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# A Study of the Impact of Personal Initiative on Safety Production Management Mode Transition: Based on the Perspective of Social Cognitive Theory and Anthropology Embeddedness Theory

Shi LIPING[1], Teng YUN[2]

## Abstract

"How to make safe production management model change into a new model meeting the real needs", has become the important subject faced by the researchers and practitioners of the current production safety management. From the perspective of individual initiative, this study attempts to use social cognitive theory and anthropology Embeddedness theory to answer the question. This study verifies the influence of personal initiative on safety production management mode transition with 1556 questionnaires from 73 manufacturing enterprises in China. The reliability and validity of all the scales were found acceptable. Path analysis using SPSS-19 and AMOS-17 software showed that there is a significant positive correlation between personal initiative and safety production management mode transition; three dimensions of safety individual behavior (safety passive behavior, safety controlled behavior and safety initiative behavior) play a partial mediating role in personal initiative and safety production management mode transition; three dimensions of on-the-job embeddedness (organization fit, organization link and organization sacrifice) can strengthen the positive correlation between personal initiative and safety production management mode transition. These findings made a new addition to the production management mode transition theory, and had guide significance for enterprises to improve production safety management level.

*Keywords:* personal initiative, safety individual behavior, safety production management, transition, social cognitive theory, anthropology embeddedness theory.

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## Introduction

The root cause of a great majority of industrial safety accidents in the past can be traced back to the absence of an adequate safety production management mode. Industrial safety accidents not only were a crisis to human life, but also gave rise to property damage and environmental pollution, such as fires, explosions and chemical leak (Khan & Abbasi, 1999, Reniers *et al.* 2006). Typically, the Bhopal gas or Chernobyl nuclear accidents have demonstrated the negative effects of modern technology (Willey *et al.,* 2005; Saraf & Karanjikar, 2006). At present, people gradually realize that safety production management mode plays an important role in realizing the improvement of safety production management level. A safety production management mode refers to a managerial system brought up by an organization to keep the damage of personnel and property within the limit during the production. This managerial system includes the idea, method and the system of security management, which is considered to be a rule, to be imitated, spread and learned by others. This mode aimed at positive effect on the employees' safety attitudes and safety behaviors, thereby increasing their safe acts and reducing their unsafe acts (DeJoy *et al.,* 2004). People mainly conduct study on safety production management mode transition from the angles of non-human factor and human factor. In the aspect of non-human factor, people put factors such as systematic management, cycle control thoughts and various management systems into safety production management mode; the safety production management work has achieved significant achievement, but the situation of safety problems is still grim (Wachter & Yorio 2013; Ching & Shu, 2014). In the aspect of human factor, the human factor plays a key role in the safety management performance (Attwood *et al.,* 2006; Hughes & Kornowa-Weichel, 2004; Nivolianitou *et al.,* 2004).Some scholars'findings of recent research on safety reveal that the human factor plays a key role in safety production management mode transition, examples of such defects include, among others, low individual characteristics, lack of instructions or appropriate training, employees demonization, lack motivating employees safety motivation, lack safe atmosphere, low management commitment to safety (Attwood *et al.*, 2006; Hughes & Kornowa-Weichel, 2004; Kwon, 2006 ). The researchers hold that compared with other human factors, personal initiative factor in personal feature factor has a stronger driving force to safety production management mode transition. It holds that human is the most active and the most decisive factor in production system. The safety production management mode transition shall fully exert personal initiative. Personal initiative is one of the key influential factors in safety production management mode transition. Study on the influence of personal initiative on safety production management mode transition has become a hot issue to which people pay attention (Vinodkumar & Bhasi, 2010; Reniers *et al.*, 2011; Zubaidah *et al.*, *2012; Crutchfield & Roughton,* 2014). However, few people have conducted comprehensive illustration and empirical test for the influencing process mechanism of personal initiative on safety production management mode transition.

"Triadic (human, behavior and environment) reciprocal determinism" in social cognitive theory has provided new perspective for the study on the influence of personal initiative on safety production management mode transition. From the logic of human influencing behavior and behavior influencing environment which is supported by triadic reciprocal determinism, we can deduce that the people with different initiatives influence safety production management mode transition through their various behaviors (Bandura, 1977). However, such a relationship may be influenced by the organizational embeddedness of person. Some scholars hold that compared with employee with low on-the-job embeddedness degree, those with high on-the-job embeddedness degree more actively participate in safety production activity, which is beneficial for effective operation and update of safety production management mode (Fernandez-Muniz *et al.*, 2007; Kines *et al.*, 2013). In view of this, this study will build a theoretical analytical framework for safety production management mode transition according to social cognitive theory and anthropology embeddedness theory, which includes personal initiative (antecedent variable), safety individual behavior (mediating variable) and on-the-job embeddedness (regulated variable), make empirical analysis, reveal the relationship between personal initiative and safety production management mode transition, so as to provide theoretical basis and practical guidance for realizing safety production management mode transition for enterprises.

