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A study on the influence of environmental responsible leadership on employee pro-environmental behavior

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As the public's call for corporate green development grows, more and more companies are joining the green development team. Environmental responsible leadership, as a leadership style focused on the construction of enterprises, has attracted widespread attention from the corporate and academic communities. Meanwhile, the pro-environmental behavior of employees is the key link in the implementation of green policies in enterprises. To clarify the mechanism of environmental responsible leadership on employee pro-environmental behavior, a moderated mediation model was constructed. This model examined the mediating role of employment relationship atmosphere between environmental responsible leadership and employee pro-environmental behavior, and examined the moderating role of social distance on the relationship between environmental responsible leadership and employment relationship atmosphere. The employment relationship atmosphere focuses on the level of trust, respect, and cooperation between managers and employees. Within a good employment relationship atmosphere, employees find that environmental responsible leaders treat them positively, and according to social exchange theory, in order to give back to the leaders, employees will take the initiative to perform the behaviors expected by the leaders, such as employee pro-environmental behaviors. We conducted a study on employees of five enterprises in Shanxi Province, and analyzed the questionnaire data using SPSS and AMOS. The results showed that environmental responsible leadership has a significant positive effect on employee pro-environmental behavior; employment relationship atmosphere plays a mediating role between environmental responsible leadership and employee pro-environmental behavior; social distance plays a moderating role in the relationship between environmental responsible leadership and employment relationship atmosphere, that is, the closer the social distance, the stronger the impact of environmental responsible leadership on employment relationship atmosphere.

KEYWORDS

environmental responsible leadership, employee pro-environmental behavior, social distance, employment relationship atmosphere, green

Abbreviations: CFI, Goodness of Fit Index; EPB, Employee pro-environmental behavior; ERA, Employment relationship atmosphere; ERL, Environmental responsible leadership; RMSEA, Root Mean Square Error of Approximation; SD, Social distance; Standardized Root Mean square Residual; TLI, Tucker-Lewis Coefficient.

1 Introduction

The UN Sustainable Development Agenda defines sustainable development as three levels: economy, society, and environment. The environmental dimension is the most important aspect of sustainable development. The issue of environmental protection has become a hot topic of research and concern in both theoretical and practical circles. In previous studies, the consciousness beliefs of enterprise management and employees' awareness of energy saving and environmental protection are the two key elements of whether energy saving and environmental protection behaviors of enterprises can be achieved. On the one hand, corporate management's control of corporate strategy and supervision of specific corporate behaviors can influence corporate energy conservation and environmental behavior; on the other hand, the managers, even the management information system, cannot monitor the environmental protection implementation of each employee, so it is difficult to cope with complex environmental problems only by relying on the "top-down" implementation of corporate environmental strategy, and it is also necessary to cultivate employee pro-environmental behavior. However, does the awareness of environmental responsibility of managers or leaders influence the pro-environmental behavior of employees? What are the paths of influence? What factors can interfere? The answers to these questions are important for promoting corporate decisions on energy-efficient and environmentally friendly behavior and for promoting the achievement of comprehensive green production.

Corporate sustainability is a reliable way to ensure long-term returns for investors. Investors' attention to the environmental performance of enterprises can reduce investment risks when making investment decisions (Ren et al., 2023a). However, to further gain economic benefits, many enterprises carry out a series of illegal operations, which seriously threaten the quality of the ecological environment and the physical and mental health of residents (Wang et al., 2023). Notably, listed industrial enterprises generally encounter stricter information disclosure and environmental penalties (Wang et al., 2023). For this reason, firms are also gradually focusing on environmental performance, such as employee pro-environmental behavior. Pro-environmental behavior, which consciously seeks to minimize the negative impact of personal actions on nature and the constructed world, can be an effective way to achieve workplace sustainability programs (Kollmuss and Agyeman, 2002; Li et al., 2023). Pro-environmental behaviors in social organizations include pro-environmental behaviors of the public, workplace employees, and school teachers and students, which are mainly divided according to the roles of individuals in social organizations (Nisar et al., 2021). Among them, pro-environmental behavior in the workplace can contribute to the sustainable management of the organization's environment and reduce the economic threat of environmental degradation to the organization (Kim et al., 2017).

