

## Article

# Paradoxical Leadership and Team Vitality: A Sequential Mediation Model of Collective Team Identification and Team Authenticity

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## Abstract

Drawing on Social Identity Theory and Self-Determination Theory, this study investigates whether paradoxical leadership is positively associated with team vitality—a core indicator of collective well-being—through an affective pathway of collective team identification and team authenticity. Using a three-wave design with temporal separation between predictor and outcomes, data were collected from 106 work teams comprising 424 employees in high-technology sectors. Results from serial mediation analysis suggest that paradoxical leadership is positively associated with collective team identification, which in turn relates positively to team authenticity and subsequently team vitality. The serial indirect effect was supported (bootstrap 95% CI excluded zero), whereas the direct effect was non-significant in the presence of the mediators. By exploring this affective mechanism, the study offers a preliminary account of how paradoxical leadership may be positively associated with shared positive affective experiences at the team level, offering practical insights for sustaining collective energy and thriving in complex, knowledge-intensive organizational environments.

**Keywords:** paradoxical leadership; collective team identification; team authenticity; team vitality



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## 1. Introduction

In contemporary organizational management, there is an increasing recognition that employee well-being and affective experiences are important facets of organizational health alongside traditional performance metrics. It is often suggested that fostering positive emotional dynamics within teams may contribute not only to individual psychological health but also to collective functioning ([Chiang et al., 2020](#); [Madrid et al., 2021](#); [Mathieu et al., 2019](#)). Especially in complex and rapidly changing environments, the ability to maintain a team that is resilient, energetic, and allows for authentic expression has become a significant interest for both scholars and practitioners ([Chiang et al., 2020](#)).

Extensive research has documented a positive association between paradoxical leadership (PL) and team outcomes, yet most studies focus on cognitive and task-related mechanisms (e.g., creativity, innovation and adaptability; (Lee et al., 2023; Wei et al., 2023; Zhao et al., 2026)), leaving affective pathways largely underexplored—especially at the team level. Despite growing attention to affective pathways in paradoxical leadership (PL) research, empirical evidence in this area remains relatively limited and somewhat fragmented. Existing affect-oriented studies have primarily focused on individual-level outcomes, such as positive affect (Chen et al., 2024), thriving at work (Yang et al., 2021), and job satisfaction (Stynen & Semeijn, 2023). Notably, these constructs often blend affective and non-affective components; for instance, thriving at work conceptually integrates vitality with learning (Spreitzer et al., 2005), while job satisfaction encompasses both affective reactions and cognitive evaluations. To delineate a more distinctly affective pathway, the present study focuses on team vitality—a collective experience of energy and aliveness—as a focal outcome. Specifically, we propose a sequential affective bond pathway: we argue that PL facilitates the development of collective team identification, which we conceptualize not as a cognitive category, but as an affective bond characterized by deep emotional connection and shared pride. This bond, in turn, is positively associated with team authenticity, which in turn is positively associated with team vitality. By exploring this chain, we hope to offer a more nuanced understanding of how paradoxical leadership may contribute to team thriving.

To provide a theoretical foundation for this proposed affective bond pathway, we integrate the complementary perspectives of Social Identity Theory (SIT) (Tajfel & Turner, 1979) and Self-Determination Theory (SDT) (Deci et al., 2017; Ryan & Deci, 2000). Drawing on SIT, we suggest that paradoxical leaders, through their both-and orientation—characterized by holistic thinking and the ability to embrace and navigate competing workplace demands (Zhang et al., 2015)—foster a sense of affective identification among team members. Within an SDT framework, this affective bond primarily satisfies members' need for relatedness. In turn, this emotionally charged identification serves as a precondition for the emergence of team authenticity—a climate in which members feel safe to act in accordance with their internal values and beliefs, thereby supporting the satisfaction of autonomy and competence needs. We further propose that this authentic climate ultimately is positively associated with team vitality (Spreitzer et al., 2005).

Drawing on data from high-technology teams, this study aims to make three primary theoretical contributions. First, we provide an affective explanation for paradoxical leadership effectiveness by focusing on collective team identification (CTI). By holding structural and relational tensions in dynamic balance, paradoxical leaders may enhance the emotional significance members derive from their team (Tajfel, 1978), thereby cultivating secure affective bonds that encourage members to perceive themselves as integral parts of the collective. Second, we offer an empirical observation of the synergy between CTI and team authenticity. Our findings suggest that high levels of CTI create a shared emotional bond that supports team authenticity—a climate in which members feel free to act in accordance with their internal values and beliefs—offering a preliminary account of how collective belonging can facilitate, rather than constrain, the expression of the true self within teams. Third, we examine a sequential pathway from paradoxical leadership to team vitality through the serial mediating roles of CTI and team authenticity. Our findings suggest that the association between paradoxical leadership and team vitality is layered: leader behaviors first manifest as a shared emotional bond, which then enables an authentic climate that is subsequently positively associated with team vitality. This provides a preliminary framework for understanding how collective aliveness may be sustained in knowledge-intensive and high-pressure work environments.

## 2. Theoretical Background: An Integration of SIT and SDT

To explain how paradoxical leadership (PL) may contribute to team vitality, this study integrates the complementary perspectives of Social Identity Theory (SIT) and Self-Determination Theory (SDT). The rationale for this integration is twofold. First, SIT explains why individuals form emotional attachments to their team and how leadership behaviors can strengthen such attachments. Second, SDT specifies the psychological needs whose satisfaction leads to authentic self-expression and team vitality. By linking these two theories, we propose a sequential affective pathway—an affective bond pathway—from paradoxical leadership to team vitality.

### 2.1. Social Identity Theory: Affective Basis

Social Identity Theory provides a foundational framework for understanding why team members develop a sense of belonging to their collective (Tajfel, 1978). Tajfel defined social identity as “that part of an individual’s self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership.” This definition explicitly recognizes that social identity is not merely a cognitive process but comprises three distinguishable components: a cognitive component (awareness of membership, i.e., self-categorization), an evaluative component (the value connotation attached to the group), and an affective component (the emotional involvement associated with group membership). While early formulations primarily emphasized the cognitive process of self-categorization (Hogg & Turner, 1985; Turner et al., 1987), subsequent scholarship has recognized social identity as this multi-dimensional construct (Bergami & Bagozzi, 2000; Ellemers et al., 1999).

In organizational and team research, Bergami and Bagozzi (2000) operationalized these three components as cognitive identification, organization-based self-esteem, and affective commitment (Bergami & Bagozzi, 2000), and found that affective commitment and self-esteem are among the primary motivators of pro-group behaviors, with cognitive identification serving as a mediator. Building on this logic, Van Der Veegt and Bunderson (2005) focused specifically on the affective component in their team research, defining collective team identification (CTI) as “the emotional significance that members of a given group attach to their membership in that group” (Van Der Veegt & Bunderson, 2005). This definition deliberately captures the affective dimension of social identity—members’ emotional involvement with the team—rather than mere cognitive belonging or evaluative judgment, thereby providing direct theoretical justification for the present study’s focus on affect-based mechanisms.

Extending SIT to the leadership domain, the social identity theory of leadership (Kark et al., 2003; van Knippenberg & Hogg, 2003) proposes that leaders can shape and represent a shared collective identity, thereby eliciting followers’ social identification. A core function of leaders is to define, elevate, and advance the collective identity of the group, making the group more attractive and cohesive in the eyes of members. Based on this theoretical logic, the first core hypothesis of the present study—that paradoxical leadership positively relates to collective team identification—can be derived from SIT.

Beyond the general recognition that social identity entails an affective component, social identity theory and its extensions have identified two specific motivational pathways through which group membership generates emotional attachment: the self-esteem hypothesis (pride in a valued group) (Abrams & Hogg, 1988; Turner et al., 1979) and optimal distinctiveness theory (simultaneous satisfaction of belongingness and uniqueness needs) (Brewer, 1991). In the present study, we draw upon these two SIT-based pathways to explain how paradoxical leadership—through its integration of opposing behaviors—meets members’ needs for self-enhancement and optimal distinctiveness, thereby promoting collective team identification as an affective bond.

## 2.2. Self-Determination Theory: From Affect to Vitality

While SIT explains the formation and affective nature of collective team identification, it does not directly explain how affective identification translates into a state of team vitality. To bridge this gap, we draw on Self-Determination Theory (SDT).

