The Cross-Level Double-Edged Sword Effect of Boundary-Crossing Behavior on Creativity

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Abstract

From a resource perspective, this study examines the effects of boundary-spanning behavior on team creativity and individual creativity at both team and individual levels, as well as the mediating mechanisms and boundary conditions. Data were collected using a multi-stage, multi-source approach. The results demonstrate that at the team level, team boundary-spanning behavior enhances team creativity; however, at the individual level, employee boundary-spanning behavior negatively impacts individual creativity by increasing employee role stress. Role breadth self-efficacy moderates this relationship: compared to employees with high role breadth self-efficacy, those with low role breadth self-efficacy are more likely to experience role stress after engaging in boundary-spanning behavior, resulting in a stronger negative effect on individual creativity.

Full Text

The Cross-level Double-edged Sword Effect of Boundary Spanning Behavior on Creativity

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Abstract

This study examines the cross-level effects of boundary spanning behavior on team creativity and individual creativity from a resource perspective, exploring the underlying mediating mechanisms and boundary conditions. Using a multi-stage, multi-source data collection approach, the results reveal that at the team level, team boundary spanning behavior enhances team creativity. However, at the individual level, employee boundary spanning behavior negatively affects individual creativity by increasing role stress. Role breadth self-efficacy moderates this relationship: employees with lower role breadth self-efficacy experience stronger role pressure when engaging in boundary spanning behavior, resulting in a more pronounced negative effect on individual creativity.

Keywords: boundary spanning behavior; creativity; role stress; role breadth self-efficacy

1. Introduction

1.1 Problem Statement Against the backdrop of China' s comprehensive deepening of reforms in the new era, enterprises face rapidly changing environments that require constant attention to external conditions and continuous acquisition of information and resources from outside the organization to navigate turbulent situations and succeed in fierce competition. Consequently, organizations increasingly and urgently encourage employees to engage in boundary spanning behavior. Boundary spanning behavior refers to individuals acquiring information from outside the organization and transmitting it to internal members (Katz & Tushman, 1983). This behavior operates at both team and individual levels, with existing literature largely examining these levels separately (Marrone, Tesluk, & Carson, 2007). However, team boundary spanning behavior originates at the individual level before aggregating to the team level (Chan, 1998), making the two levels interconnected, with individual boundary spanning behavior forming the foundation for team-level behavior (Liu & Li, 2014). Moreover, according to the concept of boundary spanning behavior, it simultaneously involves both employees and teams as actors and targets, raising a critical question: does boundary spanning behavior have the same effects on the actor and the target? Existing research has not systematically addressed this question. Therefore, examining boundary spanning behavior at both team and individual levels simultaneously is essential for comprehensively understanding its effects on outcome variables across different levels.

While research indicates that team boundary spanning behavior enhances team creativity (Xu & Qu, 2014), we know considerably less about how employee boundary spanning behavior affects individual creativity and the mechanisms through which such effects occur. In many cases, boundary spanning behavior represents extra-role behavior that exceeds role requirements, consuming substantial additional employee time and energy resources (Xu, 2019). Even when

boundary spanning is role-prescribed, employees must still expend considerable time and energy monitoring external environments and acquiring useful information for the team (Katz & Tushman, 1983). Creativity research demonstrates that adequate resources are necessary for enhancing individual creativity (Amabile, 1988). From a resource perspective, boundary spanning behavior may therefore impede individual creativity. Although scholars have recognized potential negative effects of boundary spanning behavior (Marrone et al., 2007), they have not thoroughly investigated how these negative effects emerge and under what conditions.

Addressing this gap, the present study adopts a resource perspective grounded in Conservation of Resources (COR) theory (Hobfoll, 1989, 2001; Hobfoll, Halbesleben, Neveu, & Westman, 2018) to develop and empirically test a model examining how boundary spanning behavior influences creativity at both team and individual levels, and the mechanisms and conditions underlying these effects. COR theory posits that resource depletion triggers stress responses that adversely affect individuals (Hobfoll, 1989; Hobfoll et al., 2018). Accordingly, we propose that at the team level, boundary spanning behavior acquires resources that promote team creativity, whereas at the individual level, employee boundary spanning behavior consumes employee resources, generating role stress that reduces individual creativity. Furthermore, COR theory literature indicates that self-efficacy influences the stress generation process (Hobfoll, 2001; Hobfoll, Freedy, & Geller, 1990). Building on this, we examine the moderating role of role breadth self-efficacy in the aforementioned relationships.

