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Coaching Leadership Effectiveness in Automotive SMEs: PLS-SEM and LPA Analysis

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Abstract

This study analyzed the effects of coaching leadership sub-factors (direction, accountability, development, relationship) on constructive voice behavior through leader trust and psychological safety as mediators among 219 employees in small and medium-sized automotive parts manufacturing companies. To address multicollinearity issues among coaching leadership sub-factors, partial least squares structural equation modeling (PLS-SEM) was applied, and latent profile analysis (LPA) was integrated to consider the heterogeneous characteristics of organizational members. The results revealed that among the coaching leadership sub-factors, direction and relationship factors had the greatest impact on constructive voice behavior through leader trust and psychological safety. Sequential mediation effects of leader trust and psychological safety were confirmed, and four distinct leadership profiles were derived through latent profile analysis. This study provides refined understanding of coaching leadership effectiveness by integrating variable-centered and person-centered approaches, offering practical implications for leadership development strategies in small and medium-sized automotive parts manufacturing companies. The findings suggest that coaching leadership effects vary significantly across different organizational contexts and member characteristics, highlighting the importance of customized leadership approaches in manufacturing environments.

Keywords: Coaching Leadership, Constructive Voice Behavior, Leader Trust, Psychological Safety, PLS-SEM

JEL Classification: M12, M54, C38, L62, O15

1. Introduction

Small and medium-sized automotive parts manufacturing companies operate within increasingly complex business environments characterized by dependency on original equipment manufacturers (OEMs), stringent quality requirements, and intense global competition (Abdi et al., 2018). These organizations face unique challenges that distinguish them from both larger automotive manufacturers and SMEs in other industries. The automotive supply chain's hierarchical structure often places parts manufacturers in vulnerable positions where they must balance cost pressures from OEMs with the need to maintain high quality standards and innovative capabilities.

In such challenging environments, constructive voice behavior of organizational members emerges as a critical strategic asset that serves multiple functions: facilitating process improvement, enhancing quality control mechanisms, preventing safety risks, and fostering innovation initiatives. However, traditional hierarchical organizational cultures and vertical

communication structures, deeply embedded in many manufacturing contexts, often create barriers that inhibit employee voice behavior. This cultural constraint becomes particularly problematic in automotive parts manufacturing, where frontline workers possess valuable tacit knowledge about production processes, quality issues, and potential improvements that could significantly impact organizational performance.

Pillania (2008) provided important insights into the unique characteristics of automotive parts SMEs, highlighting that informal communication cultures and field experience transfer mechanisms are fundamental features that distinguish these organizations from other manufacturing contexts. These characteristics suggest that leadership approaches must be carefully calibrated to leverage existing informal networks while creating formal channels for voice behavior. The importance of leadership in facilitating voice behavior becomes even more critical when considering the technical complexity and safety requirements inherent in automotive parts manufacturing.

1.1. Research Problem and Gaps

Existing research in coaching leadership has predominantly adopted a unidimensional perspective, treating coaching leadership as a singular construct and overlooking the nuanced differential effects of its constituent sub-factors. This approach fails to capture the complexity of leadership behaviors as they manifest in real organizational settings, where different aspects of coaching leadership may have varying impacts depending on situational factors and follower characteristics. Yuan et al. (2019) made important contributions by analyzing the impact of coaching leadership on voice behavior, demonstrating that coaching behaviors can facilitate employee voice through psychological mechanisms. However, their analysis of differential effects and interaction effects among sub-factors was insufficient for understanding how specific coaching behaviors operate in the complex, dynamic context of field practice.

Furthermore, methodological challenges have limited our understanding of coaching leadership effectiveness. The high intercorrelations among coaching leadership sub-factors create multicollinearity problems that can lead to unstable parameter estimates and misleading conclusions about the relative importance of different coaching behaviors. Simultaneously, the assumption of population homogeneity underlying traditional statistical approaches fails to account for the heterogeneous characteristics of organizational members, who may respond differently to various leadership approaches based on their individual differences, role requirements, and organizational contexts.

1.2. Research Questions and Objectives

This study addresses three critical research questions that emerged from the identified gaps in existing literature:

RQ1: What are the differential effects of coaching leadership sub-factors (direction, accountability, development, relationship) on constructive voice behavior, and which sub-factors demonstrate the strongest predictive power in automotive parts manufacturing contexts?

RQ2: What are the psychological mechanisms through which leader trust and psychological safety mediate the relationships between coaching leadership sub-factors and constructive voice behavior, and do these mediators operate sequentially or in parallel?

RQ3: How do the effects of coaching leadership vary according to the heterogeneous characteristics of organizational members, and what distinct profiles of coaching leadership effectiveness can be identified within automotive parts manufacturing companies?

1.3. Research Contributions

This study makes several significant contributions to both theory and practice. Methodologically, it presents an innovative analytical approach that addresses fundamental limitations in leadership research by integrating PLS-SEM and LPA techniques. This integration enables simultaneous resolution of multicollinearity problems while accounting for organizational member heterogeneity, providing a more nuanced and realistic understanding of leadership effectiveness. The methodological approach demonstrates how advanced statistical techniques can be combined to overcome traditional analytical constraints and generate more robust insights.

Theoretically, the study advances coaching leadership theory by identifying and validating the complex psychological mechanisms underlying constructive voice behavior formation. By testing a sequential mediation model involving leader trust and psychological safety, the research provides empirical evidence for the staged process through which coaching leadership influences employee outcomes. This theoretical contribution extends beyond simple direct effect models to reveal the intricate psychological pathways that connect leadership behaviors to organizational outcomes.

