

Article

The Impact of Reverse Mentoring on Employees' Innovative Behavior: Evidence from Chinese Technology Enterprises

Miaomiao Li ^{1,2}, Jinglong Guo ^{1,2,*}, Chiying Zou ^{1,2} and Jielin Yin ^{1,2}¹ School of Economics and Management, Beijing Information Science and Technology University, Beijing 100192, China² Center for Digital Economy and Management, Beijing Information Science and Technology University, Beijing 100192, China

* Correspondence: guojinglong159@163.com; Tel.: +86-159-0302-0125

Abstract: Innovation is crucial for enterprises to maintain a sustainable competitive advantage. Reverse mentoring, as an emerging mentoring practice that promotes knowledge and idea exchange between junior employees and senior colleagues, is regarded as a crucial element in driving overall innovation within organizations and is gradually attracting the attention of scholars. However, empirical research on its potential benefits is still relatively scarce. Based on the cognitive appraisal theory of stress, this study investigates the relationship and internal mechanisms between reverse mentoring and employees' innovative behaviors through a two-period follow-up survey of 528 employees in China's science and technology-based enterprises. The hypotheses were verified using structural equation modeling and bootstrap analysis, and the findings indicated that reverse mentoring positively influenced employees' innovative behaviors. Simultaneously, challenge stress appraisal and continuous learning serve as chain mediators between reverse mentoring and employees' innovative behaviors. This study provides valuable references for organizations to effectively implement reverse mentoring practices and foster innovation, offering a new pathway for sustainable innovation among enterprise employees.

Keywords: reverse mentoring; innovation behavior; challenge stress appraisal; continuous learning



Academic Editor: Mark A. Bonn

Received: 7 November 2024

Revised: 21 December 2024

Accepted: 23 December 2024

Published: 24 December 2024

Citation: Li, M.; Guo, J.; Zou, C.; Yin, J. The Impact of Reverse Mentoring on Employees' Innovative Behavior: Evidence from Chinese Technology Enterprises. *Sustainability* **2025**, *17*, 6. <https://doi.org/10.3390/su17010006>

Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

With the growing intergenerational diversity in workplaces, the phenomenon of senior employees working alongside their junior counterparts is becoming more prevalent [1]. Compared to older colleagues, younger workers who have grown up in a digital environment typically possess more proficient information technology skills [2] and benefit from the technical knowledge acquired through formal education. According to an OECD study, 32% of participants aged 55 to 65 reported a lack of computer skills or failing to pass relevant tests, whereas this proportion was only 7% among participants aged 25 to 34 [3]. Consequently, the intergenerational disparity in digital competencies presents an opportunity for younger employees to provide targeted digital skills training to their older colleagues, thereby assisting them in adapting to the rapidly evolving workplace [4]. This trend is driving new developments in corporate mentorship programs. In fact, globally renowned companies have begun to implement a series of programs that encourage younger employees to mentor their older colleagues, such as Huawei's "All-Employee Mentorship System" and IBM's "Global Mentor Program". The application of "reverse mentorship", which is a novel approach to mentorship relationships, is becoming an increasingly widespread

management practice. In reverse mentorship, less experienced employees take on the role of mentors, while more experienced employees become mentees. This provides young employees with more opportunities to interact with senior colleagues and obtain career support [5,6], as well as fosters the continuous development of organizational learning. However, research on the impact of reverse mentorship on young employees remains scarce, making it an emerging field that requires urgent exploration.

In the era of information technology, tapping into and enhancing employees' innovative capabilities emerged as crucial for enterprises to acquire competitive advantages and sustainable development. Consequently, exploring the antecedents that stimulate individual innovative behaviors is paramount to further elevating corporate innovation performance. Reverse mentoring, as a practice that facilitates intergenerational learning, is regarded as an effective means to enhance organizational innovation capacity. Existing literature suggests that combining the rich industry experience of older employees with the cutting-edge technological mastery of younger employees presents new opportunities for driving innovation [6,7]. However, the current academic literature on reverse mentoring is largely conceptual and still exploratory [4], with most studies conducted in Western contexts. In the Chinese cultural context, characterized by relationship orientation, significant power distance, and collectivism, empirical research on the impact of reverse mentoring on employees' innovative behavior is still limited. Moreover, the limited empirical research that is available primarily builds upon the same theories, including social exchange theory, leader-member exchange theory, and organizational age diversity [8]. However, very few studies have examined the impact of reverse mentoring on younger employees from a stress perception perspective in a Chinese context.

Given the novelty and unconventionality of reverse mentoring practices, the demands of the attendant role can be a significant source of stress for young mentors [6]. According to the cognitive appraisal theory of stress, individuals confronted with a meaningful stimulus will evaluate whether it has an impact on their well-being, determining the stressor to be either a challenge or threat [9]. By engaging in reverse mentorship practices, young mentors can simultaneously gain self-esteem, a sense of accomplishment [5], and knowledge in critical areas, such as skills and teaching techniques, from their senior counterparts [10], all of which can be classified as positive outcomes and therefore a challenge. Consequently, the current study selected challenge stress appraisal as the cognitive evaluation outcome for young mentors.

Continuous learning is regarded as an efficacious and proactive stress-coping strategy [11]. Occupations characterized by challenges and rapid knowledge updates can enhance individuals' perception of crisis, prompting them to engage in continuous learning behaviors to counter stress threats [12]. Existing research has shown that mentors can gain updated insights, namely, the promotion of personal learning behaviors through interaction and mentoring processes [13]. Continuous learning enables young mentors to constantly absorb new knowledge and approaches, as well as learn from the experiences of others, thus equipping themselves with the ability to mentor older counterparts. The knowledge accumulated and new abilities acquired during this process assist young mentors in recognizing a broader range of solutions and generating more novel ideas [14]. Consequently, the current study selected continuous learning as a stress-coping strategy, which subsequently influences behavioral outcomes.

In summary, based on the theory of cognitive appraisal of stress, this study aimed to explore the impact of reverse mentoring (stressor) on the innovative behaviors of employees (behavioral outcomes), as well as the chain mediating roles of challenge stress appraisal (cognitive appraisal) and continuous learning (coping strategies) within this relationship. Ultimately, the current study offers valuable insights for organizations to

effectively implement the emerging management practice of reverse mentoring and to promote the sustainability of employee innovation.

2. Theory and Hypotheses

2.1. Reverse Mentoring and Innovative Behavior

Reverse mentoring is a bottom-up mentoring approach, where younger mentors are paired with more experienced senior colleagues or leaders to assist older mentees in acquiring new information, typically on the subject of technology [15]. Innovative behavior refers to the proactive actions of employees in proposing, introducing, and applying new ideas to improve current work practices, with the aim of maximizing organizational benefits [16].

The unique interaction paradigm of reverse mentoring encourages younger mentors to share their novel knowledge, skills, and insights, facilitating the exchange of knowledge between younger mentors and older mentees [17]. Both mentors and mentees can learn from each other within the mentoring relationship [18,19]. By providing mentoring and constant interaction with senior mentees, young mentors can also acquire new knowledge, such as knowledge of organizational practices and experiences [20]. This assists younger mentors in proposing a broader range of problem-solving solutions and generating novel ideas [21]. Research indicates that interactions among different generations can help individuals recognize the value of multiple perspectives and motivate them to engage in innovative and creative thinking [22].

Reverse mentoring entails younger mentors imparting new technologies and perspectives to older employees. As younger mentors need to answer questions from older employees and “teach while practicing”, their professional proficiency can also be refined and enhanced during the course of continuous information output. By imparting crucial skills to older learners, younger mentors can recognize the value and significance of their own expertise, fostering increased self-confidence [23]. This perception of improved ability is conducive to the generation of innovative ideas.

Reverse mentoring also offers a platform for younger mentors to connect with senior colleagues, allowing them to share their professional knowledge, which contributes to a sense of engagement and a perception of being valued by the organization [22,24]. The high level of commitment to the organization that this fosters can, in turn, stimulate younger mentors to reciprocate by demonstrating innovative behaviors that align with organizational expectations. Based on the above points, the current study proposed the following hypothesis.

