

# The Impact Of Leadership Member Exchange On Innovation Behavior Perceived By University Lectures: The Mediation Roles Of Psychological Empowerment And Psychological Safety

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## ABSTRACT

In the current era of the knowledge economy, innovation and flexibility are essential for societal survival and competitiveness. The innovation and creativity in education hinge upon the innovative behaviors of teachers. This study concentrates on teachers from three universities located in Xi'an, China. Employing the convenience sampling method, a questionnaire survey was conducted among teachers in these universities. A total of 832 formal questionnaires were distributed. Data analysis was carried out using SPSS and AMOS to investigate the correlation between perceived leadership member exchange, teacher innovation behavior, psychological empowerment, and psychological safety among university teachers in Xi'an, China. Additionally, the study explores the impact of leadership member exchange on innovative behavior among university teachers in Xi'an, China, as well as the mediating roles of perceived psychological empowerment and psychological safety in this relationship. The findings from the structural equation model reveal that: (1) leader-member exchange significantly and positively influences teacher innovation behavior. (2) Psychological empowerment partially mediates the relationship between leadership member exchange and teacher innovation behavior. (3) Psychological safety also partially mediates the relationship between leadership member exchange and teacher innovation behavior.

**Keywords:** Leadership Member Exchange; Innovation Behavior; psychological Empowerment; Psychological Safety

## 1. Introduction

Universities serve as potent learning organizations and crucial sources of knowledge exchange in the national innovation framework (Kreiling et al., 2020; Li et al., 2022). Educational innovation depends on the creative efforts of teachers (Lambriex-Schmitz et al., 2020; Thurlings et al., 2015). These creative efforts include a range of behaviors aimed at developing innovations. This involves discovering opportunities, coming up with ideas, nurturing and realizing these ideas. (Lambriex-Schmitz et al., 2020; Thurlings et al., 2015). In the education field, there's a strong focus on teachers' innovative behaviors (Li et al., 2022; Garzon Artacho et al., 2020). Teachers are seen as both the foundation and the main drivers of the education system (Scull et al., 2020; Zainal et al., 2021).

Teachers' innovative behaviors are extensively explored in educational research (Castillo-Acobo et al., 2022). In the realm of leader-member exchange theory, within high-exchange relationships, expectations of mutual exchange foster higher levels of trust, liking, and respect, consequently prompting subordinates to engage in additional role behaviors (Lambriex-Schmitz et al., 2020; Zhang et al., 2012). Psychological empowerment serves as a psychological mindset reflecting how individuals respond to empowerment techniques and leadership behaviors (Spreitzer, 1995; Thomas & Velthouse, 1990). The interplay between leadership

demeanor and teachers' innovative conduct is shaped by various factors, including the psychological state of subordinates (Akbari et al., 2021; Bagheri et al., 2022; Kilag et al., 2023).

In a study by Gu et al. (2013) pointed out that psychological safety is key to innovation. Earlier studies have also shown its link to innovative actions (Mo et al., 2023; Miao et al., 2020; Zhu et al., 2019). Psychological safety stands out as one of the primary concerns teachers face in their work environments (Lateef, 2020; Miao et al., 2020; Wu & Chen, 2015). While past studies have largely focused on the impact of leader-member exchange on innovative behavior from specific viewpoints, this study takes a comprehensive approach to analyze its influence on teachers' innovative behaviors (Ng, 2017; Schermuly et al., 2022; Volmer et al., 2012). Previous researches have indicated a close relationship between psychological empowerment, psychological safety, and innovative practices as well as their mediating effects well-established (Akbari et al., 2021; Bagheri et al., 2022). While some scholars have explored these relationships concerning corporate employees, there is still a gap in research regarding teachers' innovative behaviors (Bagheri et al., 2022; Kilag et al., 2023; Wu & Chen, 2015).

Building on this premise, the current study will investigate the impact of leader-member exchange on teachers' innovative behaviors (Mulligan et al., 2021). By considering psychological empowerment and safety as mediating factors in conjunction with leader-member exchange, this study intends to uncover the underlying mechanisms that influence teachers' innovative practices. Self-determination theory suggests that boosting psychological empowerment and safety meets basic needs for autonomy, skill, and relatedness. This enhances teachers' inner motivation and actions thus subsequently leading to more innovative efforts (Bagheri et al., 2022; Kilag et al., 2023; Miao et al., 2020; Zhang et al., 2021; Zhu et al., 2019).

## 2. Literature Review and Hypothesis Development

### Leader-Member Exchange and Teachers' Innovative Behavior

Leader-member exchange is based on Social Exchange Theory (Homans, 1958). It also incorporates ideas from Blau (1964) and Hollander and Julian (1969). This concept explains the interactions, interdependence, and mutual influence in leader-member relationships (Gottfredson et al., 2020; Klein & Zwilling, 2022). Leader-Member Exchange (LMX) describes the bond between leaders and subordinates through respect, loyalty, and contribution. This connection is directly linked to innovative behaviors (Mulligan et al., 2021). Studies also confirm that LMX can enhance individual and team innovation (De Jong & Den Hartog, 2010; Javed et al., 2019). This outcome suggests that high-quality leader-member relationships contribute to teachers' innovative behaviors (Le Blanc et al., 2021).