Practically, the study offers actionable insights for leadership development in the specific context of small and medium-sized automotive parts manufacturing companies. By analyzing differential effects of coaching leadership sub-factors and

identifying distinct organizational profiles, the research provides foundation for developing customized leadership interventions that account for both organizational characteristics and individual differences among employees.

2. Literature Review

2.1. Coaching Leadership in Organizational Contexts

The concept of coaching leadership has evolved significantly since its initial conceptualization, reflecting growing recognition that effective leadership in contemporary organizations requires skills that extend beyond traditional command-and-control approaches. Stowell (1986) provided a foundational framework by identifying four core components of coaching leadership: direction (providing clear goals and expectations), development (facilitating skill building and growth), accountability (establishing responsibility and follow-through mechanisms), and relationship (building trust and rapport).

Each of these sub-factors represents distinct behavioral patterns that may have differential impacts on employee outcomes depending on situational factors and individual characteristics. The direction component encompasses behaviors related to vision articulation, goal setting, and performance expectations, which may be particularly important in manufacturing environments where clear operational parameters are essential for quality and safety. The development component focuses on capacity building, learning facilitation, and skill enhancement, which becomes critical in technologically dynamic industries like automotive parts manufacturing where continuous learning is necessary for competitive advantage.

The accountability component involves establishing clear responsibilities, monitoring progress, and providing feedback on performance, which may have complex effects in manufacturing contexts where both empowerment and control are necessary. Finally, the relationship component emphasizes trust building, emotional support, and interpersonal connection, which may be fundamental for creating psychological conditions that enable voice behavior.

2.2. Constructive Voice Behavior in Manufacturing Contexts

Constructive voice behavior represents a specific form of extra-role behavior that involves voluntary expression of opinions, ideas, and concerns directed toward organizational improvement and development (Van Dyne & LePine, 1998). In manufacturing contexts, particularly in automotive parts production, constructive voice behavior takes on special significance because it directly connects to operational effectiveness, quality assurance, and safety outcomes.

The manufacturing environment presents unique opportunities and challenges for voice behavior. On one hand, frontline workers in automotive parts manufacturing possess detailed knowledge about production processes, quality variations, and potential improvements that could significantly impact organizational performance. Their proximity to actual production activities provides them with insights that may not be visible to management, making their voice contributions potentially valuable for organizational learning and improvement.

On the other hand, traditional manufacturing cultures often emphasize compliance, standardization, and hierarchy, which can create psychological barriers to voice behavior. Employees may perceive voice behavior as challenging authority, disrupting established procedures, or overstepping their designated roles. Farh and Chen (2018) demonstrated that leadership behaviors, particularly those related to direction setting and coaching, can help overcome these barriers by creating psychological conditions that encourage voice behavior.

2.3. Mediating Mechanisms: Leader Trust and Psychological Safety

The relationship between coaching leadership and constructive voice behavior operates through complex psychological mechanisms that must be understood to design effective leadership interventions. Two critical mediating variables—leader trust and psychological safety—have emerged from research as fundamental psychological conditions that enable voice behavior.

Leader trust represents employees' positive expectations regarding their leader's ability, benevolence, and integrity (Mayer et al., 1995). In coaching leadership contexts, trust develops through consistent demonstration of competence, genuine concern for employee welfare, and reliable behavior patterns. Gillespie and Mann (2004) found that leaders' vision sharing and consultative behaviors explain substantial variance in team members' trust levels, suggesting that specific coaching behaviors may be particularly effective for trust building.

The relationship between trust and voice behavior operates through risk reduction mechanisms. Voice behavior inherently involves risk because employees expose themselves to potential negative consequences when they challenge existing practices or offer suggestions for improvement. Trust in leadership reduces perceived risks by creating expectations that voice behavior will be received positively and that

employees will not face retaliation for speaking up.

Psychological safety represents a shared belief within teams or organizations that it is safe to take interpersonal risks (Edmondson, 1999). This construct captures the collective sense that team members can express themselves without fear of negative consequences to their self-image, status, or career prospects. In manufacturing contexts, psychological safety becomes particularly important because voice behavior often involves challenging established procedures or raising concerns about quality and safety issues.

Research has consistently demonstrated strong relationships between psychological safety and voice behavior. Nightingale et al. (2017) conducted a comprehensive meta-analysis confirming that psychological safety serves as a robust predictor of constructive voice behavior across various organizational contexts. Ahmed et al. (2022) extended this understanding by demonstrating through longitudinal research that trust in leaders functions as a major antecedent of psychological safety, suggesting potential sequential relationships among these variables.

2.4. Sequential Mediation Model

The theoretical model underlying this study posits that leader trust and psychological safety operate through sequential mediation processes rather than simply functioning as parallel mediators. This sequential model suggests that coaching leadership behaviors first establish leader trust through consistent demonstration of competence, care, and reliability. Once trust is established, it provides the foundation for psychological safety to emerge within the work environment.

The sequential process operates through several mechanisms. Trust in leadership creates expectations that leaders will respond constructively to employee input, reducing perceived risks associated with voice behavior. As employees experience positive responses to their initial voice attempts, collective psychological safety develops within the work environment. This psychological safety then provides the immediate proximal condition that enables ongoing constructive voice behavior.

This sequential model aligns with broader theoretical frameworks in organizational psychology. Liang et al. (2012) identified psychological antecedents of voice behavior that operate through staged processes, while Chen et al. (2019) demonstrated similar sequential mediation patterns in their research on spiritual leadership and proactive workplace behavior.