1.2 Boundary Spanning Behavior and Creativity Hobfoll (1989) originally proposed COR theory, which asserts that individuals constantly strive to obtain, retain, and protect resources. Hobfoll (1989) defined resources as "objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as a means to obtain valued resources,"encompassing material resources (e.g., equipment), condition resources (e.g., seniority, position), personal characteristic resources (e.g., self-efficacy, intelligence), and energy resources (e.g., time, knowledge). These resources are valued because they help individuals achieve their goals.

Creativity research consistently shows that adequate resources are essential for enhancing individual creativity (Amabile, 1988), while resource scarcity represents a significant barrier (Amabile, 1988). Without sufficient resources such as time and knowledge, individuals cannot identify problems or develop novel solutions (De Jonge, Spoor, Sonnentag, Dormann, & van den Tooren, 2012). According to COR theory, acquiring, conserving, and protecting resources are fundamental needs for individual survival and development (Hobfoll, 1989; Hobfoll et al., 2018). Teams share these needs, continuously acquiring resources to maintain their viability. Team boundary spanning behavior serves as a crucial mechanism for resource acquisition. At the team level, boundary spanning aims

to achieve team goals (Choi, 2002), with employees consciously acquiring information and resources useful to the team through external interactions. These resources are typically heterogeneous and novel compared to internal team resources—characteristics essential for enhancing team creativity (Zhang & Ge, 2016). Additionally, boundary spanning teams proactively establish connections with senior leadership to gain support and commitment (Ancona & Caldwell, 1992), which is vital for team creativity because creative activities involve significant risk and high failure rates (Zhu, Xu, & Zhang, 2018). Leadership support alleviates concerns and enables teams to confidently engage in creative activities, thereby enhancing team creativity. Empirical research confirms that team boundary spanning behavior improves team creativity (Xu & Qu, 2014).

At the individual level, however, boundary spanning behavior—whether role-prescribed or extra-role—requires employees to continuously monitor external environments, extract useful information from complex and rapidly changing external contexts, translate this information into knowledge understandable by team members, and then transmit it to them (Katz & Tushman, 1983). This complex process itself consumes substantial employee time and energy. Empirical research demonstrates that employee boundary spanning behavior is significantly positively correlated with resource depletion (Xu, 2019). Furthermore, boundary spanning requires employees to maintain relationships with numerous stakeholders and handle complex interpersonal dynamics, which can interfere with attention and prevent employees from focusing on creative work, thereby negatively affecting individual creativity (Ramarajan, Bezrukova, Jehn, & Euwema, 2011). For extra-role boundary spanning behavior, employees typically engage in these activities outside formal working hours (Paul, Scott, & Sarah, 2011), occupying rest time and preventing adequate recovery—an important factor for enhancing creativity (Eschleman, Madsen, Alarcon, & Barelka, 2014). Additionally, balancing in-role tasks with extra-role boundary spanning demands considerable time and energy. Given that individual time and energy are finite resources, substantial resource depletion from boundary spanning reduces resources available for creative activities, thereby hindering individual creativity. Based on this analysis, we propose:

Hypothesis 1: At the team level, team boundary spanning behavior promotes team creativity. However, at the individual level, employee boundary spanning behavior reduces individual creativity.

1.3 The Mediating Role of Role Stress COR theory posits that both actual and potential resource loss trigger stress responses, prompting individuals to take measures to alleviate stress (Hobfoll, 1989; Hobfoll et al., 2018). Based on this theory, we propose that employee boundary spanning behavior consumes employee time and energy resources, thereby generating role stress that negatively affects individual creativity. Role stress refers to pressure experienced when individuals cannot effectively fulfill role expectations, encompassing role conflict, role ambiguity, and role overload (Kahn, Wolfe, Quinn,

Snoek, & Rosenthal, 1964). Role conflict occurs when employees cannot simultaneously meet inconsistent demands or expectations from multiple roles (Kim, Murrmann, & Lee, 2009; Rizzo, House, & Lirtzman, 1970). Role ambiguity arises when employees lack clarity about their roles or understanding of role expectations (House & Rizzo, 1972; Rizzo et al., 1970). Role overload occurs when role expectations exceed individual capacity limits (Singh, 1998).

Role stress frequently emerges in cross-boundary activities (Wang, Liu, & Liu, 2017). Whether boundary spanning is role-required or extra-role, employees must interact with diverse external stakeholders, playing different roles with varying—and sometimes conflicting—requirements (Ramarajan et al., 2011). Frequent boundary spanning requires continuous switching among multiple, potentially conflicting roles, triggering role conflict and confusion about self-positioning, leading to role ambiguity. For extra-role boundary spanning, employees must additionally acquire, process, and transmit information from external sources, increasing workload and consuming substantial time and energy resources, thereby causing role overload (Deng, Liu, & Mao, 2018). Empirical research shows that helping behaviors that consume employee time and energy generate role stress (Chen, Chen, & Luo, 2020). Moreover, inconsistencies between in-role tasks and extra-role boundary spanning demands can create role conflict.

