# Team Voice Effectiveness and Mechanism from a Group Information Processing Perspective: The Influence of Voice Quantity and Quality

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## Abstract

Although team voice is widely believed to yield positive outcomes for teams (e.g., high team performance and team innovation), empirical research findings have been inconsistent. From a group information processing perspective, this study distinguishes two dimensions—voice quality and voice quantity—at the team level, and constructs a dual-path model of positive and negative pathways through which voice exerts its effects, thereby examining the effectiveness of team voice and its underlying mechanisms. The main contents include: (1) developing scales for team voice quality and quantity and testing their reliability and validity, (2) testing the dual-path model of team voice, (3) developing a voice management training program for team leaders to effectively enhance team voice effectiveness. This will not only theoretically enrich and deepen existing voice research, but also provide support for team management practice.

## Full Text

### Team Voice Effectiveness and Its Mechanism from the Perspective of Group Information Processing: The Influence of Voice Quantity and Quality

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**Abstract:** Although team voice is widely believed to yield positive outcomes such as high team performance and innovation, empirical findings have been inconsistent. From the perspective of group information processing, this study distinguishes two dimensions of voice—quality and quantity—at the team level, and constructs a dual-path model illustrating both positive and negative mechanisms through which voice operates. The research comprises three main components: (1) developing and validating scales for team voice quality and quantity,

(2) testing the dual-path model of team voice effectiveness, and (3) developing a training program for team leaders to enhance voice management skills and improve voice effectiveness in practice. This research will not only enrich and deepen existing voice research theoretically, but also provide practical support for team management.

**Keywords:** team voice; voice quantity; voice quality; group information processing perspective

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## 1. Problem Statement

Economic globalization has placed increasing pressure on organizations to emphasize and rely on high-efficiency work teams (Cannon-Bowers & Bowers, 2011). Surveys indicate that all Fortune 1000 companies utilize work teams for product development, marketing, and management (Luthans, 2011). A work team (hereinafter referred to as "team") is defined as a bounded collective formed to accomplish organizational tasks, where members interact and communicate to achieve common goals and enhance organizational efficiency (Kozlowski & Bell, 2003; Frazier & Bowler, 2012). Compared with traditional hierarchical structures, teams offer advantages such as flexibility, ease of management, and facilitation of intellectual sharing, leading to their widespread adoption in organizations (Zhao Qi & Li Feng, 2016; Killumets, Dinnocenzo, Maynard, & Mathieu, 2015).

In this context, enhancing team effectiveness is crucial for organizational competitiveness. A key factor in achieving this goal is members' willingness to share information and knowledge, enabling intellectual integration. Employee voice—as a proactive information-sharing behavior—provides an effective channel for information exchange and intellectual sharing in the workplace. Scholars and practitioners widely recognize that employee suggestions can improve managerial decision-making, drive organizational change, foster innovation, and enhance performance, serving as vital intellectual resources for proactive organizational responses to internal and external challenges (Fast, Burris, & Bartel, 2015; Kaufman, 2015; Duan Jinyun & Zhong Jianan, 2012).

Although employee voice is considered a key driver of organizational learning and innovation (Bashshur & Oc, 2015), and is intuitively believed to positively impact teams, research findings have been inconsistent (Morrison, 2014; Li Fangjun, Zheng Fenfang, Yang Qianyi, & Wang Shuman, 2018). Some studies demonstrate that team-level voice enhances team innovation and performance (Halle, 2016; Liang & Rui, 2017), while others find opposite effects under certain conditions (Liang Jian & Liu Zhaopeng, 2016; Detert, Burris, Harrison, & Martin, 2013). This raises critical questions: Under what circumstances does team voice exert positive effects, and when does it produce negative consequences? What measures should managers take to harness the positive impact of team

voice? Clarifying these issues can help organizations understand how to leverage voice to enhance efficiency and competitiveness.

## 2.1 Voice Concept and Measurement

Mainstream voice research conceptualizes voice as organizational citizenship behavior or extra-role behavior—actions that fall outside employees' job responsibilities and represent "extra effort." For instance, Van Dyne and LePine (1998) define voice as organizational members' proactive challenging and constructive suggestions to improve operations rather than mere criticism. Similarly, Detert and Burris (2007) view voice as employees' voluntary ideas, opinions, or recommendations to improve organizational functioning, even when challenging the status quo and authority. Consequently, measurement instruments emphasize motivational components, focusing on employees' willingness to contribute extra effort and courage to speak up (Barry & Wilkinson, 2016). Widely used voice scales often employ terms such as "voluntarily," "initiatively," and "dare to" to describe voice behavior (Liang, Farh, & Farh, 2012; Van Dyne, et al., 1998).