2.5. Theoretical Framework

The theoretical framework integrates coaching leadership theory with voice behavior research through psychological mediation mechanisms. The framework recognizes that coaching leadership operates as a multi-dimensional construct with differential effects across its sub-components. Rather than treating coaching leadership as a unitary construct, the framework examines how specific coaching behaviors (direction, accountability, development, relationship) influence voice behavior through distinct psychological pathways.

The framework also incorporates recognition of organizational and individual heterogeneity. Rather than assuming uniform effects across all organizational members, the framework acknowledges that coaching leadership effectiveness may vary systematically across different organizational contexts and individual characteristics. This person-centered perspective complements traditional variable-centered approaches by recognizing that leadership effects may operate differently for different groups of organizational members.

2.6. Hypotheses Development

Based on the theoretical framework and empirical evidence reviewed above, the following hypotheses were developed:

H1: The sub-factors of coaching leadership (direction, accountability, development, relationship) will have positive effects on leader trust.

H2: The sub-factors of coaching leadership will have positive effects on psychological safety.

H3: Leader trust will have a positive effect on psychological safety.

H4: Leader trust and psychological safety will have positive effects on constructive voice behavior.

H5: Leader trust and psychological safety will sequentially mediate the relationships between coaching leadership sub-factors and constructive voice behavior.

H6: The effects of coaching leadership sub-factors will vary differentially according to organizational member characteristics, with distinct profiles demonstrating different patterns of relationships.

2.7. Research Model

The conceptual research model integrates variable-centered approaches (examining relationships among constructs) with person-centered approaches (identifying distinct organizational profiles). The model posits that coaching leadership sub-factors influence constructive voice behavior through

sequential mediation by leader trust and psychological safety, while simultaneously recognizing that these relationships may vary across different organizational profiles.

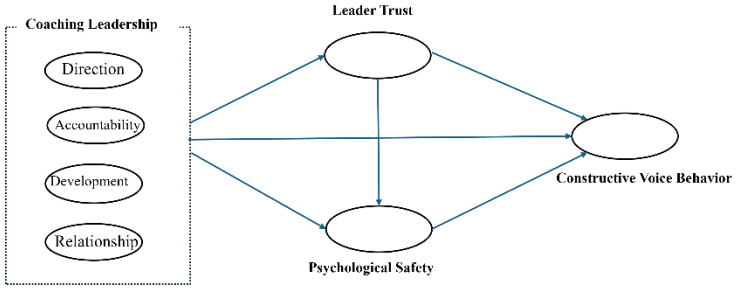

Figure 1: Conceptual Research Model

3. Methodology

3.1. Research Participants and Data Collection

This study employed a cross-sectional survey design within the specific context of small and medium-sized automotive parts manufacturing companies. The choice of this particular context was strategic, reflecting the unique characteristics of automotive parts manufacturing that make it an ideal setting for examining coaching leadership effectiveness. These companies typically operate under intense pressure from OEMs, require high levels of quality and precision, and employ a mix of skilled and semi-skilled workers who possess valuable tacit knowledge about production processes.

The automotive parts manufacturing industry represents a critical component of the broader automotive value chain, with SMEs playing essential roles in supplying components to major automotive manufacturers. These companies face particular challenges related to technological upgrading, quality management, and human resource development, making leadership effectiveness a critical factor for organizational success.

3.2. Participants and Data Collection Procedures

Data collection was conducted over approximately three weeks from March 10 to 31, 2025, using a systematic approach designed to ensure representative sampling within participating organizations. A total of 250 questionnaires were distributed across multiple automotive parts manufacturing companies, yielding 231 completed responses (response rate 92.4%). After excluding 12 responses due to incomplete data or evidence of response patterns suggesting inattentive responding, the final analytical sample consisted of 219 participants.

Participants were recruited through collaboration with industry associations and direct contact with company management. To ensure voluntary participation and data quality, the research purpose and procedures were explained thoroughly to all participants, with explicit assurances of anonymity and confidentiality. All responses were collected using anonymous survey procedures, with no identifying information linked to individual responses.

The demographic composition of the sample reflected the characteristics typical of automotive parts manufacturing. Male participants comprised 85.2% of the sample (n = 187), while female participants represented 14.8% (n = 32). This gender distribution accurately reflects the industry characteristics documented in previous research (Abdi et al., 2018; Pillania, 2008), where male concentration remains high due to the physical demands and technical requirements of production environments.

3.3. Measurement Instruments

Coaching Leadership Scale: The measurement of coaching leadership was based on Stowell (1986)'s theoretical framework, incorporating validated scales from Tak and Cho (2011) and adaptations used in recent research. To ensure contextual relevance for automotive parts manufacturing, item wording was carefully adapted to reflect the specific characteristics of these organizations, including flat organizational structures, rapid decision-making requirements, and field-centered communication patterns.

The final scale consisted of 23 items distributed across four sub-factors: direction (5 items), development (6 items), accountability (5 items), and relationship (7 items). Sample items included "My supervisor provides clear direction about work priorities" (direction), "My supervisor helps me develop new skills and capabilities" (development), "My supervisor holds me accountable for achieving results" (accountability), and "My supervisor shows genuine concern for my well-being" (relationship). All items were measured using 7-point Likert scales ranging

from 1 (strongly disagree) to 7 (strongly agree).

Leader Trust Scale: Leader trust was measured using a 6-item scale adapted from Sparks (2000) and modified for organizational contexts. The scale captures cognitive and affective dimensions of trust, with items such as "I have confidence in my supervisor's decision-making ability" and "I feel that my supervisor has my best interests at heart." The unidimensional structure was confirmed through preliminary factor analysis.