H1: *Reverse mentoring positively influences the innovative behavior of employees.*

2.2. The Mediating Role of Challenge Stress Appraisal

The cognitive appraisal theory of stress posits that when individuals encounter stressful situations, they determine the relevance of these situations to their interests through cognitive appraisal and assess whether they have the ability to cope with the current events, with challenge and threat appraisals constituting the two primary types of cognitive appraisals [9]. In stressful circumstances, employees are more inclined to perform challenge appraisals when they believe that investing time and effort will be beneficial for them. Reverse mentoring represents a new role requirement for junior employees and might engender a high or low degree of stress. Specifically, as mentors in reverse mentoring, young employees need to constantly update their knowledge and skills to meet the demands of mentoring older counterparts with the skills they lack. Simultaneously, young employees sometimes have to confront the impacts of negative stereotypes, such as being

regarded as lacking a strong work ethic and being self-centered [23], which may elicit questioning or other negative reactions from the mentees. Research indicates that for young employees who are just starting their careers, managing the role demands of unfamiliar tasks and learning how to effectively facilitate reverse mentoring relationships can be quite stressful [6]. Thus, reverse mentoring can be regarded as a stressor that stimulates further cognitive appraisal among employees.

While reverse mentoring constitutes a source of stress for younger mentors, its engagement also brings potential benefits. By enhancing young employees' organizational identification, reverse mentoring can stimulate them to view it as a beneficial stressor that promotes personal growth and development. First, through reverse mentoring, younger mentors have the ability to engage with more experienced and higher-status supervisors, helping them to obtain access to the mentees' relational networks, increasing their social capital [25] and possibly accelerating career development [26]. Second, engaging in reverse mentoring can enhance younger mentors' leadership, communication, and teaching skills [23,27], laying the foundation for their future career advancement. Third, millennial employees have the aspiration to demonstrate their competence in the workplace and desire to be heard, recognized, and respected [26]. By participating in reverse mentoring practices, younger mentors are offered opportunities where they can showcase their knowledge, as well as their competence in teaching skills, strengthening their sense of self-actualization [28]. Organizational identification, as a special form of social identification, refers to the process by which individuals define themselves as members of an organization and develop a sense of belonging within it. According to social identity theory, organizational identification, as a form of social identification, refers to individuals defining themselves as members of the organization [29], thereby gaining a sense of belonging to the organization. Reverse mentoring, by fulfilling the younger mentors' needs for belonging, respect, and competence, further encourages them to view the reverse mentoring program as a positive opportunity, transforming it into a challenge rather than an obstacle. Reverse mentoring satisfies junior mentors' needs for belonging, respect, and competence, further motivating them to perceive reverse mentoring as a positive opportunity, thereby framing it as a challenge rather than an obstacle. In summary, reverse mentoring, despite being a source of stress, contributes to the future development and promotion of younger mentors. When employees perceive it as a beneficial stressor that promotes their development and can be effectively managed through continuous knowledge enhancement, they are more inclined to evaluate it as a challenge rather than a threat.

Individuals tend to exhibit positive and proactive behaviors when they perceive stressors as challenges rather than threats [30]. First, appraising stressors as challenges typically brings about positive psychological experiences for employees, such as enthusiasm, hope, and aspiration [31]. These positive emotions contribute to enhancing innovative thinking and initiative, thereby leading to more vigorous participation in innovative behaviors [32]. Second, employees who appraise stressors as challenges view these stressors as opportunities for advancing their personal goals and growth, holding the belief that successful coping with stressors will be rewarded accordingly [33]. This expectation might motivate employees to invest more time and energy and engage in problem-oriented proactive behaviors [34], such as conducting information and resource searches, experimenting with new working methods, and responding to work demands resulting from reverse mentoring in a more flexible manner. This contributes to the generation and implementation of innovations. Based on the above points, the following hypothesis was proposed.

H2: *Challenge stress appraisal mediates the relationship between reverse mentoring and the innovative behaviors of employees.*

2.3. The Mediating Role of Continuous Learning

Continuous learning refers to the voluntary and autonomous behavior of individuals engaging in a series of formal or informal learning activities aimed at promoting their future careers through the “application and transfer of knowledge” [35]. First, reverse mentoring requires young mentors to impart knowledge, share insights, and address questions, constituting a process of knowledge output for them. During this process, young mentors can identify their own areas of knowledge weakness, necessitating continuous updating and expansion of their knowledge base. This learning demand prompts engagement in continuous learning behaviors. Second, reverse mentoring offers young mentors the opportunity to communicate with older mentees, allowing them to acquire knowledge through observation, feedback, and exchange during interactions with older mentees; these behaviors fall within the scope of continuous learning. It has been noted that high-quality mentoring relationships reinforce mentors’ perceptions of their mentoring competence, which in turn promotes them to actively engage in learning to further improve their mentoring skills [36].

Knowledge and skills constitute the foundation for innovative behaviors, while learning activities serve as an essential means for acquiring and managing this knowledge [37]. First, continuous learning contributes to enhancing employees’ perceptions of their job-related competencies [38]. For instance, younger employees can cultivate their competencies by discussing work issues with older colleagues. When employees have greater confidence in their professional knowledge and competence, they are more inclined to engage in innovative behaviors through accumulated experience and skills. Second, continuous learning is a process in which an individual acquires knowledge actively rather than passively. This intrinsically self-driven learning mindset stimulates young mentors to actively seek new information, such as learning new roles/tasks, new performance expectations, and acquiring new skills, to address the challenges posed by reverse mentoring, which is indispensable for achieving innovative behavior. Based on this, the following hypothesis was proposed.

H3: *Continuous learning mediates the relationship between reverse mentoring and innovative behaviors of employees.*

2.4. Chain Mediation Effect of Challenge Stress Appraisal and Continuous Learning

An individual’s assessment of a stressor affects subsequent coping strategies. When individuals perceive work as challenging, they are more inclined to adopt problem-focused coping strategies [9]. Specifically, individuals who make challenging stress appraisals believe that the current situation is conducive to self-development and focus their attention on potential gains, growth, and learning [39,40]. It has been demonstrated that learning behavior is a positive and effective means of coping with stress [41]. Therefore, the challenging characteristics of reverse mentoring are more likely to stimulate intrinsic motivation, encouraging employees to invest greater effort in seeking learning opportunities and continuously updating their knowledge systems; in other words, challenge perception stimulates individuals to engage in continuous learning behaviors in an effort to address the challenges of updating their knowledge to keep abreast of technological changes, allowing them to ultimately establish a harmonious mentoring relationship with older learners. Additionally, employees who make challenging stress appraisals tend to maintain a more positive work mood, perceiving current stressors as positive and variable, which can be addressed by increased efforts, such as enhancing learning motivation [42].

Based on the relationships presupposed in hypotheses 2 and 3, and in combination with the mechanism of “stressor → cognitive appraisal → coping strategy → behavioral

outcome” proposed by the cognitive appraisal of stress theory, this study posits that reverse mentoring influences innovative behaviors of employees through the successive mediating effects of cognitive appraisal and coping strategies. Reverse mentoring can bring potential benefits to younger mentors, such as obtaining the experience of older mentees, gaining respect, and feelings of personal achievement [43], which constitutes a kind of work demand that can bring them returns after investing their time and energy. Consequently, employees are inclined to evaluate reverse mentoring as a challenge during the cognitive appraisal process. Employees who perceive reverse mentoring as challenging are more likely to adopt a problem-oriented approach, proactively refining and updating their knowledge and learning communication and teaching skills; that is, prompting them to adopt a coping strategy of continuous learning. This accumulation of knowledge and skills then enables employees to contribute more novel and useful ideas to the organization [44], thereby exhibiting greater innovative behavior. Based on the above analyses, the following hypothesis was proposed.

H4: *Challenge stress appraisal and continuous learning play a chain mediation role in the relationship between reverse mentoring and the innovative behavior of employees.*

The hypothetical model for this study is shown in Figure 1.