This research leverages the theoretical framework of self-determination theory to propose that cultivating high psychological empowerment and safety can satisfy teachers' basic needs, boosting their intrinsic motivation and innovative behaviors (Bagheri et al., 2022; Kilag et al., 2023; Miao et al., 2020; Zhang et al., 2021; Zhu et al., 2019). Building on this, research suggests that fostering trust, improved communication, and mutual respect in principal-teacher relationships can foster a climate conducive to teacher innovation (Lee et al., 2020; Tastan & Davoudi, 2015; Zakariya, 2020). Additionally, the quality of LMX in educational settings has been shown to influence teachers' innovation, underscoring the significance of fostering high-quality leader-member exchange relationships to drive teacher innovation (Lee et al., 2020; Zeb et al., 2020). Based on these literature, the present study proposes Hypothesis H1.

### **H1: Leader Members Exchange has a significant positive predictive effect on teachers' innovative behavior The mediating role of psychological empowerment**

Many researchers have utilized psychological empowerment as a mediator or moderator between different leadership styles and various job-related employee attitudes, such as teacher innovation behavior and organizational commitment (Aggarwal et al., 2020; Siswanti & Muafi, 2020; Saira et al., 2021). In a study by Dulebohn et al. (2011), they found that LMX is positively associated with followers' perceived psychological empowerment. This empowerment serves as a potential mechanism that links leader-member exchange to teacher innovation behavior (Chiu et al., 2022; Khan et al., 2020; Siswanti & Muafi, 2020; Tastan & Davoudi, 2015; Zakariya, 2020). Considering that leaders can nurture employees' autonomy, discretion, and sense of empowerment, it is expected that key empowering behaviors could stimulate teachers' exploratory and innovative actions (Almulhim, 2020; Khan et al., 2020; Saira et al., 2021; Zeng & Xu, 2020).

Psychological empowerment has been linked to various positive outcomes, such as performance and creativity (Chiang & Hsieh, 2012; Zhang & Bartol, 2010; Zhang et al., 2018). Research by Almulhim (2020), and Khan et al. (2022) confirms that LMX indirectly influences employees' proactive innovative behavior through psychological empowerment. Core self-evaluation boosts the link between leader-member exchange and psychological empowerment. This strengthens the positive impact of leader-member exchange on employees' proactive innovative behavior. This interaction is partially mediated by psychological empowerment, thus shows the role of psychological empowerment as a mediator. Based on these literature, the study introduces research hypothesis H2.

## H2: Psychological empowerment serves as a mediator in the connection between leader-member exchange and innovative behavior among university teachers in Xi'an, China.

### The mediating role of Psychological Safety

The higher the quality of leader-member exchange between managers and subordinates, the greater their sense of psychological safety. Psychological safety acts as a mediating factor between leader-member exchange and innovative behavior (Mo et al., 2023; Zhu & Zhang, 2019). Psychological safety fosters increased participation in team activities and interactions among team members, which in turn enhances innovative behavior (Chen et al., 2018). Edmondson's (1999) research suggests that when the interpersonal environment for risky creative efforts feels secure, employees are more driven to innovate. A study by Kark and Carmeli (2009) reveals that psychological safety can influence creativity, with a high level of psychological safety enhancing innovative behavior (Baas et al., 2008; Mo et al., 2023; Paulus et al., 2012).

Edmondson (1999) described that psychological safety is a mental state marked by mutual respect and interpersonal trust. It creates an environment where each employee feels at ease engaging in interpersonal risks. When employees feel psychologically safe, they are more willing to take interpersonal challenges, less afraid of failure consequences, and actively propose innovative ideas (Cao et al., 2020; Miao et al., 2020). In essence, employees with higher psychological safety levels feel comfortable expressing their thoughts and are open to offering suggestions and fresh perspectives, thus fostering innovation. Conversely, individuals with lower psychological safety show defensiveness and insecurity when involved in risky tasks like innovative work behaviors (Mehmood et al., 2022). Building upon these literature, the study presents research hypothesis H3:

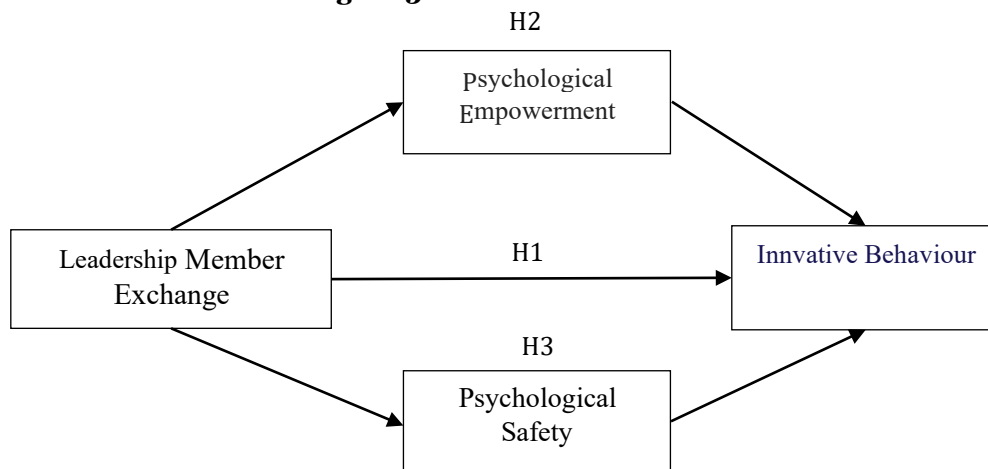
### H3: Psychological safety serves as a mediator in the connection between leader-member exchange and innovative behavior among university teachers in Xi'an, China.