According to COR theory, individuals experiencing stress take measures to prevent further resource loss (Hobfoll, 1989; Hobfoll et al., 2018). Creative activities are resource-intensive. When boundary spanning employees experience excessive resource depletion and stress, they lack sufficient resources to invest in creative activities. To prevent further resource loss, employees reduce investment in creative activities and choose to relax and recover resources instead (De Jonge et al., 2012). Empirical research demonstrates that role stress reduces employee work engagement (Wang, Han, & Yang, 2014). Additionally, role stress often accompanies emotional exhaustion (Wang & Zhang, 2016), leaving employees lacking motivation to engage in creative activities (Wan et al., 2011). Research confirms that role stress reduces employee creativity (Çekmecelioglua & Günselb, 2011). Based on this analysis, we propose:

Hypothesis 2: Employee boundary spanning behavior reduces individual creativity by increasing employee role stress.

1.4 The Moderating Role of Role Breadth Self-Efficacy COR theory suggests that individuals with more resources are less vulnerable to resource loss effects, identifying self-efficacy as an important personal characteristic resource (Hobfoll, 2001) that maintains individual resource reservoirs (Hobfoll, 2011, p. 349) and influences the stress generation process from resource loss (Hobfoll, 2001). Role breadth self-efficacy is a crucial form of self-efficacy closely related to both boundary spanning behavior and role stress. We therefore propose that role breadth self-efficacy moderates the relationship between boundary spanning behavior and role stress. Role breadth self-efficacy refers to employ-

ees' perceived capability to perform broader, more proactive tasks that exceed job requirements (Hwang, Han, & Chiu, 2015). It represents a specific form of self-efficacy emphasizing confidence in executing broader extra-role behaviors (Galperin, 2012).

Boundary spanning behavior is highly challenging and complex (Marrone et al., 2007), consuming substantial employee time and energy resources. Role breadth self-efficacy, as an important personal characteristic resource (Hobfoll, 2001), helps employees withstand resource depletion from boundary spanning. According to COR theory (Hobfoll, 2001), employees high in role breadth self-efficacy possess more resources and are less sensitive to resource loss, making them less prone to stress. Specifically, compared to employees low in role breadth self-efficacy, those high in this attribute are more confident in their ability to manage stakeholder relationships (Marrone et al., 2007). This confidence helps mitigate resource depletion from boundary spanning, reducing its negative effects and alleviating role stress. Employees with higher role breadth self-efficacy also believe they can complete tasks beyond their formal duties (Liao & Liang, 2015), have confidence in executing extra-role behaviors (Galperin, 2012), possess greater resilience to setbacks (Hartog & Belschak, 2012), and trust their ability to handle various difficulties (Liao & Liang, 2015). When facing the challenges, complexities, conflicting role demands, role ambiguity, and role overload associated with boundary spanning, they have confidence in performing various roles well and handling these issues, making them less likely to experience role stress even when engaging in extensive boundary spanning. Based on this analysis, we propose:

Hypothesis 3a: Role breadth self-efficacy moderates the relationship between employee boundary spanning behavior and role stress, such that the positive effect of employee boundary spanning behavior on role stress is weaker for employees with higher role breadth self-efficacy.

Furthermore, when role stress is reduced, employees' initiative and enthusiasm for engaging in creative activities increase. This is particularly true for employees high in role breadth self-efficacy, who demonstrate more proactive and innovative behaviors in a more detached state (Parker, Williams, & Nick, 2006) and more actively engage in creative activities. Integrating Hypothesis 2 and Hypothesis 3a, we propose a first-stage moderated mediation model:

Hypothesis 3b: Role breadth self-efficacy moderates the mediating role of role stress in the relationship between employee boundary spanning behavior and individual creativity, such that the mediating effect is weaker for employees with higher role breadth self-efficacy.

2. Method

2.1 Sample The sample comprised employees from several enterprises in Beijing, Shenzhen, and Shanghai, primarily in finance, consulting, and internet industries. Researchers first explained the survey purpose to company leaders,

who then identified lists of subordinates and supervisors eligible to participate. We assigned paired identification numbers to questionnaires accordingly. Most questionnaires were distributed in paper format, with a small number sent via email.

