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The Effect of Paternalistic Leadership on Construction Workers' Safety Behaviour in China Cultural Context: The Mediating Role of Safety Climate

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KEYWORDS

paternalistic leadership, safety climate, safety behavior, China

ABSTRACT:

Introduction: This study aims to explore the influence of paternalistic leadership on worker safety behaviors within a Chinese cultural context, addressing the mixed findings in previous research. Paternalistic leadership, characterized by a blend of authority, kindness, and virtue, has been shown to have varied effects on employee outcomes, including safety behaviors. Understanding how these leadership dimensions affect safety behaviors is crucial for improving safety management, especially in industries like construction where safety is a significant concern.

Objectives: The primary objective of this study is to investigate the impact of different dimensions of paternalistic leadership (kindness, virtue, and authority) on worker safety behaviors, considering the mediating role of safety climate. By applying social exchange theory, we aim to clarify the relationship between paternalistic leadership and safety behaviors and understand the mechanisms through which safety climate influences this relationship.

Methods: Data were collected from over 500 employees working in construction firms in Hefei, China, in 2024. Structural equation modeling (SEM) was employed to analyze the relationships between paternalistic leadership dimensions, safety climate, and worker safety behaviors. The study focuses on examining the mediation effect of safety climate in the relationship between paternalistic leadership and worker safety behaviors.

Results: Our findings demonstrate that both the kindness and virtue dimensions of paternalistic leadership have a positive effect on worker safety behaviors. Furthermore, safety climate plays a mediating role in this relationship, significantly enhancing the explanatory power of the model for understanding safety behaviors. In contrast, the authority dimension of paternalistic leadership did not show a significant effect on safety behaviors in this context.

Conclusions: This study contributes to a deeper understanding of safety management mechanisms in organizations by highlighting the importance of leadership styles and organizational climates. The findings enrich the application of mediation variable theories and provide valuable scientific evidence for policymakers and industry leaders. The study emphasizes the need for fostering positive leadership behaviors, such as kindness and virtue, as well as creating a supportive safety climate to improve worker safety behaviors.

1.Introduction

The construction industry is a foundational sector that significantly impacts national economic development and people's livelihoods (Global Data, Construction Intelligence Center, 2023). However, it is also one of the most hazardous industries, with accident and fatality rates consistently higher than average across all sectors (Ansari et al., 2022; Tan, 2022; Shohet et al., 2018). From 2018 to 2022, there were a total of 3,511 safety incidents and 4,016 fatalities in China's housing and municipal construction sector (Ministry of Housing and

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Urban-Rural Development of the People's Republic of China , 2023),as shown in Figure 1. Despite considerable efforts in accident prevention, the outcomes have been less than ideal.

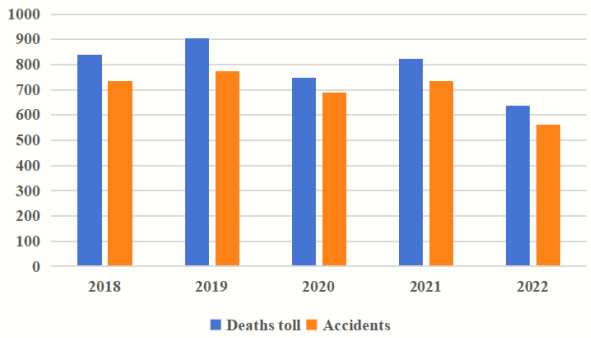

Fig.1 Statistics on Production Safety Accidents in Housing and Municipal Construction, 2018-2022

Employee unsafe behaviors are often highlighted as a primary cause of accidents (Huang et al., 2018). Statistics show that up to 80% of construction site accidents can be attributed to worker unsafe behaviors (Gupta, 2021; Jeong et al., 2022; Lee et al., 2021). Therefore, eliminating unsafe behaviors is crucial for improving occupational safety levels in the construction industry.