## 3. Methodology

### 3.1 Research Framework

Drawing from social exchange theory (Homans, 1961) and the Self-Determination Theory (SDT) by Deci and Ryan (1985), this study investigates the influence of leader-member exchange on innovative behavior among university teachers in Xi'an, China. It presents an intermediary research framework. Please refer to Figure 3.1.

Figure 3.1 Research Framework



Source: Compiled by the authors.

Note: LMX: Leadership Member Exchange ; IB : Innvative Behaviour ; PE : Psychological Empowerment ; PS : Psychological Safety

### 3.2 Participants and Sampling

The study focused on university teachers in Xi'an, China, selecting three representative institutions: A, a comprehensive university; B, a prestigious university; and C, a typical comprehensive institution. The survey focused on teachers and researchers at the university. This includes those who also have some administrative tasks, but not those who only work in administration. Employing the Convenience Sampling method as suggested by Sudman (1976) for regional studies with an optimal sample size range of 500 to 1000, the research distributed online surveys. A total of 832 questionnaires were sent out, all of which were validly returned, achieving a 100% response rate.

### 3.3 Measurement

For the Leader-Member Exchange, this study utilized the LMX-MDM multidimensional questionnaire. This is a modification of Liden and Maslyn's (1998) scale by Wang et al. (2001). The scale encompasses the original

12 items from Liden and Maslyn (1998) and an additional 4 items introduced by Wang et al. (2001). LMX-MDM involves four dimensions - affect, loyalty, contribution, and professionalism - measured using a 5-point Likert scale, with a Cronbach's Alpha value of 0.903.

The Innovation Behavior Scale used in this study incorporated the innovation behavior measurement developed by De Jong and Den Hartog (2008) and Messmann and Mulder (2012), integrating and adapting prior research to suit the local context (Ngann, 2016; Noorsafiza, 2016; Nur Atiqah, 2014). This scale was assessed using a 5-point Likert scale, resulting in a Cronbach's Alpha value of 0.926 after measurement.

The Psychological Empowerment Scale utilized in this research was created by Spreitzer (1995) and comprises four sub-dimensions: meaning, competence, self-determination, and impact. Measurement was conducted using a Likert 5-point scale, resulting in a Cronbach's Alpha value of 0.872.

Lastly, for the Psychological Safety Scale, the study employed the Security Questionnaire (SQ) developed by Cong Zhong (Beijing Institute of Mental Health) and An Lijuan (Hebei Normal University) in 2003. This scale assesses interpersonal security and certainty/control using a 5-point Likert scale with a Cronbach's Alpha value of 0.933.

### 3.4 Data Analysis

In this study, data entry and analysis were conducted using SPSS 23.0 and AMOS 24.0. The statistical methods employed included descriptive statistics, item analysis, reliability and validity analysis, analysis of variance, correlation analysis, exploratory factor analysis, regression analysis, and confirmatory factor analysis (CFA). After receiving and piloting the questionnaires, scores from the Leader-Member Exchange Scale, Innovation Behavior Scale, Psychological Empowerment Scale, and Psychological Safety Scale were grouped. The top 27% and bottom 27% of scores were designated as high and low groups respectively. Independent sample t-tests were performed on these groups to assess the discriminant validity of the questionnaire items. Furthermore, internal consistency and validity examinations were carried out for each questionnaire.

## 4. Results

### 4.1 Descriptive Statistics and Reliability Analysis

Using SPSS and AMOS statistical software, the researchers analyzed the demographic data of the valid sample. Table 4.1 presents the distribution of data for individual backgrounds. The questionnaire was administered to 832 teachers from universities in Xi'an, China, comprising 668 undergraduates (80.29%), 124 master's students (14.90%), and 40 doctoral students (4.81%). In terms of academic titles among teachers in Xi'an, there were 64 teaching assistants (7.69%), 592 lecturers (71.15%), 148 associate professors (17.79%), and 28 professors (3.37%).

**Table 4.1** Summary of Reliability Analysis for the Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety Scales

Constructs	Dimensions	Cronbach's Alpha	Total Cronbach's Alpha
LMX	Affection	.879	.922
	Loyalty	.856	
	Contribution	.868	
	Professional Respect	.874	
IB	Identify/Explore	.879	.907
	Opportunities	.883	
	Generate Ideas	.891	
	Promote Ideas	.907	
PE	Implement Ideas	.846	.902
	Ability	.837	
	Self-Decision Influence	.849	
PS	Meaning	.847	.928
	Interpersonal Safety Certainty of Safety	.918	
		.909	

Source: Compiled by the authors.