SDT posits that individuals have three basic psychological needs—autonomy, competence, and relatedness—and that satisfaction of these needs fosters intrinsic motivation and psychological well-being, and vitality (Deci & Ryan, 2000). In the context of our model, we focus on how these three needs operate synergistically. Collective team identification embodies relatedness satisfaction: when members develop strong affective identification with their team, they experience a deep sense of acceptance and belonging (Ryan & Deci, 2000; Tajfel, 1978).

This sense of acceptance goes hand in hand with the satisfaction of autonomy and competence needs. Specifically, when members feel accepted (relatedness satisfied), they are more willing to express their authentic selves without pretense or suppression. A team climate that encourages such authenticity—that is, a team authenticity climate—may support the fulfillment of autonomy needs by allowing members to act in accordance with their true values (Deci & Ryan, 1985; Wood et al., 2008). Moreover, in an authenticity climate, members are more likely to demonstrate their genuine skills and contributions, thereby eliciting meaningful recognition and satisfying competence needs (Deci & Ryan, 2000; Slemp et al., 2024). In this way, the relatedness satisfaction derived from identification helps cultivate a team authenticity climate, which in turn nourishes both autonomy and competence needs through a synergistic cycle.

Finally, SDT explicitly identifies vitality as a natural consequence of basic psychological need satisfaction. Deci and Ryan (2008) indicate that when autonomy, competence, and relatedness are satisfied, individuals experience higher levels of energy and aliveness. At the team level, the synergistic satisfaction of relatedness, autonomy, and competence needs fuels collective team vitality (Ryan & Deci, 2008).

## 2.3. The Integrated Pathway

SIT and SDT play distinct yet complementary roles in this study: SIT provides the “source mechanism” of affective identification—paradoxical leadership elicits members’ affective identification by shaping a shared collective identity. SDT provides the “transformation mechanism” of that identification— affective identification satisfies members’ relatedness needs, while a team authenticity climate supports the satisfaction of autonomy and competence needs. The synergistic fulfillment of these three basic psychological needs collectively generates team vitality.

The necessity of this integration is underscored by the inherent limitations of each theory in isolation. A model relying solely on SIT could explain how leadership cultivates unity and pride, yet it would remain silent on the energetic, growth-oriented activation inherent in vitality; a team can identify strongly with a group but still feel depleted if the needs for autonomy and competence are ignored. Conversely, while SDT explains how the satisfaction of basic needs leads to vitality, it lacks a contextualized social mechanism to explain how complex leadership behaviors cultivate that sense of relatedness in a collective environment. Without SIT, SDT would reduce relatedness to a generic interpersonal affect, failing to capture how a shared collective identity acts as the specific anchor for relatedness in a professional team. Together, these theories form a holistic framework where SIT answers why members belong together, and SDT answers how that belonging is transformed into the proactive “aliveness” and energy that characterize team vitality.

This logic aligns with recent integrative endeavors (Grenier et al., 2024; Sinclair, 2024). Their integration thus provides a coherent theoretical foundation for the identity–affective

pathway proposed here, explaining how a shared collective identity is ultimately transformed into collective emotional energy.

### 3. Hypothesis Development

#### 3.1. Paradoxical Leadership and Collective Team Identification

As elaborated in Section 2.1, collective team identification (CTI) in this study refers specifically to the affective dimension of social identity—the emotional significance that members attach to their team membership (Van Der Vegt & Bunderson, 2005). From a social identity perspective, a key question is whether paradoxical leadership can foster such affective team identification. The social identity theory of leadership posits that leaders can actively shape a shared collective identity, thereby eliciting followers' emotional attachment (Hogg, 2001; van Knippenberg & Hogg, 2003). We argue that paradoxical leadership is particularly well-suited to this task, as its integration of seemingly opposing behaviors—combining control with autonomy, high standards with flexibility, and distance with closeness—creates a unique environment where members feel both competent and cared for. Meta-analytic evidence indicates that paradoxical leadership positively relates to followers' attitudinal outcomes, including organizational identification and affective commitment (Lee et al., 2023). This environment shapes CTI through three distinct yet complementary pathways, each grounded in social identity theory.

The self-esteem hypothesis of SIT suggests a first mechanism: the combination of high standards and relational care, characteristic of paradoxical leadership, makes employees feel proud to be part of such a team. This sense of pride, born from belonging to a team that excels and cares, serves as a potent emotional driver, directly intensifying members' affective identification with the team and fostering a deeper emotional attachment (Bergami & Bagozzi, 2000; Tajfel, 1978). Recent empirical research further confirms that paradoxical leaders' integration of performance and people orientation enhances employees' emotional attachment to the collective (Fürstenberg et al., 2021; Lee et al., 2023).

Second, paradoxical leadership fosters collective team identification through satisfying the need for optimal distinctiveness (Brewer, 1991). Paradoxical leaders, by simultaneously emphasizing both individual contributions and collective goals, help reconcile the inherent human tension between the need for inclusion and the desire for uniqueness (Brewer, 1991). This balance satisfies the fundamental emotional need to feel both included and recognized as a distinct person (Brewer, 1991). By satisfying the fundamental emotional need for both belonging and uniqueness, this balance critically strengthens the emotional bond and sense of pride members experience with the team, thereby intensifying their collective team identification.

Third, paradoxical leaders' ability to balance seemingly contradictory demands, such as maintaining distance while showing closeness, contributes to a secure and trustworthy team environment. This paradox creates a sense of fairness and psychological safety (Lee et al., 2023), as members perceive that the leader is fair yet personally invested in their development. This perception cultivates deep trust and a sense of being genuinely valued, which, in turn, fortifies members' emotional connection and attachment to the team, directly contributing to stronger collective team identification (Silva et al., 2024). We therefore hypothesize:

**Hypothesis 1.** *Paradoxical leadership is positively related to collective team identification.*

#### 3.2. Collective Team Identification and Team Authenticity

Team authenticity, conceptualized as a shared climate within the team, refers to the collective perception that members are genuinely able to behave in accordance with their

core values and beliefs, rather than conforming to external pressures (Hannah et al., 2011; Wood et al., 2008). This involves not only individual genuine expression but also a collective belief that ‘we, as a team, are true and trustworthy,’ where actions align with espoused values. We argue that high collective team identification (CTI) is a crucial precursor to such an authentic team climate.

From an SIT perspective, high affective identification involves a profound psychological merging of the self with the team, blurring the boundaries between individual and collective interests (Ashforth & Mael, 1989; Ellemers et al., 1999; Kahn, 1990). This cognitive and emotional fusion fundamentally reduces members’ perceived need for impression management or the maintenance of a social facade (Kahn, 1990). Consequently, members feel liberated from self-protective behaviors, becoming more willing and able to express their true values and beliefs genuinely within the team context, thereby forming the bedrock of team authenticity.

Drawing on Self-Determination Theory (SDT), CTI satisfies members’ fundamental psychological needs for relatedness and competence (Ryan et al., 2005). When members strongly identify with their team, they experience a deep sense of belonging and connection (relatedness), and they perceive their contribution as meaningful and effective within the collective (competence) (Zhang et al., 2015). Crucially, this conjoint satisfaction of relatedness and competence provides the essential psychological foundation for the exercise of autonomy—the experience of acting with self-determined motivation (Ryan & Deci, 2000). When members feel both securely connected and professionally valued, the perceived risks associated with authentic self-expression—such as expressing personal values and beliefs—are significantly mitigated. In such a climate, members feel able to act in accordance with their true selves, viewing the suspension of self-protective impression management not as a risk but as a natural expression of their secure emotional bond and recognized role within the team (Harter, 2002; Kernis & Goldman, 2006). This liberation directly facilitates the emergence of an authentic team climate, where genuine self-expression is collectively encouraged and psychologically protected by the robust relational foundation provided by CTI. We therefore hypothesize:

**Hypothesis 2.** *Collective team identification is positively related to team authenticity.*

### 3.3. Team Authenticity and Team Vitality

Team vitality refers to the shared experience of collective positive energy and a sense of aliveness within a team (Ryan & Frederick, 1997). It manifests as heightened enthusiasm, vigor, and a collective sense of thriving. We propose that team authenticity is a direct antecedent of team vitality.