To minimize common method bias, we employed a multi-stage, multi-source data collection design. Data collection occurred in two waves from different sources. In the first wave, 620 subordinates were invited to participate, rating their own boundary spanning behavior, role breadth self-efficacy, role stress, and demographic information, yielding 590 employee questionnaires. Approximately one month later, in the second wave, 135 supervisors were invited to rate the creativity of subordinates who had completed the first-wave survey and to provide their own demographic information, resulting in 120 supervisor questionnaires.

After matching employee and supervisor questionnaires using the pre-assigned identification numbers and deleting unmatched or incomplete responses, we obtained a final sample of 536 employee questionnaires (90.32% effective response rate) and 111 supervisor questionnaires (82.22% effective response rate). Team size (i.e., number of subordinates per supervisor) ranged from 3 to 8, with an average of 4.83 members. Among employee respondents, 48.1% were male. In terms of education, 61% held bachelor' s degrees, 22.8% held associate degrees, 8.2% held graduate degrees or higher, and 8% held technical secondary school education or below. Approximately 52.6% of employees were married. The average employee age was 29.97 years (SD = 4.49), with an average organizational tenure of 3.66 years (SD = 3.84). Among supervisors, 55% were male, 65.8% held bachelor' s degrees, 16.2% held associate degrees, 16.2% held graduate degrees or higher, and only 1.8% held technical secondary school education or below. Approximately 81.1% of supervisors were married. The average supervisor age was 34.05 years (SD = 4.68), with an average organizational tenure of 5.85 years (SD = 3.97).

2.2 Measures Boundary Spanning Behavior. We used the boundary spanning behavior scale developed by Faraj and Yan (2009), which assesses the extent to which employees acquire information and resources from outside their team. The scale uses a 7-point response format (1 = "strongly disagree" to 7 = "strongly agree") and contains four items, with a representative item being "I contact important people outside the team to obtain information and resources for the team." Individual-level employee boundary spanning behavior was measured through self-reports. Following Marrone et al. (2007), we aggregated individual boundary spanning behavior to the team level by calculating the team mean to represent team boundary spanning behavior. We chose the mean rather than variance, maximum, or minimum because variance measures are appropriate for examining team composition diversity variables (e.g., age diversity), while maximum or minimum approaches are suitable when team outcomes depend entirely on a single individual (Barrick, Stewart, Neubert, & Mount, 1998). In this study, team boundary spanning behavior concerns the

overall amount of boundary spanning activity rather than its diversity, making variance inappropriate. Additionally, team-level boundary spanning behavior is determined collectively by team members rather than by any single individual, making maximum or minimum approaches unsuitable. The same logic applies to team creativity, which was also aggregated using the mean method. Cronbach' s α was 0.80 for employee boundary spanning behavior and 0.79 for team boundary spanning behavior.

Role Breadth Self-Efficacy. We used Parker' s (1998) 7-item scale, with a representative item being "I am able to contact people outside the company (e.g., customers) to discuss problems." The scale uses a 5-point response format (1 = "strongly disagree" to 5 = "strongly agree"). Cronbach' s α was 0.73.

Role Stress. We used the scale developed by Li and Zhang (2009), comprising 13 items (5 reverse-scored). The scale uses a 5-point response format (1 = "strongly disagree" to 5 = "strongly agree"), with a representative item being "I receive conflicting requests from two or more people." Cronbach' s α was 0.76.

Creativity. We used the 13-item scale developed by Zhou and George (2001), with supervisors rating subordinates' creativity using a 5-point response format (1 = "strongly disagree" to 5 = "strongly agree"). A representative item is "He/she suggests new ways to achieve work goals." Supervisor ratings of individual employees represented individual-level creativity, while the team mean of these ratings represented team-level creativity. Cronbach' s α was 0.97 for individual creativity and 0.98 for team creativity.

Control Variables. Previous research indicates that demographic variables affect boundary spanning behavior and creativity (Marrone et al., 2007). We therefore controlled for individual-level employee gender (1 = female, 2 = male), age (in years), marital status (1 = unmarried, 2 = married), education level (1 = junior high school or below, 2 = technical secondary school/high school, 3 = associate degree, 4 = bachelor' s degree, 5 = graduate degree or above), and organizational tenure (in years). At the team level, we controlled for leader gender, age, marital status, education level, and tenure, coded identically to the corresponding employee variables. Additionally, we controlled for individual paradoxical thinking, team function (1 = finance, 2 = sales, 3 = manufacturing, 4 = operations, 5 = design, 6 = management, 7 = other, converted to six dummy variables), and team size (number of team members) as these might influence boundary spanning behavior and creativity. Paradoxical thinking was measured using the 9-item scale developed by Miron-Spektor, Ingram, Keller, Smith, and Lewis (2018), with a representative item being "When I deal with conflicting perspectives, I can gain a better understanding of the problem." Cronbach' s α was 0.86. Finally, to exclude potential nesting effects from different companies, we controlled for company (27 companies converted to 26 dummy variables).