Recent studies suggest that leadership styles significantly influence worker safety behaviors in the construction industry (Qin, 2022; Xu, 2020;Lin&Zhao,2021) and other sectors (Della et al., 2020; Ae et al., 2020; Wang et al., 2021). However, whether these findings are applicable to the construction industry remains an open question. Additionally, there is limited research on paternalistic leadership, with inconsistent conclusions (Li,2022;Wang,et al.,2022). Karakitapoğlu-Aygün et al (2021) note that paternalistic leadership is a typical Chinese leadership style, and exploring its impact on employee safety behaviors in a Chinese context could enrich the field of safety behavior research and provide new insights for occupational safety management practices.

Safety climate plays a crucial mediating role. While countries like the United States, Australia, the United Kingdom, and Canada have made significant contributions to safety climate research (Saleem et al., 2021), China needs to deepen its research to fill this gap. Previous reviews have not adequately evaluated the relationship between safety climate and worker safety behaviors (Chen et al., 2021). Addressing these research gaps is essential for advancing our understanding of occupational safety in the construction industry.

This study focuses on confirming the impact of various dimensions of paternalistic leadership on worker safety behaviors in the Chinese construction industry and the mediating effect of safety climate. Using survey data from construction workers and SEM, we explore and quantify the systematic relationships among these variables.

2.Theoretical Background and Model Development

2.1.Paternalistic Leadership, Safety Behavior, and Safety Climate

Paternalistic leadership, characterized by kindness, virtue, and authority, has attracted attention from scholars both domestically and internationally. Wang et al.(2018) emphasize the influence of national culture on leadership styles. Zheng and Fan have further researched and enriched the meaning of paternalistic leadership, which is a style of leadership that includes fatherly kindness, high morality and absolute authority. According to the study, paternalistic leadership is a style of leadership that includes fatherly kindness, high morality and absolute authority, which corresponds to the three dimensions of kindness, virtue and authoritative leadership.Kindness refers to the leadership trait of caring for subordinates and helping them with difficulties in work and life.Virtue emphasises the leader's ability to set an example within the organisation by having personal moral virtues such as fairness and selflessness.Authority leadership refers to the leadership characteristics of a leader who is authoritarian and dictatorial, controlling and ordering his subordinates, and who tends to emphasise his absolute majesty and demand absolute obedience from his subordinates.(Zheng,2009;Fan,2017). Most studies consider paternalistic leadership to encompass kindness, virtue, and authority (Liang, 2020; Wu,et al., 2020; Shao& Liao, 2019).Therefore, this study also adopts this concept of paternalistic leadership proposed by Zheng to examine it.

Safety behavior is typically defined based on observable actions that comply with safety regulations and prevent accidents (Neal & Griffin, 2006). Novieto states that safe behaviour refers to the need for workers to comply with the code of practice when carrying out construction activities, enabling them to successfully complete their

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tasks and protect themselves (Novieto, 2021). Compared with traditional safety management, safety behaviour focuses more on observable safety behaviours than unobservable safety attitudes, and it emphasises the encouragement of safe behaviours rather than the punishment of unsafe behaviours (Xue et al., 2020). Ye, Shao and Sun et al give different definitions of safety behaviour, but they all revolve around two aspects: safety participation and safety compliance(Ye etal.,2005;Shao,et al.,2008;Sun,2014).Based on China's Ministry of Housing and Construction issued the ‘ Construction Enterprise Safety Production Evaluation Standard’ JGJ/T 77-2023 version and the ‘Unified Standard for Quality Acceptance of Building Construction’ GB50300-2023 version of the definition of safety-related behaviours, that is, safety production refers to a variety of measures and activities taken to prevent the occurrence of safety accidents in the production process.For this study, we adopt the definition provided by Neal, which defines safety behavior as adherence to safety rules and taking actions that protect oneself, others, and equipment before hazards or accidents occur.