Psychological Safety Scale: Psychological safety was assessed using Edmondson (1999)'s 7-item scale, translated and validated for organizational contexts. The scale measures team-level perceptions of safety for interpersonal risk-taking, with items such as "It is safe to take risks in this work group" and "Members of this work group are able to bring up problems and tough issues." Reverse-coded items were carefully reviewed and modified to ensure clarity.

Constructive Voice Behavior Scale: Constructive voice behavior was measured using a 6-item scale based on Van Dyne and LePine (1998)'s conceptualization, with recent adaptations. The scale focuses specifically on constructive voice behavior aimed at organizational improvement, with items such as "I speak up with ideas for new projects or changes in procedures" and "I communicate my opinions about work issues to others even if my opinion is different."

3.4. Analytical Strategy

The analytical approach integrated multiple advanced statistical techniques to address both theoretical questions and methodological challenges. Three main analytical components were employed:

PLS-SEM Analysis: Partial least squares structural equation modeling was chosen specifically to address multicollinearity issues among coaching leadership sub-factors while providing robust parameter estimates. Previous research has documented high correlations among coaching leadership dimensions, creating challenges for traditional regression-based approaches.

The PLS-SEM approach offers several advantages for this research context. Unlike covariance-based SEM, PLS-SEM does not require multivariate normality assumptions and can handle smaller sample sizes effectively. More importantly, PLS-SEM calculates construct scores as weighted combinations of indicators, which tends to reduce multicollinearity effects that can destabilize parameter estimates in traditional regression approaches.

Analysis was conducted using R 4.2.2 with semPLS and cSEM packages. The analytical procedure followed established best practices, including assessment of measurement model adequacy (reliability, convergent validity, discriminant validity), structural model evaluation (path coefficients, effect sizes, predictive relevance), and mediation analysis using bootstrapping procedures.

Latent Profile Analysis: To address the heterogeneity of organizational members and identify distinct patterns of coaching leadership effectiveness, latent profile analysis was conducted using tidyLPA and mclust packages in R. LPA represents a person-centered analytical approach that complements traditional variable-centered methods by identifying subgroups of individuals who exhibit similar response patterns across multiple variables.

The LPA procedure involved systematic comparison of models with different numbers of profiles, using multiple fit indices including AIC, BIC, sample-size adjusted BIC, entropy, and likelihood ratio tests. Model selection followed guidelines provided by Ferguson et al. (2020), emphasizing both statistical fit and theoretical interpretability.

Multi-group Analysis: Once optimal profiles were identified through LPA, multi-group analysis was conducted to examine whether the structural relationships among coaching leadership, mediating variables, and voice behavior varied across different profiles. This integration of person-centered and variable-centered approaches provides a more comprehensive understanding of coaching leadership effectiveness that accounts for individual and contextual differences.

4. Results

4.1. Preliminary Analyses

Preliminary analyses confirmed that the data met basic assumptions for the planned statistical procedures. Examination of skewness and kurtosis values indicated that all variables exhibited approximately normal distributions, with absolute values of skewness and kurtosis remaining below 2.0. Missing data analysis revealed minimal missing values (less than 2% for any variable), which were addressed through listwise deletion to maintain analytical clarity.

Correlation analysis revealed the expected pattern of positive relationships among all study variables, with particularly strong correlations among coaching leadership sub-factors. The correlation between development and accountability was notably high ($r = 0.90$), confirming the potential for multicollinearity issues that justified the use of PLS-SEM analytical approaches.

Table 1: Descriptive Statistics and Correlations of Major Variables

Variable	M	SD	1	2	3	4	5	6	7
1. Direction	5.26	1.27	1						
2. Accountability	5.07	1.33	.88**	1					
3. Development	5.11	1.31	.85**	.90**	1				
4. Relationship	5.03	1.28	.77**	.80**	.86**	1			
5. Leader Trust	5.21	1.17	.80**	.80**	.82**	.83**	1		
6. Psychological Safety	4.95	1.14	.57**	.57**	.59**	.61**	.69**	1	
7. Constructive Voice	5.16	1.06	.51**	.48**	.49**	.53**	.60**	.67**	1

Note. N = 219. *$p < 0.01$.

4.2. Measurement Model Analysis

The measurement model demonstrated strong psychometric properties across all constructs. Internal consistency reliability, assessed through Cronbach's alpha coefficients, exceeded 0.85 for all variables, indicating adequate reliability. Composite reliability (CR) values were all above 0.90, further confirming measurement reliability. Convergent validity was supported by average variance extracted (AVE) values exceeding 0.50 for all constructs, indicating that constructs explained more than half of the variance in their indicators.

Common method bias assessment using Harman's single-factor test indicated that the first unrotated factor accounted for 38.7% of total variance, well below the 50% threshold that would suggest serious common method bias concerns (Podsakoff et al., 2003). The PLS-SEM analytical approach further mitigates common method bias concerns by separately modeling measurement and structural components.

4.3. Multicollinearity Assessment and PLS-SEM Justification

Variance Inflation Factor (VIF) analysis confirmed serious multicollinearity concerns among coaching leadership sub-factors. Specifically, accountability (VIF = 7.17) and development (VIF = 7.46) exhibited VIF values substantially exceeding the conventional threshold of 5.0, indicating that multicollinearity could severely impact parameter stability in traditional regression approaches.