2.3 Data Analysis We conducted data analysis using SPSS 22.0 and Mplus 7.4. First, confirmatory factor analysis (CFA) and average variance extracted

(AVE) were used to assess convergent and discriminant validity. Second, Harman' s single-factor test and the unmeasured common method factor approach were employed to test for common method bias. Third, we examined the validity of data aggregation using rwg, ICC(1), and ICC(2) indices. Finally, we tested hypotheses using multilevel structural equation modeling (MSEM) path analysis and calculated confidence intervals for indirect effects using Monte Carlo methods (Preacher & Selig, 2012). We tested the moderated mediation model using the path analysis approach outlined by Edwards and Lambert (2007).

3. Results

3.1 Validity Tests We assessed convergent and discriminant validity through CFA model comparisons and AVE values. Team boundary spanning behavior and team creativity are team-level variables, while employee boundary spanning behavior, role stress, role breadth self-efficacy, individual creativity, and paradoxical thinking are individual-level variables. We therefore conducted a multilevel CFA using Mplus to test discriminant validity. Given the large number of items for role stress, individual creativity, team creativity, role breadth self-efficacy, and paradoxical thinking, we followed Wu and Wen' s (2011) recommendation to parcel these items using a balanced approach: items were sorted by factor loading, and the highest and lowest loading items were averaged to create a parcel, with this process continuing iteratively. After parceling, role stress, role breadth self-efficacy, individual creativity, and team creativity each comprised three parcels, while paradoxical thinking comprised four parcels.

As shown in Table 1 , the seven-factor model demonstrated good fit. Standardized factor loadings for the seven variables exceeded the critical value of 0.5 for all items except one team boundary spanning behavior item (loading = 0.42). AVE values were 0.59, 0.64, 0.87, 0.47, 0.64, 0.62, and 0.93 for the seven variables, respectively. Except for role breadth self-efficacy (AVE = 0.47, slightly below the 0.5 threshold), all other variables exceeded the critical value of 0.5 (Anderson & Gerbing, 1988; Hair, Black, Babin, Anderson, & Tatham, 2006), indicating adequate convergent validity. As Table 1 shows, all 11 alternative models fit significantly worse than the seven-factor model, supporting discriminant validity. Additionally, as shown in Table 2 , each variable' s AVE exceeded the squared correlation between any pair of variables (Fornel & Larcker, 1981; Hair et al., 2006), further confirming good discriminant validity.

3.2 Common Method Bias Test To reduce common method bias, we followed Podsakoff, MacKenzie, Lee, and Podsakoff' s (2003) recommendations by collecting data at different time points and from different sources, using different response formats (5-point and 7-point scales) across variables, and including five reverse-scored items in the role stress measure. In the analysis phase, we employed Harman' s single-factor test and the unmeasured common method factor approach. Harman' s test yielded a KMO of 0.92 and a significant Bartlett' s test ($p < 0.000$), with the first unrotated factor explaining only 33.04% of

total variance. The common method factor' s AVE was 0.35, substantially below the critical value of 0.5 (Dulac, Coyle-Shapiro, Henderson, & Wayne, 2008), indicating that common method bias does not substantially affect relationships among variables in this study.

3.3 Data Aggregation This study employed a cross-level design in which team boundary spanning behavior and team creativity are team-level variables measured at the individual level. Following Yu, Fang, and Ling' s (2004) recommendations, we examined data aggregation validity using rwg, ICC(1), and ICC(2). Results showed team boundary spanning behavior: rwg median = 0.92, ICC(1) = 0.33, ICC(2) = 0.70; team creativity: rwg median = 0.98, ICC(1) = 0.57, ICC(2) = 0.86. These values meet the criteria of rwg median > 0.7 (Lebreton & Senter, 2007), ICC(1) > 0.05, and ICC(2) > 0.5 (James, 1982), indicating sufficient within-group agreement and between-group differentiation. Between-group differences explained 47.05% and 65.33% of variance in team boundary spanning behavior and team creativity, respectively, supporting aggregation to the team level.

3.4 Descriptive Statistics Means, standard deviations, and correlations among variables are presented in Table 2. At the individual level, employee boundary spanning behavior was significantly positively correlated with role stress (r = 0.15, p < 0.001), and role stress was significantly negatively correlated with individual creativity (r = -0.15, p < 0.001). At the team level, team boundary spanning behavior was significantly positively correlated with team creativity (r = 0.33, p < 0.001). These results align with theoretical expectations and provide preliminary support for our hypotheses.