Although team authenticity and team vitality are often correlated in practice, they are conceptually distinct. Team authenticity captures members’ shared perception that they are enabled to express their true selves in accordance with their values and beliefs—addressing the question “Are we allowed to be our true selves?” Team vitality, by contrast, captures the collective experience of positive energy, aliveness, and spirited engagement in team interactions (Kark & Carmeli, 2009)—addressing the question “Do our interactions leave us feeling energized?” In SDT terms, authenticity primarily reflects autonomy satisfaction through reduced self-monitoring and increased self-congruence, whereas vitality reflects the affective–energetic outcome of overall need satisfaction (Deci & Ryan, 2000; Ryan & Deci, 2017). These constructs are not interchangeable: a team could be authentic yet lack vitality if members are depleted by excessive workload or interpersonal conflict; conversely, a team could exhibit surface-level energy without genuine authenticity. Thus, authenticity pertains to the team’s expressive climate, whereas vitality pertains to the intensity of its affective energy.

Within an authentic team, members' shared perception of being able to express their true perspectives and act without the constant burden of impression management directly translates into a profound satisfaction of the need for autonomy at the collective level. This liberation from the psychological pressure to conform to a false facade eliminates the emotional and cognitive costs associated with self-monitoring (Vohs et al., 2005), effectively shifting members from depleting controlled regulation to resource-generating autonomous functioning (Deci & Ryan, 2008). This fundamental shift in regulatory style is the direct precursor to vitality.

Extensive SDT research constantly demonstrates that autonomy satisfaction is a robust predictor of vitality across domains, including work, education, and health (Deci & Ryan, 2008; Ryan & Deci, 2017). When applied to teams, the same logic holds: in teams that are authentic—where members feel “licensed to be genuine” (Harter, 2002)—they are not depleted by the effort of maintaining a socially desirable mask and their autonomy needs are fulfilled. This fulfillment is precisely what fuels a sense of psychological liberation and self-congruence that, in turn, directly generates and sustains collective positive energy. Thus, team vitality emerges as the direct affective–energetic outcome of an authentic team climate, born from the satisfaction of collective autonomy. We therefore hypothesize:

**Hypothesis 3.** *Team authenticity is positively related to team vitality.*

### 3.4. The Serial Mediation Hypothesis

Building upon the individual theoretical links established in Hypotheses 1, 2, and 3, we now integrate these arguments to propose a comprehensive serial mediation hypothesis. We posit that paradoxical leadership exerts its influence on team vitality not directly, but through a crucial sequential process, where collective team identification (CTI) and team authenticity serve as consecutive, theoretically ordered mediators.

The logic of serial mediation rests on the premise that an independent variable's influence on a distal outcome is transmitted through a theorized ordering of intermediaries (Hayes, 2017; Taylor et al., 2008). In the present context, paradoxical leadership is theorized to first shape a shared team identity (CTI), which in turn is expected to foster the relational and motivational conditions under which team authenticity can develop. This authentic climate, in turn, is expected to contribute positively to collective vitality. Each link in this chain is grounded in complementary theoretical frameworks: SIT explains the identity-based process from leadership to CTI and from CTI to the relational conditions that enable authenticity, while SDT explains the need–satisfaction processes from CTI to authenticity (relatedness and competence) and from authenticity to vitality (autonomy).

First, as argued in Hypothesis 1, paradoxical leadership—through its simultaneous enactment of opposing yet complementary behaviors such as balancing control with autonomy, enforcing high standards while allowing flexibility, and maintaining distance while building closeness (Zhang et al., 2015)—creates a unique team environment in which members experience pride, optimal distinctiveness, and emotional trust. These experiences directly foster collective team identification, the emotional significance members attach to their team membership (Van Der Vegt & Bunderson, 2005). Second, as theorized in Hypothesis 2, high CTI provides the relational foundation for team authenticity. From an SIT perspective, the psychological merging of self with team (Ashforth & Mael, 1989) helps liberate members from impression management. From an SDT perspective, CTI satisfies needs for relatedness and competence (Ryan et al., 2005; Zhang et al., 2015), which in turn enables the exercise of autonomy—the experience of acting with genuine self-congruence (Ryan & Deci, 2000). This conjoint satisfaction cultivates a shared climate of team authenticity, in which members are collectively enabled to behave in accordance with their values and beliefs (Hannah et al., 2011; Wood et al., 2008). Third, as proposed in Hypothesis 3,

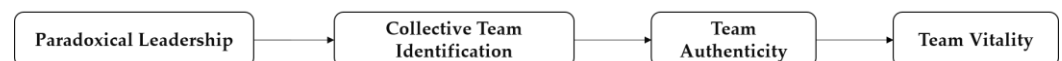
team authenticity directly contributes to team vitality. According to SDT, when members perceive that they can act authentically without external coercion or the burden of false self-presentation, their need for autonomy is satisfied. Autonomy satisfaction, in turn, generates vitality—the experience of positive energy, aliveness, and spirited engagement (Deci & Ryan, 2000; Ryan & Deci, 2000). In an authentic team, members are not depleted by self-monitoring and impression management; instead, they experience psychological liberation and self-congruence that is associated with collective positive energy (Deci & Ryan, 2008; Vohs et al., 2005).

Taken together, these three theoretical links form a coherent sequential process: paradoxical leadership → CTI → team authenticity → team vitality. Paradoxical leadership initiates the chain by building a strong affective team identity. This identity, through the satisfaction of relatedness and competence needs, fosters an authentic team climate. Finally, this authentic climate, by satisfying the need for autonomy, is expected to contribute to team vitality. The effect of paradoxical leadership on team vitality is therefore not direct but is transmitted through the sequential mediation of CTI and team authenticity.

We therefore propose:

**Hypothesis 4.** *Collective team identification and team authenticity sequentially mediate the positive relationship between paradoxical leadership and team vitality, such that paradoxical leadership is positively related to CTI, which in turn is positively related to team authenticity, and ultimately is associated with team vitality.*

Integrating the above theoretical arguments, this study proposes a serial mediation model in which collective team identification and team authenticity serve as sequential mediators between paradoxical leadership and team vitality. To provide a clear visual overview of the hypothesized relationships among the study variables and the corresponding paths for Hypotheses 1 through 4, we present the full conceptual framework in Figure 1.



**Figure 1.** The proposed serial mediation model.

## 4. Method

### 4.1. Participants, Procedures, and Sample Characteristics

This study employed a three-wave, time-lagged survey design to test the proposed serial mediation model. To mitigate potential common method bias (CMB) and achieve temporal separation in the measurement of predictors, mediators, and outcomes, all constructs were reported by team members at three distinct time points (T1, T2, and T3) with a two-week interval between each wave (Podsakoff et al., 2003). In addition, objective team-level control variables—team type and leader tenure—were obtained directly from human resources (HR) records, partially mitigating concerns about same-source bias.

The decision to utilize team-member reports for most core variables was based on both theoretical and methodological considerations. First, consistent with leadership research, subordinates' perceptions are considered a more valid indicator of a leader's behavior than leaders' self-reports, which are susceptible to social desirability bias (Atwater & Yammarino, 1992; Podsakoff & Organ, 1986). Second, the core constructs—collective team identification, team authenticity, and team vitality—represent internal affective and emergent states. As these states are grounded in the shared feelings of team members, the members themselves are the most reliable sources of information (Podsakoff & Organ, 1986).

Data collection was conducted between 16 March 2026 and 4 May 2026, in collaboration with the HR departments of Chinese firms recruited through the research team's existing corporate partnerships and professional networks in high-technology sectors (e.g., biomedicine, artificial intelligence, semiconductors, and information technology). We identified teams with at least four members and randomly selected four members from each team based on HR-provided rosters. A unique identification numbering system was used to match responses across waves while maintaining anonymity.

At Time 1 (T1), 492 members from 123 teams reported on paradoxical leadership and demographics. At Time 2 (T2), 448 members from 112 teams assessed team identification and authenticity. Finally, at Time 3 (T3), 424 members from 106 teams reported on team vitality. Teams or members with missing data at any wave were excluded from the final analysis. After data cleaning and cross-wave matching, the final sample consisted of 424 individuals nested within 106 teams, representing a team-level retention rate of 86.2%. Measurement validation extended in Section 4.2.2 suggested that common method variance is unlikely to be a major threat to the validity of our findings.

The final sample comprised 424 professionals whose demographic profile aligns with the high-technology sector. Regarding gender, 288 participants were male (67.92%) and 136 were female (32.08%). The average age was 34.22 years ( $SD = 5.15$ ). The average team tenure was 4.75 years ( $SD = 2.51$ ). The sample was highly educated: 372 members (87.74%) held a bachelor's degree, while 52 members (12.26%) possessed a master's degree or higher.