According to social learning theory, individuals learn by observing role models to provide specific guidance for their behavior. Organizational leaders provide an important model of imitation for employees to adjust their behavior. In other words, leadership plays a key role in shaping employee pro-environmental behavior (Mulder and Nelissen, 2010; Chunhui et al., 2022). Several studies have verified the positive correlation between

transformational leadership (Laura and Sung-Jun, 2022), green transformational leadership (Jorge Alberto Esponda et al., 2023) and spiritual leadership (Afsar et al., 2016) and employee pro-environmental behavior. Responsible leadership is "a social relationship and ethical phenomenon that occurs in the course of social interaction to achieve social and environmental goals and sustainable value creation for positive change" (Bar-Anan et al., 2006; Muhammad et al., 2022). According to its definition, the responsible leader considers the natural environment as an important stakeholder (Miska et al., 2014; Taiwei et al., 2022; Ren et al., 2023b) and is concerned about social and environmental sustainability, and tries to achieve harmony between people, society, and nature (Pless and Maak, 2011), which is consistent with the values reflected in pro-environmental behavior. It can be argued that responsible leaders play a crucial role in the more proactive transfer of greening efforts to individuals because responsible leaders are concerned about environmental sustainability (Székely and Knirsch, 2005; Ren et al., 2023c). Therefore, the purpose of our study is to explore the mechanisms influencing employee pro-environmental behavior from a responsible leadership perspective.

We believe this paper contributes to the literature in two aspects. First, we constructed a moderated mediation model to clarify the mechanism of environmental responsible leadership on employee pro-environmental behavior. This model not only explored the mediating role of employment relationship climate between environmentally responsible leadership and employees' pro-environmental behavior, but also explored the moderating role of social distance between environmentally responsible leadership and employment relationship climate. Second, we selected five related enterprises in Shanxi Province as the research object of study. As a large traditional energy province, Shanxi Province is in urgent need of green transformation, so we chose Shanxi Province as the research object.

The paper proceeds as follows. Section 2 introduces the theoretical basis and research hypothesis; the research method is presented in Section 3 and results are presented in Section 4; Section 5 presents the analysis and discussion; Finally, Section 6 summarizes the conclusion of study.

2 Theoretical basis and research hypothesis

2.1 Environmental responsible leadership and employee pro-environmental behavior

Social information processing theory suggests that individuals adjust their behavior according to the environment in which they live. In the workplace, the style of the leader is an important source of information for employees to act, and employees need to always observe the "leader's words" and "leader's countenance". To balance the interests of all parties, companies increasingly focus on responsible leadership. Environmental responsible leadership (Chianghui, 2023; Yi et al., 2023) builds a communication platform that includes many stakeholders, allowing employees to better understand the needs of each party rather than acting blindly based on their own experiences and assumptions, and facilitating

employees' clarity about the company's position and direction of pro-environmental behavior.

(Voegtlin et al., 2020) clarified that responsible leaders have three roles: citizen, expert, and facilitator. Firstly, when environmental responsible leaders take on the role of citizens, social concerns about green development are fully considered, and the sustainability of their operations and their responsibility to the environment and society require leaders and employees to focus on green production. At this time, environmental responsible leaders play a role model for employees, and employees' awareness of pro-environmental behavior is fully awakened. Secondly, when environmental responsible leaders of enterprises assume the role of experts, they will pay more attention to work efficiency, take the completion of organizational performance as the main goal, arrange tasks in the work in an integrated manner, and divide the responsibilities of employees, promptly solve unexpected situations and problems that arise in the process of green development work, and employees' pro-environmental behavior has the necessary support conditions. Thirdly, when environmental responsible leaders take on the role of facilitator, they motivate their employees to work and take into account their work needs while presenting their corporate vision, which makes them feel valued and their relationship with their leaders more harmonious. It is worth noting that the three roles of environmental responsible leadership are sometimes not clearly distinguishable, especially in companies where leaders and employees are extremely close, and the three roles are intertwined to promote pro-environmental behavior among employees.

Based on the above analysis, hypothesis H1, that environmental responsible leaders positively influence employees' pro-environmental behavior, is proposed.

2.2 The mediating role of employment relationship atmosphere between environmental responsible leadership and employee pro-environmental behavior

According to social exchange theory, the employment relationship atmosphere between a company and its employees is essentially a social and economic exchange between the company and its employees (Bei, 2023). Employment relationship atmosphere refers to the employee's overall perception of the relationship between leader and employee, which is essentially the employee's evaluation of the leader, reflecting the exchange relationship between the leader and the employee (Bulińska-Stangrecka and Bagieńska, 2021). The employment relationship atmosphere focuses on the level of trust, respect, and cooperation between managers and employees, and its focus is more concentrated, excluding institutional aspects and studying only the relationship between managers and employees (Fan et al., 2022; Guanglin and Tao, 2023). A positive employee relationship atmosphere encourages a high level of employee involvement in the business and creates an employee-centric culture. At this point, employees feel comfortable and contribute positively to organizational performance (Ali et al., 2018; Dong et al., 2023). Research also confirms that a better employment relationship atmosphere is conducive to increased employee job satisfaction and

organizational commitment (Valizade et al., 2016). A good employment relationship atmosphere produces motivated, loyal, high-performing employees who will do their best for the company (Daniel, 2003).

