The Impact and Mechanisms of Team Reflexivity Training on Team Ambidextrous Development

Authors: Li Qirong, Li Chunxuan, Li Qirong

Date: 2023-11-20T00:00:00+00:00

Abstract

Based on the "differentiation-integration" framework, this study examines the effect of team reflection training on team ambidexterity growth (Study 1) and the mediating role of meta-knowledge sharing and perspective taking (Study 2). This study conducted a 3-month longitudinal survey of 90 course teams composed of 360 new university students (Study 1) and a 1-year longitudinal survey of 74 innovation teams composed of 656 employees (Study 2), and analyzed the data using latent growth models and latent difference models, respectively. The results indicate that: (1) team reflection training positively influences the growth trend of team ambidexterity; (2) meta-knowledge sharing and perspective taking mediate the positive effect of team reflection training on the growth trend of team ambidexterity, such that when teams receive reflection training, the levels of team meta-knowledge sharing and perspective taking increase, which in turn elevates team ambidexterity. The study supports the view that team reflection promotes team adaptive capability and enhances ambidexterity levels, and further elaborates on its underlying mechanisms. Additionally, the research contributes positively to revealing the dynamic nature and enhanced complexity of team ambidexterity.

Full Text

The Influence Mechanism of Team Reflexivity Training on Team Ambidexterity Development

Li Qirong[1],[2]**, Li Chunxuan**[1] ([1] School of Business and Management, Jilin University, Changchun, 130012) ([2] Institute of Innovation and Entrepreneurship, Jilin University, Changchun, 130012)

Abstract

This study investigates the impact of team reflexivity training on team ambidexterity development and its underlying mechanisms through two complementary studies grounded in the "differentiation-integration" framework. Study 1 examines the main effect of reflexivity training on ambidexterity growth, while Study 2 explores the mediating roles of shared meta-knowledge and perspective taking. Study 1 employed a three-month longitudinal design with 360 university students forming 90 course project teams, analyzing data through latent growth modeling. Study 2 conducted a one-year tracking survey of 656 employees across 74 innovation teams, utilizing latent change score modeling. Results reveal: (1) team reflexivity training positively influences the growth trajectory of team ambidexterity; (2) shared meta-knowledge and perspective taking mediate this positive relationship, such that reflexivity training enhances levels of meta-knowledge sharing and perspective taking, which in turn elevates team ambidexterity. These findings support theoretical perspectives positing team reflexivity as a catalyst for adaptive capacity and ambidexterity, while elucidating the specific cognitive mechanisms involved. The study also advances understanding of the dynamic nature and developmental complexity of team ambidexterity.

Keywords: team ambidexterity, team reflexivity training, meta-knowledge sharing, perspective taking, differentiation-integration framework

Classification Code: B849:C93

Teams represent an advanced organizational form for navigating complex and dynamic environments (Haas, 2010), and a central challenge for scholars has been understanding how teams can simultaneously maintain efficiency and flexibility. Engaging in both exploratory and exploitative learning—team ambidexterity—has been identified as critical for rapid adaptation to environmental and task changes (Jansen et al., 2016). While prior research has primarily focused on between-team factors such as structural configurations, task design, team composition, and leadership styles (Dean, 2022), these studies describe characteristics of high-ambidexterity teams but fail to address developmental processes. Consequently, from a team development perspective, investigating the developmental patterns of team ambidexterity and identifying methods to foster its long-term growth hold significant theoretical and practical value.

Existing research predominantly examines how team characteristics influence ambidexterity, yet these factors are difficult to manipulate in practice. Team reflexivity training offers a practical alternative, as it can be systematically implemented to guide teams in reflective practices that enhance dynamic capabilities like ambidexterity. Theoretically, the differentiation-integration framework posits that team ambidexterity requires members to both acquire diverse perspectives and information and integrate this information at the team level (Heavey & Simsek, 2017). Team reflexivity training creates an environment where members can actively communicate and identify internal shortcomings, fa-

cilitating the absorption of others' viewpoints (Schippers et al., 2008). Through continuous learning and integration of diverse information, teams enhance their capacity to resolve paradoxical tensions (Knight & Paroutis, 2017). Practically, reflexivity training is more easily integrated into daily work than other team interventions, enabling spontaneous task-related communication and promoting high-quality management practices. This study therefore examines how team reflexivity training influences team ambidexterity growth.

Examining this relationship raises questions about underlying mechanisms. Shared meta-knowledge and perspective taking appear to explain how reflexivity training enhances team differentiation and integration to promote ambidexterity growth. The differentiation-integration framework explicitly identifies seeking and appropriately integrating diverse information as key mechanisms for ambidexterity (Smith & Tushman, 2005). Reflexivity fosters frequent interaction and perspective sharing that shapes common understanding of team tasks—shared meta-knowledge—which helps members locate and access differential knowledge and expertise (Li et al., 2018). Additionally, reflexivity prompts members to deeply analyze information and integrate different viewpoints—perspective taking (Li, 2016). Through collective, open discussion and integration, members become willing to accept diverse opinions (陈星汶等, 2015). This study therefore introduces shared meta-knowledge and perspective taking as mediators to explore the mechanisms linking reflexivity training to ambidexterity growth.