At the team level, scholars generally adopt mainstream definitions and measurement tools. Two primary approaches exist: first, measuring individual voice behaviors and aggregating them to the team level; second, modifying individual-level instruments by changing the subject from "this employee" or "he/she/I" to "team members" for direct evaluation by team leaders (Zhou Wenjuan, 2013).

## 2.2 Antecedents and Mechanisms of Voice

Research on voice antecedents is extensive. At the individual level, scholars have examined mechanisms from perspectives of the voicer (Ng & Feldman, 2015; Wei, Zhang, & Chen, 2015), organizational leadership (Liu, Song, Li, & Liao, 2017; Wang, Gan, Wu, & Wang, 2015), organizational context (Duan Jinyun, Shi Jiayi, & Ling Bin, 2017; Rasheed, Shahzad, Conroy, Nadeem, & Siddique, 2017), and cultural background (Chen Wenping, Duan Jinyun, & Tian Xiaoming, 2013).

At the team level, research indicates that team leadership and voice climate are important factors. Farh and Chen (2018) found from a functional leadership perspective that directing and coaching leaders promote team voice, while supporting leaders have no significant effect. Frazier (2009) demonstrated a positive relationship between team voice climate and team voice. Additionally, Bang, Chen, and Cremer (2017) found that task conflict increases team voice while relationship conflict decreases it. Jiang (2017) reported that mean leader-member exchange influences team voice through team task reflexivity.

## 2.3 Outcomes and Mechanisms of Voice

Compared with antecedent research, voice outcome studies are relatively scarce, primarily focusing on consequences for the voicer. Research shows voice affects

voicers' performance (Ng & Feldman, 2012), work attitudes (Ruck, Welch, & Menara, 2017; Burris, Detert, & Romney, 2013), subsequent voice behavior (Lin & Johnson, 2015), interpersonal relationships (Burris, Rockmann, & Kimmons, 2017), organizational status, and leadership emergence potential (Weiss & Morrison, 2018; McClean, Martin, Emich, & Woodruff, 2017). However, due to substantial differences between individual and team levels, individual-level findings may not generalize to teams (Xiao Junyi & Duan Jinyun, 2015), necessitating deeper investigation of team-level voice outcomes.

Literature review reveals limited research on team-level voice outcomes[2] (Morrison, 2011; Yu Jingjing & Zhao Shuming, 2013). These studies fall into two categories. First, research demonstrating positive outcomes (Halle, 2016) focuses primarily on team innovation and performance. Regarding innovation, surveys show voice positively influences organizational innovation and mediates the relationship between high-performance work systems and innovation (Rasheed et al., 2017). Bang et al. (2017) found voice can alleviate task and relationship conflicts, facilitating new product development. Liang et al. (2017) surveyed 78 teams across three pharmaceutical companies, revealing that both promotive and prohibitive team voice correlate positively with team innovation through different mechanisms: promotive voice via knowledge utilization, and prohibitive voice via team reflexivity. Regarding performance, Li, Liao, Tangirala, and Firth (2017) analyzed data from 88 teams in a large Chinese chemical company, finding promotive voice positively related to team productivity and prohibitive voice positively related to team safety performance. Huang and Paterson (2014) showed group ethical voice positively influences group ethical performance.

Second, some research suggests team voice may negatively impact innovation and performance under certain conditions. Regarding innovation, Liang Jian et al. (2016) proposed that the effect of team voice structure on innovation may follow a positive but diminishing trend. Regarding performance, research indicates that at the work unit level, voice improves performance only when directed at appropriate managers; when misdirected, it can harm performance (Detert, et al., 2013). Mackenzie, Podsakoff, and Podsakoff (2011) found an inverted U-shaped relationship between voice and team task performance. Deng Jinzhao, Huang Zhongmei, and Yu Shaozhong (2015) empirically demonstrated non-additive effects, where voice's positive impact on team performance reverses when exceeding an optimal level. These seemingly contradictory and fragmented findings motivate further exploration.

## 2.4 Summary

Current team voice research can be improved and deepened in three areas. First, regarding definition and measurement: Conceptually, existing research emphasizes motivational aspects, focusing on whether employees "make suggestions." In these studies, voice functions as a verb representing the act of suggestion. However, employee voice is essentially an information exchange behavior whose

impact depends on whether the information is valuable and accepted. Thus, information value should be central to the concept (Mowbray, Wilkinson, & Tse, 2015). A definition highlighting information value should be adopted.