## 4.2. Measures and Measurement Validation

### 4.2.1. Measures

To ensure conceptual alignment between our theoretical constructs and their operationalization, we adopted or adapted established scales to capture the team-level nature of our core constructs. All variables were measured using 7-point Likert scales (1 = "Strongly Disagree" to 7 = "Strongly Agree"), unless otherwise noted. With the exception of paradoxical leadership (rated by team members about their supervisor), all team-level constructs—collective team identification, team authenticity, and team vitality—were assessed by individual team members and subsequently aggregated to the team level, consistent with their conceptualization as shared emergent states. Data were collected at three time points to help mitigate common method bias.

For scales adapted from individual-level measures to the team level, we followed the standard and widely accepted adaptation procedure of changing the referent from the first-person singular ("I"/"me"/"my") to the third-person plural team referent ("members of our team"), while preserving the original item content and meaning (Chan, 1998). This adaptation approach is consistent with established practices in team-level research, where individual team members serve as informants reporting on collective phenomena (Kozlowski & Klein, 2000). All adapted items were reviewed by the research team for clarity and relevance to the team context. The complete list of all adapted measurement items is provided in Appendix A (Table A1).

**Paradoxical Leadership (Time 1).** At T1, team members evaluated their direct supervisor's behavior using the 22-item scale developed by Zhang et al. (2015). The scale captures five dimensions: treating subordinates uniformly while allowing individualization (5 items, e.g., "The team leader treats all subordinates fairly but also recognizes their unique personalities"), integrating self-centeredness and other-centeredness (5 items), maintaining decision control while allowing autonomy (4 items), enforcing work requirements while allowing flexibility (4 items), and keeping distance while remaining approachable (4 items). Participants rated each item from 1 (very low ability) to 7 (very high ability). The scale demonstrated excellent reliability in this study (Cronbach's  $\alpha = 0.987$ ).

Collective Team Identification (Time 2). At T2, team members reported on their team's shared sense of identification using a 4-item scale adapted from [Van Der Vegt and Bunderson \(2005\)](#), which originally modified the affective commitment subscale of [Allen and Meyer \(1990\)](#). Items were reworded to reflect the team as the referent and a collective climate (e.g., "Members of our team have a strong sense of belonging to the team"). Responses ranged from 1 (very low) to 7 (very high). The reliability coefficient was  $\alpha = 0.889$ .

Team Authenticity (Time 2). Also at T2, team authenticity was measured using a 4-item scale adapted from [Wood et al. \(2008\)](#), and the workplace adaptation by [Reis et al. \(2017\)](#). We further modified the items to shift from individual to team-level reference (e.g., "In our team, members are able to act according to their own values and beliefs"). The scale assesses the extent to which the team collectively permits members to be genuine and align actions with personal values. Cronbach's  $\alpha$  for this scale was 0.897.

Team Vitality (Time 3). At T3, team vitality—a dimension of team thriving—was measured using the vitality subscale of the thriving at work scale developed by [Porath et al. \(2012\)](#), adapted to the team level. The subscale consists of five items: four positively worded (e.g., "Members of our team feel full of life and energy") and one reverse-coded item ("Members of our team do not feel very energetic"). All items were rephrased from first-person singular to plural team-referenced statements. The scale showed good reliability (Cronbach's  $\alpha = 0.916$ ).

We controlled for team type (from HR, dummy-coded), leader tenure (from HR, in years), and mean member tenure (self-reported, averaged across four members randomly selected per team). These variables were selected because they have the potential to affect team processes and outcomes; specifically, they may influence team identity formation, affective climate, or collective vitality.

#### 4.2.2. Measurement Validation

Aggregation statistics. Because collective team identification, team authenticity, and team vitality are conceptualized as shared team-level emergent states, we first examined within-group agreement and between-group variance to justify aggregating individual members' responses to the team level. For paradoxical leadership (PL), the intraclass correlation coefficients were  $ICC(1) = 0.829$  and  $ICC(2) = 0.951$ , with a mean  $R_{wg}$  of 0.836. For collective team identification (CTI),  $ICC(1) = 0.367$ ,  $ICC(2) = 0.699$ , mean  $R_{wg}$  of 0.741; a one-way ANOVA confirmed significant between-team variance ( $F [105, 318] = 3.32$ ,  $p < 0.001$ ). For team authenticity (AU),  $ICC(1) = 0.370$ ,  $ICC(2) = 0.701$ , mean  $R_{wg} = 0.745$ , also showing significant between-team differentiation ( $F [105, 318] = 3.35$ ,  $p < 0.001$ ). For team vitality (TV),  $ICC(1) = 0.610$ ,  $ICC(2) = 0.862$ , mean  $R_{wg} = 0.788$ .

All  $ICC(1)$  values exceeded the conventional threshold of 0.12 ([Bliese, 2000](#)). Although the  $ICC(2)$  values for CTI and AU were borderline (0.699 and 0.701, respectively), aggregation is justified on three grounds: (a)  $ICC(2)$  is sensitive to group size, and values near 0.70 are common with modest group sizes (approximately four members per team) ([Bliese, 2000](#)); (b) the  $ICC(1)$  values were substantially high, indicating that team membership explains a large proportion of variance in individual responses; and (c) the highly significant F-statistics and mean  $R_{wg}$  values (all  $> 0.70$ ) collectively demonstrate robust within-team consensus and clear between-team distinctiveness. These results provide a strong empirical basis for aggregating individual ratings to the team level for all four constructs.

Construct validity. We used Mplus 8 to conduct confirmatory factor analyses (CFAs) to assess the discriminant validity of the four core constructs: paradoxical leadership (PL), collective team identification (CTI), team authenticity (AU), and team vitality (TV). Three alternative measurement models were compared: (a) a first-order four-factor model (PL, CTI, AU, and TV as separate correlated factors); (b) a second-order model in which PL was specified as a higher-order construct encompassing its five dimensions (uniformity vs.

individualization, self-centeredness vs. other-centeredness, decision control vs. autonomy, work requirements vs. flexibility, distance vs. closeness), alongside the three first-order factors of CTI, AU, and TV; and (c) a single-factor model in which all 35 items were forced to load onto one common factor.

The hypothesized first-order four-factor model showed a marginal fit to the data (see Table 1):  $\chi^2(558) = 1618.83$ ,  $p < 0.001$ , RMSEA = 0.067, CFI = 0.874, TLI = 0.865, SRMR = 0.081. The second-order model, which accounts for the multidimensional nature of paradoxical leadership, demonstrated a significantly better fit:  $\chi^2(553) = 1136.38$ , RMSEA = 0.050, CFI = 0.931, TLI = 0.925, SRMR = 0.077. All fit indices met the recommended standards (Hu & Bentler, 1999). In contrast, the single-factor model exhibited poor fit:  $\chi^2(561) = 2996.55$ , RMSEA = 0.101, CFI = 0.710, TLI = 0.693, SRMR = 0.109. These results support the distinctiveness of the four constructs and support the use of PL as a higher-order factor.

**Table 1.** Fit indices of alternative measurement models.

| Model                            | $\chi^2$ | df  | RMSEA | CFI   | TLI   | SRMR  |
|----------------------------------|----------|-----|-------|-------|-------|-------|
| First-order four-factor model    | 1618.83  | 558 | 0.067 | 0.874 | 0.865 | 0.081 |
| Second-order model (theoretical) | 1136.38  | 553 | 0.050 | 0.931 | 0.925 | 0.077 |
| Single-factor model              | 2996.55  | 561 | 0.101 | 0.710 | 0.693 | 0.109 |
| Recommended thresholds           | –        | –   | <0.08 | >0.90 | >0.90 | <0.08 |

Note.  $N = 424$  individual responses (from 106 teams, with 4 members per team on average). The CFA was conducted at the individual level. All  $\chi^2$  tests are significant at  $p < 0.001$ . Model descriptions are provided in the main text.

The second-order model was retained as the preferred representation of paradoxical leadership on both theoretical and empirical grounds. Theoretically, paradoxical leadership is conceptualized as a multidimensional construct comprising five interrelated yet distinct dimensions that collectively reflect a higher-order capability of managing competing demands (Zhang et al., 2015). Empirically, the second-order model demonstrated a significantly better fit than the first-order four-factor model ( $\Delta\chi^2 = 482.45$ ,  $\Delta df = 5$ ,  $p < 0.001$ ;  $\Delta CFI = 0.057$ ,  $\Delta RMSEA = 0.017$ ), with all fit indices meeting the recommended thresholds. This indicates that the five dimensions, while distinct, converge meaningfully onto a unified higher-order construct. The second-order model also offers a more parsimonious representation of the data and aligns with the theoretical conceptualization of paradoxical leadership as a coherent behavioral repertoire rather than a set of unrelated dimensions. Accordingly, we retained the second-order model as our final measurement model.