These findings validated the decision to employ PLS-SEM, which is specifically designed to handle multicollinearity through its component-based estimation approach. Unlike covariance-based methods that can produce unstable results under multicollinearity conditions, PLS-SEM constructs are formed as weighted combinations of indicators, reducing the impact of intercorrelations among predictor variables.

4.4. Structural Model Results and Hypothesis Testing

PLS-SEM structural model analysis revealed several important findings regarding the differential effects of coaching leadership sub-factors. The model demonstrated strong explanatory power, with R^2 values of 0.756 for leader trust, 0.523 for psychological safety, and 0.505 for constructive voice behavior. These values indicate that the model explained substantial proportions of variance in all outcome variables, with particularly strong prediction of leader trust.

Table 2: PLS-SEM Structural Model Analysis Results

Path	Standardized Coefficient	Path	t-value	p-value	95% CI	Effect Size (f^2)
Direct Effects						

Path	Standardized Coefficient	Path	t-value	p-value	95% CI	Effect Size (f^2)
Direction →	0.46		5.87	<.001	[0.31, 0.61]	0.31
Accountability → Leader Trust	0.12		1.45	.147	[-0.04, 0.28]	0.02
Development → Leader Trust	0.18		1.98	.048	[0.01, 0.35]	0.04
Relationship → Leader Trust	0.37		4.96	<.001	[0.22, 0.52]	0.24
Leader Trust → Psychological Safety	0.52		6.31	<.001	[0.36, 0.68]	0.27
Direction → Psychological Safety	0.31		3.56	<.001	[0.14, 0.48]	0.09
Relationship → Psychological Safety	0.21		2.38	.017	[0.04, 0.38]	0.05
Leader Trust → Constructive Voice	0.27		2.82	.005	[0.08, 0.46]	0.06
Psychological Safety → Constructive Voice	0.47		6.83	<.001	[0.33, 0.61]	0.26

Note. Bootstrapping 5,000 iterations. Effect size f^2 >0 .02 small, >0 .15 medium, >0 .35 large (Cohen, 1988).

Analysis results revealed significant differential effects among coaching leadership sub-factors:

Effects on Leader Trust (H1 - Partially Supported): Among the coaching leadership sub-factors, direction demonstrated the strongest effect on leader trust ($\beta = 0.46$, $p < 0.001$, $f^2 = 0.31$), indicating a large effect size according to Cohen (1988)'s criteria. This suggests that leaders who provide clear goals, expectations, and work priorities are most effective at building follower trust in automotive parts manufacturing contexts.

Relationship also showed substantial impact on leader trust ($\beta = 0.37$, $p < 0.001$, $f^2 = 0.24$), representing a medium-to-large effect. This finding confirms that interpersonal connection, genuine concern for employee welfare, and supportive behaviors significantly contribute to trust development.

Development exhibited a significant but weaker effect ($\beta = 0.18$, $p = 0.048$, $f^2 = 0.04$), suggesting that skill-building and growth-oriented coaching behaviors contribute modestly to trust formation. The relatively small effect size indicates that development-focused coaching may be less critical for trust building in this manufacturing context.

Accountability failed to reach statistical significance ($\beta = 0.12$, $p = 0.147$, $f^2 = 0.02$), indicating that accountability-focused coaching behaviors do not significantly contribute to leader trust. This unexpected finding may reflect the manufacturing context where accountability systems might be perceived as controlling rather than supportive, or where formal accountability mechanisms already exist through quality control processes.

Effects on Psychological Safety (H2 - Partially Supported):
For psychological safety outcomes, direction ($\beta = 0.31$, $p < 0.001$, $f^2 = 0.09$) and relationship ($\beta = 0.21$, $p = 0.017$, $f^2 = 0.05$) factors demonstrated significant direct effects. The stronger effect of direction suggests that clear goal-setting and expectations help create psychological safety by reducing ambiguity about performance standards and acceptable behaviors.

Notably, development and accountability factors did not significantly predict psychological safety directly, suggesting that these coaching behaviors may require the presence of trust and relationship quality to create psychologically safe environments.

Sequential Relationship Confirmation (H3 - Strongly Supported):
H3 received strong support, with leader trust demonstrating a substantial positive effect on psychological safety ($\beta = 0.52$, $p < 0.001$, $f^2 = 0.27$). This finding confirms the theoretical proposition that trust provides a foundation for psychological safety development, representing the largest single effect in the model.

Effects on Constructive Voice Behavior (H4 -

Strongly Supported):
H4 was strongly supported, with both leader trust ($\beta = 0.27$, $p = 0.005$, $f^2 = 0.06$) and psychological safety ($\beta = 0.47$, $p < 0.001$, $f^2 = 0.26$) showing significant positive effects on constructive voice behavior. Notably, psychological safety demonstrated a substantially larger effect size than leader trust, suggesting that the immediate psychological context may be more proximal and influential for voice behavior than trust relationships. This finding emphasizes that while trust is important, creating an environment where employees feel safe to take interpersonal risks is the more direct enabler of constructive voice behavior.

4.5. Mediation Analysis Results

Mediation analysis provided crucial insights into the psychological mechanisms through which coaching leadership influences constructive voice behavior. Both single mediation and sequential mediation effects were examined using bootstrapping procedures with 5,000 iterations to ensure robust confidence intervals.