## Research Hypothesis

### *Personal initiative and safety production management mode transition*

Personal initiative refers to a behavioral pattern that individual actively and spontaneously overcomes various obstacles and difficulties, tries to finish work task and finally realizes work objective, which includes three dimensions, namely, spontaneity, prospectiveness and tenacity (Frese *et al.,* 1997). Their explanation of these three dimensions is as follows: Spontaneity represents that individual completes some things under the condition of not informed, not guided and not required for the role. The objective that he/she pursues is not the objective assigned by others. Perceptiveness represents that individual will pay close attention to things from long-term angle rather than taking action when he/she must response to the demand; the individual can think about things that might happen and make advance preparation. Tenacity represents that individual constantly accept challenges, tackle with obstacle, eliminate interruption and fight against difficulties in the work action process (Jiang & Yuan, 2009). A domestic and international researcher divides the safety production management mode from the perspective of the management object, the initiative and passiveness of accident precautions and the observation of management system (Chang & Liang, 2009). Seldom are there documents in which safety production management mode is divided from the angle of transition. Its aim is to improve people's initiative in safety production management mode through a fundamental transform from passive mind to positive mind (Fernandez-Muniz *et al.*, 2007). Referring to the research results of Fernandez-Muniz *et al.*, 2007, and considering the concept of quantum transition, this study holds that safety production management mode transition refers to a salutatory mutation process of safety production management mode to a mode with higher exertion degree of people's initiative feature, when the effect of influence factors on safety production management mode reaches a certain degree, and each element in mode (management concept, management method and management system) has an essential change. The transition of safety production management mode is divided into two stages: from punishment type to regulation type, and then from regulation type to guided type. In recent years, studies on the relationship between personal initiative and safety production mode transition have been published one after another. Vinodkumar & Bhasi (2010) found that personal initiative plays a key boosting role in the improvement of safety production management elements of organization. Reniers *et al.* (2011) believe that safety production management mode is a system composed of a series of elements. Individual with high initiative can put forward constructive opinion for the construction and operation of safety production management mode; they have strong power to eliminate these unreasonable factors. Zubaidah *et al.* (2012) think that individual with high initiative has important positive influence on safety production management mode transition since they have features of spontaneity, perceptiveness and tenacity. *Crutchfield & Roughton* (2014) find that employee is the driving factor for safety production management mode transition; the organization shall motivate employee to actively participate in safety production management activity, promoting safety production management mode transform to a new mode that meet practical needs. Based on the above analysis, we have the following hypotheses:

Hypothesis 1: A significant positive correlation between personal initiative and safety production management mode transition, that the higher the personal initiative is, the better safety production management mode transition will be promoted.

### *Personal initiative and safety individual behavior*

Griffin and Neal (2000) divide safety behavior into safety compliance behavior and safety participation behavior. Hoffman *et al.* (2003) put forward the concept of safety citizenship behavior based on organizational citizenship behavior theory, amend and supplement the research result of Griffin and Neal (2000), include safety participation behavior and suggestion behavior into the constitutional dimension of safety citizenship behavior, and integrate safety compliance behavior and safety citizenship behavior into safety behavior. But the safety citizenship behavior put forward by Griffin, Neal and Hoffman only reflects the initiative component of individual behavior but neglects the passive component of individual behavior, which exactly is opposite to the opinion of Spector and Fox (2002). The individual self-decision behavior sourced from internal employee factor includes two types, namely, initiative behavior and passive behavior. The two behaviors are opposite. One behavior is the reverse result of the other behavior (LeBlanc & Kelloway, 2006; Farrell *et al.*, 2006). Based on the above analyses, safety individual behavior shall be composed of three dimensions, namely, safety passive behavior, safety controlled behavior and safety initiative behavior. Among which, safety controlled behavior refers to that in safety production activities, individual must execute the behavior required by job responsibility, defined by rules and regulations to ensure the safety production of organization. Safety initiative behavior refers to that in safety production activities, individual spontaneously conducts a behavior that exceeds the scope explicitly stipulated in formal job description and job responsibility description, and has positive impact on safety performance of organization. Safety passive behavior refers to that in safety production activities, individual implements the behavior which is contrary to safety citizenship behavior and has negative impact on safety performance of organization. Some scholars hold that personal initiative can predict safety individual behavior. When facing safety problem, individual with high initiative tends to adopt positive behavior to overcome the difficulty, while individual with low initiative tends to adopt withdrawal behavior (Carnino, 2012). Individual with high initiative tends to implement high level initiative safety behavior, while individual with low initiative tends to implement non-initiative safety behavior (Zohar, 2008). Based on their research results (Fernandez-Muniz *et al.*, 2007), it is found that initiative behavior is a subjective behavior affected by individual's inner psychological state; personal initiative feature is an effective predictor of initiative behavior; personal initiative plays an important role in safety citizenship behavior (Fernandez-Muniz *et al.*, 2014). Based on the above analyses, we have the following hypotheses:

Hypothesis 2: The correlation between personal initiative and safety individual behavior, that high personal initiative corresponds to safety individual behavior with high initiative component.

Hypothesis 2a: The higher the personal initiative is, the less safety passive behavior is.

Hypothesis 2b: The higher the personal initiative is, the more safety controlled behavior is.

Hypothesis 2c: The higher the personal initiative is, the more safety initiative behavior is.