The CR and AVE values reported in Table 2 indicate satisfactory convergent validity for all constructs, with all CR values above 0.70 and all AVE values at or above 0.50 (Fornell & Larcker, 1981).

The second-order structure validated at the individual level confirms that the five dimensions of paradoxical leadership converge onto a unified construct. In subsequent hypothesis testing at the team level, we operationalize this unified construct using the aggregated mean of the 22 PL items, consistent with the second-order representation identified in our CFA. This approach is consistent with established practices in team-level research, where higher-order constructs validated at the individual level are represented as aggregated observed variables at the team level for path analysis.

Common method bias. To mitigate potential common method bias (CMB), we employed both procedural and statistical remedies (Podsakoff et al., 2003). Procedurally, data were collected at three distinct time points (T1, T2, and T3), a design choice that helps reduce common-source variance at its root. Statistically, we employed the unmeasured

latent method factor (ULMC) approach to assess the potential threat of CMB. We added a common method factor to our second-order CFA model, allowing all observed indicators to load on both their theoretical constructs and the method factor, while specifying the method factor to be orthogonal to the other latent variables. The results showed only a minimal improvement in fit after including the method factor: CFI increased from 0.931 to 0.939 ( $\Delta\text{CFI} = 0.008$ ), RMSEA decreased from 0.050 to 0.048 ( $\Delta\text{RMSEA} = 0.002$ ), and TLI increased from 0.925 to 0.930. These changes are far below common thresholds that would indicate severe CMB (e.g., a  $\Delta\text{CFI}$  of 0.01 or greater) (Cheung & Rensvold, 2002). Moreover, although some loadings on the method factor were significant, the pattern of substantive relationships among the constructs remained unchanged. Thus, common method bias is unlikely to be a major threat to the validity of our findings. Nevertheless, because the core study variables were self-reported by team members, common method variance cannot be completely ruled out. We further address this limitation in the Limitations section.

**Table 2.** Construct reliability and convergent validity of measures.

| Construct                            | Number of Items | CR    | AVE   |
|--------------------------------------|-----------------|-------|-------|
| Paradoxical Leadership               | 22              | 0.967 | 0.854 |
| Collective Team Identification (CTI) | 4               | 0.800 | 0.501 |
| Team Authenticity (AU)               | 4               | 0.832 | 0.554 |
| Team Vitality (TV)                   | 5               | 0.842 | 0.517 |

Note. CR = composite reliability; AVE = average variance extracted. All CR values exceed the recommended threshold of 0.70. AVE values for all constructs are at or above 0.50, indicating adequate convergent validity. All standardized factor loadings for individual items were statistically significant at  $p < 0.001$ , ranging from 0.641 to 0.867; second-order factor loadings for the five PL subdimensions ranged from 0.890 to 0.974. Detailed item-level statistics, including individual factor loadings, standard errors and  $p$ -values, are provided in Appendix B (Table A2).

## 5. Results

We first conducted preliminary analyses using SPSS 24.0. Table 3 presents the means, standard deviations, and discriminant validity assessment of all study variables. The correlation patterns provided initial support for our hypotheses. Consistent with expectations, paradoxical leadership (PL) was significantly and positively correlated with collective team identification (CTI) ( $r = 0.417, p < 0.001$ ), team authenticity (AU) ( $r = 0.387, p < 0.001$ ), and team vitality (TV) ( $r = 0.426, p < 0.001$ ). These results offer preliminary evidence in favor of the hypothesized relationships. Specifically, teams with higher levels of paradoxical leadership tended to report stronger collective identification, greater authenticity, and higher vitality. Furthermore, CTI was positively related to AU ( $r = 0.580, p < 0.001$ ) and TV ( $r = 0.530, p < 0.001$ ), and AU was strongly positively related to TV ( $r = 0.761, p < 0.001$ ), providing initial support for the sequential mediating paths. This pattern suggests that teams with stronger collective identification also tend to be more authentic and vital, and that team authenticity is particularly closely linked to vitality. Although the correlation between AU and TV was substantial ( $r = 0.761$ ), the prior confirmatory factor analysis (CFA) empirically supported their discriminant validity, suggesting that they represent distinct psychological constructs. To further assess discriminant validity, we examined the Fornell–Larcker criterion (AVE square roots on the diagonal) and HTMT ratios (above the diagonal) as reported in Table 3 (Fornell & Larcker, 1981; Henseler et al., 2015). The AVE square root of each construct exceeded its correlations with all other constructs, supporting discriminant validity. Additionally, all HTMT ratios were below the 0.90 threshold (Henseler et al., 2015); the AU–TV pair (0.853) slightly exceeded the conservative 0.85 threshold but remained below 0.90, indicating acceptable discriminant validity. Furthermore, all correlation magnitudes remained below the 0.85 threshold, suggesting no indication of severe multi-collinearity (Kline, 2023). Regarding control variables, leader tenure (LT) was

significantly correlated with PL ( $r = 0.202$ ,  $p < 0.05$ ) and AU ( $r = 0.206$ ,  $p < 0.05$ ), whereas mean member tenure (MT) and team type (TT) did not show significant correlations with most focal variables ( $p > 0.05$ ).

**Table 3.** Means, standard deviations and discriminant validity assessment.

| Variable | M     | SD    | 1            | 2            | 3            | 4            | 5      | 6      | 7 |
|----------|-------|-------|--------------|--------------|--------------|--------------|--------|--------|---|
| 1. PL    | 5.461 | 0.822 | <b>0.924</b> | 0.415        | 0.419        | 0.469        |        |        |   |
| 2. CTI   | 5.501 | 0.656 | 0.417 **     | <b>0.708</b> | 0.545        | 0.595        |        |        |   |
| 3. AU    | 5.480 | 0.673 | 0.387 **     | 0.580 **     | <b>0.744</b> | 0.853        |        |        |   |
| 4. TV    | 5.643 | 0.750 | 0.426 **     | 0.530 **     | 0.761 **     | <b>0.719</b> |        |        |   |
| 5. MT    | 4.755 | 1.828 | 0.016        | −0.127       | −0.118       | −0.067       | —      |        |   |
| 6. LT    | 8.10  | 2.426 | 0.202 *      | 0.161        | 0.206 *      | 0.179        | 0.095  | —      |   |
| 7. TT    | 1.40  | 0.902 | 0.165        | 0.067        | 0.069        | 0.058        | −0.068 | −0.032 | — |

Note:  $N = 106$  teams. Diagonal values (bold) are the square roots of AVE for each construct. Values below the diagonal are inter-construct correlations. Values above the diagonal are HTMT ratios. \*  $p < 0.05$ , \*\*  $p < 0.01$  (two-tailed).

**Analytical Strategy.** To test the hypothesized serial mediation model, we used Hayes' PROCESS macro for SPSS (Model 6) with 5000 bootstrap samples (Hayes, 2017). Although we used Mplus for CFA to validate the measurement model at the individual level ( $N = 424$ ), we used PROCESS for hypothesis testing at the team level ( $N = 106$ ) for two reasons. First, our theoretical model concerns team-level constructs; after confirming sufficient within-group agreement ( $R_{wg}$ , ICC(1), ICC(2), and ANOVA results reported in Section 4.2.2), individual members' ratings were aggregated to the team level, making observed variable path analysis a natural and appropriate choice. Second, our team-level sample size (106 teams) is modest for a full latent-variable SEM that would require estimating a large number of parameters simultaneously; the regression-based PROCESS approach offers greater statistical stability in this context. This analytical strategy—using CFA for measurement validation and PROCESS for path analysis—has been widely adopted in organizational research (Hayes, 2017; Hayes et al., 2017).

We tested the hypothesized serial mediation model using PROCESS macro for SPSS 24 with Model 6 (Hayes, 2017) with 5000 bootstrap samples to generate bias-corrected confidence intervals for indirect effects. Paradoxical leadership (PL) was entered as the independent variable (X), collective team identification (CTI) as the first mediator (M1), team authenticity (AU) as the second mediator (M2), and team vitality (TV) as the dependent variable (Y). A significant indirect effect is indicated when the 95% confidence interval does not contain zero.