Note: LMX: Leadership Member Exchange ; IB : Innvative Behaviour ; PE : Psychological Empowerment ; PS : Psychological Safety

In this study, a reliability analysis was conducted on the Leader-Member Exchange Scale and its dimensions to examine internal consistency for university teachers in Xi'an, China. The reliability was typically assessed using Cronbach's Alpha coefficient, where a value above 0.7 indicates good scale reliability (Beavers et al., 2019). The

results revealed high Cronbach's Alpha coefficients for the total scores: 0.922 for the Leader-Member Exchange, 0.907 for Teacher Innovation Behavior, 0.902 for Psychological Empowerment, and 0.928 for Psychological Safety. These findings signify strong reliability of the scales, also the factors and constructs represented are dependable and representative.

#### 4.2 Exploratory Factor Analysis

To avoid common method variance resulting from respondents' repetitive response patterns and its potential impact on the study outcomes, the questionnaires on Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety were administered concurrently. According to Podsakoff et al. (2003), if a single factor explains more than 50% of the variance, it indicates significant common method variance. Hence, a Harman (1960) single-factor test was employed in this section to conduct an exploratory factor analysis on all items to mitigate potential method biases.

Assessing the Kaiser-Meyer-Olkin (KMO) sampling adequacy and Bartlett's test of sphericity helped determine the questionnaire's suitability for factor analysis. Kaiser (1974) suggested that a KMO above .800 signifies a robust model, above .700 indicates a moderate model, and above .600 suggests an acceptable model, while a KMO below .500 is deemed inadequate. Additionally, Bartlett's test of sphericity requires a p-value less than 1% to confirm suitability for factor analysis (Podsakoff et al., 2003).

The findings reveal that the KMO value for the Leader-Member Exchange Scale is 0.930, exceeding the threshold of 0.7 (Kaiser, 1974). It indicates successful information extraction from the data. The variance explained by the four factors ranges from 17.57% to 18.37%, with a cumulative variance of 72.19% after rotation (>40%), meeting the standard (Beavers et al., 2019). All eigenvalues are above 1, supported by a Bartlett value of 7581.462, df of 120, and p-value of 0.000, conforming to the criterion (Emelianchik-Key et al., 2018). For the Teacher Innovation Behavior Scale, the KMO value is 0.947. The variance explained by the four factors ranges from 17.023% to 18.304%, with a cumulative variance of 69.845% after rotation (>40%), meeting the standard (Taherdoost, 2022). All eigenvalues exceed 1, consistent with a Bartlett value of 10005.4, df of 190, and p-value of 0.000, meeting the criteria (Fornell & Larcker, 1981).

The Psychological Empowerment Scale shows a KMO value of 0.893. This is above Kaiser's (1974) threshold of 0.7, indicating effective data extraction. The variance explained by the four factors ranges from 19.06% to 19.36%, with a cumulative variance of 76.66% after rotation (>40%), aligning with the standard (Cheung & Wang, 2017). All the eigenvalues exceeded 1, with a Bartlett's test value of 5274.905, 66 degrees of freedom, and a p-value of 0.000. This meets the criteria set by Marsh et al. (1988).

The Psychological Empowerment Scale has a KMO value of 0.961, which is above Kaiser's (1974) threshold of 0.7. This indicates successful data extraction. With variance explained by two factors at 32.09% and 30.59%, the cumulative variance after rotation is 62.68% (>40%), meeting the standard (Marsh et al., 1988). All eigenvalues are greater than 1, with a Bartlett's test value of 5274.905, 66 degrees of freedom, and a p-value of 0.000. This aligns with the standard set by Marsh et al. (1988). As a result, the questionnaire is considered highly valid and effective.

#### 4.4 Confirmatory Factor Analysis

The primary objective of this study is to investigate the influence of Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety. Through structural equation modeling, causal relationships among these variables are examined to assess the model's fit. Following Marsh et al. (1988)'s guidance, a two-stage approach is recommended for structural equation modeling. The initial stage involves Confirmatory Factor Analysis (CFA) to evaluate the reliability, convergent validity, and discriminant validity of the research constructs. Subsequently, a reduced set of indicators is employed for the structural modeling phase. In this research, the AMOS software was used. The result shows that a Composite Reliability (CR) exceeding .6 indicates variables align with their constructs (Cheung & Wang, 2017). Moreover, surpassing the Average Variance Extracted (AVE) threshold of .5 (Fornell & Larcker, 1981) confirms strong convergent and discriminant validity. Confirmatory Factor Analysis serves as a crucial tool to assess the suitability and authenticity of the scale's construct validity (Wu, 2009).

Validity and fit analysis were performed on the scales measuring Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety through Confirmatory Factor Analysis. Following the guidelines outlined by Beavers et al. (2019) for testing structural equation models, it was observed that all item factor loadings exceeded 0.5, AVE values were above 0.5, and CR values surpassed 0.8, indicating robust convergent validity. The model displayed a good fit with a  $\chi^2/df$  ratio below 5, RFI exceeding 0.9, RMSEA below 0.08, GFI surpassing 0.9, and NFI over 0.9, alongside other incremental fit indices above 0.90. These results signify a relatively strong fit and favorable structural validity of the assessment scales.