### *Safety individual behavior and safety production management mode transition*

Through relevant theories of organizational behavior, Hofmann *et al.* (2003) analyzes and holds that safety participation is similar to the organizational citizenship behavior put forward by Smith *et al.* (1983) and exceeds the scope of due responsibility of individual; Hofmann and Stetzer (1996) defines the employee's safety participation behavior as safety citizenship behavior, and points out that safety citizenship behavior is beneficial to the improvement of each element of organization safety production management. Haytham *et al.* (2011) find that the improvement of organization safety production management mode mainly depends on the employee's spontaneous behavior beyond the provision. Safety production management mode is a complex system; the systemic interaction process is accompanied with various behaviors of employee; positive behavior of employee promotes the normal operation and optimization of system (Ching & Shu, 2014). Some researchers make further findings that employee behavior plays a key role in the operation of safety management mode; organization shall motivate employee to actively participate in the construction and operation of safety production management mode, and promote continuous renewal and optimization of safety production management mode (Marinova *et al.*, 2015). Based on the above analysis, we have the following hypotheses:

Hypothesis 3: The correlation between safety individual behavior and safety production management mode transition, that the safety individual behavior with higher initiative component can better promote the safety production management mode transition.

Hypothesis 3a: There are significant negative correlation between safety passive behavior and safety production management mode transition.

Hypothesis 3b: There are significant positive correlations between safety controlled behavior and safety production management mode transition.

Hypothesis 3c: There are significant positive correlations between safety initiative behavior and safety production management mode transition.

### *Mediating role of individual behavior*

"Triadic (human, behavior and environment) reciprocal determinism" put forward by Bandura, the representative of social cognition school, reveals the interactive relationship of individual and environment all-sided, and emphasizes the reciprocity of individual internal factor, behavior pattern and environment event (Bandura & Wood, 1989; Yeh & Fu, 2014). The interaction effect of triadic elements (human, behavior and environment) can better answer the question how individual influences safety production management mode transition, and whether safety individual behavior plays as a mediator between the two. Many scholars has referred to the basic concept of triadic reciprocal determinism of Bandura, and constructed various study models from the interaction of individual, behavior and environment. Based on social cognitive theory, Parker *et al.*, (2006) point out that individual with high initiative generally conducts spontaneous and predictable behavior to improve environment. Frese *et al.* (2007) conducts positive behavior study based on the reciprocal determinism of Bandura, and emphasizes that human is both the product and the producer of social system. Based on social cognitive theory, Griffin *et al.*(2007) point out that individual can actively transform environment through reflection and self regulation; active behavior of individual has spontaneity, change-orientation and focusing on future, mainly reflecting on the improvement of work environment. De Lange (2009) put forward positive shaper hypothesis by referring to triadic reciprocal determinism; they believe that positive problem solver can adopt positive behavior to change work environment. According to the analysis of relation that human – behavior – environment in social cognitive theory, together with the above-mentioned discussion, we draw two conclusions that individual initiative affects employees' individual safety behavior and individual safety behavior affects safety production management mode. It is reasonable to predict that individual safety behavior is the intervening variable of individual initiative and safety production management mode.

Hypothesis 4: Safety individual behavior mediates the relationship between personal initiative and safety production management mode transition.

Hypothesis 4a: Safety passive behavior mediates the relationship between personal initiative and safety production management mode transition.

Hypothesis 4b: Safety controlled behavior mediates the relationship between personal initiative and safety production management mode transition.

Hypothesis 4c: Safety initiative behavior mediates the relationship between personal initiative and safety production management mode transition.

### *Regulation role of on-the-job embeddedness*

The anthropologist Polanyi (1944) puts forward the concept of "embeddedness". Granovetter also puts forward the concepts such as social embeddedness, relational embeddedness and structural embeddedness in succession, and further infers that relational network has impact on individual (Granovetter, 1985; Granovetter, 1992). Mitchell firstly puts forward the concept of job embeddedness in combination of embeddedness theory (Mitchell *et al.*, 2001). Thereafter, Mitchell and Lee further divide job embeddedness into two dimensions (Lee *et al.*, 2004), namely, on-the-job embeddedness (organizational embeddedness) and off-the-job embeddedness (community embeddedness). Since this study emphasizes on the embeddedness relationship between individual and organization, off-the-job embeddedness is not included in the research framework. Based on the research results of Mitchell and Lee, this study selects three dimensions (organization fit, organization link, organization sacrifice) to reveal the embeddedness of human and organization. This study gives the definitions of these three dimensions as follows. Organization fit refers to the compatibility with organization and comfort that individual feels, mainly reflected in that individual and organization have consistent value, and that job competence fits with organization; organization link refers to a formal and informal link between individuals and between individual and organization, mainly reflected in the harmonious relationship between individual and other members of organization; organization sacrifice refers to the loss that can be felt due to demission of individual, mainly reflected in the material and spirit loss caused by individual's demission from organization. In recent years, on-the-job embeddedness factor was introduced to the field of safety management. In the process of studying on safety production management mode transition, Fernandez-Muniz *et al.* (2007) put forward that the main reason why previous safety production management mode fails is that organization pays less attention to employees' psychological factors, and that employees with high on-the-job embeddedness degree can have initiative behavior which is beneficial for safety production management, effectively improving safety production management mode; Kines *et al.* (2013) use 16 small and medium sized metal enterprises as study sample, and summarize that the on-the-job embeddedness degree of employee decides the initiative of employee, and the initiative facilitates safety production management mode transition. Based on the above analyses, we are able to infer that the impact of individual initiative and safety production management mode can be varied in different on-the-job embeddedness degrees. Weakening the individual initiative has passive impact on safety production management mode, so the positive impact should be enhanced. The hypotheses are as follows:

Hypothesis 5: On-the-job embeddedness can strengthen the positive correlation between personal initiative and safety production management mode transition.