Safety climate, first introduced by Zohar (1980), refers to employees' shared perceptions of their organization's commitment to safety. Neal defines safety climate as an indicator of the validity of employee evaluations of safety culture, a special type of organisational climate that belongs to a special type of organisational climate (Neal, 2006). Fang and Chen believe that safety climate refers to employees' attitudes and understanding of safety, as well as their patterns and rules for dealing with safety issues (Fang & Chen, 2005). Lu et al define it as the common attitude of employees towards safety issues in an enterprise (Lu etal.,2006).Colley understands safety climate as the common perception of employees towards safety-related policies, regulations, and various behaviours at work (Colley et al., 2013). Yang believes that safety climate refers to the belief perception of safety production, safety attitudes, and safety policies, etc., which are generated by employees in the process of work in order to complete specific work tasks (Yang, 2018). It encompasses safety policies, procedures, training, and leadership support.In this study, it tends to suggest that safety climate belongs to an individual's interactive perception of organisational safety issues, and is a perception or evaluation sum of construction workers' perceptions of organisational safety production management, safety-related policies, and norms.

2.2.Relationship Between Paternalistic Leadership and Safety Behavior

Zhang et al (2021) and Liu (2022).explored the relationship between paternalistic leadership and the safety behaviour of HSR drivers based on social exchange theory. The results showed that the two dimensions of paternalistic leadership, kindness and virtue, had a significant positive effect on the safety engagement of HSR drivers, while authoritarianism had no significant effect on safety engagement.In addition to this, there is a wealth of research demonstrating that Kindness and virtue leadership provide emotional and social support to workers, fostering positive work attitudes and behaviours, including adherence to safety protocols(Cavazotte et al.,2021:Li,2022;Wang et al.,2023).At the same time, studies have also found that authoritarian leadership has a negative impact on worker safety behaviours(Hilleret al.,2019:Wang et al.,2022).Thus, we propose hypotheses H1a, H1b, H1c:

H1a: Kindness leadership positively influences worker safety behavior.

H1b: Virtue leadership positively influences worker safety behavior.

H1c: Authority leadership negatively influences worker safety behavior.

2.3 Relationship Between Safety Climate and Safety Behavior

A positive safety climate, characterized by robust safety policies, procedures, training, and leadership support, can bolster employees' sense of security and trust, thus fostering enhanced safety behaviors. Conversely, if employees perceive a lack of organizational commitment to safety, they may be less inclined to exert the necessary effort to maintain safety (Yu, 2023; Zhang, Li, & Yu, 2023; Lan & Tao, 2022).Within the domain of safety management, this implies that employees' safety behaviors are likely responses to the safety resources and support provided by the organization. Chen et al. (2021) reviewed 33 studies and found considerable variability and complexity in the relationship between safety climate and occupational safety behaviors in construction. Of the studies examined, 32 indicated

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either a direct (78.8%) or indirect (18.2%) relationship.Afuye et al. (2024) surveyed 159 construction craftsmen in Lagos and found that the formation of a safety climate, including management's commitment to safety measures, training, provision of personal protective equipment, and enforcement of safety rules, is the most significant factor in promoting occupational safety behaviors among construction craftsmen. He et al. (2020) employed structural equation modeling (SEM) to show a positive correlation between safety climate and safety behavior. Li et al. (2019) found that organizational safety climate directly and significantly influences employees' safety participation and compliance behaviors, noting that a favorable organizational safety climate can reduce unsafe behaviors and consequently decrease accidents. Novieto (2021) demonstrated that safety climate has a positive predictive effect on the safety behaviors and psychological ownership of construction professionals.Therefore, we propose hypothesis H2:

H2: Safety climate positively influences safety behavior.

2.4 Mediating Role of Safety Climate Between Paternalistic Leadership and Safety Behavior

Research has demonstrated that safety climate plays a mediating role between leadership styles and worker safety behaviors (Chen et al., 2020). Studies in the manufacturing sector have found that safety climate partially mediates the relationship between transformational leadership and safety behaviors (Draghici et al., 2022). Zulkefli et al. (2020) investigated the relationship between safety leadership and safety behaviors among technicians at TNB, using safety climate as a mediator, and confirmed significant effects among the variables. He, McCabe, and Jia (2021) explored the relationship between leader-member exchange (LMX) and construction worker safety behavior (CWSB), testing the mediating role of safety climate (SC) in the LMX-CWSB relationship. Aboramadan and Dahleez (2022) found that servant leadership can effectively promote task performance and risk-taking behavior during crises through the mediating effect of safety climate. These findings indicate that safety climate often serves as a mediator in studies, but its role in the relationship between paternalistic leadership and worker safety behavior requires further investigation. Hence, we propose hypotheses (H3a, H3b, H3c):

H3a: Safety climate partially mediates the relationship between kindness leadership and worker safety behavior, facilitating the occurrence of safe behaviors.