**Table 4.2** Summary of Fit Indices for the Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety Model

CMIN	df	CMIN/DF	NFI	IFI	TLI	CFI	GFI	RMSEA
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2399.915	1861.000	1.290	0.923	0.982	0.980	0.981	0.920	0.019
Suggested Value		<3	>0.8	>0.9	>0.8	>0.9	>0.8	<0.08

Source: Compiled by the authors.

The study will examine the factor loadings of variables, looking for values over .5 (Podsakoff et al., 2003), Composite Reliability (CR) above .6, and Average Variance Extracted (AVE) greater than .5 (Fornell & Larcker, 1981). This is to prove the scale's good convergent validity. The model's fit should include a  $\chi^2/df$  ratio less than 5, RFI above .9, RMSEA below .08, GFI exceeding .9, and NFI higher than .9, with all other incremental fit indices above .90.

As per the results in Table 4.2, the model fit indices in this study, including CMIN/DF=1.290, NFI=.923, IFI=.982, TLI=.980, CFI=.981, GFI=.920, RMSEA=.019, meet the standard requirements, indicating a favorable model fit (Cheung & Wang, 2017; Marsh et al., 1988). Analyzing the data in Table 4.3 revealed that the confirmatory factor analysis for LeaderMember Exchange, Teacher Innovation Behavior, Psychological Empowerment, and

Psychological Safety collectively yielded significant coefficient estimates for variables across all dimensions ( $p < 0.05$ ). The factor loading values varied between 0.705 and 0.859. This indicates a strong correlation among the factors and meets the established standards.

**Table 4.3** Summary of Confirmatory Factor Analysis

Constructs	Dimensions	Factor Loading (min/max)	p	AVE	CR
LMX	Affection	0.754/0.826	0.000	0.647	0.880
	Loyalty	0.744/0.824	0.000	0.603	0.858
	Contribution	0.739/0.837	0.000	0.627	0.871
	Professional Respect	0.745/0.833	0.000	0.639	0.876
	Identify/Explore Opportunities				
IB	Generate Ideas	0.717/0.820	0.000	0.596	0.881
		0.720/0.800	0.000	0.604	0.884
	Promote Ideas	0.705/0.811	0.000	0.623	0.892
	Implement Ideas	0.736/0.839	0.000	0.665	0.908
PE	Ability	0.760/0.805	0.000	0.652	0.849
	Self-Decision Influence	0.738/0.819	0.000	0.638	0.841
		0.763/0.844	0.000	0.659	0.853
PS	Meaning	0.766/0.827	0.000	0.654	0.850
	Interpersonal Safety	0.732/0.855	0.000	0.587	0.919
	Certainty of Safety	0.720/0.859	0.000	0.560	0.910

Source: Compiled by the present study.

Note: LMX: Leadership Member Exchange ; IB : Innvative Behaviour ; PE : Psychological Empowerment ; PS : Psychological Safety

#### 4.5 Correlation Analysis

This study analyzed the correlations among the dimensions of Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety. The Pearson correlation coefficients between each dimension are displayed in Table 4.4.

**Table 4.4** Summary of Pearson Correlation among Teacher Innovation Behavior, Psychological Empowerment, Psychological Safety, and Leader-Member Exchange

Constructs	Mean	Standard Deviation	IB	PE	PS	LMX
IB	3.369	0.797	1			
PE	3.254	0.878	0.523***	1		
PS	3.172	0.827	0.536***	0.490***	1	
LMX	3.239	0.840	0.577***	0.498***	0.496***	1

Note: \*\*\*  $p < 0.001$ , LMX: Leadership Member Exchange ; IB : Innvative Behaviour ; PE :