3.5 Hypothesis Testing We used Mplus 7.4 to conduct two-level path analysis following Preacher, Zyphur, and Zhang' s (2010) approach. As shown in Figure 1 [Figure 1: see original paper], after controlling for individual-level paradoxical thinking, gender, age, marital status, education level, and tenure, as well as team-level team function, team size, company, and leader gender, age, marital status, education level, and tenure, team boundary spanning behavior had a significant positive effect on team creativity (β = 0.18, p < 0.05). The total effect of employee boundary spanning behavior on individual creativity was negative and significant (β = -0.02, p < 0.05), supporting Hypothesis 1.

Tests of the mediating effect of role stress showed that employee boundary spanning behavior had a significant positive effect on role stress (β = 0.05, p < 0.01), and role stress had a significant negative effect on individual creativity (β = -0.34, p < 0.001). The indirect effect of role stress between employee boundary spanning behavior and individual creativity was significant (indirect effect = -0.02, p < 0.05), with the Monte Carlo method indicating that the 95% confidence interval did not include zero (-0.03, -0.006). These results support the mediating role of role stress, confirming Hypothesis 2.

The test of the moderating effect of role breadth self-efficacy showed that the interaction term between employee boundary spanning behavior and role breadth self-efficacy was significant (β = -0.08, p < 0.01), supporting Hypothesis 3a. To illustrate this moderating effect, we plotted the interaction following Aiken and West' s (1991) procedure, using values one standard deviation above and below the mean of role breadth self-efficacy. As shown in Figure 2 [Figure 2: see original paper], the positive relationship between employee boundary spanning behavior and role stress was stronger when role breadth self-efficacy was low. Simple slope analysis revealed that when role breadth self-efficacy was low (mean - 1 SD), employee boundary spanning behavior had a significant positive effect on role stress (β = 0.10, p < 0.001). When role breadth self-efficacy was high (mean + 1 SD), the effect was non-significant (β = 0.02, p > 0.10), with the difference between the two slopes being significant (β = -0.08, p < 0.05).

We tested Hypothesis 3b regarding the first-stage moderated mediation model using Edwards and Lambert' s (2007) approach. We divided the sample into high and low groups based on values one standard deviation above and below the mean of the moderator, then calculated and compared the indirect effects across groups. As shown in Table 3 , when role breadth self-efficacy was high, the indirect effect through role stress was small and non-significant (indirect effect = -0.01, p > 0.10, 95% CI = [-0.02, 0.01]). When role breadth self-efficacy was low, the indirect effect was larger and significant (indirect effect = -0.03, p < 0.01, 95% CI = [-0.06, -0.01]), with the between-group difference being significant (Δindirect effect = 0.02, p < 0.05, 95% CI = [0.01, 0.05]). These results support Hypothesis 3b, indicating that role breadth self-efficacy moderates the mediating role of role stress.

4. Discussion

This study examined the cross-level effects of boundary spanning behavior on team and individual creativity from a resource perspective, grounded in COR theory. The findings reveal that at the team level, team boundary spanning behavior enhances team creativity, whereas at the individual level, employee boundary spanning behavior negatively affects individual creativity through increased role stress. Role breadth self-efficacy moderates this relationship: employees with lower role breadth self-efficacy experience stronger role pressure when engaging in boundary spanning behavior, resulting in a more pronounced negative effect on individual creativity. Scholars and practitioners should be mindful of the detrimental effects of boundary spanning behavior, maximizing its positive effects while minimizing its negative consequences.

4.1 Theoretical Contributions This study makes three primary theoretical contributions. First, previous research has examined boundary spanning effects from either the behavior target' s or the actor' s perspective alone (Ancona & Caldwell, 1992; Song, Wang, & Zhang, 2017). This study integrates these perspectives by simultaneously investigating both positive and negative

effects at team and individual levels. More importantly, when focusing on literature concerning boundary spanning behavior and creativity, existing research has primarily examined effects on the behavior target (team creativity) (Xu & Qu, 2014). This study shifts the focus to effects on the actor (individual creativity), moving from the target perspective to the actor perspective and from the team level to the individual level, thereby providing a more comprehensive understanding of boundary spanning behavior.