H3b: Safety climate partially mediates the relationship between virtue leadership and worker safety behavior, facilitating the occurrence of safe behaviors.

H3c: Safety climate partially mediates the relationship between authority leadership and worker safety behavior, facilitating the occurrence of safe behaviors.

2.5 Development of theoretical models

The initial research model shown in Figure 2 is based on the assumptions made above. In this model, kindness, virtue and authority as well as safety climate are potential variables, while safety behaviour is observable. The model examines the relationship between the three dimensions of paternalistic leadership, safety climate and safety behaviour.

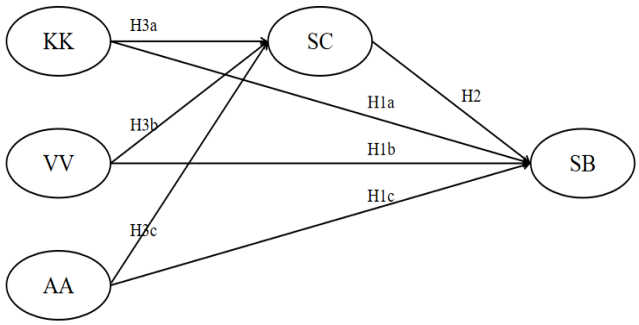

Fig. 2 Theoretical model and hypothesized relationships

(Note: PL stands for Paternalistic Leadership, KK stands for Kindness, VV stands for Virtue, AA stands for Authority, SC stands for Safety Climate, and SB stands for Safety Behaviou)

3.Research Methodology

3.1 Sample

According to research by Hwang et al., a 15% increase in compensation can significantly improve workplace safety (Hwang et al., 2018). The questionnaire was primarily distributed in electronic form, and based on Miao and Zhang's (2023) assumption of an 80% response rate, the sample size was set at 624 workers after careful consideration.Given the characteristics of construction

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enterprises' contracting projects and research efficiency, we focused on construction companies with ongoing projects in Hefei between January and May 2024. Relevant information can be accessed from the Hefei Urban and Rural Construction Bureau, the Hefei Construction Industry Supervision Comprehensive Service Platform, and the Tian yan cha (tianyancha.com) website. The questionnaires were administered through the Wen juan xing platform, with required questions set and the data submission status monitored in real-time, effectively preventing data loss. All respondents ' feedback was completely recorded and preserved. A total of 624 questionnaires were distributed, with 545 valid responses collected, corresponding to an effective response rate of 87.34%.

Statistics show that among the 545 participants, males dominated the sample, with 426 individuals constituting 78.2% of the total. In terms of age distribution, the largest group was workers aged between 20 and 29 years, followed by those aged 40 years and above and those aged between 30 and 39 years, with the smallest group being those under 20 years of age.Regarding educational attainment, 101 individuals had completed primary school, accounting for 18.5%; 155 had completed junior high school, 139 had completed high school, making up 25.5%; and 150 had a college degree or higher, representing 27.5% of the sample. The specific demographic distribution characteristics of the study sample are shown in Table 1.