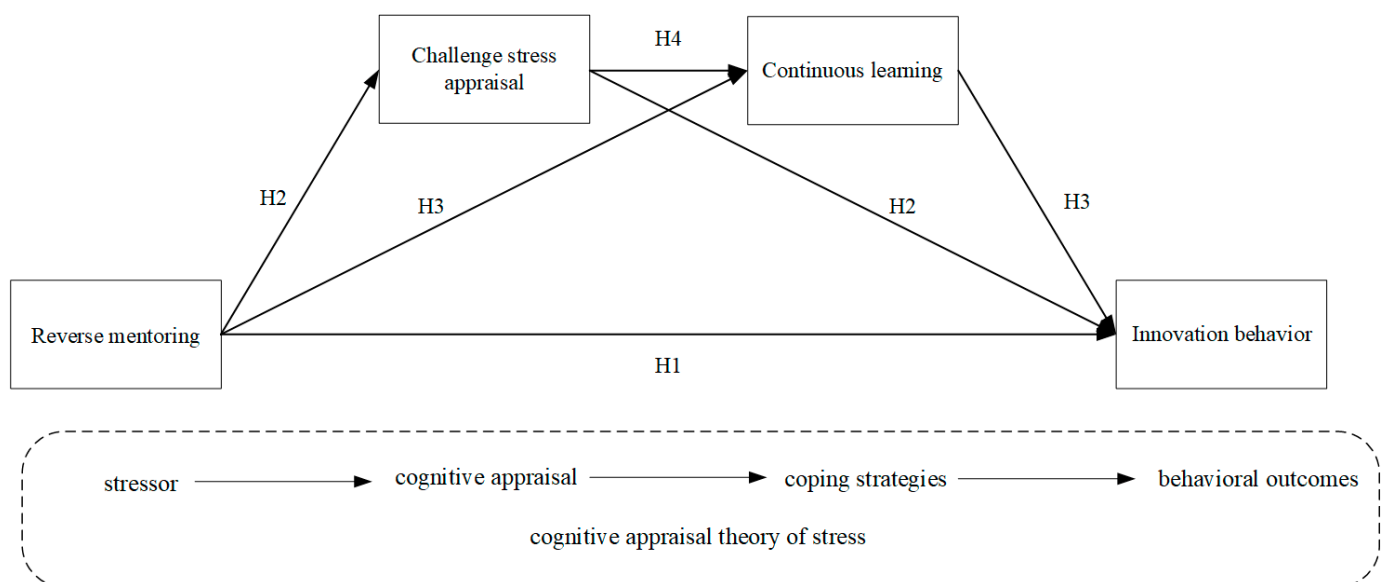


Figure 1. Theoretical model diagram.

3. Methodology

3.1. Design

This cross-sectional quantitative study was conducted from early March 2024 to the end of May 2024, recruiting employees from technology companies as research participants.

3.2. Participants

Convenience sampling was used to recruit participants. Eight technology companies from Beijing, Henan, Hebei, and Shandong provinces were randomly selected to recruit employees who meet the inclusion criteria. In convenience sampling, participant selection is based on accessibility and availability, not necessarily on the representativeness of the entire population. The inclusion criteria for participants were as follows: (1) currently holding a position at a technology firm; (2) provided informed consent and voluntarily

participated in the study; and (3) engaged in reverse mentoring (screened through the item “I share knowledge or new technologies with my old colleagues or supervisors”).

3.3. Data Collection

For data collection, an online survey platform (Wen-Juanxing) was utilized to create and retrieve electronic questionnaires. Before the survey, approval was obtained from the administrators, and they were provided with relevant training. Subsequently, links to a questionnaire were distributed to the administrators in each technology company. Respondents completed the questionnaires online and could only submit them after answering all items. The survey was conducted anonymously, and respondents had the right to withdraw from the survey at any time. Before the survey began, participants were informed of the study purpose, the study duration, and their anonymity, and that voluntary submission of the questionnaire would be considered to constitute voluntary participation in the survey. After obtaining informed consent from participants, they were instructed to fill out the questionnaires truthfully. To minimize the impact of common method bias and accurately assess the causal relationships between variables, this study adopted a two-wave data collection strategy. However, in multi-wave data collection, both excessively long and short time intervals can compromise the accuracy and validity of the findings [45]. Drawing on previous studies and considering the practical context of this research [46], the data collection interval was set to one month. Participants were also required to fill in their surname and the final four digits of their phone number as a pairing cue for the two time points. At time point one, 580 questionnaires were distributed that required participants to fill in demographic information, as well as answer questions about reverse mentoring and appraising challenge stress. Questionnaire 2 was distributed one month later, and participants were invited to complete the continuous learning and innovative behavior questionnaires based on the valid questionnaires collected in the first phase.

3.4. Measures

The scales utilized in this study are all derived from mature scales with high reliability and validity, which have been employed and validated by scholars both domestically and internationally. When introducing foreign scales, the Chinese scales were formed by strictly adhering to the procedure of “translation-back translation” [47].

3.4.1. Reverse Mentoring

Reverse mentoring was evaluated using the scale developed by Garg et al. [24], which consisted of 11 items. Each item was rated using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), and included questions such as “I feel capable of reporting the latest technologies and emerging trends to my mentee, namely an older colleague or supervisor”. A higher score on this scale indicated a stronger reverse mentoring relationship. The Cronbach’s alpha value for this scale was 0.858.

3.4.2. Challenge Stress Appraisal

The measurement of this variable employs the scale developed by LePine et al. [48], which consisted of 3 items. All items were scored using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item is “Overall, I feel that my work contributes to my personal achievement”. Higher scores on this scale indicated higher assessments of challenging stress by the participants. The Cronbach’s alpha value for this scale was 0.801.

3.4.3. Continuous Learning

The scale used was based on one developed by Liu et al. [49], specifically for use within a Chinese context, and consisted of 3 items. Each item was scored using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with items such as “If I know what I need to learn, I will actively seek learning opportunities”. A higher overall score indicated better continuous learning behavior of the individual. This scale has been validated among Chinese working populations with good reliability and validity [50]. The Cronbach’s alpha value for this scale was 0.803.

3.4.4. Innovative Behavior

The scale adopted was based on one developed by Scott and Bruce [16], which consisted of 11 items. Each item was scored using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item is “I will make practical plans for the implementation of new ideas”. A higher overall score indicated better innovative behavior of the individual. The Cronbach’s alpha value for this scale was 0.868.

3.4.5. Control Variables

Based on previous research [51], the current study controlled for participants’ gender, age, working years, education level, job type, and position to mitigate their impact on the results.

3.5. Data Analysis

This study employed SPSS 25.0 software for statistical analysis. For count data, results were presented in the form of frequencies and corresponding proportions, while measurement data were presented through means and standard deviations. Pearson correlation analysis was used to explore the correlations between reverse mentoring, challenging stress appraisal, continuous learning, and innovative behavior. The PROCESS macro program (Model 6) in SPSS 25.0 was utilized to test the multiple mediation model, aiming to initially verify whether the hypothetical relationships among the variables were established. Specifically, the number of bootstrap samples was set to 5000, and a 95% bias-corrected confidence interval was constructed. If the confidence interval did not include zero, it indicated that the effect was statistically significant. Mplus 8.0 was used to construct structural equation models and conduct model comparisons to find the optimal model. After determining the optimal model, the bootstrap method in Mplus 8.0 was applied again to further test the significance of direct and mediation effects. $p < 0.05$ was considered as the criterion to determine whether the difference was statistically significant.

4. Results

4.1. Common Method Bias Test

Since all the variables in this study were self-assessed by the young mentors, there might be the issue of common method bias. To examine the influence of common method bias, this study employed Harman’s single-factor test to analyze the principal components of all the scale question items involved. The results demonstrated that the unrotated first factor accounted for 36.863% of the total variance of the data, which is below the critical threshold of 50% and within an acceptable range, indicating that the common method bias in this study is not severe.

4.2. Demographic Characteristics

A total of 580 questionnaires were distributed. By eliminating the questionnaires that were too short to answer, not filled out carefully, and not matched, 528 valid questionnaires

were ultimately recovered, and the validity rate of questionnaire recovery was 91.03%. A detailed distribution of sample characteristics is presented in Table 1. Independent sample *t*-tests and an analysis of variance (ANOVA) were used to compare scale scores. Statistically significant differences in innovation behavior were found among employees of different genders, ages, years of work, job types, and positions.

Table 1. Sample characteristics and score distribution of innovative behavior (N = 528).