Second, previous research has primarily examined positive effects of boundary spanning from learning and network perspectives (Liu, Jiang, Chen, Pan, & Lin, 2018). For example, Xu and Qu (2014) demonstrated that team boundary spanning behavior enhances team creativity through team learning. Liu and Li (2014) found that employee boundary spanning behavior improves task performance through enhanced network centrality. Departing from these perspectives, this study examines negative effects from a resource perspective, revealing that employee boundary spanning behavior reduces individual creativity through increased role stress. This demonstrates that boundary spanning behavior produces both positive and negative effects, thereby expanding boundary spanning research.

Finally, this study enriches COR theory by identifying a specific boundary condition—role breadth self-efficacy. Halbesleben, Neveu, and Paustianunderdahl (2014) called for research examining interactions among multiple resources and emphasizing environmental factors. This study responds to this call by investigating how an internal psychological characteristic resource (role breadth self-efficacy) moderates the individual resource depletion process, thereby enriching COR theory.

4.2 Practical Implications Previous research indicates that boundary spanning behavior promotes team creativity (Xu & Qu, 2014). This study reveals that while boundary spanning behavior enhances team creativity, it simultaneously hinders individual creativity, suggesting that the positive effect on team creativity may come at the cost of individual creativity. In practice, when teams enhance team creativity through member boundary spanning behavior, they must be vigilant about detrimental effects on employees. Organizations should both minimize these negative effects and recognize and reward employees' self-sacrificing dedication to the team. For example, when forming teams, organizations should select employees with higher self-efficacy and use praise to enhance employee self-efficacy, as employees with higher self-efficacy experience smaller negative effects from boundary spanning behavior. Additionally, team leaders can publicly praise and reward employees who engage in boundary spanning behavior, signaling to other members that such behavior is recognized and supported. This can reduce role stress from boundary spanning and mitigate negative individual effects while affirming and recognizing employees' self-sacrificing dedication, thereby motivating them to contribute more to the team.

4.3 Limitations and Future Research First, although this study used a multi-stage, multi-source design that reduces common method bias, it cannot establish causal relationships, particularly because boundary spanning behavior and role stress were measured concurrently. Future research could employ experimental designs to test causal relationships more rigorously. Additionally, measuring team creativity as the mean of team leaders' individual creativity ratings rather than through direct holistic evaluation of team creativity represents a limitation. Future research could have team leaders directly evaluate overall team creativity to further validate our findings.

Second, boundary spanning behavior is often not voluntary but strategically arranged by teams to adapt to external environments (Ancona & Caldwell, 1992). Boundary spanning behavior could therefore be categorized as proactive or passive, with potentially different effects. Future research could examine the positive and negative effects of different types of boundary spanning behavior and their mechanisms. Moreover, this study focused only on the stress mechanism. At the individual level, besides role stress creating negative effects on individual creativity, other mechanisms might produce positive effects. For instance, if boundary spanning employees have rich information sources, they may more easily access novel ideas and perspectives that could enhance individual creativity. Future research could examine dual or multiple mechanisms through which boundary spanning behavior simultaneously produces positive and negative effects on individual creativity.

Finally, this study was conducted in the Chinese context, and whether the findings generalize to other countries requires further examination. China is a highly collectivist culture (Hofstede, Hofstede, & Minkov, 2010), where employees are more likely to sacrifice personal interests for collective benefit and proactively engage in boundary spanning behavior to enhance team performance. In contrast, the United States is a highly individualistic culture (Hofstede et al., 2010), where employees focus more on personal interests and are less likely to sacrifice for collective benefit, making them less likely to proactively engage in boundary spanning behavior. The likelihood and motivation for boundary spanning behavior may therefore differ across cultural contexts. Future research could collect data from multiple countries for comparative studies, potentially yielding interesting insights.

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Appendix 1: Specific Definitions of Factor Models in Table 1

Seven-factor model: Individual level: employee boundary spanning behavior, role stress, role breadth self-efficacy, individual creativity, paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Six-factor model 1: Individual level: employee boundary spanning behavior + individual creativity, role stress, role breadth self-efficacy, paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Six-factor model 2: Individual level: employee boundary spanning behavior + role breadth self-efficacy, role stress, individual creativity, paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Six-factor model 3: Individual level: employee boundary spanning behavior, role stress, role breadth self-efficacy + individual creativity, paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Six-factor model 4: Individual level: employee boundary spanning behavior, role stress, role breadth self-efficacy, individual creativity + paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Six-factor model 5: Individual level: employee boundary spanning behavior, role stress, role breadth self-efficacy, individual creativity, paradoxical thinking; Team level: team boundary spanning behavior + team creativity

