		
Safety Participation	S10	0.651	6.827	0.832	0.500
	S11	0.704	7.128		
	S12	0.671	6.943		
	S13	0.566	6.275		
	S14	0.515	/		

Table VI

Psychological contract state

Dimension	No.	Item	AVG	SD	N
Normative	P1	Provide reasonable wages	4.50	0.58	206
	P2	Provide social welfare (vacation, medical insurance, labor insurance)	4.71	0.63	206
	P3	Provide stable job security	4.62	0.54	206
	P4	Provide adequate resources	4.67	0.52	206
Interpersonal	P5	Communication between superiors and subordinates is smooth and obtains a harmonious relationship	4.78	0.45	206
	P6	Fully respect and trust employees and support them	4.66	0.51	206
	P7	Concern about employees' life and ideological problems	4.72	0.51	206
	P8	Care for personal growth and development of employees	4.71	0.50	206
	P9	Have a harmonious colleague relationship	4.76	0.50	206
	P10	Treat each employee sincerely	4.78	0.45	206
Developmental	P11	Provide training opportunities	4.71	0.56	206
	P12	Provide job guidance in time	4.76	0.48	206
	P13	Able to show skills in the work	4.73	0.49	206
	P14	Create career development and promotion space	4.55	0.64	206
	P15	Various and challenging job	4.65	0.63	206

Table VII

Safety performance state

Dimension	No.	Item	AVG	SD	N
Safety Result	S1	The rate of safety accidents on site is low	4.53	0.60	206
	S2	There are basically no safety accidents on site	4.67	0.55	206
	S3	Economic loss resulting from safety accidents is low	4.60	0.60	206
	S4	Generally, the safety condition of the site is good	4.73	0.48	206
Safety Compliance	S5	I always follow the correct safety rules when I work	4.80	0.43	206
	S6	I abide by the safety rules and regulations of the enterprise	4.81	0.45	206
	S7	I will work in the safest possible state	4.77	0.46	206
	S8	I always use all the necessary safety facilities when I work	4.74	0.51	206
	S9	I will work safely even if the foreman does not supervise	4.79	0.43	206
Safety Participation	S10	I will participate in the safety risk assessment of the company	4.74	0.48	206
	S11	I will take the initiative to correct my colleagues' wrong actions or ideas	4.74	0.51	206
	S12	I will take the initiative to demonstrate to my colleagues the correct method of operation	4.80	0.43	206
	S13	I will make suggestions for improving safety in production	4.77	0.46	206
	S14	I volunteer to take part in activities to improve workplace safety	4.76	0.47	206

Table VIII

Regression analysis

	Nonstandardized Coefficient		Standardized Coefficient	t	Sig.	95.0% Confidence Interval of B	
	B	Standard Error	Trial Version			Lower Limit	Upper Limit
(Constant)	0.314	0.28		1.119	0.264	-0.239	0.867
Psychological Contract	0.923	0.06	0.734	15.437	0	0.805	1.041

Table IX
Correlation analysis results

Construct/dimension	AVG	SD	Normative	Interpersonal	Developmental	*Psychological Contract*	Safety Result	Safety Compliance	Safety Participation	*Safety Performance*
Normative	4.63	0.44	1							
Interpersonal	4.73	0.36	.771**	1						
Developmental	4.67	0.42	.653**	.700**	1					
Psychological Contract	4.68	0.36	.906**	.907**	.878**	1				
Safety Result	4.63	0.46	.686**	.650**	.635**	.734**	1			
Safety Compliance	4.78	0.33	.689**	.787**	.512**	.732**	.561**	1		
Safety Participation	4.76	0.34	.709**	.768**	.608**	.771**	.667**	.789**	1	
Safety Performance	4.72	0.33	.788**	.823**	.671**	.845**	.876**	.859**	.910**	1