This research comprises two sequential, logically coherent studies to understand the effects and information-processing mechanisms of team reflexivity training on ambidexterity development (theoretical model shown in [Figure 1: see original paper]). Study 1 uses experimental design and latent growth modeling to establish whether reflexivity training positively influences long-term ambidexterity growth. Building on Study 1's findings, Study 2 employs a field experiment and latent change score modeling to address limitations regarding long-term trends and to test the mediating roles of meta-knowledge sharing and perspective taking. This research deepens ambidexterity studies within the differentiation-integration framework and addresses the gap between identifying versus cultivating team ambidexterity.

1.1 Literature Review

[Figure 1: see original paper] Theoretical Framework

Existing team ambidexterity research has drawn from organizational ambidexterity perspectives and team characteristics to explore how teams integrate contradictory learning behaviors. However, these studies focus on member traits and overall team characteristics that are difficult to intervene upon, providing limited guidance for practice. Scholars have noted that formal management interventions like training can stimulate team reflexivity (Gurtner et al., 2007). Trained teams can identify and use valuable, relevant, and accurate perspec-

tives (Cronin & Weingart, 2007) while creating shared understanding of team tasks, facilitating integration of internal differences and promoting ambidexterity growth. Investigating team reflexivity as a key antecedent of ambidexterity thus holds substantial theoretical and practical significance.

1.2 The Impact of Team Reflexivity Training on Team Ambidexterity Growth

Jansen et al. (2016) define team ambidexterity as collective learning behaviors involving simultaneous exploratory and exploitative learning. As external environments evolve over time, teams continuously balance these two activities, making ambidexterity inherently dynamic (Luger et al., 2018). Early research on organizational ambidexterity dynamics focused on the rebalancing process between exploration and exploitation, which shifts with organizational life cycles and external challenges. As teams seek balance to creatively resolve contradictions, their balancing capacity improves (吴瑶等, 2022), meaning team ambidexterity continuously changes and develops.

Conceptualizing team ambidexterity as a dynamic capability based on paradoxical cognition, the differentiation-integration framework provides theoretical grounding for understanding its development. Team reflexivity involves public reflection on team goals, strategies, and processes to adapt to environmental changes (West, 1996) and correlates with beneficial outcomes like efficiency and flexibility (Tannenbaum & Cerasoli, 2013). The differentiation-integration framework requires members to identify differences among contradictory elements and extract commonalities for integration (Smith & Tushman, 2005). Reflexivity training provides a platform for communication and information integration, particularly strengthening task information processing (Schippers et al., 2018) to improve team functioning. Through continuous reflection, reflexivity training builds trust and harmony (Rong et al., 2019), prompting proactive information sharing and discussion of diverse viewpoints (Wang et al., 2022). It also shapes members' cognition and behavior to actively embrace contradictory information, enhancing coordination efficiency. By accumulating experience in integrating and utilizing differentiated information, reflexivity training promotes continuous ambidexterity growth. We therefore propose:

H1: Team reflexivity training positively influences team ambidexterity growth.

1.3 The Mediating Roles of Meta-Knowledge Sharing and Perspective Taking

Shared meta-knowledge refers to team members' awareness of who knows what within the team (Wegner, 1995), evolving from transactive memory system research. Ren and Argote (2011) note that deep understanding and communication about tasks activates transactive memory systems. Since searching for and sharing task-related information constitutes a core component of team reflex-

ivity, we posit that meta-knowledge sharing mediates the relationship between reflexivity training and ambidexterity growth.

Schippers et al. (2014) indicate that team reflexivity requires members to reflect deeply on past task progress. During reflection, members learn about others' perspectives, attitudes, and information through discussion and critique, facilitating shared meta-knowledge. This enables teams to clearly understand knowledge boundaries and access external perspectives (Olabisi & Lewis, 2018). High meta-knowledge sharing distributes the burden of learning, remembering, and communicating information across members (Lewis et al., 2007), making new knowledge development more likely and laying foundations for ambidexterity. This mediating role is supported by the differentiation-integration framework's "difference-integration-output" cycle. Reflexivity fosters paradoxical information processing cognition to understand complex knowledge (Schippers et al., 2014), which is key to forming team ambidexterity (Smith & Tushman, 2005). We therefore propose:

H2: Team meta-knowledge sharing mediates the positive relationship between team reflexivity training and team ambidexterity growth.

Team perspective taking refers to a collective cognitive process where members objectively attempt to understand others' thoughts, motivations, and feelings (Hoever et al., 2012). Essentially, it is an information integration process based on thorough sharing and discussion that leverages diversity for complex tasks. We argue that reflexivity training integrates information through perspective taking to positively influence ambidexterity. Throughout reflexivity, members engage in deep communication about task progress, gaining understanding of others' viewpoints through discussion and critique. High-quality communication helps employees develop holistic understanding, making them more willing to adopt others' perspectives (Parker & Axtell, 2001). Teams high in reflexivity actively seek new perspectives, emphasizing multi-angle consideration and information adoption. Perspective taking enables effective cognitive integration, balances overall interests, and stimulates ambidexterity growth. Within the differentiation-integration framework, reflexivity strengthens perspective taking, helping members identify differences in complex information and integrate them from multiple levels, thereby promoting ambidexterity growth. We therefore propose:

H3: Team perspective taking mediates the positive relationship between team reflexivity training and team ambidexterity growth.