Organizational managers can have an impact on the employment relationship atmosphere by establishing rules and regulations or through their actions. Environmental responsible leaders discuss with all parties when establishing green rules and regulations (Abdullah Sultan et al., 2023), respect the employees' right to express themselves, and adjust the policies and systems according to the employees' needs, which makes the social and economic exchange of employees go smoothly. The employees trust the leaders more, and the employment relationship atmosphere is more positive at this time. At the same time, under environmental responsible leadership management, employees can recognize the significance of fulfilling their green social responsibility and give more consideration to the impact of their actions on their teams, leaders, and other stakeholders in their daily work (Tian and Suo, 2021; Bing and Qi, 2023), which also contributes to a harmonious employment relationship atmosphere.

In the Chinese scenario, the emotional ties between employees and managers are stronger and more complex than the institutional ties to the company. Employment relationships are inherently embedded in human relationships, and in the operation of a business, they are an important medium for influencing employees' work experiences and perceptions of stress. According to social embedding theory, the degree of individual embedding in the organizational network is closely related to the positive behavior of individuals (Elena et al., 2023). A good employment relationship atmosphere acts as an organizational network of individual embeddedness, which increases the psychological security and job embeddedness of employees (Fan et al., 2022; Guanglin and Tao, 2023). The employment relationship is often a prerequisite for motivation. On the one hand, when employees find that environmental responsible leaders respect their social status and try to protect social rights and interests, according to the resource investment principle of the conservation of resource theory, employees will invest more resources to ensure that harmonious resources are not lost, including employee pro-environmental behavior; On the other hand, within a good employment relationship atmosphere, employees find that environmental responsible leaders treat them positively, and according to social exchange theory, in order to give back to the leaders, employees will take the initiative to perform the behaviors expected by the leaders, such as employee pro-environmental behaviors.

Based on the above analysis, hypothesis H2 is proposed that the employment relationship atmosphere plays a mediating role in the relationship between environmental responsible leadership and employees' pro-environmental behavior.

2.3 Moderating effect of social distance

According to the construal level theory, individuals' perception and explanation level of external things are influenced by psychological distance, which includes space distance, time distance, social distance, and hypothetically distance (Frey et al., 2019). Social distance is concerned with the closeness of individuals