Table 1 Characteristics of the sample

Criteria		Numbers	Percentage(%)
Gender	Male	426	78.2
	Female	119	21.8
Age	18 to 20	67	12.3
	20 to 29	177	32.5
	30 to 39	150	27.5
	40 and above	151	27.7
Educational level	Primary school	101	18.5
	Junior high school	155	28.4
	High school	139	25.5
	College and above	150	27.5

3.2 Measurement Instrument

To ensure scientific rigor and validity, this study did not develop new measurement scales but instead utilized established scales that have been widely adopted in the field and published in top-tier domestic journals to support content validity. Given the generally lower educational levels and limited knowledge of construction workers, the questionnaire was designed with straightforward questions. The paternalistic leadership scale adopted the tri-dimensional scale developed by Zheng et al. (2000), consisting of 15 items (Zheng, Zhou, & Fan, 2000). The safety climate scale was based on the well-established safety climate scale developed by Zohar for manufacturing workers, and it was adapted for construction workers, drawing on the scale developed by Yang (2018) to create a set of 11 measurement items (Yang, 2018). The safety behavior scale utilized the safety behavior scale developed by Neal and Griffin (2006), which consists of 9 items and has been shown to have good reliability and validity (Neal & Griffin, 2006). All scales used a five-point Likert scale, ranging from "strongly disagree" to "strongly agree," scored as 1, 2, 3, 4, and 5, respectively.

3.3 Data Analysis

Data were analyzed using SPSS 25.0 and AMOS 24.0 software for exploratory factor analysis and confirmatory factor analysis. The measurement model was tested to validate the questionnaire, and the hypotheses were examined using structural equation modeling.

4 Results

4.1 Measurement Model Results

Prior to conducting formal hypothesis testing, exploratory factor analysis (EFA) and reliability analysis were performed on the items of the measurement instruments to evaluate their internal consistency and construct validity, thus assessing the appropriateness of the theoretical model (DeVellis & Thorpe,2021;Kline,2023).It is generally accepted that a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy greater than 0.9 indicates a high degree of shared variance among variables, and a Sig. value less than 0.01 is interpreted as significant in Bartlett's test of sphericity, making the data suitable for factor analysis (Hair,et al.,2014). According to Hair et al. (2014), factor loadings above 0.4 are considered acceptable. In this

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study, the KMO value was 0.962, and the Sig. value was less than 0.01 (as shown in Table 2). The results of the factor analysis (Table 3) revealed that all factor loadings were above 0.6, indicating strong associations between each variable and its corresponding factor.

Table 2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
	Approx. Chi-Square	df	Sig.
0.962	28025.102	2346.000	0.000

Table 3 Rotated Component Matrix[a]

Item		Component						
		1	2	3	4	5	6	7
PL	KK4	0.738						
	KK1	0.717						
	KK5	0.714						
	KK2	0.714						
	KK3	0.656						
	VV1		0.755					
	VV2		0.753					
	VV5		0.739					
	VV4		0.705					
	VV3		0.698					
	AA5			0.740				
	AA3			0.720				
	AA2			0.718				
	AA1			0.713				
	AA4			0.668				
SC	SC2						0.823	
	SC8						0.806	
	SC9						0.772	
	SC11						0.767	
	SC6						0.757	
	SC3						0.751	
	SC5						0.748	
	SC7						0.746	
	SC10						0.745	
	SC1						0.741	
	SC4						0.717	
SB	SB5							0.795
	SB1							0.794
	SB4							0.793
	SB8							0.778
	SB6							0.776
	SB2							0.764
	SB7							0.762
	SB9							0.76
	SB3							0.756

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 6 iterations.

Note:PL stands for Paternalistic Leadership, KK stands for Kindness, VV stands for Virtue, AA stands for Authority, SC stands for Safety Climate, and SB stands for Safety Behaviou

Composite reliability (CR) and average variance extracted (AVE) values exceeded the recommended thresholds, establishing satisfactory internal reliability and discriminant validity (Tables 4 and 5).