Study 1: Experimental Analysis of Team Reflexivity Training's Impact on Team Ambidexterity Development

Study 1 aims to establish the main effect of team reflexivity training on ambidexterity growth. To ensure validity, we employed a controlled field experiment with university students enrolled in an "Innovation and Entrepreneurship Business Simulation" course.

2.1.1 Experimental Sample and Data

We randomly recruited 432 economics or management majors from a university in southern China who had never taken similar courses. After briefing them on course content and follow-up requirements, 360 students (180 male, 180 female) with an average age of 21.05 years (SD = 0.71) and average GPA of 3.27 (SD = 0.42) participated. To avoid expectancy effects, we only indicated that training beneficial for course learning and teamwork would be provided, without detailing research purposes.

The simulation course involved high task interdependence with autonomous division of labor. Teams had substantial autonomy in product development, procurement, pricing, capacity allocation, market strategies, task assignment, information sharing, and decision-making. This highly innovative and autonomous context ensured reflexivity could function effectively while providing space for proactive learning.

Participants were randomly assigned to 90 four-person teams, which were then randomly divided into experimental (n = 45) and control (n = 45) groups. Chi-square and t-tests revealed no significant differences between groups in average GPA ($t(88) = 0.29$, $p = 0.77$) or baseline team ambidexterity ($t(88) = 0.05$, $p = 0.96$), confirming successful random assignment without systematic bias.

2.1.2 Experimental Procedure and Manipulation Check

We employed a longitudinal pre-/post-test design with seven measurement waves: before the course (T0) and at each half-monthly session (T1–T6). The reflexivity training intervention occurred before the second session (T2).

Procedure: At T0, the facilitator introduced the simulation background, objectives, rules, and guidelines. After team role assignments, participants reported demographics while research assistants completed team ambidexterity observations. Teams were then randomly assigned to conditions.

At T1, formal instruction and simulation began, with assistants rating team reflexivity and ambidexterity post-session.

At T2, following Chen et al. (2018), we implemented the SED (Shift-end debriefing) protocol for the experimental group. Facilitators and assistants were trained on reflexivity principles and procedures one day prior. After normal instruction, the control group engaged in simple team-building exercises (trust games, social activities) while the experimental group underwent reflexivity training using the SED checklist (Appendix B). Initial sessions lasted approximately 25 minutes, decreasing to 5–10 minutes over time. Facilitators submitted completed checklists after each session to monitor fidelity. All teams strictly followed the five-step SED protocol with minimal off-task discussion.

To reduce Hawthorne effects, control teams participated in team-building activities after each session, with durations matching the experimental group's

average reflexivity time. Assistants rated team ambidexterity after each session. Upon completion, participants received 50 RMB book vouchers.

Manipulation Check: At T2, assistants rated team reflexivity levels. Pre-intervention (T1) reflexivity did not differ between experimental (M = 4.69, SD = 0.55) and control groups (M = 4.65, SD = 0.57; t(88) = 0.33, p = 0.74). Post-intervention (T2), experimental group reflexivity (M = 5.04, SD = 0.33) was significantly higher than control group (M = 4.55, SD = 0.64; t(88) = 4.57, $p < 0.001$, Cohen's d = 0.96).

Sessions T3–T6 continued instruction, simulation, and post-session activities, with ambidexterity ratings collected each time.

2.1.3 Research Instruments

Team Ambidexterity: Following established research (Jansen et al., 2016), we used a two-step measurement approach. First, we adapted Kostopoulos and Bozionelos' (2011) Team Learning Scale, comprising exploratory learning (5 items, e.g., "Our team tries new, creative ways to accomplish work") and exploitative learning subscales (5 items, e.g., "Our team uses standardized work methods and fixed procedures"). Cronbach's α coefficients across seven measurements ranged from 0.85–0.89 for exploratory learning and 0.86–0.88 for exploitative learning. Second, we calculated ambidexterity scores by summing the two dimensions. Although alternative computation methods exist (multiplicative, additive, subtractive), prior research using Edwards' (1994) procedures has demonstrated that the additive model minimizes information loss and provides superior fit.

2.1.4 Data Analysis

Study 1 used R 3.2.3 for data management and analysis. Prior to hypothesis testing, we examined attrition patterns, scale reliability, and measurement invariance, and conducted Pearson correlation analyses. To test the effect of reflexivity training on ambidexterity growth, we constructed a conditional latent growth model with training condition as a covariate. We compared no-growth, linear, and quadratic growth models to determine the optimal trajectory shape for both groups before adding the covariate.