Hypothesis 5a: Organization fit can strengthen the positive correlation between personal initiative and safety production management mode transition.

Hypothesis 5b: Organization link can strengthen the positive correlation between personal initiative and safety production management mode transition.

Hypothesis 5c: Organization sacrifice can strengthen the positive correlation between personal initiative and safety production management mode transition.

### *Hypothesized model construct*

According to above research hypotheses, the theoretical hypothesized model of this study is shown in Fig.1.

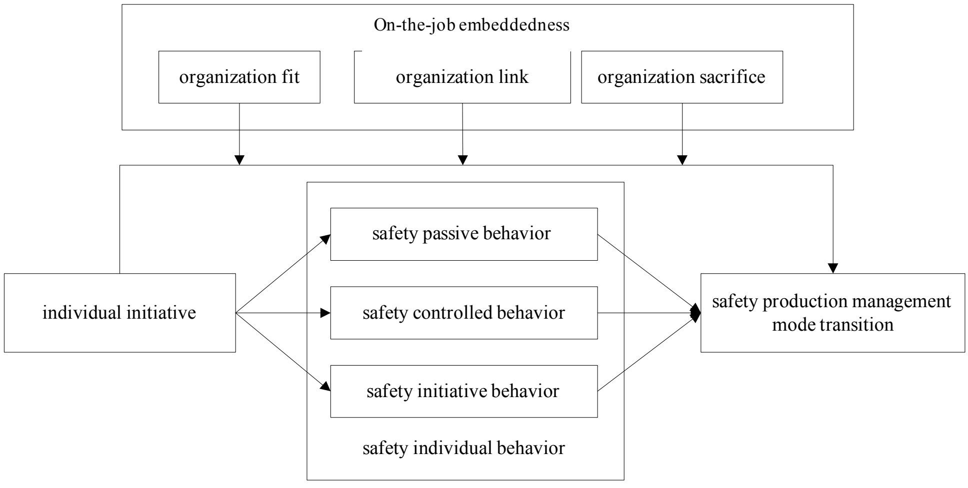


*Figure 1. Hypothesized model*

## Research methodology

### *Population and sample*

This study used 1000 grass-roots employees from 43 manufacturing enterprises in three provinces in the northeast of China as the objects. Before formal investigation and survey, pre-survey was conducted with employees (Nâ80) from 2 enterprises. These sample data were used to amend the questionnaire. Formal investigation and survey were conducted after qualified questionnaire. The time for formal field research was June 2014 to September 2014. Data collection process was completed with the support and coordination of Department of Human Resource Management and Department of Safety Production Management of each enterprise. Before investigation and survey, the researcher and human resource specialist or safety production management specialist jointly and randomly selected research objects. Upon survey, there is a specific survey instruction which solves the problem of questionnaire understanding. The grass-roots employees filled in the questionnaire. All questionnaires were granted and taken back in the same day. Until September 27, 2014, 1000 questionnaires were collected with the recovery rate of 100%. Through carefully studying and judging for 1000 questionnaires, and eliminating questionnaire with incomplete and inconsistent information, we obtained 836 questionnaires, with the effective rate of 83.6%. Among effective samples, male sample took up 39% of total samples; average age of sample was 33.8 years old; 54.9% had an education background above undergraduate; average years of working in the unit were 4.87 years.

### *Survey instrument*

Scales of this study: (1) Personal initiative scale used 7-item scale put forward by Frese *et al.* (1997) for reference; combined with research topic and pre-survey result, there was a total of 7 items (3 items on tenacity, 2 items on perceptiveness and 2 items on spontaneity) after amendment; (2) On-the-job embeddedness scale used 10-item scale put forward by Mitchell and Lee *et al.* (2004) for reference; combined with research topic and pre-survey result, there was a total of 10 items (4 items on organization fit, 3 items on organization sacrifice and 3 items on organization link) after amendment; (3) Safety controlled behavior used 5-item scale on safety compliance behavior put forward by Griffin *et al.* (2000) for reference, combined with research topic and pre-survey result, there was a total of 4 items after amendment; (4) Safety initiative behavior used 14-item scale on safety citizenship behavior put forward by Hoffman *et al.* (2003)for reference, combined with research topic and pre-survey result, there was a total of 8 items after amendment; (5) For safety passive behavior, scale backward processing method adopted by academic circle was used to backward process safety initiative behavior. Word order change was suitably conducted. A total of 8 items were obtained. The pre-survey result was good; (6) Safety production management mode transition scale used the 28-item scale put forward by Fernandez-Muniz *et al.* (2007) for reference, combined with research topic and pre-survey result, there was a total of 21 items (7 items on management concept reform, 6 items on management system change, 8 items on management method change) after amendment. All scales in this study adopted Likert level 1-5 scale, from 1 (strongly disagree) to 5 (strongly agree).