Table 4 presents the regression coefficients for all paths in the model. As shown, PL was significantly and positively associated with CTI (H1:  $a_1 = 0.321$ ,  $SE = 0.074$ ,  $p < 0.001$ ), supporting Hypothesis 1. This indicates that paradoxical leadership is a meaningful predictor of collective identity: team members who experience more paradoxical leader behaviors report stronger emotional attachment to their team. CTI was significantly and positively associated with AU (H2:  $d_{21} = 0.499$ ,  $SE = 0.091$ ,  $p < 0.001$ ), supporting Hypothesis 2. In other words, teams with stronger collective identification tend to report a more authentic climate, suggesting that a sense of belonging may enable members to express themselves genuinely. Finally, AU had a strong positive association with TV (H3:  $b_2 = 0.732$ ,  $SE = 0.089$ ,  $p < 0.001$ ), supporting Hypothesis 3. This implies that team authenticity is a particularly robust correlate of collective energy—teams that foster an authentic climate tend to report substantially higher vitality. The direct effect of PL on TV after controlling for the mediators was non-significant ( $c' = 0.122$ ,  $SE = 0.066$ ,  $p = 0.068$ , 95% CI [−0.009, 0.254]), indicating a mediation pattern consistent with full mediation. This suggests that the impact

of paradoxical leadership on team vitality operates primarily through the hypothesized indirect paths.

**Table 4.** Regression coefficients for the serial mediation model.

| Antecedent     | Consequent        |         |                   |         |                   |         |
|----------------|-------------------|---------|-------------------|---------|-------------------|---------|
|                | CTI (M1)          |         | AU (M2)           |         | TV (Y)            |         |
|                | Coeff (SE)        | $\beta$ | Coeff (SE)        | $\beta$ | Coeff (SE)        | $\beta$ |
| PL (X)         | 0.321 (0.074) *** | 0.402   | 0.133 (0.073) †   | 0.163   | 0.122 (0.066) †   | 0.134   |
| CTI (M1)       | —                 | —       | 0.499 (0.091) *** | 0.486   | 0.112 (0.092)     | 0.098   |
| AU (M2)        | —                 | —       | —                 | —       | 0.732 (0.089) *** | 0.656   |
| MT             | −0.051 (0.032)    | —       | −0.025 (0.030)    | —       | 0.008 (0.027)     | —       |
| LT             | 0.025 (0.025)     | —       | 0.028 (0.023)     | —       | −0.001 (0.020)    | —       |
| TT             | −0.004 (0.066)    | —       | 0.006 (0.060)     | —       | −0.012 (0.054)    | —       |
| Constant       | 3.795 (0.433) *** |         | 1.891 (0.524) *** |         | 0.335 (0.496)     |         |
| R <sup>2</sup> | 0.200             |         | 0.375             |         | 0.606             |         |

Note.  $N = 106$  teams. *Coeff* = unstandardized coefficients;  $\beta$  = standardized coefficients. †  $p < 0.10$ ; \*\*\*  $p < 0.001$ . Standardized coefficients for control variables and constants are not reported as they are not central to hypothesis testing.

To evaluate the practical significance of these results, we examined explanatory power ( $R^2$ ) and the magnitude of the unstandardized path coefficients. According to (Cohen, 1988), the model demonstrated substantial practical relevance, particularly for the ultimate outcome, team vitality, where the predictors accounted for 60.6% of the total variance ( $R^2 = 0.606$ ). This represents a large effect size in absolute terms—and is notably strong in organizational research—suggesting that the serial mediation chain is a strong predictor of collective energy.

Furthermore, the magnitude of the specific effects is noteworthy. The unstandardized coefficient from team authenticity to team vitality ( $b = 0.732$ ,  $p < 0.001$ ) indicates that for every one-unit increase in the perception of an authentic team climate (on a 7-point scale), team vitality is higher by nearly three-quarters of a unit. This strong association highlights team authenticity as a critical pathway leader seeking to foster team energy. Similarly, the 20% variance explained in CTI ( $R^2 = 0.200$ ) suggests that paradoxical leadership is a substantial factor in shaping a team's shared identity. Collectively, these effect magnitudes suggest that the impact of paradoxical leadership is not only statistically significant but also practically meaningful in fostering high-energy team environments.

Hypothesis 4 proposed that the positive association between PL and TV is sequentially mediated by CTI and AU. As shown in Table 5, the bootstrap analysis indicated that the specific indirect effect for this serial chain (Ind2: PL → CTI → AU → TV) was significant (Effect = 0.117, Boot SE = 0.070, 95% CI [0.014, 0.297]), as the confidence interval excluded zero. Thus, Hypothesis 4 is supported. This indicates that the association between paradoxical leadership and team vitality is explained by a sequential process: paradoxical leaders are associated with stronger collective identification, which in turn is associated with a more authentic team climate, ultimately relating to higher team vitality. Notably, the simple indirect effects via CTI only (Ind1: Effect = 0.036, 95% CI [−0.015, 0.142]) and via AU only (Ind3: Effect = 0.098, 95% CI [−0.015, 0.275]) were both non-significant. This pattern suggests that collective identification and team authenticity function as a sequential mechanism, rather than as parallel mediators, in linking paradoxical leadership behaviors to collective vitality. Furthermore, the total indirect effect was significant (Effect = 0.250, 95% CI [0.014, 0.520]), and given that the direct effect of PL on TV was non-significant ( $c' = 0.122$ ,  $p = 0.068$ ), the model shows that the indirect effects account for the majority of the total association, with the direct effect being non-significant. Together, these results suggest that

the association between paradoxical leadership and team vitality is substantially linked to the sequential identity–authenticity pathway.

**Table 5.** Bootstrap indirect effects.

| Path                          | Effect | Boot SE | 95% CI          |
|-------------------------------|--------|---------|-----------------|
| Total indirect effect         | 0.250  | 0.131   | [0.014, 0.520]  |
| Ind1: PL → CTI → TV           | 0.036  | 0.037   | [−0.015, 0.142] |
| Ind2: PL → CTI → AU → TV (H4) | 0.117  | 0.070   | [0.014, 0.297]  |
| Ind3: PL → AU → TV            | 0.098  | 0.072   | [−0.015, 0.275] |

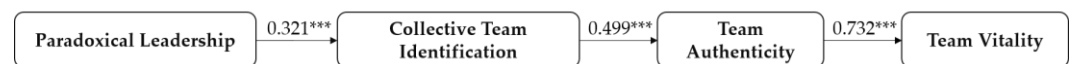
Note. The rightward arrow indicates hypothesized paths in the serial mediation model. Number of bootstrap samples = 5000; bias-corrected confidence intervals.

The results of the hypothesis tests are summarized in Table 6 and Figure 2. Hypotheses 1, 2, 3, and 4 were all supported, while the direct effect of PL on TV was not significant after accounting for the mediators.

**Table 6.** Summary of hypothesis testing.

| Hypothesis | Path               | Effect (b)/Indirect Effect | 95% CI         | Supported |
|------------|--------------------|----------------------------|----------------|-----------|
| H1         | PL → CTI           | 0.321 ***                  | [0.175, 0.467] | Yes       |
| H2         | CTI → AU           | 0.499 ***                  | [0.319, 0.679] | Yes       |
| H3         | AU → TV            | 0.732 ***                  | [0.555, 0.908] | Yes       |
| H4         | PL → CTI → AU → TV | 0.117                      | [0.014, 0.297] | Yes       |

Note: The rightward arrow indicates hypothesized paths in the serial mediation model. For H1–H3, \*\*\*  $p < 0.001$ . For H4, the 95% bias-corrected bootstrap confidence interval is reported; the indirect effect is considered supported when the interval excludes zero.



**Figure 2.** Results of the serial mediation model (unstandardized coefficients). Note:  $N = 106$  teams. Unstandardized coefficients shown. \*\*\*  $p < 0.001$ . The sequential indirect effect (PL → CTI → AU → TV) = 0.117, 95% CI [0.014, 0.297].

## 6. Discussion

### 6.1. Theoretical Contributions

Based on the empirical evidence from our sample of high-technology teams, this study makes three primary theoretical contributions to the literature on paradoxical leadership, social identity and self-determination theories, and team vitality.