2.2.1 Longitudinal Measurement Invariance

Given the longitudinal design, we tested measurement invariance across seven time points by comparing configural (M1), weak (M2), strong (M3), and strict (M4) invariance models. As shown in , chi-square difference tests between adjacent models were non-significant, and fit index differences were below critical values (ΔCFI $\leq$ 0.01; Cheung & Rensvold, 2002), supporting measurement invariance and confirming reliable repeated measurement.

2.2.2 Descriptive Statistics and Correlations

presents descriptive statistics and correlations. Early adjacent time points showed higher correlations, which decreased later, suggesting training effects created between-group differences.

2.2.3 Model Comparison

We identified the optimal growth trajectory model for both groups. The linear growth model significantly outperformed the no-growth model (M1 vs. M2: $\Delta\ ^2(\Delta df) = 45.54(3)$, $p < 0.001$), while the quadratic model did not improve fit over the linear model (M2 vs. M3: $\Delta\ ^2(\Delta df) = 5.39(4)$, $p = 0.25$), indicating linear growth best described ambidexterity development.

2.2.4 Hypothesis Testing

The conditional latent growth model demonstrated good fit ($^2 = 30.16$, df = 20, CFI = 0.95, TLI = 0.95, RMSEA = 0.08, SRMR = 0.07). Results () showed reflexivity training positively influenced the ambidexterity slope ($\beta = 0.12$, p = 0.02) but not the intercept ($\beta = 0.03$, $p > 0.05$). This supports H1, confirming that reflexivity training promotes ambidexterity growth. The non-significant intercept effect further validates random assignment. Additionally, untrained teams showed a marginally significant downward trend ($\beta = –0.07$, p = 0.09), significant at the 90% confidence level, indicating that without intervention, teams struggle to maintain ambidexterity levels.

2.2.5 Post-hoc Analysis

To examine robustness across different ambidexterity operationalizations, we compared additive, multiplicative, and subtractive models. Results () showed consistent effects using the multiplicative "combined" approach ($\beta = 0.56$, p = 0.02), but non-significant effects using the subtractive "balanced" approach ($\beta = 0.01$, p = 0.88). This aligns with Cao et al. (2009) regarding potential theoretical inconsistencies in the subtractive method.

Study 2: Quasi-Experimental Analysis of Mediating Mechanisms

3.1.1 Sample and Data

Study 2 involved R&D teams from 26 high-tech companies (information technology, precision instruments, biopharmaceuticals) in a southern Chinese province. Team members worked interdependently with autonomy in task execution, pacing, and rotation. To avoid expectancy effects, we described the study as a new employee development training program.

We excluded new hires and employees with turnover intentions at baseline (T0), resulting in 656 participants across 74 teams (7–11 members per team). Teams

were randomly assigned to experimental (n = 37, Msize = 8.81, SD = 1.39; Mtenure = 5.58 years, SD = 0.34) and control (n = 37, Msize = 8.92, SD = 1.34; Mtenure = 5.44 years, SD = 0.31) groups. No significant differences emerged in team size ($t(72) = 0.34$, $p = 0.74$), tenure ($t(72) = 1.86$, $p = 0.07$), or baseline ambidexterity ($t(72) = 0.63$, $p = 0.53$). The sample comprised 472 males and 184 females, averaging 26.40 years old (SD = 3.10), with educational backgrounds including bachelor's (n = 180), master's (n = 313), and doctoral degrees (n = 163). Average team tenure was 5.51 years (SD = 0.96).

3.1.2 Experimental Procedure and Manipulation Check

This quasi-experiment used a longitudinal pre-/post-test design with three waves (T0–T2) at six-month intervals over one year, with intervention following T0. Questionnaires included target variables and filler items to mask research purposes and assess response quality.

Procedure: At T0, facilitators introduced the training background, objectives, and guidelines. Unique team-member codes were assigned for tracking. Participants completed measures of team reflexivity, ambidexterity, meta-knowledge sharing, perspective taking, and demographics, while team leaders reported team formation dates. Teams were then randomly assigned to conditions and received initial training: control groups participated in team-building exercises, while experimental groups received reflexivity training following Chen et al. (2018) and the SED protocol.

For one month, experimental teams conducted weekly Friday reflexivity sessions facilitated by trained moderators, while control teams engaged in equivalent team-building activities. Manipulation checks confirmed pre-training equivalence (experimental: M = 4.65, SD = 0.52; control: M = 4.66, SD = 0.57; $t(72) = 0.05$, $p = 0.96$) and post-training superiority of the experimental group (M = 4.86, SD = 0.37 vs. control: M = 4.23, SD = 0.41; $t(72) = 6.99$, $p < 0.001$, Cohen's $d = 1.63$).

Following the initial month, experimental teams continued weekly reflexivity activities independently, while control teams conducted equivalent team-building activities. At T1 (month 6), participants completed measures of ambidexterity, meta-knowledge sharing, and perspective taking. Based on Chen et al. (2018), activity frequency was reduced to biweekly from month 7 to prevent fatigue. At T2 (month 12), ambidexterity was measured again. Participants received custom USB drives as compensation.