Variables	Subject	N (%)	Innovative Behavior Mean $\pm$ SD	t/F	p
Gender	Males	254 (48.1)	24.57 $\pm$ 3.29	11.689	0.001
	Females	274 (51.9)	23.68 $\pm$ 4.27		
Age	≤ 25 years old	156 (29.5)	22.92 $\pm$ 4.41	7.546	<0.001
	26–35 years old	327 (61.9)	24.54 $\pm$ 3.59		
	36–45 years old	34 (6.4)	24.94 $\pm$ 2.82		
	≥ 46 years old	11 (2.1)	25.45 $\pm$ 1.75		
	≤ 2 years	161 (30.5)	22.80 $\pm$ 4.45		
Years of work	3–4 years	142 (26.9)	24.92 $\pm$ 2.94	9.827	<0.001
	4–5 years	74 (14.0)	24.34 $\pm$ 3.64		
	>5 years	151 (28.6)	24.63 $\pm$ 3.69		
	High school and below	17 (3.2)	22.94 $\pm$ 4.01		
Education	Specialty	75 (14.2)	23.48 $\pm$ 4.54	1.564	0.197
	Undergraduate	372 (70.5)	24.31 $\pm$ 3.66		
	Postgraduate and above	64 (12.1)	23.97 $\pm$ 3.96		
	Technical	189 (35.8)	24.44 $\pm$ 3.10		
Job type	Production	53 (10.0)	24.91 $\pm$ 3.07	5.591	<0.001
	Sales	98 (18.6)	24.04 $\pm$ 4.15		
	Administration	132 (25.0)	24.27 $\pm$ 3.98		
	Others	56 (10.6)	21.95 $\pm$ 5.14		
Position	General Employees	310 (58.7)	23.41 $\pm$ 4.25	9.116	<0.001
	Grassroots Managers	136 (25.8)	24.93 $\pm$ 2.86		
	Middle Managers	74 (14.0)	25.27 $\pm$ 3.12		
	Senior Managers	8 (1.5)	26.50 $\pm$ 2.39		

4.3. Validity Analysis

To examine the discriminant validity among the four variables of reverse mentoring, challenge stress appraisal, continuous learning, and innovative behavior, a confirmatory factor analysis was carried out using Mplus 8.0, and the results of the analysis are presented in Table 2. The four-factor model demonstrated the best fit compared to the other three models ($\chi^2/\text{df} = 1.644 < 2$, RMSEA = 0.035 < 0.08, CFI = 0.969 > 0.9, TLI = 0.965 > 0.9, SRMR = 0.033 < 0.08). These results indicate that the four variables involved in this study possessed adequate discriminant validity.

4.4. Correlation Analysis

Descriptive statistics and correlation analyses were conducted using SPSS 25.0, with the results presented in Table 3. The reverse mentoring was significantly and positively correlated with challenging stress appraisal ($r = 0.577$, $p < 0.01$), continuous learning ($r = 0.478$, $p < 0.01$), and innovative behaviors ($r = 0.616$, $p < 0.01$). Additionally, challenging stress appraisal was significantly and positively correlated with individual continuous learning ($r = 0.431$, $p < 0.01$) and innovative behaviors ($r = 0.452$, $p < 0.01$). Furthermore, continuous learning was significantly and positively correlated with employee innovative behavior ($r = 0.607$, $p < 0.01$).

Table 2. Results of validation factor analysis (N = 528).

Model	Factors	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR
4-factor model	(RM, CSA, CL, IB)	368.262	224	1.644	0.969	0.965	0.035	0.033
3-factor model	(RM, CSA + CL, IB)	708.663	227	3.122	0.898	0.886	0.063	0.048
3-factor model	(RM, CSA + IB, CL)	742.198	227	3.270	0.891	0.878	0.066	0.054
2-factor model	(RM + CSA, CL + IB)	765.186	229	3.341	0.886	0.875	0.067	0.047
2-factor model	(RM, CSA + CL + IB)	911.309	229	3.980	0.855	0.840	0.075	0.059
2-factor model	(RM + IB, CSA + CL)	1081.841	229	4.724	0.819	0.800	0.084	0.063
2-factor model	(RM + CL, CSA + IB)	1087.792	229	4.750	0.818	0.799	0.084	0.067
1-factor model	(RM + CSA + CL + IB)	1237.080	230	5.379	0.787	0.765	0.091	0.068

Note: N = 528. Abbreviation: RM, Reverse mentoring; CSA, challenge stress appraisal; CL, continuous learning; IB, innovative behaviors.

Table 3. Descriptive statistical analysis (N = 528).

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	1.519	0.500	—									
2. Age	1.811	0.639	0.035	—								
3. Working years	2.407	1.194	0.081	0.651**	—							
4. Education	2.915	0.621	0.075	0.060	0.029	—						
5. job type	2.646	1.444	0.397**	0.063	0.033	0.078	—					
6. Position	1.583	0.784	−0.062	0.316**	0.339**	0.126**	0.015	—				
7. RM	4.049	0.524	−0.078	0.203**	0.181**	0.001	−0.088*	0.171**	—			
8. CSA	4.183	0.624	−0.012	0.039	0.086*	0.016	−0.111*	0.072	0.577**	—		
9. CL	4.141	0.621	−0.052	0.139**	0.120**	0.059	−0.043	0.145**	0.478**	0.431**	—	
10. IB	4.016	0.643	−0.118**	0.191**	0.162**	0.061	−0.135**	0.216**	0.616**	0.452**	0.607**	—

Notes: N = 528; ** $p < 0.01$, * $p < 0.05$. Abbreviation: RM, Reverse mentoring; CSA, challenge stress appraisal; CL, continuous learning; IB, innovative behaviors.

4.5. Hypothesis Testing

This study employed the Process plugin in SPSS 25.0 to test the main effects and the chain mediation effect. The number of bootstrap samples was set to 5000, and 95% bias-corrected confidence intervals (95% CI) were constructed. If the interval did not include zero, it indicated that the mediation effect was established. Results are presented in Table 4. Based on the outcomes of bootstrap analysis, the effect value of reverse mentoring on innovative behavior was 0.453, and the 95% confidence interval did not include the zero value, suggesting that reverse mentoring had a significantly positive effect on innovative behavior. Thus, hypothesis H1 was initially supported. The path coefficient for “reverse mentoring → challenge stress appraisal → innovation behavior” was 0.042, and the 95% confidence interval included zero. Therefore, hypothesis H2 was not supported, indicating that the influence of reverse mentoring on innovation behavior is not achieved solely by affecting challenge stress appraisal. Consequently, it was necessary to revise the theoretical model. Finally, the model after eliminating the path of reverse mentoring → challenge stress appraisal → innovative behavior was selected as the hypothetical model of this paper.

Table 4. Bootstrap analysis results for serial mediation (N = 528).

Type of Effect	Effect Path	Effect	SE	95% CI	
				Lower Limits	Upper Limits
Total effect		0.712	0.043	0.627	0.796
Direct effect	Reverse mentoring → innovative behavior	0.453	0.049	0.356	0.549
Total direct effect		0.259	0.047	0.173	0.360
indirect effect	Reverse mentoring → challenge stress appraisal → innovative behavior	0.042	0.037	−0.028	0.121
	Reverse mentoring → continuous learning → innovative behavior	0.150	0.036	0.088	0.227
	Reverse mentoring → challenge stress appraisal → continuous learning → innovative behavior	0.067	0.019	0.032	0.104

After removing insignificant paths to select the optimal model, this study employed Mplus 8.0 to construct a structural equation model for testing. Four nested competitive models were established based on the theoretical model. Competitive Model 1 only removed the reverse mentoring → continuous learning path. Competitive Model 2 only removed the challenging stress appraisal → innovative behavior path. Competitive Model 3 transformed into a fully chained mediation model by deleting both the reverse mentoring → continuous learning and the challenging stress appraisal → innovative behavior paths. Competitive Model 4 simultaneously removed the reverse mentoring → innovative behavior and challenge stress appraisal → continuous learning paths. The results, as shown in Table 5, indicated that both the parsimonious model (Competing Model 2), after removing insignificant paths, and the theoretical model exhibited better-fit parameters than the other models. Although there was no significant difference between the parsimonious model (Competitive Model 2) and the theoretical model as a whole ($\Delta\chi^2 = 0.454$, $p > 0.05$), the parsimonious model demonstrated superior fit parameters in some respects. Therefore, the parsimonious model, after removing insignificant path coefficients, was determined to be the optimal model.

Based on the revised model, hypothesis testing was conducted using Mplus 8.0 software. The results of the path analysis, based on bootstrapping, are presented in Figure 2 and Table 6. After controlling for employees' gender, age, working years, education level, job type, and position, reverse mentoring was found to positively influence innovative behavior ($b = 0.478$, $p < 0.001$), and the 95% confidence interval did not encompass zero, indicating support for hypothesis H1. As shown in Table 4, the influence of reverse mentoring on innovative behavior through challenge stress appraisal was not significant ($b = 0.042$, 95% CI [−0.028, 0.121]); thus, hypothesis H2 was not supported. Reverse mentoring positively influenced innovative behavior through continuous learning ($b = 0.208$, 95% CI [0.097, 0.381]), supporting hypothesis H3. Additionally, reverse mentoring positively influ-

enced innovative behavior through the chain mediation of challenge stress appraisal and continuous learning ($b = 0.095$, 95% CI [0.015, 0.189]), supporting hypothesis H4.