### *Data analysis*

This study used SPSS-19 software and AMOS-17 software to analyze the data collected in the survey, Data analysis involves three procedures: (1) Descriptive statistics and correlations of all variables were analyzed; (2) Confirmatory factor analysis was used to verify the validity and reliability of three determinants of personal initiative (Spontaneity, Perceptiveness, Tenacity), three determinants of safety individual behavior (Safety passive behavior, Safety controlled behavior, safety initiative behavior), three determinants of safety production management mode transition (Management idea change, Management institution change, Management institution change) and three determinants of on-the-job embeddedness (Organization fit, Organization link, Organization sacrifice); (3)Structural equation modeling (SEM) techniques were used to conduct the path analyses to test the hypotheses and the goodness of fit of the various models.

## Results

### *Descriptive statistics and correlation analysis*

*Table 1* contains the means, standard deviation and inter-correlation of all the measures. There are significant positive correlation between personal initiative and safety production management mode transition. There are significant negative correlation between personal initiative and safety passive behavior. There are significant positive correlations between personal Initiative and safety controlled behavior. There are significant positive correlations between personal initiative and safety initiative behavior. There are significant negative correlation between safety passive behavior and safety production management mode transition. There are significant positive correlations between safety controlled behavior and safety production management mode transition. There are significant positive correlations between safety initiative behavior and safety production management mode transition. There are significant positive correlation between on-the-job embeddedness and personal Initiative. There are significant positive correlation between three dimensions of on-the-job embeddedness (organization fit, organization link and organization sacrifice) and personal initiative. There are significant positive correlation between three dimensions of on-the-job embeddedness (organization fit, organization link and organization sacrifice) and safety production management mode transition. The correlation coefficients between the variables are shown in *Table 1*.

### *Reliability and validity analysis*

This study mainly referred to Cronbach's alpha coefficient as the index for reliability test of scale. The Cronbach's alpha coefficient of each scale in *Table 1* was greater than 0.7, which indicated that the scales had high reliability. The factor loading of all dimensions and items was above 0.5, which indicated that each dimension had high convergent validity. Average Variance Extracted (AVE) of all sub-dimensions was above 0.5, which indicated that the scale had good content validity. RMSEA of structure factor of all variables was less than the ideal value of 0.08. The rest fit indices reached the ideal level, that is, NNFI and CFI were greater than 0.09, and basically within the limit from 2 to 5, which indicated that the fitting of scale was good. The square root of AVE value of each sub-dimension was greater than the correlation coefficient with other sub-dimension, which indicated that the scale had high discriminated validity. Specific data were as shown in *Table 2*.

Table 1. *Descriptive statistics and correlation analysis results*

| | Mean | S.D. | Sex | Age | Yow | EB | T | P | S | SPB | SCB | SIB | MIC | MSC | MMC | OF | OJ | OS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sex | .39 | .489 | / | | | | | | | | | | | | | | | |
| Age | 2.457 | .866 | .145* | / | | | | | | | | | | | | | | |
| Yow | 2. 451 | .736 | -.103* | .293** | / | | | | | | | | | | | | | |
| EB | 2.566 | .485 | -.032 | -.181* | -.137* | / | | | | | | | | | | | | |
| T | 2.740 | .668 | -.064 | .183* | .125* | .115* | (.855) | | | | | | | | | | | |
| P | 2.871 | .694 | .017 | .029 | .028 | .271** | .653** | (.862) | | | | | | | | | | |
| S | 2.293 | .623 | -.030 | .032 | -.119* | .116* | .658** | .667** | (0.867) | | | | | | | | | |
| SPB | 2.011 | .589 | -.064 | .143* | .166* | -.026 | -.628** | -.618** | -.541** | (. 813) | | | | | | | | |
| SCB | 2.167 | .621 | .015 | .025** | .107* | .113* | .456** | .526** | .442** | -.625** | (.810) | | | | | | | |
| SIB | 2.874 | .635 | .047 | -.161* | -.154 | .326* | .621** | .656** | .645** | -.786** | .596** | (.872) | | | | | | |
| MIC | 2.831 | .768 | .172* | .092 | -.036 | .123* | .467** | .533** | .383** | -.614** | .598** | .731** | (.880) | | | | | |
| MSC | 2.750 | .719 | .102* | .021 | .084 | .129* | .365** | .482** | .514** | -.584** | .573** | .648** | .732** | (.857) | | | | |
| MMC | 2.806 | .745 | .088 | .242** | .014 | .162* | .325** | .497** | .463** | -.531** | .443** | .691** | .672** | .689** | (.702) | | | |
| OF | 2.558 | .665 | .029 | .137* | .125* | .024 | .523** | .532** | .446** | -.526** | .325** | .482** | .383** | .356** | .381** | (.804) | | |
| OJ | 2.503 | .636 | .018 | .024 | .324** | .037 | .482** | .472** | .482** | -.425** | .416** | .435** | .471** | .362** | .322** | .683** | (.825) | |
| OS | 2.063 | .604 | .065 | .063 | .189* | .119* | .521** | .584** | .564** | -.503** | .438** | .427** | .484** | .417** | .42 3** | .599** | .576** | (.822) |