Five-factor model 1: Individual level: employee boundary spanning behavior + individual creativity + role breadth self-efficacy, role stress, paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Five-factor model 2: Individual level: employee boundary spanning behavior + individual creativity, role breadth self-efficacy, role stress, paradoxical thinking; Team level: team boundary spanning behavior + team creativity

Four-factor model 1: Individual level: employee boundary spanning behavior + individual creativity + role breadth self-efficacy + paradoxical thinking, role stress; Team level: team boundary spanning behavior, team creativity

Four-factor model 2: Individual level: employee boundary spanning behavior + individual creativity + role breadth self-efficacy + role stress, paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Three-factor model: Individual level: employee boundary spanning behavior + individual creativity + role breadth self-efficacy + role stress + paradoxical thinking; Team level: team boundary spanning behavior, team creativity

Two-factor model: Individual level: employee boundary spanning behavior + individual creativity + role stress + role breadth self-efficacy + paradoxical thinking; Team level: team boundary spanning behavior + team creativity

Appendix 2: Measurement Scales Used in the Study

Employee Boundary Spanning Behavior - I contact important people outside the team to obtain information and resources for the team. - I use my relationships outside the team to obtain information and resources. - I obtain information and resources from inside/outside the department. - I obtain information and resources for the team through informal channels.

Team Boundary Spanning Behavior (team-level aggregation of employee responses) - Team members contact important people outside the team to obtain information and resources. - Team members use their relationships outside the team to obtain information and resources. - Team members obtain information and resources from inside/outside the department. - Team members obtain information and resources for the team through informal channels.

Role Breadth Self-Efficacy - I can provide relevant information and materials to colleagues in the team. - I can participate in setting my work goals. - I can design new procedures for my work scope. - I can contact people outside the company (e.g., customers) to discuss problems. - I can analyze long-standing problems and seek solutions. - I can represent the department in meetings with senior management. - I will visit colleagues in other departments to suggest doing things differently.

Role Stress - I often face situations with conflicting demands. - I receive conflicting requests from two or more people. - I have to face different situations and do things in different ways. - My work has clear, planned goals and objectives. - I clearly understand what the unit expects of me. - I know what my responsibilities are. - I am very clear about how much responsibility I bear. - My responsibilities are clearly defined. - There is a great need to reduce some of my work. - At work, I feel overloaded. - I have taken on too many responsibilities. - My workload is too heavy. - The workload I have taken on is so large that I cannot guarantee work quality.

Individual Creativity (supervisor-rated) - He/she will propose new methods to achieve work goals. - He/she will propose new and feasible ideas to improve work performance. - He/she will identify new ideas in techniques, processes, and other aspects. - He/she will propose new approaches to improve quality. - He/she is a good source of creative ideas. - He/she is not afraid to take risks. - He/she will proactively express ideas to others. - He/she can demonstrate creativity at work when given the opportunity. - He/she will make adequate plans to implement new ideas. - He/she often has innovative ideas. - He/she will come up with creative problem solutions. - He/she often has new methods for solving problems. - He/she will suggest new methods for performing work tasks.

Appendix 3: R Code for Testing Differences in Indirect Effects Between High and Low Groups in the Moderated Mediation Model

```
a0 = 0.056 # Path coefficient from independent variable to mediator
a1 = -0.076 # Path coefficient from interaction term to mediator
b = -0.346 # Path coefficient from mediator to dependent variable
a0std = 0.016 # Standard error of a0
a1std = 0.026 # Standard error of a1
bstd = 0.085 # Standard error of b
rep = 20000 # Number of simulation repetitions
conf = 95 # Confidence interval percentage

a0vec = rnorm(rep) * a0std + a0 # Simulated values for coefficient a0
a1vec = rnorm(rep) * a1std + a1 # Simulated values for coefficient a1
bvec = rnorm(rep) * bstd + b # Simulated values for coefficient b

amhvec = a1vec * 0.5161 + a0vec # Mediator path for high group
am1vec = a1vec * (-0.5161) + a0vec # Mediator path for low group

abh = amhvec * bvec # Indirect effect for high group
ab1 = am1vec * bvec # Indirect effect for low group
d = abh - ab1 # Difference in indirect effects between groups

low = (1 - conf/100) / 2
upp = ((1 - conf/100) / 2) + (conf/100)
LL = quantile(d, low) # Lower limit of confidence interval
UL = quantile(d, upp) # Upper limit of confidence interval
LL4 = format(LL, digits = 5)
UL4 = format(UL, digits = 5)

hist(d, breaks = 'FD', col = 'skyblue',
     xlab = paste(conf, '% Confidence Interval', 'LL', LL4, 'UL', UL4),
     main = 'Distribution of Indirect Effect')
```