3.1.3 Research Instruments

We adapted established scales for our context. English scales underwent standard translation-back-translation by one overseas management scholar and two English specialists. All items used 7-point Likert scales (1 = "strongly disagree" to 7 = "strongly agree").

Team Ambidexterity: Measured identically to Study 1. Exploratory learning $\alpha = 0.86$ for both waves; exploitative learning $\alpha = 0.87$ for both waves.

Team Perspective Taking: Adapted from Li (2016), 4 items (e.g., "During team discussions, we often try to listen to each member's perspective"). $\alpha = 0.83$ (T0) and 0.82 (T1).

Team Meta-Knowledge Sharing: Adapted from Richter et al. (2012), 3 items (e.g., "If you need expertise on an issue, you know who to ask in this team"). $\alpha = 0.80$ for both waves.

3.1.4 Data Analysis

Study 2 used R 3.2.3 for data management. We examined attrition, reliability, measurement invariance, and conducted correlation analyses. To test mediation, we employed latent change score (LCS) modeling (McArdle & Grimm, 2010), which analyzes temporal relationships and identifies intervention effects. As illustrated in [Figure 2: see original paper], change in team ambidexterity (T1 to T2) was modeled as a latent variable (ΔTA) functioning as a component of T2 ambidexterity. The path from T1 ambidexterity to ΔTA was freely estimated while paths from ΔTA and T1 ambidexterity to T2 ambidexterity were fixed at 1. Similar specifications were made for other variables, ensuring mediators (T0–T1) preceded the outcome (T1–T2) to strengthen causal inference.

3.2.1 Longitudinal Measurement Invariance

Following Study 1's procedure, measurement invariance tests for ambidexterity, perspective taking, and meta-knowledge sharing showed non-significant chi-square differences between adjacent models and ΔCFI ≤ 0.01 (), supporting invariance and reliable repeated measurement.

3.2.2 Descriptive Statistics and Correlations

presents means, standard deviations, and correlations. Multi-wave measurement resulted in less obvious correlations, necessitating longitudinal modeling.

3.2.3 Aggregation Tests

As variables were aggregated from individual to team level, we examined Rwg (mean, median) and ICC(1), ICC(2) (). All indices fell within acceptable ranges, supporting valid aggregation.

3.2.4 Hypothesis Testing

The LCS model demonstrated excellent fit ($^2 = 9.17$; df = 13; CFI = 1.00; TLI = 1.02; RMSEA = 0.000; SRMR = 0.06). Path estimates ([Figure 3: see original paper]) showed reflexivity training positively influenced changes in meta-knowledge sharing ($\beta_1 = 0.08$, p = 0.005) and perspective taking ($\beta_2 = 0.05$;

p = 0.023). Both change variables positively influenced ambidexterity change (β_3 = 0.96, p = 0.009; β_4 = 1.01, p = 0.024). Bootstrap analysis (5,000 iterations) confirmed significant indirect effects: training→meta-knowledge sharing→ambidexterity change (indirect effect = 0.07, 95% CI [0.011, 0.19]) and training→perspective taking→ambidexterity change (indirect effect = 0.05, 95% CI [0.005, 0.17]). H2 and H3 were supported.

3.2.5 Post-hoc Analysis

Following Study 1's logic, presents unstandardized coefficients for robustness checks. Consistent with Study 1, multiplicative "combined" models showed significant effects (meta-knowledge→ambidexterity: β = 4.57, p = 0.006; perspective taking→ambidexterity: β = 4.46, p = 0.03), while subtractive "balanced" models did not (β = 0.04, p = 0.90; β = –0.48, p = 0.21).

General Discussion

Ambidextrous behavior is crucial for team adaptability and efficiency, yet research on cultivating these capabilities and identifying underlying mechanisms remains limited. Grounded in the differentiation-integration framework, two sequential studies demonstrated that team reflexivity training promotes ambidexterity growth and clarified the cognitive mechanisms involved. Study 1 revealed that untrained teams showed non-significant declines in ambidexterity, while trained teams exhibited significant growth. Study 2 confirmed that reflexivity training enhanced meta-knowledge sharing and perspective taking, which subsequently increased ambidexterity.

These findings align with both the differentiation-integration framework and social cognitive theory's propositions about reflexivity. Smith and Tushman (2005) argue that overcoming tensions between exploration and exploitation requires new cognitive frameworks shaped by learning processes. Social cognitive theory (Bandura, 2001) suggests individuals learn both from direct experience and vicariously from others (Myers, 2018). Team reflexivity promotes active information seeking, sharing, evaluation, and elaboration (Konradt et al., 2016), forming a key component of team learning (Schippers et al., 2014). It breaks information silos, encourages diverse information sharing, and creates shared understanding (Cronin & Weingart, 2007). By systematically evaluating past, present, and future activities (Ellis et al., 2014), reflexivity connects historical feedback to optimize exploitation while providing forward-looking thinking that encourages exploration (van Neerijnen et al., 2022). This dual-focus information processing helps members recognize the value of balancing both activities, fostering ambidexterity growth.