Note: *N = 1556, **: correlations are significant at* $p \leq 0.01$ *level, *: correlations are significant at p 0.05 level.*

*Abbreviations: years of working (YOW); educational background (EB); organization fit (OF); organization link (OL); organization sacrifice(OS); safety passive behavior (SPB); safety controlled behavior (SCB); safety initiative behavior (SIB); management idea change (MIC); management institution change (MSC); management methods change (MMC); tenacity (T); perceptiveness(P); spontaneity (S).*

Table 2. Reliability and validity of all the scales

| *Dimensions* | *Sub-dimensions* | *Cronbach's alpha(α)* | *Factor loading* | *AVE* | *Fitting index* |
|---|---|---|---|---|---|
| personal initiative (II) | | 0.932 | | | |
| | Tenacity(T)<br>Perceptiveness(P)<br>Spontaneity(S) | 0.843<br>0.832<br>0.818 | 0.901<br>0.872<br>0.804 | 0.784<br>0.743<br>0.751 | $\lambda^2/df=2.72$ RMSEA(0.074)NNFI(0.93) CFI(0.94) GFI(0.90) |
| safety individual behavior (SPB) | | 0.920 | | | |
| | Safety passive behavior (SPB)<br>Safety controlled behavior(SCB)<br>safety initiative behavior (SIB) | 0.831<br>0.780<br>0.892 | 0.926<br>0.884<br>0.821 | 0.662<br>0.656<br>0.761 | $\lambda^2/df=2.09$ RMSEA(0.071) NNFI(0. 91) CFI(0.90) GFI(0.92) |
| safety production management mode transition (SPMMT) | | 0.930 | | | |
| | Management idea change (MIC)<br>Management institution change(MSC)<br>Management methods change (MMC) | 0.844<br>0.745<br>0.838 | 0.913<br>0.873<br>0.802 | 0.774<br>0.734<br>0.702 | $\lambda^2/df=2.56$ RMSEA(0.069) NNFI(0.91) CFI(0.92) GFI(0.91) |
| on-the-job embeddedness (OJE) | | 0.837 | | | |
| | Organization fit (OF)<br>Organization link (OL)<br>Organization sacrifice(OS) | 0.753<br>0.883<br>0.829 | 0.902<br>0.865<br>0.828 | 0.647<br>0.681<br>0.675 | $\lambda^2/df=2.38$ RMSEA(0.073) NNFI(0.92) CFI(0.93) GFI(0.90) |

*Abbreviations: AVE: average variance extracted, $\lambda^2/df$: chi-square/degrees of freedom, RMSEA: root mean square error of approximation, NNFI: Bentler-Bonnett normed fit index, CFI: comparative fit index, GFI: goodness-of-fit index.*

## *Path analysis*

### *Test for mediating effect*

This study firstly tested the mediating effect of safety passive behavior, safety controlled behavior and safety initiative behavior. The specific testing procedures were: Regression analysis was conducted to get personal initiative's impact on safety production management mode transition; Regression analysis was conducted to get personal initiative's impact on safety passive behavior, safety controlled behavior and safety initiative behavior; Regression analysis was conducted to safety production management mode transition through safety passive behavior, safety controlled behavior and safety initiative behavior. Regression analysis was conducted to safety production management mode transition through personal initiative, safety passive behavior, safety controlled behavior and safety initiative behavior. The result was shown in *Table 3*.

Hypothesis 1: In model 5, the regression coefficient of personal initiative to safety production management mode transition was significant (β = 0.218, $P < 0.01$), with explanation effect $R^2$ being 0.510. Hypothesis 1 was verified.

Hypotheses 2a, 2b and 2c: In models 1, 2 and 3, the regression coefficient of personal initiative to safety passive behavior was significant (β = -0.653, $P < 0.01$). The regression coefficient of personal initiative to safety controlled behavior was significant (β = 0.438, $P < 0.01$). The regression coefficient of personal initiative to safety initiative behavior was significant (β = 0.603, $P < 0.01$), with explanation effect $R^2$ being 0.324, 0.354 and 0.386, respectively. Hypotheses 2a, 2b and 2c were verified.

Hypotheses 3a, 3b and 3c: In model 6, the regression coefficients of safety passive behavior, safety controlled behavior and safety initiative behavior to safety production management mode transition were significant (β = -0.401, $P<0.01$) (β = 0.411, $P < 0.01$) (β = 0.532, $P<0.01$). Hypotheses 3a, 3b and 3c were verified, and the explanation effect $R^2$ of three dimensions of safety individual behavior to safety production management mode transition was 0.601 respectively.

Hypotheses 4a, 4b and 4c: In model 7, intervening variables – safety passive behavior, safety controlled behavior and safety initiative behavior – were added based on model 5. The regression coefficients of safety passive behavior, safety controlled behavior and safety initiative behavior to safety production management mode transition were significant (β = -0.511, $P < 0.01$) (β = 0.586, $P < 0.01$) (β = 0.631, $P<0.01$). The regression coefficient of personal initiative to safety production management mode transition was significant (β = 0.195, $P < 0.01$), but the regression coefficient was reduced, which indicated that safety passive behavior, safety controlled behavior and safety initiative behavior played a plays a partial mediating role in personal initiative and safety production management mode transition. Moreover, the model discriminate coefficient F value was 31.749 ($P < 0.01$), which indicated that the model can better reflect the relationship between variables.