Table 4 Convergent Validity for the Constructs

NO.	Construct	CR	AVE
1	KK	0.876	0.587
2	VV	0.888	0.613
3	AA	0.881	0.598
4	SC	0.955	0.679
5	SB	0.949	0.675

Table 5 Discriminant Validity for the PL Constructs

Construct	SB	SC	AA	VV	KK
SB	**0.820**				
SC	0.58***	**0.821**			
AA	0.447***	0.495***	**0.773**		
VV	0.384***	0.541***	0.677***	**0.783**	
KK	0.424***	0.53***	0.717***	0.647***	**0.766**
AVE	0.672	0.675	0.598	0.613	0.587

***p<0.001，the value of the diagonal is the square root of AVE.

4.2 Structural Model

Upon evaluating the measurement model and making adjustments based on diagnostic feedback, the final measurement model, depicted in Figure 3, exhibits acceptable fit indices. Following Hu and Bentler’s (1999) recommendations, key fit parameters such as χ^2 /df, RMSEA, GFI, NFI, CFI, and TLI were utilized. Based on these criteria, regression models(RM) ,as shown as Figure 4. And a mediation model(MM) incorporating the mediator variable (safety climate) were

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constructed(Figure 5). As shown in Table 6, the fit indices for each model indicate a good fit.

Table 6 Fit Indices for Models

Index	Model			Evaluation Basis	Comments	Reference Source
	FMM	RM	MM			
χ2/df	1.324	1.377	1.324	<3，well	Well-fitted	
RMSEA	0.024	0.026	0.024	<0.08，well-fitted	Well-fitted	
GFI	0.93	0.951	0.93	>0.9，well-fitted	Well-fitted	Hayduck, 1987;
NFI	0.952	0.963	0.952	>0.9，well-fitted	Well-fitted	Bagozzi & Yi, 1988
CFI	0.988	0.99	0.988	>0.9，well-fitted	Well-fitted	
TLI	0.987	0.988	0.987	>0.9，well-fitted	Well-fitted	

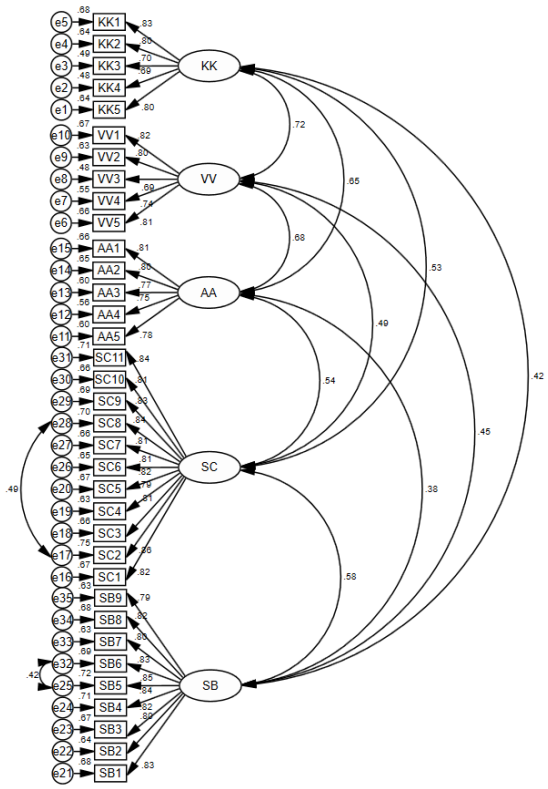

Fig. 3 Final Measurement Model(FMM)

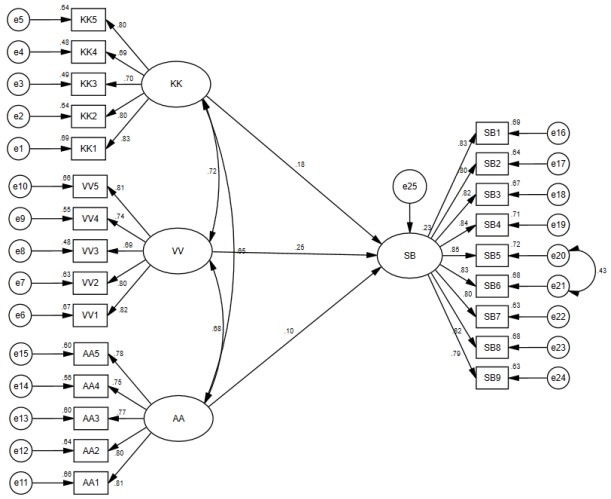

Fig. 4 Regression Model(RM)