4.1 Theoretical Contributions

First, this research provides robust empirical evidence for cultivating team ambidexterity through experimental and quasi-experimental longitudinal designs.

While previous research has identified structural, contextual, and leadership characteristics of ambidextrous teams (Dean, 2022), managers need guidance on developing these capabilities. This study demonstrates reflexivity training as an effective management intervention for enhancing team adaptability, complementing van Neerijnen et al.'s (2022) findings on top management teams and extending them to the team level. It addresses calls for research on guiding paradoxical coping toward beneficial developmental processes (庞大龙等, 2017).

Second, grounded in the differentiation-integration framework and team information processing model, this study identifies meta-knowledge sharing and perspective taking as critical cognitive mechanisms linking reflexivity training to ambidexterity development. This advances understanding beyond general cognitive patterns (e.g., holistic thinking, cognitive flexibility) to specific processes that trigger sustained ambidexterity improvement. The findings align with Salas-Vallina et al. (2020) regarding information exchange as necessary for ambidexterity, expand cognitive perspective research, and reaffirm the fundamental role of efficient information processing in team effectiveness (Nijstad & De Dreu, 2012).

Third, this study introduces temporal dynamics to ambidexterity research, deepening understanding of its evolutionary nature. Despite theoretical recognition of ambidexterity's dynamic character and case study explorations (吴瑶等, 2022), consensus on developmental trajectories and empirical validation has been lacking. Using longitudinal data and analytical models, we confirmed that ambidexterity follows a negative evolutionary trajectory without intervention, consistent with Luger et al.'s (2018) negative self-reinforcing effect rather than positive self-learning assumptions (O'Reilly & Tushman, 2008). This suggests behavioral inertia leads members to prefer specific activities over complex ambidextrous patterns. This finding addresses empirical gaps and provides evidence for considering dynamic characteristics in future research to avoid biased conclusions.

4.2 Practical Implications

Organizations should provide team reflexivity training to prevent ambidexterity loss due to organizational inertia. While research has identified ambidextrous teams, this study offers a validated intervention with specific procedures. The finding that ambidexterity declines without intervention suggests static features like leadership styles may have sustainability limitations. Management should implement continuous interventions, such as providing reflexivity courses to develop rethinking habits and establishing systems (fixed timing, frequency) with support (venues, guidance) to sustain high-level reflexivity and prevent decline.

Effective team information processing is key to reflexivity's benefits. Meta-knowledge sharing and perspective taking emerged as critical mechanisms. Given that many teams are short-term with high turnover, limiting member familiarity and trust, managers should emphasize social and task integration through leadership behaviors, team design, and contextual factors. Members

should maintain good interpersonal communication, actively share task information, and seriously consider others' perspectives when completing complex tasks.

4.3 Limitations and Future Directions

Several limitations warrant attention. First, while we focused on reflexivity training, other interventions may produce similar effects. For instance, Zhao and Xiang (2021) found that intuitive and systematic cognitive styles help balance exploration and exploitation. Future research should identify and test alternative interventions to enrich management practice.

Second, while the differentiation-integration framework illuminated cognitive mechanisms, reflexivity may also affect non-task relationships and interactions in nonlinear, time-varying ways. Future research could employ other theories and finer-grained methods to explore these complex mechanisms.

Finally, the time intervals differed substantially between studies (half-monthly vs. six-monthly). While this allowed short- and long-term examination, future research should test alternative time frames to verify robustness.

References

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1–26.

Cao, Q., Gedajlovic, E., & Zhang, H. (2009). Unpacking organizational ambidexterity: Dimensions, contingencies, and synergistic effects. *Organization Science*, 20(4), 781–796.

Chen, J., Bamberger, P. A., Song, Y., & Vashdi, D. R. (2018). The effects of team reflexivity on psychological well-being in manufacturing teams. *Journal of Applied Psychology*, 103(4), 443–462.

Chen, X. W., Cui, X., & Yu, G. L. (2015). How team cognitive diversity influences team creativity: A moderated mediation model. *Science and Technology Management Research*, 35(19), 112–118.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255.

Cronin, M. A., & Weingart, L. R. (2007). Representational gaps, information processing, and conflict in functionally diverse teams. *Academy of Management Review*, 32(3), 761–773.

Dean, B. P. (2022). Developing and leading ambidextrous teams: A Team-Centric framework of ambidexterity in volatile environments. *Journal of Change Management*, 22(2), 120–146.

Edwards, J. R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes*, 58(1), 51–100.

Ellis, S., Carette, B., Anseel, F., & Lievens, F. (2014). Systematic reflection: Implications for learning from failures and successes. *Current Directions in Psychological Science*, 23(1), 67–72.

Gurtner, A., Tschan, F., Semmer, N. K., & Nägele, C. (2007). Getting groups to develop good strategies: Effects of reflexivity interventions on team process, team performance, and shared mental models. *Organizational Behavior and Human Decision Processes*, 102(2), 127–142.

Haas, M. R. (2010). The double-edged swords of autonomy and external knowledge: Analyzing team effectiveness in a multinational organization. *Academy of Management Journal*, 53(5), 989–1008.