Table 5. Fit indices of structural equation models.

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$	Δdf
Theoretical Model	368.481	224	1.645	0.969	0.965	0.035	0.033		
Competing Model 1	399.176	225	1.774	0.963	0.958	0.038	0.044	30.695***	1
Competing Model 2	368.935	225	1.640	0.969	0.966	0.035	0.033	0.454	1
Competing Model 3	401.202	226	1.775	0.963	0.958	0.038	0.045	32.721***	2
Competing Model 4	425.349	226	1.882	0.958	0.953	0.041	0.044	56.868***	2

Notes: N = 528; *** $p < 0.001$.

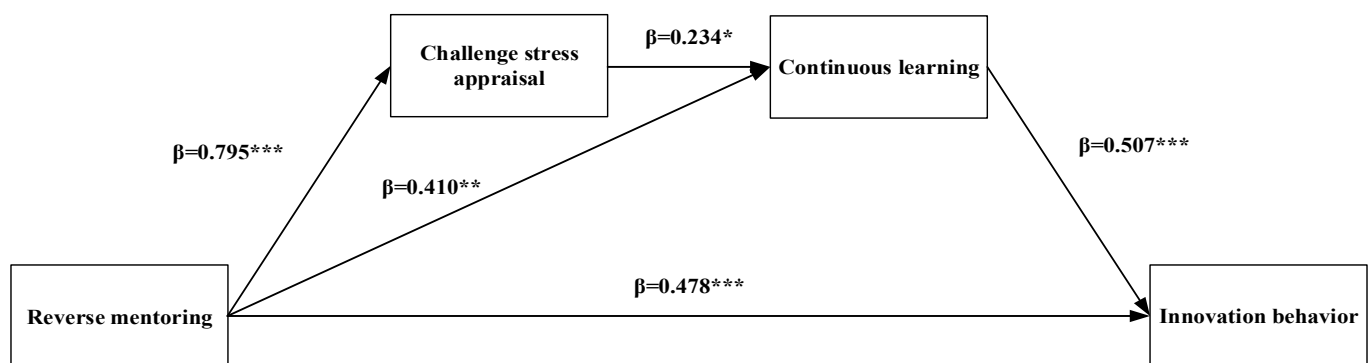


Figure 2. Path Coefficient Results. Note: *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$.

Table 6. Path analysis results based on bootstrapping (N = 528).

Type of Effect	Effect Path	Effect	SE	95% CI
Direct effect	Reverse mentoring → challenge stress appraisal	0.795	0.102	[0.621, 1.019]
	Reverse mentoring → continuous learning	0.410	0.119	[0.202, 0.664]
	Challenging stress appraisal → continuous learning	0.234	0.109	[0.016, 0.447]
	Continuous learning → innovative behavior	0.507	0.086	[0.348, 0.686]
	Reverse mentoring → innovative behavior	0.478	0.080	[0.331, 0.645]
indirect effect	Reverse mentoring → continuous learning → innovative behavior	0.208	0.071	[0.097, 0.381]
	Reverse mentoring → challenging stress appraisal → continuous learning → innovative behavior	0.095	0.044	[0.015, 0.189]
	Reverse mentoring → innovative behavior	0.478	0.080	[0.331, 0.645]
Total effect		0.780	0.081	[0.633, 0.949]

Note: All path coefficients shown are unstandardized.

5. Discussion

In the digital era, the turbulence and complexity characteristics of the competitive environment are more obvious [52], posing greater challenges to technology companies and employees. If a company lacks competitive advantages, its sustainability will be negatively affected, potentially leading to failure. Employee innovative behavior is crucial for enhancing corporate competitive advantages and promoting overall organizational sustainability [53]. In particular, the emergence of new technologies is gradually reshaping traditional ways of working, necessitating continuous innovation from employees to adapt to the rapid pace of industry development [54]. Young employees often stand at the forefront of these new technologies and are equipped with the ability to teach their less tech-savvy older colleagues how to use these technologies. Through reverse mentoring, diverse generational perspectives converge, promoting continuous organizational learning and stimulating innovative vitality [55]. Therefore, delving deeper into the application of reverse mentoring within organizations holds profound significance and utility for driving continuous innovation and sustainable development in enterprises. Based on the cognitive appraisal theory of stress, this study examined the relationship and mechanism between reverse mentoring and the innovation behavior of employees. The main conclusions were as follows: (1) reverse mentoring has a significant and positive impact on employees' innovative behavior; (2) the mediating role of challenging stress appraisal between reverse mentoring and employees' innovative behavior was not significant; (3) continuous learning mediates the relationship between reverse mentoring and employees' innovative behavior; and (4) challenge stress appraisal and continuous learning play a chain-mediating role between reverse mentoring and employees' innovative behavior.

First, the findings of this study indicate that reverse mentoring can significantly and positively predict employees' innovative behavior, providing empirical support for understanding the critical role of reverse mentoring practices in the context of Chinese enterprises. Previous research has suggested that reverse mentoring connects younger mentors, who bring fresh perspectives on products, services, and processes, with older employees, who are well-versed in organizational workflows, thereby offering new opportunities for organizational innovation [6]. However, there is still a lack of extensive empirical validation. This study supports and extends prior research by demonstrating that reverse mentoring, as an emerging organizational practice, can encourage younger employees to engage in innovation. Specifically, By participating in reverse mentoring practices, young employees not only gain experiential knowledge from older employees but also refine and develop their own professional skills in the process of teaching new ideas or knowledge to their older colleagues. This acquired knowledge and enhancement of skills contribute to increasing employees' willingness and confidence to engage in innovative behaviors.

Second, the findings indicate that challenge stress appraisal does not significantly mediate the relationship between reverse mentoring and employees' innovative behavior, suggesting that perceiving stress as a challenge rather than a threat does not necessarily enhance employees' innovative behaviors. While this result contradicts the initial hypothesis, it aligns with insights from previous studies. According to the cognitive appraisal theory of stress, individuals who appraise stress as a challenge tend to focus on the potential growth and benefits associated with the stressor [9]. Overcoming challenging stressors may lead to material rewards and a sense of accomplishment; this does not imply that challenging stress is recognized equally by all individuals. For instance, studies have found that when work resources fail to meet the needs of the post-90s generation of employees in coping with challenging stress, the positive effect of challenging stress on their perception of organizational support is greatly reduced [56]. In the context of reverse mentoring, mentors are often younger and less experienced employees. These less experienced em-

employees often face limited resources, job instability, and incomplete psychological contracts with their organizations [57]. Even if they perceive reverse mentoring as a challenge, their constrained resources and situational challenges may hinder their ability to engage in innovative behaviors effectively.

Third, the current results unveil the mediating role of continuous learning between reverse mentoring and the innovative behavior of employees. Reverse mentoring enhances continuous learning among younger employees, which in turn stimulates their innovative behavior, aligning with previous research conclusions. Reverse mentoring is characterized by a bidirectional transfer of knowledge [58], and previous research has confirmed that mentors can learn from mentoring relationships, such as through acquiring mentoring and specific relational knowledge [36]. Moreover, continuous learning has been shown to have a significant positive impact on innovative behavior [50]. Young employees need to acquire necessary professional knowledge and skills in specific domains to equip themselves with the ability to share knowledge with older employees, while also coping with rapid updates in knowledge and technology. These demands prompt young employees to engage in continuous learning behaviors as a coping mechanism. Through continuous learning, young employees can broaden their horizons, enhance their job competence, actively seek new information, and master new technologies. The knowledge and skills acquired through such learning are indispensable for realizing innovative behaviors.