Control variables (sex, age, years of working, educational background): The F = 15.543 in model 4 and the significance level of $P > 0.05$ indicated that model did not pass the overall significance test, and that the control variables in study did not have explanatory power for safety production management mode transition.

***Test for regulating effect***

Hypotheses 5a, 5b and 5c: Regression was conducted for safety production management mode transition after adding personal initiative, organization fit, organization link and organization sacrifice. The regression coefficient of personal initiative to safety production management mode transition was significant (β = 0.267, $P<0.01$). The regression coefficients of organization fit, organization link and organization sacrifice to safety production management mode transition were significant (β = -0.376, P<0.01) (β = 0.347, P<0.01) (β = 0.286, P<0.01). In model 9, based on model 8, the cross product of personal initiative and organization fit, the cross product of personal initiative and organization link, and the cross product of personal initiative and organization sacrifice were added, and then the regression was conducted to safety production management mode transition. Compared with model 8, $R^2$ value of model 9 ($R^2 = 0.723$) was further improved, having better explanatory power than model 8. The regression coefficients of the cross products of personal initiative and organization fit, organization link and organization sacrifice, respectively to safety production management mode transition were significant (β = 0.462, p < 0.01)(β = 0.403, p<0.05)(β = 0.381, p<0.01). This result accorded with that of hypotheses 5a, 5b and 5c, which indicated that organization fit, organization link and organization sacrifice played a positive regulating role between personal initiative and safety production management mode transition.

Table 3. *Test result of mediating effect and regulating effect*

| | *SPB* | | | *SPMMT* | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 |
| Control variables | | | | | | | | | |
| Sex | -0.181 | 0.016 | 0.179 | -0.185* | -0.121 | -0.062 | -0.076 | -0.089 | -0.048 |
| Age | 0.163 | 0.037 | -0.143 | 0.062 | -0.082 | 0.055 | 0.041 | 0.091* | 0.055 |
| YOW | 0.191* | 0.213** | -0.182* | -0.014 | -0.083 | 0.127* | 0.047 | 0.041 | 0.065* |
| EB | -0.106* | 0.107 | 0.263** | 0.026 | -0.122 | -0.108 | -0.086 | -0.157 | -0.052 |
| Independent variable | | | | | | | | | |
| II | -0.653** | 0.438** | 0.603** | | 0.218** | | 0.195** | 0.267** | 0.282** |
| Mediating variable | | | | | | | | | |
| SPB | | | | | | -0.401** | -0.511** | | |
| SCB | | | | | | 0.411** | 0.586** | | |
| SIB | | | | | | 0.532** | 0.631** | | |
| Regulating variable | | | | | | | | | |
| OF | | | | | | | | -0.376** | -0.381** |
| OL | | | | | | | | 0.347** | 0.361** |
| OS | | | | | | | | 0.286** | 0.315** |
| Interactive items | | | | | | | | | |
| Inter1= II*OF | | | | | | | | | 0.426** |
| Inter2= II*OL | | | | | | | | | 0.403** |
| Inter3= II*OS | | | | | | | | | 0.381** |
| $R^2$ | 0.324 | 0.354 | 0.386 | 0.046 | 0.510 | 0.601 | 0.667 | 0.681 | 0.723 |
| F | 36.358** | 38.547** | 31.837** | 15.543 | 27.375** | 28.963** | 31.749** | 29.624** | 30.996** |

*Note: N = 1556, **: correlations are significant at pd" 0.01 level, *: correlations are significant at pd" 0.05 level, $R^2$: squared multiple correlations, F: significance test.*

*Abbreviations: years of working(YOW); educational background(EB); organization fit (OF); organization link (OL); organization sacrifice (OS); safety passive behavior (SPB); safety controlled behavior(SCB); safety initiative behavior (SIB); management idea change (MIC); management institution change(MSC); management methods change (MMC); tenacity(T); perceptiveness(P); spontaneity(S).*

## Discussion

This study verifies the influence of personal initiative on safety production management mode transition with 1556 questionnaires from 73 manufacturing enterprises in China. The research results can be summarized as: there is a significant positive correlation between personal initiative and safety production management mode transition; three dimensions of safety individual behavior (safety passive behavior, safety controlled behavior and safety initiative behavior) play a partial mediating role in personal initiative and safety production management mode transition; three dimensions of on-the-job embeddedness (organization fit, organization link and organization sacrifice) can strengthen the positive correlation between personal initiative and safety production management mode transition. The innovation and contribution of this study can be summarized as the following three points:

This study analyzes and confirms the following three aspects under the background of safety production, namely, the structure of individual behavior, the category and transition of safety production management. According to internal and external factors of employee, this study divides individual behavior into three parts, namely, safety controlled behavior, safety initiative behavior and safety passive behavior. In previous literatures, individual behavior closely related to safety is mainly divided into safety compliance behavior and safety participation behavior (Griffin *et al.* 2000), or safety compliance behavior and safety citizenship behavior (Hoffman *et al.* 2003). Among which, safety compliance behavior is similar to safety controlled behavior. However, both safety participation behavior and safety citizenship behavior characterize with initiative, which ignores the passiveness of the employees. Safety production management mode is divided into punishment, regulation and guided modes. In the previous documents, the classification of safety production management mode is divided into punishment, regulation and guided modes. In the previous documents, the classification of safety production management mode is mainly conducted from static perspective, such as object-centered and man-centered safety production management mode, post-accident and preventive safety production management mode, as well as the safety production management mode which observe HSE system, QHSE system and OHSM system (James *et al.* 2009), but there is no such division that is from the angle of dynamic transition. This study clearly defines the concept of safety production management mode transition with the help of transition theory of quantum system. In previous literatures, the definition for the concept of safety production management mode transition is in fuzzy state; most literatures mix up the concept of enhancement and improvement with that of transition (Fernandez-Muniz *et al.* 2007).

This study constructs research framework according to social cognitive theory and anthropology embeddedness theory In previous literatures, the transition of safety production management mode mainly involves in two aspects: firstly, concentrating on personal initiative; these studies reflect the interaction effect of human and environment; secondly, concentrating on on-the-job embeddedness; on-the-job embeddedness has predictive effect for personal initiative, thereby influencing safety production management mode transition (Fernandez-Muniz *et al.* 2007, Kines *et al.* 2013), but very few researchers have integrated the two. Therefore, on-the-job embeddedness should be made from the dimension of organization fit, organization link and organization sacrifices. The research results indicate that this research framework accurately reveals the relationship between personal initiative and safety production management mode transition.

This study constructs the research framework and theoretical hypotheses for the influence of personal initiative on safety production management mode transition according to social cognitive theory, and conducts empirical study by selecting 1556 grass-roots employees from 73 manufacturing enterprises in China as the objects. The empirical results further clarify the internal structure and operation law for the influence of personal initiative on safety production management mode transition.

## Conclusion

The enterprise shall master the feature and law of safety production management mode transition. Modern management trends toward the thought of people oriented. Safety production management mode shall develop and transition to the direction fully mobilizing people's initiative. Such a transition process is happened under the premise of improving employee's initiative, that is, the change of mode is driven by the change of people. To make the rule of transmission more specific, employees with low initiative will transform to those with average initiative, and safety passive behavior will transform to safety controlled behavior. Because safety controlled behavior is regulated by the organization, and comply with the features of safety production management mode, thus promoting the transition from punishment to regulation mode. If average individual initiative transforms to high individual initiative, and safety controlled behavior transforms to safety initiative behavior, then safety production management will achieve transition from regulation to guided mode when the positive effects accumulate and surpass theoretical value of safety initiative behavior.

The enterprise shall realize that personal initiative is changeable, and that enterprise can improve employee's initiative through enhancing employee's on-the-job embeddedness. Three dimensions (organization fit, organization link and organization sacrifice) of on-the-job embeddedness facilitate the effect of personal initiative on safety production management mode transition, which is due to the fact that on-the-job embeddedness has a positive influence on personal initiative. The enterprise shall note that the key of safety production management mode transition is to improve employee's initiative, and the key to improve employee's initiative is to strengthen employee's on-the-job embeddedness which shall be done through the following three aspects: Firstly, the enterprise can facilitate the consistency of individual value and organization value through cultural construction. The enterprise can train the employee to make the employee equipped with corresponding technology, knowledge and ability and conform to the requirement of work task. Secondly, the enterprise can facilitate to form harmonious internal interpersonal interaction network, and strengthen perception cohesion, mutual trust and cooperative willingness of employees through methods such as outdoor training, team activity and supervisor-subordinate communication. Thirdly, the enterprise shall provide good treatment for employees, such as stable salary, chance of promotion, development opportunity and full respect.

Limitations of this study: Firstly, this study only selects a one-way acting path in triadic reciprocal determinism to explain the relationship of personal initiative to safety production management mode transition. However, triadic reciprocal determinism is a circular interaction relationship between three factors, which means that the relationship of personal initiative to safety production management mode transition may also be a circular interaction relationship. This is not included to the research scope of this study. Secondly, the sample selection has a certain limitation. In accordance with the principle of easy sampling, the research group only selects the manufacturing enterprises within China to make investigations. Thirdly, the research method has some limitation. This study adopts the traditional method of questionnaire and thus we are not able to obtain individual initiative's impact on safety production management mode from the perspective of cognition.

Future research direction: Firstly, triadic reciprocal determinism can be used to carry out further research. Other branches can be selected to study the relationship between personal initiative and safety production management mode transition. For example, the branch "environment->individual->behavior" can be utilized to verify the questions such as whether safety production management mode transition reacts upon personal initiative and safety individual behavior. Secondly, the selection of research objects can be much wider. More foreign enterprises and enterprises in other industries can be selected to make the research result have more universal and practical guidance significance. This study is going to use the classic paradigm of cognitive neuroscience to make further experiments on the relationship of individual initiative and safe production management mode by events association technology. In this way, the process and results can be much objective, scientific and referable.

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