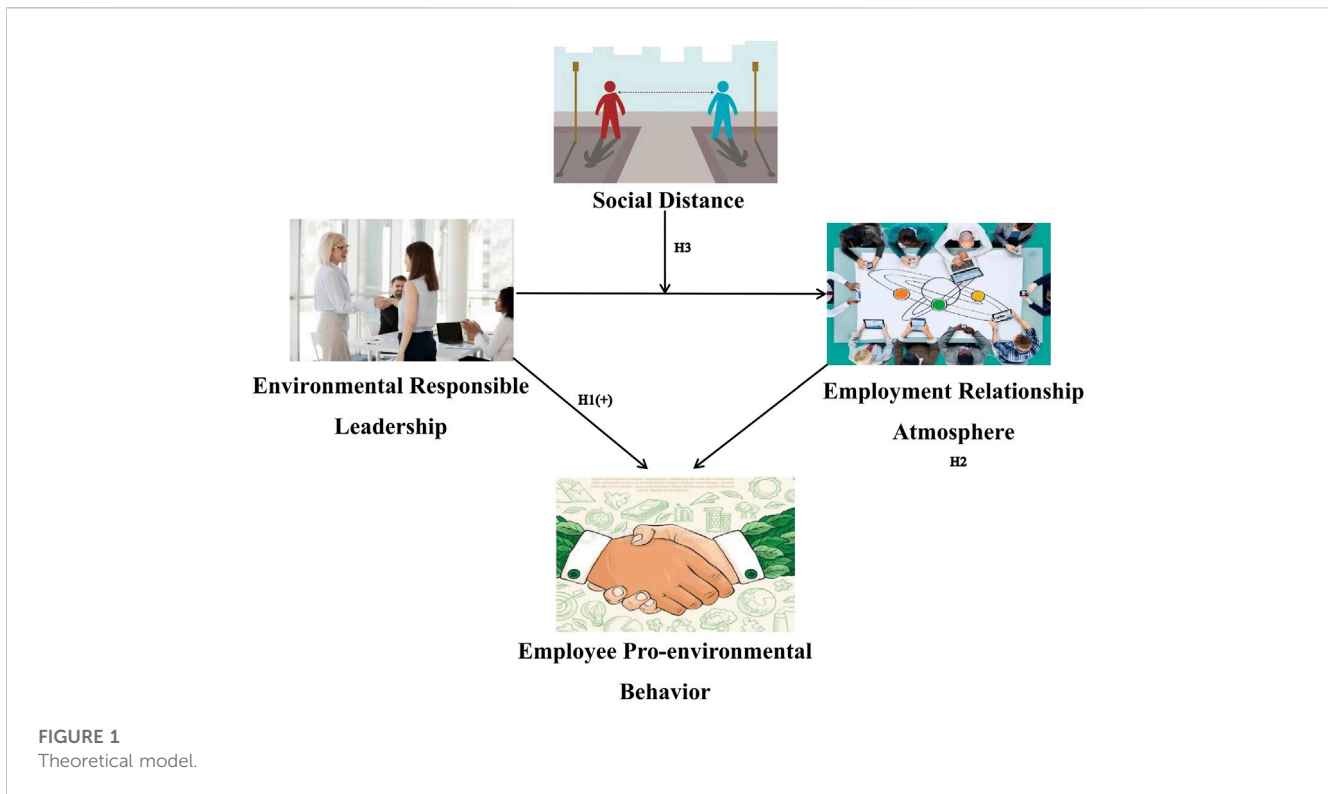


FIGURE 1 Theoretical model.

to each other, and can take many forms, such as self and others, acquaintances and strangers, and in-group and out-group. Social distance describes the closeness of an individual to an external object, often taking “oneself” as the reference point and reflecting one’s familiarity with the external object (Trope and Liberman, 2010).

Individuals adjust their judgments based on their social proximity to others. According to construal level theory, different social distances make individuals understand the same information or the same event in different ways. First, when social distance is close, individuals are at a low level of interpretation, focusing on the concrete, situational features of things. Second, when social distance is far, individuals are at a high level of interpretation, focusing more on the abstract core features of events (Gächter et al., 2015). When employees perceive that environmental responsible leaders are closer to themselves, they will pay more attention to whether and how environmental responsible leaders can improve the wellbeing of their employees, and consider whether the initiatives proposed by environmental responsible leaders can better contribute to their own social and economic exchange in the company, so that employees will perceive their relationship with the company more genuinely and understand that environmental responsible leadership is beneficial to them, and the employment relationship will be more harmonious at this time. If employees perceive that environmental responsible leadership is distant from their society, they will only focus on the symbolic meaning of environmental responsible leadership, which is only a form of leadership for them. As a result, employees perceive a lack of positivity and harmony in the employment relationship.

People are more willing to share resources with close others and show a high willingness to sacrifice (Liberman et al., 2007) and

pro-social tendencies for individuals who are socially close (Ostaszewski and Osiński, 2011), while construct level theory suggests that close social distance increases familiarity between interacting parties, resulting in higher emotional involvement of individuals (Buchan et al., 2006), both of which contribute to a more harmonious employment relationship.

Based on the above analysis, hypothesis H3 is proposed, that social distance plays a moderating role in the relationship between environmental responsible leadership and employment relationship atmosphere.

In summary, based on social information processing theory, social exchange theory, and construal level theory, this paper constructs a mediated model (Stephan et al., 2011; Bing and Qi, 2023) with regulation, as shown in Figure 1, to examine the mechanisms of mediating (employment relationship atmosphere) and regulating (social distance) effects of environmental responsible leaders and employees’ pro-environmental behaviors.

3 Research method

3.1 Research subjects

In this article, a random sampling method is used to distribute paper questionnaires to employees of five enterprises in Shanxi Province. A total of 401 questionnaires were collected. By checking the reverse proposition, this article excluded 55 randomly filled questionnaires. The number of valid questionnaires is 346, and the valid questionnaire rate is 86.28%.

The demographic statistics of the questionnaire are as follows. In terms of age, 22.30% are aged 18–25, 35.50% are aged 25–35, 27.20%

are aged 35–45, and 15% are aged 45 and above. In terms of education level, 60.70% of them have a high school degree or below, 34.70% have a college degree, and 4.60% have a bachelor's degree or above. In terms of working hours, 14.74% of them are under 6 h, 53.46% are between 6 and 8 h, 21.68% are between 8 and 10 h, and 10.12% are above 10 h.

3.2 Research tools

In order to measure the relationship between variables more accurately, the questionnaires used in this article are mature and widely used. The questionnaire was partially adjusted based on the actual work content of employees, including four variables: environmental responsible leadership, social distance, employment relationship atmosphere, and employee pro-environmental behavior. The reliability and validity of the scale used in this paper are verified by 60 small sample data tests. The Likert 5-point scale was used in the questionnaire, 1 indicating the least agreement and 5 indicating the most agreement.