Fourth, existing research on reverse mentoring has primarily focused on conceptual discussions, with limited empirical studies largely based on theories such as social exchange and leader-member exchange to explore its potential impacts on organizations and individuals [8]. However, the mechanisms through which reverse mentoring influences employees' innovative behavior remain underexplored. This study innovatively situates reverse mentoring within the framework of the cognitive appraisal theory of stress and finds that continuous learning and challenge stress appraisal play a chain-mediating role between reverse mentoring and employees' innovative behavior. This conclusion is consistent with the literature [6,12]. Reverse mentoring requires young employees to continuously update their knowledge base, enhance their mentoring skills, and manage and maintain relationships with mentees, which collectively serve as sources of stress for young employees. However, reverse mentoring also brings additional benefits to young employees, such as acquiring knowledge of organizational routines and experience from older colleagues, as well as earning respect and recognition from these same colleagues. According to the cognitive appraisal theory of stress, employees tend to evaluate reverse mentoring as a stressor, as beneficial for their personal development, and as something that can yield rewards through effort; in other words, they tend to appraise the stress as a challenge. Individuals who make such challenging appraisals adopt continuous learning strategies to cope with the stress brought by reverse mentoring. The knowledge and skills acquired through this continuous learning process are necessary conditions for creatively solving problems and improving current processes, thereby promoting individual innovative behavior.

5.1. Theoretical Implications

This study holds significant theoretical implications. First, this research enhances the focus on the emerging organizational practice of “reverse mentoring”, thereby enriching the study of mentoring more comprehensively. The concept of mentoring relationships has long existed, with previous academic and practical domains primarily concentrating on traditional mentoring models, wherein experienced employees act as mentors, providing knowledge and teaching skills necessary for the professional development of less experienced mentees. However, with advancements in information technology and the increasing influx of millennial employees entering the labor market, reverse mentoring, a novel form

of mentoring relationship, is gaining attention [20]. Given the novelty of this intervention, empirical research on reverse mentoring is currently limited [59], with most studies only theoretically exploring its potential impact on employees and organizations. Furthermore, scholars' attention has primarily focused on bridging the technological divide between generational groups [60], alleviating social isolation among older adults [23], and cultivating young leaders [26]. However, research combining employees' innovative behavior with reverse mentoring remains scarce. Therefore, this study explores the intrinsic relationship between reverse mentoring and employees' innovative behavior, thereby further enriching and expanding the research on the effects of reverse mentoring.

Additionally, the majority of current research on reverse mentoring tends to favor qualitative methods [8], with relatively few studies employing quantitative or mixed methods. Given that reverse mentoring serves as an instrument of social exchange, social exchange theory and leader-member exchange theory are frequently utilized as fundamental theories in extant reverse mentoring studies [5,60,61]. In contrast, the current study situated reverse mentoring within the framework of the cognitive appraisal of stress theory, verifying the effectiveness of the "stressor → cognitive appraisal → coping strategy → behavioral outcome" process in explaining the relationship between reverse mentoring and employees' innovative behavior. This sheds light on the "black box" mechanism of how reverse mentoring influences the innovative behaviors of employees. Notably, the independent mediating effect of challenge stressor appraisal was not significant in this study, indicating that individuals do not immediately engage in innovative behavior upon perceiving stressors as challenges. Rather, the entire process is one of gradual adaptation. When confronted with challenge stressors arising from reverse mentoring, employees may update their knowledge and skills by seeking feedback and engaging in self-directed learning, thereby fostering continuous learning, which further enhances their innovative behavior. Consequently, this study not only offers a new theoretical perspective for understanding the psychological and behavioral responses of employees to reverse mentoring, actively responding to scholars' calls for expanding and enriching existing theories in reverse mentoring research [8] but also enriches the application of cognitive appraisal theory of stress in the context of reverse mentoring research.

5.2. Practical Implications

Firstly, employees' innovative behavior is crucial for enhancing overall innovation performance and core competitiveness of technology enterprises. According to the findings of this study, reverse mentoring has a significant positive effect on stimulating employees' innovation behavior. Therefore, managers should actively explore how to best design and implement reverse mentoring programs in the workplace to facilitate knowledge exchange between younger mentors and older colleagues, thereby promoting the sustainability of employee innovation within the enterprise. Specifically, companies can adopt the following measures. First, to attract the participation of younger employees, companies should establish a comprehensive incentive mechanism that tracks the contributions of reverse mentors and rewards them, such as providing certificates, and promotion opportunities. Second, to attract the participation of older employees, companies should create an inclusive, open, and communicative learning environment, which will foster the perception among older employees that the organization values their growth and development. Although reverse mentoring offers many potential benefits, this practice also involves certain risks, and organizations need to be mindful of some critical prerequisites. Therefore, organizations should cultivate a culture that prioritizes employee development and collaboration, encouraging a focus on mutual learning among colleagues while alleviating older employees' perception of status threats. Furthermore, organizations should establish effective communication

platforms. For instance, they could implement mentoring meetings and sports activities, promoting open dialogue, enhancing mutual trust, and reducing generational conflicts.

Secondly, companies should seek to identify and manage the stress appraisal process of young mentors. The turnover rate of employees in technology-based enterprises has remained high [62], and reverse mentoring, as a bottom-up approach, can effectively reduce employee turnover [63]. However, reverse mentoring may also impose additional stress on employees. If their cognitive process is not well-managed, it could exacerbate employee turnover. While it is important for managers to help young employees foster an optimistic and enterprising work attitude, enabling them to perceive the benefits of reverse mentoring so they can view it as an opportunity, rather than an impediment, it is also critical to provide necessary resources for participating employees, such as access to online learning platforms and reasonable reduction of daily workload to appropriately invest time in learning. By enhancing employees' challenge assessments, they can be further motivated to engage in continuous learning and innovative behaviors.

Thirdly, the half-life of knowledge is increasingly shortening, and for organizations facing global competition, continuously updating employees' knowledge is crucial for maintaining their competitive advantage and achieving business sustainability [64]. Therefore, companies should actively support employees' continuous learning behavior to promote the establishment of enterprise innovation and long-term sustainable development capability. Likewise, employees should consciously cultivate a proactive and sustained awareness of professional learning. This is especially true within the continuous application of advanced equipment and technologies; employees need to continuously enhance their abilities to acquire information and apply new technologies to effectively cope with the ever-changing environment. Additionally, managers can guide employees to establish the concept of "learning by doing" through organizing practical activities, such as simulation training and skills competitions. These measures can effectively promote employees' continuous learning behavior, enhance their employability [38], and thus lay the foundation for sustainable innovation of employees.

5.3. Limitations and Future Research

First, although the data in this study was collected through a two-stage approach, it is still essentially a cross-sectional study. Future research could adopt a longitudinal design, tracking the same sample at multiple time points to explore the long-term effects of reverse mentoring on employees' innovative behavior. Additionally, this study did not include a control group of employees who did not participate in reverse mentoring, which may limit the persuasiveness of the findings. Therefore, future studies could supplement the research with experimental methods, incorporating a control group and random assignment, to better compare the differences in innovative behavior between employees who participate in reverse mentoring and those who do not, thereby strengthening the inference of causality.

Second, all the questionnaire items were self-reported by the young mentors, lacking data from other raters, which may lead to exaggeration or underestimation of certain behaviors and perspectives, thereby introducing common method bias. Although the one-factor ANOVA results suggest that common method bias is not a serious issue in this study, the conclusions still have limitations. Future research could utilize a 360-degree feedback mechanism to collect feedback from colleagues, subordinates, and supervisors, enhancing the triangulation of the data or gathering paired mentor-mentee data to validate the findings further. Additionally, improving the data collection methods by using the experience sampling method (ESM) to collect data at different time points could increase the accuracy and objectivity of the research.

Third, this study primarily focused on employees of technology firms; however, this single-type sample selection may have some limitations, potentially affecting the generalizability of the research findings. Reverse mentoring has been applied in various fields, including business [63], education [65,66], and government [2]. Therefore, future research could expand the sample scope by employing a multi-stage random sampling method to ensure diversity in terms of geography, industry, company size, and employee levels.

Fourth, this study did not examine the boundary conditions of the impact of reverse mentoring on employees' innovative behavior. Given that individuals from different cultural backgrounds may have different appraisals of the same stressors [67], future research could, based on cross-cultural management theory, explore the moderating role of cultural value factors (such as power distance, collectivism, etc.) on the effects of reverse mentoring, in order to further advance cross-cultural research on reverse mentoring.

Author Contributions: M.L.: Writing—original draft, Conceptualization, Methodology, Funding acquisition. J.G.: Writing—original draft, Conceptualization, Data curation, Formal analysis. C.Z. and J.Y.: Conceptualization, Writing—review and editing, Validation, Supervision. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the Project of Beijing Social Science Fund, Grant no. 22GLC043.