Heavey, C., & Simsek, Z. (2017). Distributed cognition in top management teams and organizational ambidexterity: The influence of transactive memory systems. *Journal of Management*, 43(3), 919–945.

Hoever, I. J., Van Knippenberg, D., Van Ginkel, W. P., & Barkema, H. G. (2012). Fostering team creativity: Perspective taking as key to unlocking diversity's potential. *Journal of Applied Psychology*, 97(5), 982–996.

Jansen, J. J., Kostopoulos, K. C., Mihalache, O. R., & Papalexandris, A. (2016). A socio-psychological perspective on team ambidexterity: The contingency role of supportive leadership behaviours. *Journal of Management Studies*, 53(6), 939–965.

Junni, P., Sarala, R. M., Taras, V. A. S., & Tarba, S. Y. (2013). Organizational ambidexterity and performance: A meta-analysis. *Academy of Management Perspectives*, 27(4), 299–312.

Knight, E., & Paroutis, S. (2017). Becoming salient: The TMT leader's role in shaping the interpretive context of paradoxical tensions. *Organization Studies*, 38(3–4), 403–432.

Konradt, U., Otte, K. P., Schippers, M. C., & Steenfatt, C. (2016). Reflexivity in teams: A review and new perspectives. *Journal of Psychology*, 150(2), 153–174.

Kostopoulos, K. C., & Bozionelos, N. (2011). Team exploratory and exploitative learning: Psychological safety, task conflict, and team performance. *Group & Organization Management*, 36(3), 385–415.

Kozlowski, S. W. J., & Bell, B. S. (2003). Work groups and teams in organizations. *Handbook of Psychology: Industrial and Organizational Psychology*, 12, 333–375.

Lewis, K., Belliveau, M., Herndon, B., & Keller, J. (2007). Group cognition, membership change, and performance: Investigating the benefits and detriments

of collective knowledge. *Organizational Behavior and Human Decision Processes*, 103(2), 159–178.

Li, C. R. (2016). The role of top-team diversity and perspective taking in mastering organizational ambidexterity. *Management and Organization Review*, 12(4), 769–794.

Li, C. R., Li, C. X., Lin, C. J., & Liu, J. (2018). The influence of team reflexivity and shared meta-knowledge on the curvilinear relationship between team diversity and team ambidexterity. *Management Decision*, 56(5), 1033–1050.

Luger, J., Raisch, S., & Schimmer, M. (2018). Dynamic balancing of exploration and exploitation: The contingent benefits of ambidexterity. *Organization Science*, 29(3), 449–470.

Lv, J., & Zhang, G. (2013). The emergence of team cognition: Based on the perspective of collective information processing. *Advances in Psychological Science*, 21(12), 2214–2223.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26(3), 356–376.

Mcardle, J. J., & Grimm, K. J. (2010). Five steps in latent curve and latent change score modeling with longitudinal data. In M. Kees van, H. L. Oud Johan & S. Albert (Eds.), *Longitudinal research with latent variables* (pp. 245–273). Berlin, Heidelberg: Springer Berlin Heidelberg.

Myers, C. G. (2018). Coactive vicarious learning: Toward a relational theory of vicarious learning in organizations. *Academy of Management Review*, 43(4), 610–634.

Nijstad, B. A., & De Dreu, C. K. (2012). Motivated information processing in organizational teams: Progress, puzzles, and prospects. *Research in Organizational Behavior*, 32, 87–111.

O'Reilly III, C. A., & Tushman, M. L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behavior*, 28(1), 185–206.

Olabisi, J., & Lewis, K. (2018). Within-and between-team coordination via transactive memory systems and boundary spanning. *Group & Organization Management*, 43(5), 691–717.

Pang, D. L., Xu, L. G., & Xi, Y. M. (2017). Paradox management: Origins of thoughts, characteristic implications, and future perspectives. *Chinese Journal of Management*, 14(2), 168–175.

Parker, S. K., & Axtell, C. M. (2001). Seeing another viewpoint: Antecedents and outcomes of employee perspective taking. *Academy of Management Journal*, 44(6), 1085–1100.

Ren, Y., & Argote, L. (2011). Transactive memory systems 1985–2010: An integrative framework of key dimensions, antecedents, and consequences. *Academy of Management Annals*, 5(1), 189–229.

Richter, A. W., Hirst, G., Van Knippenberg, D., & Baer, M. (2012). Creative self-efficacy and individual creativity in team contexts: Cross-level interactions with team informational resources. *Journal of Applied Psychology*, 97(6), 1282–1290.

Rong, P., Li, C., & Xie, J. (2019). Learning, trust, and creativity in top management teams: Team reflexivity as a moderator. *Social Behavior and Personality*, 47(5), 1–14.

Salas-Vallina, A., Pozo-Hidalgo, M., & Monte, P. G. (2020). High involvement work systems, happiness at work (HAW) and absorptive capacity: A bathtub study. *Employee Relations*, 42(4), 949–970.

Schippers, M. C., Den Hartog, D. N., Koopman, P. L., & Van Knippenberg, D. (2008). The role of transformational leadership in enhancing team reflexivity. *Human Relations*, 61(11), 1593–1616.