First, this study extends the paradoxical leadership literature by identifying affective collective team identification as a key mechanism through which paradoxical leaders are associated with team-level outcomes, particularly within knowledge-intensive settings such as high-technology teams. Prior research has predominantly examined the direct effects of paradoxical leadership on employee creativity, adaptability, and individual well-being (Shao, 2024; Wei et al., 2023; Zhao et al., 2026). The underlying mechanisms linking paradoxical leadership to team-level emergent states remain less explored. This finding resonates with the social identity theory of leadership (van Knippenberg & Hogg, 2003) while providing new evidence that paradoxical leadership, specifically, may serve as a relevant mechanism for identity-building in teams. The pattern observed in this study—where paradoxical leadership was positively associated with CTI—extends prior research by suggesting that, at least in knowledge-intensive settings, the simultaneous enactment of competing demands is linked not only to task performance but also to the emotional fabric

of the team. Whether this effect generalizes to teams in less knowledge-intensive industries remains an open question, but the present data offer an encouraging starting point.

Second, and more tentatively, the observed sequential mediation pattern offers early evidence for a potential integration of social identity theory (SIT) and self-determination theory (SDT) by showing a pattern consistent with a sequential process linking affective identification to collective vitality. While recent work has called for integrating SIT and SDT to explain team motivation (Grenier et al., 2024; Sinclair, 2024), empirical evidence on how identification translates into need satisfaction and energy remains scarce. Specifically, affective identification with the team (relatedness satisfaction) is positively related to a team authenticity climate (supporting autonomy and competence), which in turn is positively associated with team vitality. The observation that the indirect effects via CTI alone and via AU alone were non-significant, whereas the serial indirect effect was significant, suggests that a purely relational pathway (CTI → TV) or a purely environmental pathway (AU → TV) may not be sufficient on its own; rather, the emotional bond with the team may need to be associated with a shared climate of authenticity before it is reflected in collective energy. Such a sequential process is consistent with the idea that, in knowledge-intensive and fast-changing environments, teams require both strong interpersonal attachment and a climate that permits genuine self-expression to sustain collective energy.

Third, this study contributes to the emerging literature on team vitality by clarifying its social-psychological antecedents, at least in the context of high-technology work. Team vitality—a state of collective energy and aliveness—has been recognized as important for team resilience and innovation, yet its drivers remain underexplored (Alliger et al., 2015; Kark & Carmeli, 2009; Ryan & Deci, 2008). Our model suggests that team vitality is not merely the sum of individual energy levels, but rather an emergent state positively associated with a distinct social process: a shared identity that generates a psychologically authentic environment. The strong positive relationship between team authenticity and team vitality suggests that, in these high-technology teams, an authentic climate is associated with greater team vitality. This extends SDT-based arguments that authenticity-supportive environments are positively associated with individual vitality (Ryan & Deci, 2008) to the team level, and integrates this logic with identity-based leadership perspectives. Future research with more diverse samples is needed to assess whether the magnitude of this relationship is particularly pronounced in knowledge-intensive settings or represents a more general phenomenon.

## 6.2. Practical Implications

The findings of this study carry several tentative, practically oriented implications for leaders and organizations, particularly those operating in knowledge-intensive and innovation-driven environments such as high-technology firms. However, given the observational nature of our study, these implications should be interpreted as suggesting promising associations rather than definitive causal prescriptions for managerial action.

First, this study suggests that leaders who wish to build emotionally cohesive teams might consider paying deliberate attention to supporting members' affective identification with the team. Our findings indicate that paradoxical leadership—simultaneously communicating high performance expectations and genuine interpersonal care, enforcing clear structures while granting meaningful autonomy, and maintaining decision control while inviting dissenting voices—is positively associated with collective team identification. In knowledge-intensive settings such as high-technology firms, where employees often value both professional excellence and a sense of belonging, these integrative behaviors appear especially relevant. Rather than treating task demands and relational needs as competing priorities that must be addressed in sequence, leaders might explore ways to weave them together in their daily interactions. By doing so, such an integrated approach

appears to contribute to team members seeing their membership not merely as a functional arrangement, but as a source of emotional meaning and pride.

Second, leaders in high-technology and other knowledge-intensive settings might explore the potential of using paradoxical behaviors to support a need-supportive team environment—one where members feel they belong, can be authentic, and are recognized for their contributions. Such an environment may, in turn, serve as a shared resource that is associated with team vitality. The value of paradoxical leadership lies in doing these things together, not separately: when high standards are paired with care, they are perceived as motivating rather than intimidating; when structure is paired with autonomy, it is perceived as enabling rather than constraining; when recognition is paired with genuine respect for individual expertise, it is perceived as affirming rather than patronizing. In high-pressure, fast-changing environments such as high-technology teams, this integrated approach may be especially useful in sustaining the collective energy that team vitality represents.

Third, team members play an indispensable role in the process through which leadership and climate are associated with collective vitality. On the one hand, members can actively engage with paradoxical leadership by recognizing and embracing its integrative intent. When a leader simultaneously sets high standards and extends personal care, members can choose to interpret this not as mixed signals but as a coherent invitation to strive for excellence within a supportive environment. When a leader grants autonomy alongside clear expectations, members can respond by taking ownership of their work while staying aligned with the team's direction. In this sense, members who meet the leader's integrative efforts with openness and reciprocal commitment appear to contribute to transforming leadership behaviors into tangible team experiences. On the other hand, members' interpersonal treatment of one another is positively associated with team vitality. Just as paradoxical leaders may hold competing demands in tension, members can practice a similar openness—listening carefully to opinions that differ from their own, remaining curious rather than defensive when disagreements arise, and offering encouragement when teammates take interpersonal risks. When members respond to one another's honest contributions with respect rather than dismissal, they collectively seem to help sustain the authenticity climate that our findings link to team vitality.

### *6.3. Limitations and Future Directions*

Despite the theoretical and practical insights offered by this study, several limitations warrant acknowledgment, which also provide fruitful avenues for future research.

First, while we employed a three-wave time-lagged design to establish a temporal sequence and mitigate common method bias, all variables were collected from a single source (team members). We acknowledge that this design feature represents a key limitation, as common method variance cannot be fully excluded despite our procedural and statistical remedies. Although our statistical tests (e.g., the ULMC approach) suggested that common method bias did not substantively alter the pattern of findings, and we theoretically justified that internal affective states are best reported by the members themselves, we encourage future research to adopt multi-source designs. For instance, obtaining independent observer ratings or objective team performance metrics would strengthen the robustness of our conclusions.

Second, our research was specifically contextualized within the high-technology sector, which may limit the generalizability of our findings. The high-tech industry is characterized by knowledge-intensive work and high autonomy needs, where identity and authenticity may carry more weight than in more traditional or manual labor sectors. Future studies should replicate this model in diverse organizational settings, such as the manufacturing or service industries, to examine whether the sequential mechanism of identity and authen-

ticity remains a generalizable mechanism of team vitality or if its influence varies across different work contexts.

Third, we did not examine the boundary conditions of this mechanism. While the serial mediation model received support within our sample, it is likely that certain contextual moderators influence these relationships. For example, team-level factors such as task interdependence or environmental volatility, and leader-level factors such as leader humility, could potentially moderate the associations involving paradoxical leadership. Future research could incorporate these moderators to provide a more nuanced understanding of when and for whom the model is most relevant.

Fourth, this study focused on the vitality dimension of team thriving. While vitality captures the energetic and affective essence of a thriving team, the cognitive dimension—namely, collective learning—is equally important for long-term sustainability. Future research could expand our model to include collective learning as a parallel or distal outcome, exploring how the identity-based security and authentic climate associated with paradoxical leadership might simultaneously relate to both the energy and the knowledge growth of teams.

Fifth, while we employed a three-wave time-lagged design and established measurement quality through CFA at the individual level, our hypothesis testing relied on aggregated team-level observed variables using PROCESS rather than a full latent-variable SEM. We chose this approach given our team-level sample size (106 teams) and the established practice of using observed variable path analysis for aggregated team constructs. Nonetheless, future research with larger team samples could employ full latent-variable SEM to simultaneously model measurement error and structural relationships, further strengthening the methodological rigor of the analysis.

## 7. Conclusions

Drawing upon three-wave data from 106 high-technology teams, this study offers insights into how paradoxical leadership may relate to team vitality. Our findings suggest that the association between paradoxical leadership and team vitality is primarily indirect, with the sequential pathway accounting for most of the total association: paradoxical leadership is positively associated with affective collective team identification, which in turn is positively associated with a team authenticity climate, and team authenticity is positively associated with shared team vitality.

The results indicate that paradoxical leaders, by simultaneously enacting seemingly competing behaviors—such as combining high standards with relational care, maintaining decision control while granting autonomy, and enforcing structure alongside flexibility—are positively associated with a shared emotional bond within the team, affective collective team identification. Viewed through the lens of Self-Determination Theory, this affective foundation helps satisfy members' need for relatedness, while the resulting team authenticity climate supports the satisfaction of autonomy and competence needs. Together, these need-satisfying experiences are positively associated with shared psychological energy, which is reflected in team vitality.