Institutional Review Board Statement: This study was approved by the Academic Committee of the School of Economics and Management, Beijing Information Science and Technology University (approval number: No. EA202401019). To protect the privacy of the participants, the survey was conducted anonymously. Prior to participating in the survey, participants were informed about the purpose and use of the study, as well as their right to withdraw from the survey at any time without any negative consequences. All participants volunteered to participate, and the first page of the questionnaire provided a link to the informed consent form. Participants could only proceed to the subsequent survey questions after clicking “agree”, thereby obviating the need for a paper-based informed consent form.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data involved in this study can be requested from the corresponding author upon reasonable request.

Acknowledgments: We express our profound gratitude to all the employees and administrators who generously participated in this study.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Colbert, A.; Yee, N.; George, G. The digital workforce and the workplace of the future. *Acad. Manag. J.* **2016**, *59*, 731–739. [\[CrossRef\]](#)
2. Burdett, J. Reverse mentoring becomes a two-way street: Case study of a mentoring project for IT competence. *Dev. Learn. Organ.* **2014**, *28*, 13–16. [\[CrossRef\]](#)
3. OECD. *Skills for a Digital World: 2016 Ministerial Meeting on the Digital Economy Background Report*; OECD Digital Economy Papers; OECD: Paris, France, 2016.
4. Kaše, R.; Saksida, T.; Mihelič, K.K. Skill development in reverse mentoring: Motivational processes of mentors and learners. *Hum. Resour. Manag.* **2019**, *58*, 57–69. [\[CrossRef\]](#)
5. Chaudhuri, S.; Ghosh, R. Reverse mentoring: A social exchange tool for keeping the boomers engaged and millennials committed. *Hum. Resour. Dev. Rev.* **2012**, *11*, 55–76. [\[CrossRef\]](#)
6. Murphy, M.W. Reverse mentoring at work: Fostering cross-generational learning and developing millennial leaders. *Hum. Resour. Manag.* **2012**, *51*, 549–573. [\[CrossRef\]](#)
7. Joe, C.; Yoong, P. Harnessing the expert knowledge of older workers: Issues and challenges. *J. Inf. Knowl. Manag.* **2006**, *5*, 63–72. [\[CrossRef\]](#)

8. Chaudhuri, S.; Park, S.; Johnson, K.R. Engagement, inclusion, knowledge sharing, and talent development: Is reverse mentoring a panacea to all? Findings from literature review. *Eur. J. Train. Dev.* **2022**, *46*, 468–483. [\[CrossRef\]](#)
9. Lazarus, R.S.; Folkman, S. *Stress, Appraisal, and Coping*. Springer: New York, NY, USA, 1984.
10. Clarke, A.J.; Burgess, A.; van Diggele, C.; Mellis, C. The role of reverse mentoring in medical education: Current insights. *Adv. Med. Educ. Pract.* **2019**, *10*, 693–701. [\[CrossRef\]](#) [\[PubMed\]](#)
11. Zheng, X.J.; Chang, K. Internet company employees' strategies to dissatisfaction at work—Exploring the role of boundaryless career orientation. *Manag. Rev.* **2023**, *35*, 321–335.
12. Dong, W.; Qin, Q.W.; Wang, Y.F.; Wang, F.Y. Career-related continuous learning: A literature review and prospects. *Foreign Econ. Manag.* **2016**, *38*, 65–75.
13. Ghosh, R.; Hutchins, H.M.; Rose, K.J.; Manongsong, A.M. Exploring the lived experiences of mutuality in diverse formal faculty mentoring partnerships through the lens of mentoring schemas. *Hum. Resour. Dev. Q.* **2020**, *31*, 319–340. [\[CrossRef\]](#)
14. Xu, S.; Liu, P.; Yang, Z.; Cui, Z.; Yang, F. How does mentoring affect the creative performance of mentors: The role of personal learning and career stage. *Front. Psychol.* **2021**, *12*, 741139. [\[CrossRef\]](#)
15. Allen, T.D.; McManus, S.E.; Russell, J.E. Newcomer socialization and stress: Formal peer relationships as a source of support. *J. Vocat. Behav.* **1999**, *54*, 453–470. [\[CrossRef\]](#)
16. Scott, S.G.; Bruce, R.A. Determinants of innovative behavior: A path model of individual innovation in the workplace. *Acad. Manag. J.* **1994**, *37*, 580–607. [\[CrossRef\]](#)
17. Karunaratne, M.W.O.M.; Karunaratne, M.W.T. Review on application of reverse mentoring during COVID-19 pandemic. *Int. J. Res. Eng. Sci. Manag.* **2022**, *5*, 91–96.
18. Hu, Z.; Li, J.; Kwan, H.K. The effects of negative mentoring experiences on mentor creativity: The roles of mentor ego depletion and traditionality. *Hum. Resour. Manag.* **2022**, *61*, 39–54. [\[CrossRef\]](#)
19. Chaudhuri, S.; Ghosh, R.; Park, S. The missing voices of learning and development professionals: Factors influencing formal and informal practices of reverse mentoring. *New Horiz. Adult Educ. Hum. Resour. Dev.* **2022**, *34*, 14–30. [\[CrossRef\]](#)
20. Gadowska-Lila, K. Effectiveness of reverse mentoring in creating intergenerational relationships. *J. Organ. Chang. Manag.* **2020**, *33*, 1313–1328. [\[CrossRef\]](#)
21. Wang, C.Y.; Zuo, M.Y. Research on the effects of intergenerational and peer-to-peer knowledge transfer on younger employees' innovative behavior. *Chin. J. Manag.* **2018**, *15*, 893–900.
22. Madhavanprabhakaran, G.; Francis, F.; Labrague, L.J. Reverse mentoring and intergenerational learning in nursing: Bridging generational diversity. *Sultan Qaboos Univ. Med. J.* **2022**, *22*, 472–478. [\[CrossRef\]](#) [\[PubMed\]](#)
23. Breck, B.M.; Dennis, C.B.; Leedahl, S.N. Implementing reverse mentoring to address social isolation among older adults. *J. Gerontol. Soc. Work* **2018**, *61*, 513–525. [\[CrossRef\]](#)
24. Garg, N.; Murphy, W.; Singh, P. Reverse mentoring, job crafting and work-outcomes: The mediating role of work engagement. *Career Dev. Int.* **2021**, *26*, 290–308. [\[CrossRef\]](#)
25. Hezlett, S.A.; Gibson, S.K. Linking mentoring and social capital: Implications for career and organization development. *Adv. Dev. Hum. Resour.* **2007**, *9*, 384–411. [\[CrossRef\]](#)
26. Meister, J.C.; Willyerd, K. Mentoring millennials. *Harv. Bus. Rev.* **2010**, *88*, 68–72.
27. Gabriel, A.G.; Alcantara, G.M.; Alvarez, J.D. How do millennial managers lead older employees? The philippine workplace experience. *Sage Open* **2020**, *10*, 2158244020914651. [\[CrossRef\]](#)
28. Jayathilake, H.D.; Daud, D.; Eaw, H.C.; Annuar, N. Employee development and retention of Generation-Z employees in the post-COVID-19 workplace: A conceptual framework. *Benchmarking* **2021**, *28*, 2343–2364. [\[CrossRef\]](#)
29. Tajfel, H.; Turner, J.H. The social identity theory of intergroup behavior. In *Psychology of Intergroup Relations*; Worchel, S., Austin, G., Eds.; Nelson: Chicago, IL, USA, 1986; pp. 7–24.
30. Scheuer, M.L.; Burton, J.P.; Barber, L.K.; Finkelstein, L.M.; Parker, C.P. Linking abusive supervision to employee engagement and exhaustion. *Organ. Manag. J.* **2016**, *13*, 138–147. [\[CrossRef\]](#)
31. Raper, M.J.; Brough, P.; Biggs, A. Is it all about the personal resources? The moderating role of resilience on daily stress appraisal and emotion. *Work. Stress* **2024**, *38*, 248–269. [\[CrossRef\]](#)
32. Mitchell, R.; Boyle, B.; Nicholas, S. Team innovative capability: Does positive mood unlock the innovative potential of environmental cues? *J. Bus. Res.* **2021**, *126*, 376–384. [\[CrossRef\]](#)
33. Mitchell, M.S.; Greenbaum, R.L.; Vogel, R.M.; Mawritz, M.B.; Keating, D.J. Can you handle the pressure? The effect of performance pressure on stress appraisals, self-regulation, and behavior. *Acad. Manag. J.* **2019**, *62*, 531–552. [\[CrossRef\]](#)
34. Zhan, X.; Zhao, X.; Hu, B.; Li, Z.; Xia, J. Challenge or threat? Examining when and how employees react positively and negatively to coworkers' job crafting. *J. Bus. Psychol.* **2024**, *39*, 1413–1426. [\[CrossRef\]](#)
35. London, M.; Smither, J.W. Career-related continuous learning: Defining the construct and mapping the process. *Res. Pers. Hum. Resour. Manag.* **1999**, *17*, 81–121.