Table 3: Mediation Effect Analysis Results

Mediation Path	Indirect Effect	t-value	p-value	95% CI	VAF
Single Mediation Effects					
Direction → Leader Trust → Constructive Voice	0.12	2.54	.011	[0.03, 0.22]	38.7%
Relationship → Leader Trust → Constructive Voice	0.10	2.43	.015	[0.02, 0.18]	52.6%
Direction → Psychological Safety → Constructive Voice	0.15	3.19	.001	[0.06, 0.24]	44.1%
Relationship → Psychological Safety → Constructive Voice	0.10	2.29	.022	[0.01, 0.19]	52.6%
Sequential Mediation Effects					
Direction → Leader Trust → Psychological Safety → Constructive Voice	0.11	4.48	<.001	[0.06, 0.16]	22.9%
Relationship → Leader Trust → Psychological Safety → Constructive Voice	0.09	3.86	<.001	[0.04, 0.14]	32.1%

Note. VAF (Variance Accounted For) = indirect effect/total effect. VAF > 20% partial mediation, > 80% complete mediation (Hair et al., 2017). Bootstrapping 5,000 iterations.

The results confirmed significant indirect effects for both direction and relationship factors through both mediating pathways. Single mediation effects through leader trust were significant for direction (indirect effect = 0.12, $p = 0.011$) and relationship (indirect effect = 0.10, $p = 0.015$) factors. Similarly, single mediation effects through psychological safety were significant for both direction (indirect effect = 0.15, $p = 0.001$) and relationship (indirect effect = 0.10, $p = 0.022$) factors.

Most importantly, H5 received strong support through confirmation of sequential mediation effects. Both direction (indirect effect = 0.11, $p < 0.001$) and relationship (indirect effect = 0.09, $p < 0.001$) factors demonstrated significant sequential mediation through leader trust to psychological safety to constructive voice behavior. The VAF (Variance Accounted For) values indicated partial mediation effects (22.9% for direction, 32.1% for relationship), suggesting that both direct and indirect pathways contribute to voice behavior outcomes.

4.6. Latent Profile Analysis

Latent profile analysis revealed meaningful heterogeneity within the sample regarding coaching leadership effectiveness patterns. Model comparison procedures indicated that a four-profile solution provided the optimal balance of statistical fit and theoretical interpretability.

Table 4. *Latent Profile Analysis Model Comparison*

Profile Number	AIC	BIC	SABIC	Entropy	LMR LRT p-value	BLRT p-value
2	2535.67	2576.41	2539.65	0.892	<.001	<.001
3	2468.24	2523.82	2473.21	0.884	.031	<.001
4	2412.81	2483.23	2418.78	0.901	.024	<.001
5	2400.17	2485.43	2407.14	0.887	.125	.078

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SABIC = Sample-size Adjusted BIC; LMR LRT = Lo-Mendell-Rubin Likelihood Ratio Test; BLRT = Bootstrap Likelihood Ratio Test.

The four-profile solution was selected based on multiple criteria: substantial BIC The four-profile solution was selected based on multiple criteria: substantial BIC improvement over simpler models, high entropy value (0.901) indicating clear profile separation, and significant likelihood ratio tests supporting profile distinction. The five-profile model showed non-significant LMR LRT results, suggesting that additional profiles did not provide meaningful improvement.

Table 5: Mean Values and Characteristics of Variables by Profile

Variable	Profile 1 (n=14, 6.4%)	Profile 2 (n=32, 14.2%)	Profile 3 (n=85, 38.4%)	Profile 4 (n=88, 39.7%)	F-value
Direction	6.91 (0.19)	3.55 (0.74)	4.79 (0.56)	5.95 (0.52)	135.42***
Accountability	6.91 (0.20)	3.49 (0.94)	4.65 (0.52)	5.93 (0.54)	141.67***
Development	6.86 (0.28)	3.30 (0.89)	4.51 (0.58)	5.96 (0.57)	158.23***
Relationship	6.98 (0.08)	3.60 (0.92)	4.42 (0.54)	6.03 (0.55)	167.89***
Leader Trust	6.79 (0.54)	4.55 (0.82)	4.69 (0.72)	5.99 (0.78)	124.18***
Psychological Safety	6.88 (0.16)	3.95 (0.79)	4.72 (0.63)	5.59 (0.65)	98.36***
Constructive Voice	6.23 (0.68)	4.30 (0.93)	4.44 (0.77)	5.43 (0.78)	81.47***

*Note. Mean (Standard Deviation) format. *** p <0 .001.*

Profile 1 ("Exemplary Leadership", n = 14, 6.4%) represented organizations with exceptionally high levels across all coaching leadership dimensions. Despite the small size of this profile, its theoretical and practical significance should not be underestimated. This profile likely represents organizations that have successfully implemented comprehensive coaching leadership practices, serving as examples of best practices that could inform leadership development initiatives.

Profile 2 ("Low Engagement", n = 32, 14.2%) characterized organizations with consistently low levels of coaching leadership across all dimensions. These organizations may represent contexts where traditional hierarchical management approaches predominate, with limited emphasis on coaching-oriented leadership practices.

Profile 3 ("Moderate Development", n = 85, 38.4%) represented the largest single group, with moderate levels of coaching leadership that fall below optimal but above the lowest performers. This profile suggests organizations in transition, possibly implementing coaching leadership practices but not yet achieving full effectiveness.

Profile 4 ("High Performance", n = 88, 39.7%) demonstrated strong coaching leadership practices across most dimensions, representing organizations that have successfully implemented effective coaching approaches but may not yet have reached exemplary levels.

4.7. Multi-Group Analysis by Profile

Multi-group analysis revealed important differences in structural relationships across the identified profiles,

providing support for H6 and demonstrating the value of person-centered analytical approaches.