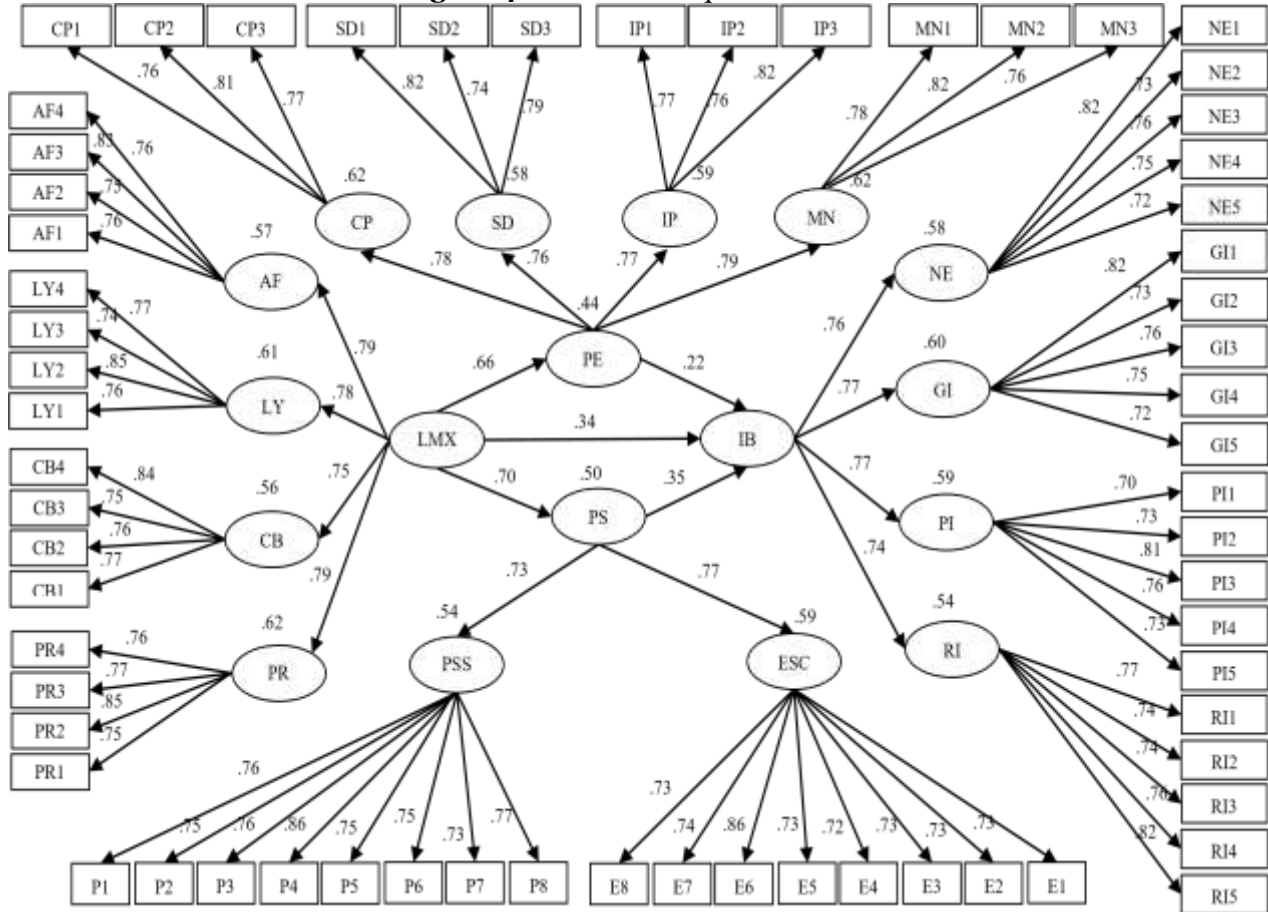
Psychological Empowerment ; PS : Psychological Safety Analyzing the data from Table 4.4, the study employed correlation analysis to examine the relationships between Teacher Innovation Behavior and Psychological Empowerment, Psychological Safety, and Leader-Member Exchange, using Pearson correlation coefficients to gauge the strength of these connections. The results indicate significant correlations between Teacher Innovation Behavior and the dimensions of Psychological Empowerment, Psychological Safety, and Leader-Member Exchange, with correlation coefficients of 0.523, 0.536, and 0.577 respectively. All these

values are positive, suggesting a direct positive relationship between Teacher Innovation Behavior and the three dimensions. The correlation coefficient between Leader-Member Exchange and Psychological Empowerment is 0.498, indicating a significant positive correlation. Similarly, the correlation coefficient between Leader-Member Exchange and Psychological Safety is 0.496, signifying a noteworthy positive relationship between the two dimensions.

#### 4.6 Structural Equation Modeling

Following the confirmatory factor analysis in the first stage, the significant correlations among the four observed variables showed the way for a structural model analysis.

Figure 4.1 Structural Equation Model



Source: Compiled by the present study.

As for the dimensions of Leader-Member Exchange, Teacher Innovation Behavior, Psychological Empowerment, and Psychological Safety, a model fit analysis was carried out. Following the model testing criteria set by Marsh et al. (1988), the model's fit requirements should include CMIN/DF < 3, NFI > 0.9, IFI > 0.9, TLI > 0.8, CFI > 0.9, GFI > 0.8, and RMSEA < 0.08 to affirm the robust convergent validity of the scale; with other incremental fit indices exceeding 0.90. Consequently, an analysis of model fit was conducted for the mentioned dimensions, and the outcomes displayed in Table 4.5 show that in this study's model, CMIN/DF=1.305, NFI=0.919, IFI=0.980, TLI=0.979, CFI=0.980, GFI=0.916, RMSEA=0.019. All model fit indices in this study's model including CMIN/DF, NFI, IFI, TLI, CFI, GFI, RMSEA, CFI, meet the prescribed standards, and shows an excellent model fit (Cheung & Wang, 2017; Marsh et al., 1988).

Table 4.5 Model fit indices

CMIN	df	CMIN/DF	NFI	IFI	TLI	CFI	GFI	RMSEA
2522.054	1933.000	1.305	0.919	0.980	0.979	0.980	0.916	0.019
Suggested Value		<3	>0.8	>0.9	>0.8	>0.9	>0.8	<0.08

Source: Compiled by the present study.

Table 4.6 Path analysis

Path	Non-Standardized Regression Coefficient	$\beta$	Standard Error	t-value	p	Path Test Result
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Model 1	LMX -> PE	0.663	0.662	0.056	11.738***	.000
Model 2	LMX -> PS	0.697	0.704	0.060	11.543***	.000
Model 3	PE -> IB	0.267	0.222	0.062	4.306***	.000
Model 4	PS -> IB	0.428	0.351	0.081	5.308***	.000
Model 5	LMX -> IB	0.414	0.344	0.090	4.595***	.000

Source: Compiled by the present study.