36. Astrove, S.L.; Kraimer, M.L. What and how do mentors learn? The role of relationship quality and mentoring self-efficacy in mentor learning. *Pers. Psychol.* **2022**, *75*, 485–513. [\[CrossRef\]](#)
37. Carmeli, A.; Gelbard, R.; Reiter-Palmon, R. Leadership, creative problem-solving capacity, and creative performance: The importance of knowledge sharing. *Hum. Resour. Manag.* **2013**, *52*, 95–121. [\[CrossRef\]](#)
38. Rowold, J.; Kauffeld, S. Effects of career-related continuous learning on competencies. *Pers. Rev.* **2008**, *38*, 90–101. [\[CrossRef\]](#)
39. Folkman, S.; Lazarus, R.S. If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *J. Pers. Soc. Psychol.* **1985**, *48*, 150–170. [\[CrossRef\]](#) [\[PubMed\]](#)
40. Prem, R.; Ohly, S.; Kubicek, B.; Korunka, C. Thriving on challenge stressors? Exploring time pressure and learning demands as antecedents of thriving at work. *J. Organ. Behav.* **2017**, *38*, 108–123. [\[CrossRef\]](#) [\[PubMed\]](#)
41. Song, Q.; Zhang, L.; Gao, L.; Cheng, B.; Chen, Y. Learn from others or put them down? The double-edged effect of upward social comparison in the workplace. *Acta Psychol. Sin.* **2023**, *04*, 658–670. [\[CrossRef\]](#)
42. LePine, J.A.; LePine, M.A.; Jackson, C.L. Challenge and hindrance stress: Relationships with exhaustion, motivation to learn, and learning performance. *J. Appl. Psychol.* **2004**, *89*, 883–891. [\[CrossRef\]](#) [\[PubMed\]](#)
43. Harvey, M.; McIntyre, N.; Thompson Heames, J.; Moeller, M. Mentoring global female managers in the global marketplace: Traditional, reverse, and reciprocal mentoring. *Int. J. Hum. Resour. Manag.* **2009**, *20*, 1344–1361. [\[CrossRef\]](#)
44. Lankau, M.J.; Scandura, T.A. An investigation of personal learning in mentoring relationships: Content, antecedents, and consequences. *Acad. Manag. J.* **2002**, *45*, 779–790. [\[CrossRef\]](#)
45. Dobrow, S.R.; Ganzach, Y.; Liu, Y. Time and job satisfaction: A longitudinal study of the differential roles of age and tenure. *J. Manag.* **2018**, *44*, 2558–2579. [\[CrossRef\]](#)
46. Castanheira, F. Perceived social impact, social worth, and job performance: Mediation by motivation. *J. Organ. Behav.* **2016**, *37*, 789–803. [\[CrossRef\]](#)
47. Brislin, R.W. Back-translation for cross-cultural research. *J. Cross-Cult. Psychol.* **1970**, *1*, 185–216. [\[CrossRef\]](#)
48. LePine, M.A.; Zhang, Y.; Crawford, E.R.; Rich, B.L. Turning their pain to gain: Charismatic leader influence on follower stress appraisal and job performance. *Acad. Manag. J.* **2016**, *59*, 1036–1059. [\[CrossRef\]](#)
49. Liu, J.; Zhao, X.K.; Ma, S.L.; Zhao, C.L.; Xue, F. The multi-dimensional measurement scale for knowledge employees' perception of innovation ability in China. *Sci. Technol. Prog. Policy* **2019**, *36*, 143–150.
50. Liu, J.; Zhao, X.K.; Shen, H.L. Do employees' career planning contribute to their innovative behavior? Mediating role of continuous learning and self-efficacy and moderating role of organizational atmosphere. *Forecasting* **2020**, *39*, 53–60.
51. Dhar, R.L. Ethical leadership and its impact on service innovative behavior: The role of LMX and job autonomy. *Tour. Manag.* **2016**, *57*, 139–148. [\[CrossRef\]](#)
52. Si, S.; Hall, J.; Suddaby, R.; Ahlstrom, D.; Wei, J. Technology, entrepreneurship, innovation and social change in digital economics. *Technovation* **2023**, *119*, 402–484. [\[CrossRef\]](#)
53. Wang, L.; Jin, X.; Yoo, J.J. The process of visionary leadership increases innovative performance among IT industry 4.0 for SMEs for organizational sustainability: Testing the moderated mediation model. *Sustainability* **2024**, *16*, 8690. [\[CrossRef\]](#)
54. Zhang, G.; Lin, W.; Song, G.; Chen, J.; Li, H.; Sun, L.; Cheng, B.; Zhang, X. The mediating role of psychological capital on the relationship between authentic leadership and innovative behavior among Chinese nurses. *Nurs. Open* **2024**, *11*, e2126. [\[CrossRef\]](#) [\[PubMed\]](#)
55. Pandita, D.; Agarwal, Y.; Vapiwala, F. Fostering the sustainability of organizational learning: Reviewing the role of Gen-Z employees. *Ind. Commer. Train.* **2023**, *55*, 375–387. [\[CrossRef\]](#)
56. Yang, W.S.; Yang, X.; Yang, S.L. The influence of challenge stressors on new generation employees' proactive-reactive innovation behavior. *Sci. Technol. Prog. Policy* **2019**, *36*, 139–145.
57. Ma, J.J.; Wang, S.; Wei, Y.L.; Zhao, H.; Feng, H.L.; Zhang, L.Y. Mediating effect of workplace spirituality between challenge-hindrance stressor and proactive innovation behavior among junior nurses. *J. Nurs.* **2023**, *30*, 68–73.
58. Cismaru, L.; Iunius, R. Bridging the generational gap in the hospitality industry: Reverse mentoring—An innovative talent management practice for present and future generations of employees. *Sustainability* **2019**, *12*, 263. [\[CrossRef\]](#)
59. Chaudhuri, S. Perspectives in HRD—Reverse mentoring: Hallmarks for implementing an intergenerational intervention. *New Horiz. Adult Educ. Hum. Resour. Dev.* **2019**, *31*, 65–71. [\[CrossRef\]](#)
60. Flinchbaugh, C.; Valenzuela, M.A.; Li, P. Developing employee socio-technical flexibility in a multigenerational workforce. *J. Manag. Organ.* **2018**, *24*, 517–532. [\[CrossRef\]](#)
61. Hechl, C. Affective commitment to organizations: A comparison study of reverse mentoring versus traditional mentoring among millennials. *Binus Bus. Rev.* **2017**, *8*, 157–165. [\[CrossRef\]](#)
62. Kong, F.; Zhao, L. The Dual Influence of Forbearance and Job Embeddedness on the Relationship between Workplace Bullying and Turnover Intention in Scientific and Technological Enterprises. *J. Tech. Econ. Manag.* **2018**, *12*, 75–80.
63. Upadhyay, S.; Singh, P. Linking leader humility, reverse mentoring and subordinate turnover intentions: Empirical evidence from the Indian information technology industry. *Int. J. Organ. Anal.* **2024**, *32*, 1483–1500. [\[CrossRef\]](#)

64. Mayo, A. The role of employee development in the growth of intellectual capital. *Pers. Rev.* **2000**, *29*, 521–533. [[CrossRef](#)]
65. Alvarez, D.M.; Blair, K.; Monske, E.; Wolf, A. Team models in online course development: A unit-specific approach. *J. Educ. Technol. Soc.* **2005**, *8*, 176–186.
66. Augustiniene, A.; Ciuciulkiene, N. Reverse mentoring as facilitating factor for the development of a beginning teacher's self-authorship process. *Soc. Sci.* **2013**, *81*, 73–84. [[CrossRef](#)]
67. Jiang, F.B.; Wang, Z. Applications of cognitive appraisal theory of stress in managerial psychology research: Scenes, methods, and myths. *Adv. Psychol. Sci.* **2022**, *30*, 2825–2845.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.