1) Environmental responsible leadership (ERL)

This paper uses the questionnaire of responsible leadership developed by Voegtlin (Voegtlin et al., 2020) for reference. Based on the original scale, the words such as environmental protection are integrated into the item description to highlight the environmental responsible leadership studied in this paper. There are 5 items in total, including “my immediate leader considers the consequences of the company's environmental policies on stakeholders,” “my immediate leader considers the consequences of environmental decisions for the affected stakeholders,” “my immediate leader involves the affected stakeholders about environmental decisions in the decision-making process,” “my immediate leader weighs different stakeholder claims before making an environmental decision,” and “my immediate leader tries to achieve a consensus among the affected stakeholders about environmental decisions.” The reliability of the scale is 0.929.

2) Social distance (SD)

This paper uses the social distance questionnaire developed by Bar-Anan et al. (Bar-Anan et al., 2006; Muhammad et al., 2022) for reference, and finally integrates the questionnaire with four items. As this paper studies the impact of environmental responsible leadership, the description of leadership is also highlighted in the questionnaire, for example, “I am willing to make friends with our leaders,” “I am willing to be neighbors with our leaders,” “I am willing to live in the same community with our leaders,” and “I am willing to be related to our leaders.” The reliability of the scale is 0.942.

3) Employment relationship atmosphere (ERA)

This paper uses the scale of employment relationship atmosphere used by Ngo et al. (Ngo et al., 2008) for reference. The scale includes four items. For example, “I can honestly communicate with leaders and others about possible problems,”

“I have a sense of belonging and commitment to the organization,” “I can discuss operational issues in an open, frank, and constructive manner,” and “I can freely discuss job-related issues with their supervisor.” The reliability of the scale is 0.933.

4) Employee pro-environmental behavior (EPB)

This paper uses the scale of Robertson and Barling (Robertson and Barling, 2013) and Kim et al. (Kim et al., 2017) for reference. The scale includes 6 items. For example, “I will carry out tasks beneficial to the environment,” “I try to convince my group members to reduce, reuse, and recycle office supplies in the workplace,” “I work with my group members to create a more environmentally-friendly workplace” “I share knowledge, information, and suggestions on workplace pollution prevention with other group members,” “I recycle reusable items in the workplace,” and “I sort recyclable materials into their appropriate bins when other group members do not recycle them.” The reliability of the scale is 0.718.

4 Research results

4.1 Common method deviation test and structural validity analysis

In this paper, Harman's one-way analysis of variance was used to test for common method bias, and a total of four factors with eigenvalues greater than one were finally extracted. Among them, the cumulative variance explained by the first principal factor was 38.83%, which was lower than the critical value of 40%. Therefore, the common method bias results showed that there was no serious common method bias in this study.

A validated factor analysis using Amos 24.0 for environmental responsible leadership, social distance, employment relationship atmosphere, and employee pro-environmental behavior is shown in Table 1. It can be seen that the baseline model has a χ^2/df (less than 5 acceptable, less than 3 better) of 1.888, TLI (greater than 0.85 acceptable, greater than 0.9 better) of 0.969, CFI (more than 0.85 acceptable, more than 0.9 better) is 0.974, RMSEA (less than 0.08 acceptable, less than 0.05 better) is 0.051, and SRMR (less than 0.08 acceptable, less than 0.05 better) is 0.064. The results show that the five fitting indexes of the four-factor model are within the range, and better than the other three-factor models, so there is good discriminant validity among the four variables of this paper, environmental responsible leadership, social distance, employment relationship atmosphere and employee pro-environmental behavior.

4.2 Descriptive statistical analysis and correlation analysis

Descriptive statistical analysis and correlation analysis were conducted on the data in this paper, and the results are shown in Table 2. There is a positive correlation between environmental responsible leadership and employee pro-environmental behavior ($r = 0.426, p < 0.01$), a positive correlation between environmental responsible leadership and employment relationship atmosphere ($r = 0.289, p < 0.01$), and a positive correlation between employment

TABLE 1 Results of validation factor analysis.

Models	χ^2/df	TLI	CFI	RMSEA	SRMR
Four-factor model	1.888	0.969	0.974	0.051	0.064
Three-factor model	9.497	0.531	0.741	0.157	0.168
Two-factor model	14.421	0.332	0.586	0.197	0.210
One-factor model	20.108	0.332	0.407	0.235	0.167

Note: One-factor model is ERL + SD + ERA + EPB; two-factor model is ERL + SD, ERA + EPB; three-factor model is ERL + ERA, SD, EPB; four-factor model is ERL, SD, ERA, EPB.

TABLE 2 The descriptive statistics and correlation analysis of variables.

Models	M	SD	1	2	3	4	5	6
1 Age	2.990	1.309	1	—	—	—	—	—
2 Education level	2.340	0.826	-0.029	1	—	—	—	—
3 Working hours	2.271	0.835	-0.003	0.688**	1	—	—	—
4 ERL	3.417	1.285	0.053	0.312**	0.354**	1	—	—
5 SD	2.744	1.417	-0.041	0.133*	0.155**	0.296**	1	—
6 ERA	2.739	1.431	0.048	0.071	0.147**	0.289**	0.454**	1
7 EPB	3.022	1.033	0.147**	0.166**	0.221**	0.426**	0.335**	0.508**

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, Same as below.