Note: LMX: Leadership Member Exchange ; IB: Innvative Behaviour ; PE: Psychological Empowerment ; PS: Psychological Safety

The results of the path analysis conducted using AMOS are presented in Table 4.6 above. Notably, Leader-Member Exchange shows a significant positive influence on Psychological Empowerment ( $\beta=0.662$ ,  $p<0.05$ ), supporting Path 1. It indicates a substantial positive effect of Leader-Member Exchange on Psychological Empowerment among teachers in universities in Xi'an, China. Additionally, Leader-Member Exchange exhibits a significant positive impact on Psychological Safety ( $\beta=0.704$ ,  $p<0.05$ ), confirming Path 2. This indicates a positive association between Leader-Member Exchange and Psychological Safety among university faculty in Xi'an, China. Moreover, Psychological Empowerment significantly influences Innovation Behavior positively ( $\beta=0.222$ ,  $p<0.05$ ), thus confirming Path 3. It shows a positive relationship between Psychological Empowerment and Innovation Behavior within university teachers in Xi'an, China. Similarly, Psychological Safety significantly impacts Innovation Behavior positively ( $\beta=0.351$ ,  $p<0.05$ ), supporting Path 4. It reveals a positive effect of Psychological Safety on Innovation Behavior among university educators in Xi'an, China. Lastly, Leader-Member Exchange remarkably affects Innovation Behavior positively ( $\beta=0.344$ ,  $p<0.05$ ), supporting Path 5 and confirming research hypothesis H1 that Leader-Member Exchange among university teachers in Xi'an, China significantly influences to Innovation Behavior.

#### 4.7 Mediation effect

**Table 4.7** Mediation Analysis

Path Relationship	Mediating Variable	Indirect Effects Test		
		BootLLCI	BootULCI	<i>p</i>
LMX -> PE -> IB	PE	0.082	0.227	0.000
LMX -> PS -> IB	PS	0.142	0.349	0.000

Source: Compiled by the present study.

Note: LMX: Leadership Member Exchange ; IB: Innvative Behaviour ; PE: Psychological Empowerment ; PS: Psychological Safety

Analyzing the various intermediary paths of the model, Table 4.7 presents the biascorrected confidence intervals and significance tests for each corresponding path. In the path "Leader-Member Exchange -> Psychological Empowerment -> Innovative Behavior," the bias-corrected confidence interval (CI) for the mediating effect based on psychological empowerment is [0.082, 0.227]. This interval does not contain 0 and accompanied by a p-value less than 0.05, is showing a significant indirect effect and the presence of mediation. Hence, confirming research hypothesis H2, psychological empowerment mediates the relationship between leader-member exchange and innovative behavior among college teachers in Xi'an, China.

Within the "Leader-Member Exchange -> Psychological Safety -> Innovative Behavior" path, the bias-corrected confidence interval for the mediating effect based on psychological safety ranges from [0.142, 0.349]. This interval does not include 0 with a p-value below 0.05 is signaling an indirect effect and mediation in the pathway. Research hypothesis H3 is thus confirmed. It indicates that psychological safety acts as a mediator between leader-member exchange and innovative behavior among college teachers in Xi'an, China.

**Table 4.8** Total, Direct, and Mediating Effects Table

Path	Effect	Effect Value	Relative Effect Value
LMX -> PE, PS->IB	Total Effect	0.739	
	Direct Effect	0.346	46.82%
	PE Mediating Effect	0.154	20.84%
	PS Mediating Effect	0.240	32.48%

Source: Compiled by the present study.



Note: LMX: Leadership Member Exchange ; IB: Innovative Behaviour ; PE: Psychological Empowerment ; PS: Psychological Safety

Analysis from the table of total, direct, and mediating effects in Table 4.8 reveals the path "Leader-Member Exchange -> Psychological Empowerment, Psychological Safety > Innovative Behavior" shows a relative effect value of 46.82% for the direct effect, 20.84% for the mediating effect of psychological empowerment, and 32.48% for the mediating effect of psychological safety. This suggests that the mediating effect in this path is a partial one. In essence, the leader-member exchange not only predicts innovative behavior through the mediation of psychological empowerment but also through the mediation of psychological safety.

## 5. Discussion

Drawing from the aforementioned research findings, this study has uncovered that leader-member exchange not only directly influences teachers' innovative behavior significantly but also indirectly impacts the innovative behavior of college educators through the mediating roles of psychological empowerment and psychological safety. The mediating model in this study has significantly improved its explanatory power. It shows that the variables of leader-member exchange, psychological empowerment, and psychological safety can offer a comprehensive understanding of college teachers' innovative behavior.

The research findings have verified Hypothesis 1. It confirms the significant positive impact of leader-member exchange on teachers' innovative behavior. This aligns with prior studies which underlining leader-member exchange as a vital factor influencing educators' creativity (Aga et al., 2016; De Jong & Den Hartog, 2010; Lei & Le., 2020; Mazzucato et al., 2022; Javed et al., 2019). The study results uphold the concept of Social Exchange Theory, and indicates that the quality of interpersonal exchanges plays an essential role in fostering innovative behaviors (Liao & Hui, 2021). The findings also emphasize that fostering a healthy leader-member relationship is crucial for teachers' innovative endeavors, it can help teachers to alleviate stress and anxiety. Also it is providing the necessary support system to enhance creative initiatives in higher education.