Table 6: Comparison of Major Path Coefficients by Profile

Path	Profile (Low)	2 Profile (Medium-Low)	3 Profile (High)	4 Between-Group Difference Test
Direction → Leader Trust	0.31*	0.42***	0.61***	p < .05
Relationship → Leader Trust	0.49**	0.35***	0.24*	p < .05
Leader Trust → Psychological Safety	0.47**	0.51***	0.54***	n.s.
Psychological Safety → Constructive Voice	0.53***	0.45***	0.48***	n.s.
Sequential Mediation Effects				
Direction → Leader Trust → Psychological Safety → Constructive Voice	0.08	0.10**	0.16***	p < .05
Relationship → Leader Trust → Psychological Safety → Constructive Voice	0.12**	0.08**	0.06*	p < .05

*Note. * p <0 .05, ** p < 0.01, *** p < 0.001. n.s. = not significant.*

The results revealed several important patterns:

Direction effects were strongest in high-performance organizations (Profile 4, $\beta = 0.61$), suggesting that direction-focused coaching behaviors may be most effective in contexts where other coaching practices are already well-established. This finding implies that direction-setting may serve as a culminating leadership practice that builds on existing trust and relationship foundations.

Relationship effects showed the opposite pattern, with strongest effects in low-engagement organizations (Profile 2, $\beta = 0.49$). This suggests that relationship-building may be particularly critical in contexts where coaching leadership practices are generally underdeveloped, serving as a foundational practice that enables other coaching behaviors to become effective.

Sequential mediation effects also varied across profiles, with direction-focused sequential mediation being strongest in high-performance contexts, while relationship-focused sequential mediation was most pronounced in low-engagement contexts. These findings suggest that effective coaching leadership development may require different emphases depending on organizational context and current leadership capability levels.

5. Discussion

5.1. Theoretical Implications and Contributions

This study makes several significant theoretical contributions that advance our understanding of coaching leadership effectiveness and its psychological mechanisms.

First, the research extends coaching leadership theory by demonstrating differential effects among sub-factors rather than treating coaching leadership as a unitary construct. The finding that direction and relationship factors demonstrated stronger effects than development and accountability factors challenges assumptions about the equivalence of coaching leadership components. This differentiation suggests that coaching leadership theory should recognize the hierarchical importance of different behavioral components, with some practices serving as more fundamental enablers of employee outcomes than others.

The limited effects of accountability and development factors require particular theoretical consideration. These findings may reflect the specific context of automotive parts manufacturing, where accountability systems may be perceived as controlling rather than supportive, and where development opportunities may be limited by technical constraints and production pressures. Alternatively, these results might indicate that accountability and development practices require foundational trust and relationship quality to become effective, suggesting potential interaction effects that warrant future investigation.

Second, the study provides empirical validation of sequential mediation processes involving leader trust and psychological safety. This contribution extends beyond simple mediation models to demonstrate the staged psychological processes through which coaching leadership influences employee outcomes.

The sequential model suggests that coaching leadership effectiveness depends not just on direct behavioral influences, but on the accumulation of psychological capital through trust development and subsequent psychological safety creation.

This sequential mediation finding aligns with broader theoretical frameworks in organizational psychology while providing specific evidence for coaching leadership contexts. The result supports theories suggesting that organizational trust serves as a fundamental precondition for creating psychologically safe environments, which in turn enable risk-taking behaviors such as constructive voice.

Third, the integration of variable-centered and person-centered analytical approaches represents a methodological contribution that could influence future leadership research. The finding that coaching leadership effects vary substantially across organizational profiles demonstrates the importance of considering contextual and individual differences in leadership effectiveness research. This integration challenges the assumption of population homogeneity that underlies many leadership studies and suggests that universal leadership prescriptions may be insufficient for complex organizational realities.

5.2. Practical Implications for Leadership Development

The research findings offer several actionable insights for leadership development in automotive parts manufacturing and potentially other manufacturing contexts.

Leadership Prioritization Strategies: The differential effects of coaching leadership sub-factors suggest that leadership development initiatives should prioritize direction-setting and relationship-building capabilities. Organizations seeking to enhance coaching leadership effectiveness may achieve greater return on investment by focusing development efforts on these high-impact areas rather than attempting to develop all coaching competencies simultaneously.

For automotive parts manufacturing companies, direction-setting capabilities appear particularly important, possibly reflecting the technical precision and quality requirements inherent in automotive supply chains. Leaders who can clearly articulate performance expectations, quality standards, and strategic priorities may be better positioned to guide employee behavior in these demanding environments.

Contextual Leadership Adaptation: The profile-based differences revealed through LPA suggest that effective leadership development must be customized to organizational context. Organizations with low baseline coaching leadership effectiveness (Profile 2) may benefit most from relationship-focused development initiatives that build trust and interpersonal connection as foundations for other coaching practices. Conversely, organizations with established coaching cultures (Profile 4) may achieve greater benefits from advanced direction-setting and strategic coaching capabilities.

This contextual adaptation principle challenges one-size-fits-all approaches to leadership development and suggests that diagnostic assessment of current organizational coaching climate should precede intervention design. Organizations may need different leadership development pathways depending on their current capabilities and cultural characteristics.

Sequential Development Approaches: The confirmed sequential mediation effects suggest that leadership development should follow staged progression models. Initial development efforts should focus on trust-building behaviors that establish leader credibility and follower confidence. Once trust foundations are established, leaders can more effectively implement practices that foster psychological safety. Finally, with both trust and psychological safety in place, leaders can more successfully encourage and support constructive voice behavior.

This sequential approach has implications for both individual leader development and organizational leadership development programs. Individual leaders may need to invest time in relationship-building before expecting voice behavior outcomes, while organizations may need multi-year development initiatives that progressively build coaching capabilities rather than expecting immediate comprehensive transformation.