Schippers, M. C., Edmondson, A. C., & West, M. A. (2014). Team reflexivity as an antidote to team information-processing failures. *Small Group Research*, 45(6), 731–769.

Schippers, M. C., Edmondson, A. C., & West, M. A. (2018). Team reflexivity. In L. Argote & J. M. Levine (Eds.), *The Oxford handbook of group and organizational learning* (pp. 1–35). Oxford: Oxford University Press.

Shin, Y., Kim, M., & Lee, S. H. (2017). Reflection toward creativity: Team reflexivity as a linking mechanism between team goal orientation and team creative performance. *Journal of Business and Psychology*, 32(6), 655–671.

Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science*, 16(5), 522–536.

Tannenbaum, S. I., & Cerasoli, C. P. (2013). Do team and individual debriefs enhance performance? A meta-analysis. *Human Factors*, 55(1), 231–245.

van Neerijnen, P., Tempelaar, M. P., & van de Vrande, V. (2022). Embracing Paradox: TMT paradoxical processes as a steppingstone between TMT reflexivity and organizational ambidexterity. *Organization Studies*, 43(11), 1793–1814.

Wang, Z., Cui, T., & Cai, S. (2022). How and when team reflexivity influences employee innovative behavior. *Journal of Managerial Psychology*, 37(1), 61–75.

Wegner, D. M. (1995). A computer network model of human transactive memory. *Social Cognition*, 13(3), 319–339.

West, M. A. (1996). Reflexivity and work group effectiveness: A conceptual integration. In *The handbook of work group psychology* (pp. 555–579). John

Wiley & Sons, Ltd.

Wu, Y., Xia, Z. H., Hu, Y. S., Xie, K., & Wang, Q. (2022). Developing dynamic capability of "Harmony in Diversity" with digital technology: A longitudinal case study of SOFIA and its dealers from 2011 to 2020. *Journal of Management World*, 38(1), 144–163+206+164.

Zhao, K., & Xiang, S. T. (2021). How to reconcile team innovation paradox? An explorative study from the perspectives of members' cognitive style "composition" and "configuration". *Advances in Psychological Science*, 29(1), 1–18.

Appendix A: Research Scales

Team Ambidexterity (Kostopoulos & Bozionelos, 2011; Shin et al., 2017)

Instructions: To what extent does your team exhibit the following behaviors in the previous work phase? (7-point scale: 1 = strongly disagree, 7 = strongly agree)

Exploratory Learning: 1. Our team systematically searches for new possibilities. 2. Our team proposes new ideas and solutions for complex problems. 3. Our team tries new, creative ways to accomplish work. 4. Our team thoroughly evaluates various options in work processes. 5. Our team develops many new skills when performing tasks.

Exploitative Learning: 6. Our team completes work by recombining existing knowledge. 7. Our team performs procedural work while completing tasks. 8. Our team uses standardized work methods and fixed procedures. 9. Our team improves and refines existing knowledge and expertise while completing work. 10. Our team primarily uses existing knowledge and skills to complete tasks.

Team Reflexivity (Chen et al., 2018)

Instructions: To what extent does your team exhibit the following behaviors? (7-point scale) 1. In this team, we frequently review our work methods. 2. In this team, we frequently examine the feasibility of our goals. 3. In this team, we frequently discuss whether we work together effectively. 4. In this team, we frequently modify our goals based on external environmental changes.

Team Perspective Taking (Li, 2016) 1. During team discussions, we often try to listen to each member's perspective. 2. At work, we often imagine how each team member feels. 3. In group discussions, we strive to view the world through each member's different perspective. 4. At work, we often seek to understand each member's viewpoint.

Meta-Knowledge Sharing (Richter et al., 2012) 1. If you need expertise on an issue, you know exactly who to ask in this team. 2. You know which team members have expertise in specific areas. 3. You have a thorough understanding of "who knows what" in this team.

Appendix B: SED Protocol Checklist

Team ID: *{{{_}}{{}}}* **Start Time:** ***{{{***}}{{}}_} **End Time:** *{{{_}}{{}}}* **Facilitator:** ***{{{***}}{{}}_}

1. Number of team members: *{_}* present? *{_}* participating in discussion?
2. Did the team address the following items today:
   - Review goals (daily, weekly, or monthly)? Yes No
   - Discuss what progressed well and why? Yes No
   - Identify what didn't progress well and why goals weren't met? Yes No
   - Determine what needs improvement next time?
     - Who needs to do what to generate improvement? Yes No
     - How will we know if improvement occurred? Yes No
   - Summarize lessons learned? Yes No
3. Main discussion topics:
   - Were follow-up tasks assigned to members? Yes No
   - Did this meeting follow up on previous issues? Yes (record issues) No

Appendix C: Data Platform

Per editorial requirements, raw data from both studies, along with all analysis syntax and results, have been deposited on a data sharing platform for expert review and future reference: https://www.scidb.cn/en/s/YJ7j2q.

Note: Figure translations are in progress. See original paper for figures.