The study's findings confirm Hypothesis 2 by revealing that psychological empowerment plays a partial mediating role in the relationship between leader-member exchange and teachers' innovative behavior. This is consistent with previous research (Aggarwal et al., 2020; Chiu et al., 2022; Khan et al., 2020; Siswanti & Muafi, 2020; Saira et al., 2021). This stresses the essential role of psychological empowerment as a crucial element in leader-member exchange. It can have positive work attitudes in educators as well as foster proactive drive, and ultimately boost innovative behaviors (Aggarwal et al., 2020; Saira et al., 2021; Khan et al., 2020;). The results align with the Social Exchange Theory on how leader-member exchange influences innovative behaviors through the lens of psychological empowerment (Almulhim, 2020; Chiang & Hsieh, 2012; Zhang & Bartol, 2010). It highlights how leader-member exchange acts as a key environmental factor in nurturing teachers' psychological empowerment to enhance their innovative capacities. Psychological empowerment, as a personal factor and positive emotion, can empower teachers for creative behaviors (Khan et al., 2020; Siswanti & Muafi, 2020; Saira et al., 2021; Zainoodin et al., 2021).

The study findings confirm Hypothesis 3. It reveals that psychological safety plays a crucial role as a partial mediator in the relationship between leader-member exchange and innovative behavior. This is aligning with prior research (Chen et al., 2018; Kark & Carmeli, 2009; Mo et al., 2023; Zhu & Zhang, 2019). When teachers experience psychological safety in their work environment, they exhibit higher engagement, vitality, and generate valuable ideas and behaviors, thus ultimately fostering innovation (Javed et al., 2021; Zhu et al., 2019). This study posits that leaders impact innovation by nurturing the psychological safety of teachers, enhancing followers' sense of security, and increasing their propensity to engage in innovative behaviors. When followers perceive their leaders as providers of psychological safety and empathy, they devote more energy to their work. Consequently, it is stimulating innovative behaviors (Cao et al., 2020; Mo et al., 2023; Paulus et al., 2012). By exploring the mediating role of psychological safety in the dynamics between leader-member exchange and innovative behavior, this study makes a timely contribution to the field (Chen et al., 2018; Mo et al., 2023; Miao et al., 2020; Mehmood et al., 2022). Previous research overlooked the impact of psychological safety on the interplay between leader-member exchange and innovative behavior. These results rectify this gap and emphasize that teachers who experience greater psychological safety exhibit heightened levels of innovation.

## 6. Conclusion and Suggestion

### 6.1 conclusion

Overall, this study has developed a mediation model that confirms leader-member exchange can directly influence innovative behaviors. Psychological empowerment serves as a mediator between leader-member exchange and innovative behaviors, while psychological safety also plays a mediating role between leader-member exchange and innovative behaviors. The research results indicate that leader-member exchange among teachers in Xi'an, China, significantly and positively impacts psychological empowerment. Additionally,

leader-member exchange among teachers in Xi'an, China, significantly and positively affects psychological safety. Furthermore, psychological empowerment among teachers in Xi'an, China, significantly and positively influences innovative behaviors, as does psychological safety among these teachers. Lastly, innovative behaviors among teachers in Xi'an, China, significantly and positively impact psychological safety. Psychological empowerment among teachers in Xi'an, China, partially mediates between leader-member exchange and innovative behaviors.

## 6.2 Contribution

This study expands the use of LMX theory in higher education by examining how psychological empowerment and safety mediate the relationship between teachers' perceptions of LMX and their innovative behavior. This insight helps us grasp the motivational factors driving innovative behaviors among university educators. And it also offers valuable theoretical backing for educational management. By employing a quantitative research approach, the study strengthens the credibility of its findings. Furthermore, it considers the impact of cultural backgrounds and professional titles on the results as a way to enhance the study's applicability. These findings provide practical guidance for university administrators. By boosting teachers' psychological empowerment and safety, it can ignite their innovative spirit, leading to enhanced teaching quality and research excellence.

## 6.3 Research suggestion

To enhance innovative practices among university educators through leader-member exchanges and teacher innovation behavior, universities can convene specialized seminars where educators present work requisites in accordance with a structured agenda, nurturing mutual comprehension via role interchanges between leaders and educators. This approach ignites proactive work attitudes and enhances innovation (Gilson et al., 2005). To enhance psychological empowerment, administrators should create a positive teaching atmosphere by providing encouraging feedback through praise and support, inspiring teachers to recognize their progress and achievements. Empowering teachers with respect and freedom encourages proactive self-improvement from a sense of professional mission, competence, and autonomy, rather than just fulfilling tasks. Concerning psychological safety, cultivating communication and collaboration among educators establishes a nurturing communal setting for exchanging experiences and resources.

## Research Ethics

This study strictly adheres to the National Policy & Guidelines for Human Research (2015) established by the National Research Council of Thailand. It has also obtained approval from the Ethics Committee of Dhurakij Pundit University in Thailand (Approval Number: DPU\_BSH 110866/2565).

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