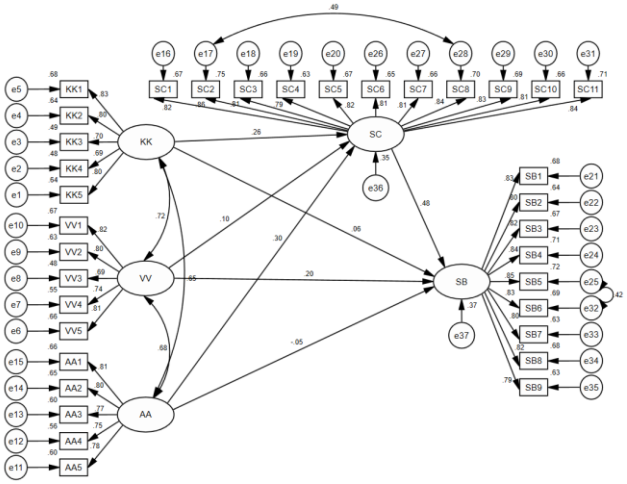

Fig. 5 Mediation Model(MM)

The path coefficients and the proportion of explained variance (R^2) for the regression and mediation models are presented in Table 7. The explained variance ratio is utilized to determine the accuracy of the model predictions (Yusof et al., 2017; Kurniawan et al., 2017). As shown in Table 7, the R^2 for safety behavior (SB) in the regression model (RM) is 0.227, indicating low explanatory power. In the mediation model (MM), the R^2 for SB is 0.373, suggesting moderate explanatory power. Furthermore, the results indicate that kindness leadership (KK) has a positive and significant effect on SB (β = 0.18, $p < 0.05$), and virtue leadership (VV) also has a positive and significant effect on SB (β = 0.253, $p < 0.001$). However, authority leadership (AA) does not have a significant effect on SB ($p > 0.05$). Therefore,

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hypotheses H1a and H1b are supported, while hypothesis H1c is not supported.

Table 7 Structural model path analysis results

Path	Ustd.		S.E.		C.R.		P		Std.		R^2	
	MM	RM	MM	RM	MM	RM	MM	RM	MM	RM	MM	RM
KK→SB	0.063	0.186	0.074	0.074	0.856	2.536	0.392	0.011	0.056	0.18		
VV→SB	0.216	0.264	0.072	0.078	3.014	3.398	0.003	***	0.205	0.253	0.373	0.227
AA→SB	-0.052	0.095	0.067	0.065	-0.779	1.472	0.436	0.141	-0.048	0.096		
SC→SB	0.492	--	0.053	--	9.36	--	***	--	0.475	--		--

***p<0.001.

In the mediation model (MM), safety climate (SC) has a positive and significant effect on SB (β = 0.475, p < 0.001), supporting hypothesis H2. KK, after being mediated by SC, has a positive but non-significant effect on SB (β = 0.056, p > 0.05), indicating full mediation. VV, after being mediated by SC, has a positive and significant effect on SB (β = 0.205, p < 0.05), suggesting partial mediation. AA, after being mediated by SC, still does not have a significant effect on SB (p > 0.05), indicating no mediation. Therefore, hypotheses H3a and H3b are supported, while hypothesis H3c is not supported.

5 Discussion

Research on occupational safety behavior is a critical component of construction industry safety management. It directly affects the safety and health of construction workers and the smooth progress of projects, contributing to overall societal stability. Building upon the model established by Wang et al. (2022) regarding the impact of authoritative leadership on employee safety participation and compliance, this study enriches the understanding of how leadership styles influence worker safety behavior and explores the mediating mechanism of safety climate.

Zhang et al.'s (2021) findings indicate that kindness leadership has a positive effect on safety participation (β = 0.313, p < 0.001), and moral leadership is positively associated with safety participation (β = 0.291, p < 0.001). These findings align with our study, supporting hypotheses H1a and H1b. However, Chen (2017), Zhang et al. (2021), and Li(2022) suggest that authority leadership has a significant positive effect on unsafe behavior, which contrasts with our results (hypothesis H1c not supported). Jiang et al. (2019) found that the direct path coefficient between authority leadership and employee unsafe behavior was not significant, consistent with our findings.