5.3. Implications for Automotive Parts Manufacturing

The industry-specific context of this research provides several targeted implications for automotive parts manufacturing companies and potentially other manufacturing sectors with similar characteristics.

Quality and Safety Voice Behavior: In automotive parts manufacturing, constructive voice behavior directly connects to product quality and workplace safety outcomes that have significant cost and liability implications. The finding that direction and relationship factors most effectively promote voice behavior suggests that quality and safety improvement initiatives should emphasize clear standard-setting combined with supportive relationship development rather than relying primarily on formal accountability systems.

Supply Chain Integration: The relationship-building emphasis revealed in this research may be particularly

important for automotive parts manufacturers who must maintain close coordination with OEM customers while also fostering internal voice behavior. Leaders who can build strong internal relationships may be better positioned to represent employee perspectives and knowledge in external customer relationships, creating value for both internal employee engagement and external customer satisfaction.

Technical Knowledge Transfer: The limited effectiveness of development-focused coaching in this context may reflect constraints on formal development opportunities in manufacturing environments. However, the strong effects of relationship-building suggest that informal knowledge transfer and mentoring relationships may be more effective than formal training programs for enhancing employee capabilities and encouraging knowledge sharing through voice behavior.

5.4. Research Limitations and Future Directions

While this study provides valuable insights into coaching leadership effectiveness, several limitations should be acknowledged and addressed in future research.

Methodological Limitations: The cross-sectional research design limits causal inferences about the relationships among coaching leadership, mediating variables, and voice behavior. While the theoretical model and empirical results suggest causal pathways, longitudinal research would provide stronger evidence for causal claims. Future research should employ multi-wave data collection to examine how coaching leadership development influences trust and psychological safety over time, and how these changes subsequently impact voice behavior patterns.

The reliance on self-report measures for all variables creates potential common method bias concerns, despite statistical tests suggesting that bias effects are not severe. Future research could benefit from multi-source data collection, including supervisor ratings of coaching leadership behaviors, peer assessments of psychological safety, and objective measures of voice behavior such as suggestion system participation or quality improvement initiatives.

Sample and Context Limitations: The focus on automotive parts manufacturing companies limits generalizability to other cultural contexts and industry sectors. Organizational culture, with its emphasis on hierarchy and relationship quality, may create different patterns of coaching leadership effectiveness than would be observed in other cultural settings. Cross-cultural replication studies would enhance understanding of cultural boundary conditions for coaching leadership effectiveness.

Similarly, the automotive parts manufacturing context has unique characteristics that may not generalize to other manufacturing sectors or service industries. Future research should examine coaching leadership effectiveness in diverse organizational contexts to identify universal principles versus context-specific findings.

Theoretical and Analytical Extensions: While this study examined sequential mediation through trust and psychological safety, other psychological mechanisms may also contribute to coaching leadership effectiveness. Future research could explore additional mediating variables such as leader-member exchange quality, organizational commitment, or employee engagement to develop more comprehensive models of coaching leadership effectiveness.

The latent profile analysis revealed meaningful organizational heterogeneity, but the mechanisms underlying profile differences were not fully explored. Future research could examine organizational, leadership, and cultural factors that contribute to different coaching leadership effectiveness profiles, providing insights into how organizations can transition from lower-effectiveness to higher-effectiveness profiles.

Practical Research Extensions: From a practical standpoint, future research should examine the effectiveness of different leadership development interventions for enhancing coaching leadership capabilities. Experimental or quasi-experimental designs could test whether targeted development programs focusing on direction-setting and relationship-building produce expected improvements in trust, psychological safety, and voice behavior outcomes.

Additionally, research examining the organizational outcomes of enhanced voice behavior would strengthen the business case for coaching leadership development. Studies connecting voice behavior to measurable performance outcomes such as quality improvement, cost reduction, safety enhancement, or innovation could provide compelling evidence for the organizational value of coaching leadership investment.

6. Conclusions

This study provides comprehensive evidence for the effectiveness of coaching leadership in facilitating constructive voice behavior through complex psychological mechanisms involving leader trust and psychological safety. The research demonstrates that coaching leadership should not be treated as a unitary construct, but rather as a multi-dimensional set of

behaviors with differential effects depending on organizational context and member characteristics.

The integration of advanced analytical techniques—PLS-SEM for addressing methodological challenges and LPA for recognizing organizational heterogeneity—represents a methodological advancement that could inform future leadership research. This analytical approach enables more nuanced understanding of leadership effectiveness that accounts for both statistical and practical complexities inherent in organizational research.

For practitioners, the research provides actionable guidance for leadership development prioritization, contextual adaptation, and sequential implementation strategies. The emphasis on direction-setting and relationship-building capabilities, combined with recognition of organizational profile differences, offers a framework for designing effective coaching leadership development initiatives in manufacturing contexts.

The automotive parts manufacturing industry, with its unique combination of technical requirements, quality pressures, and competitive challenges, serves as an important context for understanding how leadership practices can enhance organizational effectiveness through employee voice behavior. The findings suggest that coaching leadership, properly implemented and developed, can serve as a strategic capability that enhances both employee engagement and organizational performance outcomes.

Looking forward, this research establishes a foundation for continued investigation of coaching leadership effectiveness using integrated analytical approaches that recognize both methodological sophistication and practical relevance. The combination of theoretical advancement, methodological innovation, and practical applicability positions this research to contribute meaningfully to both academic understanding and organizational practice in leadership development.

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