In summary, this study integrates Social Identity Theory and Self-Determination Theory to suggest that paradoxical leadership is positively associated with team vitality through a sequential pattern: affective collective team identification is positively associated with a team authenticity climate, which in turn is positively associated with collective energy. This highlights the complementary roles of belonging and genuine self-expression in team thriving. Practically, leaders in knowledge-intensive settings can support this process by enacting paradoxical behaviors that address multiple psychological needs simultaneously, while team members sustain vitality through mutual openness and support.

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

**Data Availability Statement:** The data presented in this study are not publicly available due to privacy or ethical restrictions but are available on request from the corresponding author.

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## Abbreviations

The following abbreviations are used in this manuscript:

|      |                                                                          |
|------|--------------------------------------------------------------------------|
| PL   | Paradoxical leadership                                                   |
| PLUI | PL—Treating subordinates uniformly while allowing individualization (UI) |
| PLSO | PL—Combining self-centeredness with other-centeredness (SO)              |
| PLCA | PL—Maintaining decision control while allowing autonomy (CA)             |
| PLRF | PL—Enforcing work requirements while allowing flexibility (RF)           |
| PLDC | PL—Maintaining both distance and closeness (DC)                          |
| CTI  | Collective team identification                                           |
| AU   | Team authenticity                                                        |
| TV   | Team Vitality                                                            |

## Appendix A

This appendix provides the complete list of measurement items for scales adapted from individual-level to team-level measures. Items were reworded to reflect the team as the referent, changing the referent from the first-person singular (“I”) to the third-person plural team referent (“members of our team”). All items were measured on a 7-point Likert scale (1 = “Strongly Disagree” to 7 = “Strongly Agree”). Paradoxical leadership was measured using the original 22-item scale developed by (Zhang et al., 2015) without modification; the full item list is available in the original source.

**Table A1.** Adapted measurement items by construct.

| Construct                            | Item | Wording                                                             |
|--------------------------------------|------|---------------------------------------------------------------------|
| Collective Team Identification (CTI) | CTI1 | Members of our team feel emotionally attached to their team.        |
|                                      | CTI2 | Members of our team feel a strong sense of belonging to their team. |
|                                      | CTI3 | Members of our team feel as if the team’s problems are their own.   |
|                                      | CTI4 | Members of our team feel like part of the family in their team.     |

**Table A1.** *Cont.*

| Construct              | Item | Wording                                                                               |
|------------------------|------|---------------------------------------------------------------------------------------|
| Team Authenticity (AU) | AU1  | In our team, members are able to be true to themselves in most situations.            |
|                        | AU2  | In our team, members feel they can be themselves rather than having to please others. |
|                        | AU3  | In our team, members are able to behave in accordance with their values and beliefs.  |
|                        | AU4  | In our team, members always feel free to stand by what they really believe in.        |
|                        | TV1  | Members of our team feel full of life and vitality.                                   |
| Team Vitality (TV)     | TV2  | Members of our team have energy and spirit.                                           |
|                        | TV3  | Members of our team do not feel very energetic. (R)                                   |
|                        | TV4  | Members of our team feel alert and awake.                                             |
|                        | TV5  | Members of our team are looking forward to each new day.                              |

Note. (R) denotes reverse-coded item.

## Appendix B

This appendix provides detailed item-level statistics for all constructs in the measurement model. Table A1 reports standardized factor loadings, standard errors, and *p*-values for each item, supplementing the summary reliability and validity information presented in Table 2 of the main text. For paradoxical leadership, the five subdimensions are: PLUI (treating subordinates uniformly while allowing individualization), PLSO (combining self-centeredness with other-centeredness), PLCA (maintaining decision control while allowing autonomy), PLRF (enforcing work requirements while allowing flexibility), and PLDC (maintaining both distance and closeness). These subdimensions are also reported in the second-order factor loadings section of Table A1.

**Table A2.** Standardized factor loadings and construct correlations from the confirmatory factor analysis.

| Construct and Items         | Standardized Loading (StdYX) | S.E.  | <i>p</i> -Value |
|-----------------------------|------------------------------|-------|-----------------|
| Paradoxical Leadership (PL) |                              |       |                 |
| PLUI1                       | 0.809                        | 0.01  | <0.001          |
| PLUI2                       | 0.763                        | 0.022 | <0.001          |
| PLUI3                       | 0.799                        | 0.019 | <0.001          |
| PLUI4                       | 0.788                        | 0.019 | <0.001          |
| PLUI5                       | 0.788                        | 0.021 | <0.001          |
| PLSO6                       | 0.687                        | 0.032 | <0.001          |
| PLSO7                       | 0.764                        | 0.024 | <0.001          |
| PLSO8                       | 0.768                        | 0.023 | <0.001          |
| PLSO9                       | 0.781                        | 0.024 | <0.001          |
| PLSO10                      | 0.729                        | 0.024 | <0.001          |
| PLCA11                      | 0.751                        | 0.023 | <0.001          |
| PLCA12                      | 0.777                        | 0.023 | <0.001          |
| PLCA13                      | 0.819                        | 0.019 | <0.001          |
| PLCA14                      | 0.754                        | 0.025 | <0.001          |
| PLRF15                      | 0.69                         | 0.03  | <0.001          |
| PLRF16                      | 0.794                        | 0.021 | <0.001          |
| PLRF17                      | 0.751                        | 0.025 | <0.001          |
| PLRF18                      | 0.778                        | 0.023 | <0.001          |
| PLDC19                      | 0.743                        | 0.024 | <0.001          |
| PLDC20                      | 0.766                        | 0.024 | <0.001          |
| PLDC21                      | 0.772                        | 0.023 | <0.001          |
| PLDC22                      | 0.741                        | 0.027 | <0.001          |

Table A2. Cont.

| Construct and Items                  | Standardized Loading (StdYX) | S.E.  | p-Value |
|--------------------------------------|------------------------------|-------|---------|
| Collective Team Identification (CTI) |                              |       |         |
| CTI1                                 | 0.786                        | 0.015 | <0.001  |
| CTI2                                 | 0.666                        | 0.048 | <0.001  |
| CTI3                                 | 0.646                        | 0.041 | <0.001  |
| CTI4                                 | 0.724                        | 0.043 | <0.001  |
| Team Authenticity (AU)               |                              |       |         |
| AU1                                  | 0.79                         | 0.013 | <0.001  |
| AU2                                  | 0.706                        | 0.039 | <0.001  |
| AU3                                  | 0.723                        | 0.032 | <0.001  |
| AU4                                  | 0.756                        | 0.034 | <0.001  |
| Team Vitality (TV)                   |                              |       |         |
| TV1                                  | 0.754                        | 0.012 | <0.001  |
| TV2                                  | 0.692                        | 0.047 | <0.001  |
| TV3                                  | 0.641                        | 0.059 | <0.001  |
| TV4                                  | 0.741                        | 0.036 | <0.001  |
| TV5                                  | 0.76                         | 0.031 | <0.001  |
| Second-order factor loadings for PL  |                              |       |         |
| PL ← PLUI                            | 0.974                        | 0.012 | <0.001  |
| PL ← PLSO                            | 0.89                         | 0.02  | <0.001  |
| PL ← PLCA                            | 0.917                        | 0.019 | <0.001  |
| PL ← PLRF                            | 0.922                        | 0.016 | <0.001  |
| PL ← PLDC                            | 0.916                        | 0.018 | <0.001  |
| Construct Correlations               |                              |       |         |
| PL ↔ CTI                             | 0.386                        | 0.073 | <0.001  |
| PL ↔ AU                              | 0.393                        | 0.066 | <0.001  |
| PL ↔ TV                              | 0.443                        | 0.068 | <0.001  |
| CTI ↔ AU                             | 0.488                        | 0.082 | <0.001  |
| CTI ↔ TV                             | 0.537                        | 0.085 | <0.001  |
| AU ↔ TV                              | 0.774                        | 0.049 | <0.001  |

Note. All factor loadings and correlations are standardized estimates (StdYX). The leftward arrow indicates that the five subdimensions load onto the higher-order PL factor. The double-headed arrow indicates bivariate correlations between constructs. Item-level and second-order loadings are reported as indicated. All estimates were statistically significant at  $p < 0.001$ .

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