Paternalistic leadership, particularly salient in the Chinese cultural context, centers on leaders' care, guidance, and moral exemplification. From the perspective of social exchange theory, the kindness and virtue dimensions of paternalistic leadership represent emotional care and resource support, such as safety training and personal concern. This investment is viewed as a social exchange, where workers perceive the leader's concern and respond with greater adherence to safety behaviors. Moreover, paternalistic leaders serve as role models through their own behavior, such as adhering to safety rules and exhibiting integrity, which communicates the organization's ethical standards and values. This ethical modeling strengthens trust and respect within the organization, promoting a reciprocal social exchange, where workers are more inclined to reciprocate the expectations of leaders and the organization through safe behaviors. Kindness and virtue leadership styles foster trust relationships between leaders and workers, stimulating organizational commitment. This commitment manifests not only in job dedication but also in adherence to safety protocols, as workers believe that leaders will continue to prioritize their safety and well-being. Conversely, authority leadership may rely more on power and control, which is less aligned with the voluntary and trust-based principles of social exchange theory. Consequently, the authority dimension may not significantly influence worker safety behavior, as workers might be less responsive to involuntary exchanges.

Additionally, the data reveal differences in the magnitude of effects between kindness and virtue leadership on worker safety behavior, with virtue leadership having a greater impact than kindness leadership. This may relate to contemporary workers' psychological needs. In a society with increasing material wealth, workers' inner desires evolve, no

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longer solely dependent on material needs. Workers' identification with the organization and leadership significantly influences their performance. Virtuous leaders contribute to shaping an ethical and safety-oriented culture within the organization, encouraging mutual supervision and reminders among workers, thereby fostering a collective safety consciousness. In contrast, kindness may more strongly influence individual emotional states, whereas virtue may have broader and deeper effects. On construction sites, the complexity and importance of safety behaviors require not only emotional support but also a deep understanding and adherence to safety norms. Virtue leadership, through providing moral guidance and behavioral examples, may more effectively promote a comprehensive understanding and implementation of safety protocols by workers.

Introducing the mediator variable increases the R^2 from 0.227 to 0.373. The data suggest that the mediator variable plays a significant role in the model, revealing deeper mechanisms underlying safety behavior. Safety climate acts as a bridge between kindness and virtue leadership and safety behavior, enhancing the model's explanatory power. This finding is consistent with our results (hypotheses H2 and H3a, H3b supported) and aligns with Wang et al.'s (2023) perspective that selecting and cultivating kind and virtuous leaders can enhance subordinates' rapport and cultivate a positive organizational safety climate.

In China, paternalistic leadership aligns with traditional cultural values of "benevolence" and "harmony," where leaders are seen as the "parent" responsible for maintaining the team's welfare and stability. In the construction industry, this leadership style creates a work environment that emphasizes safety and cares for employees, effectively enhancing workers' safety awareness and behavioral standards. Safety climate, acting as a mediator, reinforces trust and cooperation between leaders and employees, promoting adherence to safety protocols and reducing accident risks. This cultural connection not only elevates safety levels on construction sites but also reflects the Chinese society's pursuit of harmony and order.

6 Limitations and Recommendations

This study employs a cross-sectional design, which precludes the establishment of causal relationships. Future research should adopt a longitudinal design to explore the evolution of relationships between leadership styles, safety climate, and safety behavior over time. Additionally, while this study provides insights into the specific cultural context of China, future research could compare these findings with those from other cultural backgrounds to understand the universality or specificity of the relationships.

Despite the MM model's advantages in explaining safety behavior, the R^2 value is not exceptionally high (e.g., above 0.7 or 0.8), suggesting the potential existence of other important factors not included in the model. Future research could explore these potential factors and integrate them into the model to further enhance its explanatory and predictive power.

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