TABLE 3 Results of regression model analysis of environmental responsible leadership, employment relationship atmosphere, and employee pro-environmental behavior.

Variables	ERA			EPB		
	Model 1	Model 2	Model 3	Model 4	Mode 5	Model 6
Age	0.047	0.031	0.148**	0.126*	0.126**	0.113*
Education level	-0.055	-0.092	0.035	-0.017	0.062	0.021
Working hours	0.185*	0.113	0.197**	0.095	0.108	0.048
ERL	—	0.276***	—	0.391***	—	0.276***
ERA	—	—	—	—	0.482***	0.414***
F	2.985*	8.561***	8.744**	21.706**	36.061**	38.041***
R^2	0.026	0.091	0.071	0.203	0.297	0.359
ΔR^2	0.017	0.081	0.063	0.194	0.289	0.349

relationship atmosphere and employee pro-environmental behavior ($r = 0.508, p < 0.01$). ($r = 0.508, p < 0.01$), and the research hypotheses of this paper were initially verified.

can be seen that environmental responsible leadership significantly and positively affects employe pro-environmental behavior ($\beta = 0.391, p < 0.001$), and hypothesis H1 was verified.

4.3 Hypothesis testing

1) Main effect test

In this paper, the relationship between environmental responsible leadership, employment relationship atmosphere and employee pro-environmental behavior was analyzed using cascade regression, and the results of data analysis are shown in Table 3. It

2) Test of mediating effect

This paper uses cascade regression method to test the mediation effect. The mediating effect is established by simultaneously meeting the following requirements: 1) the independent variable significantly affects the dependent variable; 2) the independent variable significantly affects the mediating variable and the mediating variable significantly affects the dependent variable; 3) the mediating variable still significantly affects the dependent variable

TABLE 4 Total, direct and mediated effects.

Projects	Effect value	Boot standard error	Boot CI		Relative effect value (%)
			Lower limit	Upper limit	
Intermediary Effect	0.092	0.021	0.053	0.135	29.30
Direct effect	0.222	0.039	0.146	0.299	70.70
Total effect	0.314	0.042	0.232	0.397	—

after the inclusion of the mediating variable in the regression equation, and the effect of the independent variable on the mediating variable is weakened or even disappears. From model 4 in Table 3, the independent variable environmental responsible leadership significantly and positively affects the dependent variable employee pro-environmental behavior ($\beta = 0.391, p < 0.001$), requirement (1) is satisfied; model 2 shows that the independent variable environmental responsible leadership significantly and positively affects the mediating variable employment relationship atmosphere ($\beta = 0.276, p < 0.001$), model 5 shows that the mediating variable employment relationship atmosphere significantly and positively affects the dependent variable ($\beta = 0.482, p < 0.001$), requirement (2) is satisfied; from model 6, after adding mediating variables to the regression equation, the mediating variable employment relationship atmosphere still positively affects the dependent variable employee pro-environmental behavior ($\beta = 0.414, p < 0.001$), and the effect of the independent variable environmental responsible leadership on employee pro-environmental behavior is weakened ($\beta = 0.391$ becomes $\beta = 0.276, p < 0.001$), requirement (3) was satisfied.

The results of using the process plug-in in SPSS to verify the mediating effect of employment relationship atmosphere are shown in Table 4. The confidence intervals for both the direct effect of environmental responsible leadership on employee pro-environmental behavior and the mediating effect of employment relationship atmosphere do not contain 0. Therefore, environmental responsible leadership not only directly employee pro-environmental behavior, but also indirectly predicts employee pro-environmental behavior through employment relationship atmosphere. The mediating effect accounts for the total effect. The mediating effect accounted for 29.30% of the total effect and the direct effect accounted for 70.70% of the total effect. In summary, H2 holds that employment relationship atmosphere has a mediating effect between environmental responsible leadership and employee pro-environmental behavior.

3) Test for moderating effect

To verify the moderating effect of social distance between environmental responsible leadership and employment relationship atmosphere, this paper still uses the hierarchical analysis method. As shown in Table 5, Models M1 and M2 represent the effects of the control variables and the inclusion of the independent variable environmental responsible leadership on the mediating variable employment relationship atmosphere, model M3 represents the effects of the inclusion of the moderating variable social distance on the employment relationship atmosphere, and M4 reflects the effects of

TABLE 5 The moderating role of social distance between environmental responsible leadership and employment relationship atmosphere.

Variables	ERA			
	M1	M2	M3	M4
Control variables				
Age	0.047	0.031	0.053	0.058
Education level	-0.055	-0.092	-0.096	-0.093
Working hours	0.185*	0.113	0.093	0.074
Independent variable				
ERL	—	0.276***	0.163**	0.220***
Adjustment variables				
SD	—	—	0.406***	0.389***
Interaction items				
ERL*SD	—	—	—	0.128*
F	2.985*	8.561***	21.542***	19.253***
R ²	0.026	0.091	0.241	0.254
ΔR ²	0.017	0.081	0.229	0.241

M4 reflects the effect of the interaction term between the independent and moderating variables on the mediating variable employment relationship atmosphere. The results of model M4 show that social distance has a moderating role in the relationship between environmental responsible leadership and employment relationship atmosphere, with an interaction term coefficient of 0.128, which is significant at the $p < 0.05$ level.

In order to visualize the moderating effect of social distance in the relationship between environmental responsible leadership and employment relationship atmosphere, this paper depicts the difference between the relationship between environmental responsible leadership and employment relationship atmosphere at different levels of social distance with the moderating variable social distance being one standard deviation above and below the mean, and the results are shown in Figure 2. When the level of social distance is low, environmental responsible leadership positively influences the employment relationship atmosphere. When the level of social distance is high, environmental responsible leadership also positively influences the employment relationship atmosphere. But the slope value becomes larger. This phenomenon indicates that there is a positive moderating effect of social distance, and the H3 hypothesis is further supported.

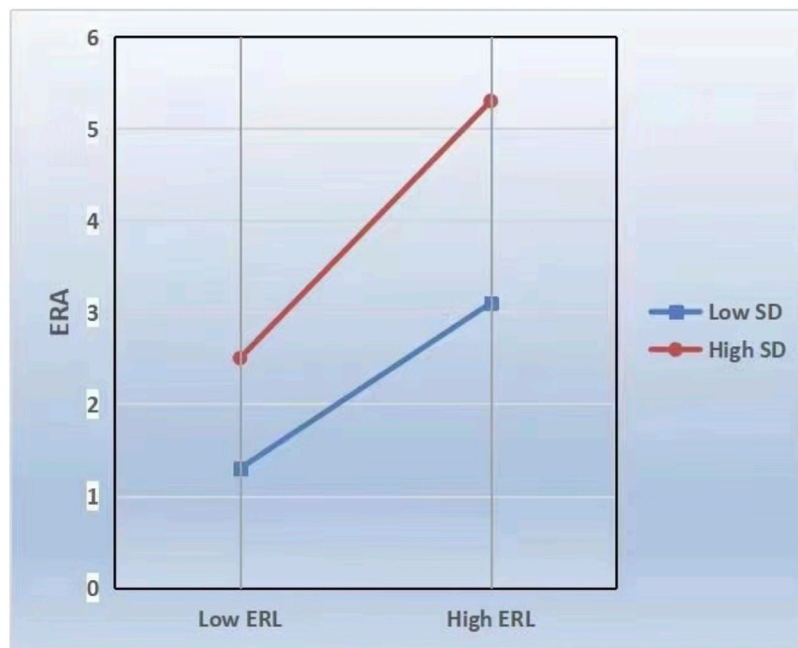


FIGURE 2
Diagram of the moderating effect of social distance.

TABLE 6 Tests for mediating effects of different levels of social distance.

Social distance	Effect value	Standard error	Confidence interval
1.327	0.030	0.019	[0.006, 0.071]
2.744	0.073	0.020	[0.038, 0.117]
4.161	0.117	0.033	[0.060, 0.188]

The extent of the mediating effect of the employment relationship atmosphere in the relationship between environmental responsible leadership and employee pro-environmental behavior varies across social distances, as shown in Table 6. It can be clearly seen that with the shortening of social distance, the mediating effect of employment relationship atmosphere on the relationship between environmental responsible leadership and employee pro-environmental behavior is gradually enhanced.

5 Analysis and discussion

The general increase in public awareness of environmental protection has prompted enterprises to go green, and environmental responsible leadership, as the direction of change in leadership roles in enterprises nowadays, not only responds to society’s call for green development, but also promotes the green transformation of enterprises. However, there are no relevant researches on how environmental responsible leadership affects employees’ pro-environmental behaviors. Environmental

responsible leadership attaches importance to the contribution of stakeholders closely related to the enterprise in protecting the environment. Such concern is comprehensive and can be frequently reflected in the business process of the enterprise. Therefore, employees can perceive the environmental responsibility style of the leader from his words and deeds, and then promote the generation of their pro-environmental behaviors. This paper discusses how environmental responsible leadership affects employees’ pro-environmental behavior, in which the employment relationship atmosphere is introduced as the mediating variable and social distance is the moderating variable. After sending questionnaires and analyzing the data, all the three hypotheses proposed in this paper are verified. Specific conclusions are following:

Environmental responsible leadership can promote employees’ pro-environmental behaviors. The effectiveness of responsible leadership believes that environmental responsible leadership has high professional quality and demonstration effect. It not only strictly complies with the green development norms of the industry, but also takes balancing the interests of all parties as the key content of its work. By playing the three roles of citizen,

expert and facilitator, environmental responsible leaders provide behavioral references for employees' green behaviors, while improving rules and regulations through timely communication to support employees' pro-environmental behaviors. Most importantly, environmental responsible leadership attaches importance to employees' interest demands and pays attention to employees' feelings when implementing green policies, which makes employees increase their trust in the enterprise and consciously take more behaviors expected by the enterprise, such as pro-environmental behaviors.

Employment relationship atmosphere plays a mediating role in the relationship between environmental responsible leadership and employees' pro-environmental behaviors. The subordinate relations in the Chinese context include both instrumental satisfaction of benefit reciprocity and emotional satisfaction of the law of human feeling. Environmental responsible leaders do not rigidly implement and promulgate policies; they make employees feel that the company is supportive of their work through their practices and full consideration of employees' demands, which makes the company more "humane" in their minds and makes the employment relationship more harmonious. In return for the organization and leadership, employees will show a working attitude that is beneficial to the enterprise and act spontaneously toward the enterprise's goals.

Social distance has a positive moderating effect on the environmental responsible leadership and employment relationship atmosphere. Different social distance affects individuals' cognitive preference for the same information, and the cognition of self-boundary is also affected by social distance. Employees include environmental responsible leadership with high social distance into the boundary range of "self," forming the concept of "we," the subject and object of which are highly overlapping, resulting in a high emotional community. Employees' co-emotional knowledge and trust in environmental responsible leadership are improved, and employment relationship atmosphere is more harmonious. On the contrary, if employees think that there is far social distance between them and environmental responsible leadership, the emotional connection between employees and environmental responsible leadership is weak, and employees will pay more attention to their own interests, and employment relationship atmosphere is relatively fragile.

6 Conclusion

6.1 Main conclusions

Green production is not only a social concern at present, but also the direction for enterprises to achieve sustainable business goals. In addition to formulating rules and regulations for green development and investing funds to introduce equipment and facilities, employees' pro-environmental behavior should also be the breakthrough point for enterprises to carry out green production. Based on the concept of environmental responsible leadership that considers the interests of multiple parties, this paper explores the influence path of environmental responsible leadership on employees' pro-environmental behavior.

The research results have important implications for enterprises to promote employee pro-environmental behavior. First, enterprises should strive to shape environmental responsible leadership. On the one hand, they can select managers with the characteristics of environmental responsible leadership through effective procedures. On the other hand, training of existing managers can also be carried out to encourage leaders to make fully communication with stakeholders, and pay attention to multiple interests, especially the needs of employees.

Second, in their daily work, leaders also ought to reflect on whether they assume the three roles of environmental responsible leadership: citizen, expert, and facilitator. In the operation process of enterprises, especially when the leaders discuss and issue relevant rules and regulations for green development, they should make fully discussion with the representatives of employees, respect the right of expression of employees, make the social and economic exchange between employees and enterprises go smoothly, and create a good employment atmosphere.

Third, enterprises can actively organize party-building and league-building activities, as well as face-to-face communication activities between leaders and employees. Through the above activities, enterprises can understand the real thoughts of employees. Enterprises allow employees to make mistakes in green behaviors to a certain extent, shorten the social distance with employees, and make employees truly feel the harmonious employment relationship atmosphere, rather than looking at environmental responsible leadership as a bystander. And try to avoid the situation that employees think that the construction of environmental responsible leadership is a face project.

6.2 Limitations and prospects

Firstly, in terms of research design, this article has tried to control the role of some potential influencing variables, and in the future, relevant factors can be considered to exclude possible interference; Secondly, in terms of the research sample, all the companies participating in the questionnaire survey are from Shanxi, which may have a certain impact on the reliability of the research conclusions. Therefore, in the future, it is recommended to select representative companies from all over the country to make the research conclusions more universal; Finally, in terms of research methods, this article uses random sampling to distribute paper questionnaires. In future research, qualitative research methods such as experiments or in-depth interviews can be considered to improve the research methods.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

Conceptualization, CZ and LL; methodology, CZ; software, LL; validation, CZ and LL; formal analysis, CZ; investigation, LL;

resources, LL; data curation, CZ; writing—original draft preparation, CZ; writing—review and editing, LL; visualization, CZ; supervision, LL; project administration, CZ; funding acquisition, LL. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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