Measurement-wise, current scales focus on employees' courage to speak up while neglecting information value. In teams, voice quality varies considerably due to differences in motivation, intelligence, and experience. Some suggestions are insightful (high information value) and beneficial, while others constitute "noise" (low information value) that distracts colleagues and leaders, increasing cognitive burden and reducing efficiency. Previous measurement tools inadequately capture this information value characteristic. Additionally, team-level research often adopts individual-level instruments without team-specific scales, potentially causing measurement bias. Therefore, developing new measurement tools is necessary.

Second, regarding research direction and level: The literature primarily examines antecedents, with outcome research relatively weak. However, whether voice benefits teams is managers' primary concern. Only by clarifying voice effectiveness can organizations justify encouraging voice, making antecedent research more meaningful. Moreover, individual-level research is abundant while team-level research is scarce and fragmented. This study will focus on team voice outcomes to expand and deepen existing research.

Third, regarding mechanisms and boundary conditions: Detert et al. (2013) showed different voice targets yield different outcomes; Liang et al. (2017) found team knowledge utilization and reflexivity mediate voice-innovation relationships. Although scholars have begun examining mechanisms and boundary conditions, substantial gaps remain. Given that information value should be central to voice, what mechanisms and boundary conditions operate under this conceptualization? Clarifying this will enrich team voice research.

Therefore, from the group information processing perspective (Hinsz, Tindale, & Vollrath, 1997; De Dreu, 2007), this study will develop team voice quality and quantity scales, examine voice mechanisms, and explore practical approaches to enhance voice effectiveness.

## 3. Research Framework

Building on previous definitions (Liang, et al., 2012; Van Dyne, et al., 1998) while simplifying motivational components and emphasizing information characteristics, this study defines team voice as: "Information proactively offered by team members to improve team operations, including opinions, suggestions, and concerns." Notably, unlike previous definitions treating voice as employee behavior, this definition conceptualizes voice as a noun—"suggestions offered." Team voice comprises two dimensions: voice quality refers to "valuable and feasible suggestions presented appropriately by team members," while voice quantity refers to "the frequency of suggestions offered." Based on this definition and the groups-as-information-processors model (Hinsz, et al., 1997), this study con-

structs a dual-path model of team voice including: (1) scale development, (2) model testing, and (3) leadership training development. The overall framework is shown in Figure 1 [Figure 1: see original paper].

### 3.1.1 Scale Development

This study will measure team voice using separate quality and quantity subscales. For the quality scale, the critical incident technique (Flanagan, 1954) will be used to conduct in-depth interviews with MBA students. Sample interview prompts include: "Please recall a high-quality suggestion or critical problem identified by a team member in your work team, and describe the situation in detail." Following interviews, Q-sort methodology will categorize responses into scale items. Expert evaluation will enhance content validity. Based on team managers' and experts' feedback, redundant items will be deleted and inappropriate items revised to form the team voice quality scale.

For the quantity scale, existing scales will be adapted, primarily based on Van Dyne et al.'s (1998) widely used 6-item scale. A sample item is: "Team members make suggestions about issues that may affect the team" (rated on a 6-point Likert scale from 1 = "never" to 6 = "extremely frequently").

### 3.1.2 Reliability and Validity Testing

The study will use one sample for item analysis, internal consistency reliability testing, and exploratory factor analysis to further refine the scale. An independent sample will be used for confirmatory factor analysis and nomological network testing. Confirmatory factor analysis will examine construct and discriminant validity. The nomological network predicts that motivational factors such as psychological safety and team commitment will correlate more strongly with voice quantity than quality, as these factors encourage voice but not necessarily high-quality voice. Conversely, leader experience and intelligence are predicted to correlate more strongly with voice quality than quantity, as these factors enhance quality but may not significantly increase quantity. Additionally, existing voice scales (Liang, et al., 2012; Duan Jinyun et al., 2011) will serve as criteria for criterion-related validity testing.

## 3.2 Study 2: Mechanisms of Team Voice Effectiveness

Study 2 aims to construct and test the dual-path model of team voice effectiveness (Figure 1). Specifically, team voice can positively affect teams through team learning (positive path, Hypotheses 1-3) or negatively through team information overload (negative path, Hypotheses 4-6). This study proposes that voice quality and quantity play critical roles in voice effectiveness, using team performance and innovation as key outcomes. Consider this scenario: In a team where all members are willing to offer suggestions for improvement, voice quality varies due to differences in experience, intelligence, and thinking styles. Which suggestions produce positive versus negative effects?

**3.2.1 Positive Effects: The Role of Team Learning** Team learning involves members acquiring, sharing, and integrating knowledge (Argote, Gruenfeld, & Naquin, 2001) and is crucial for organizational learning and performance (Hong, Baruch, Chau, & He, 2016). Scholars agree that targeted information sharing is necessary for team learning (De Dreu, 2007; Edmondson, 1999). Therefore, members sharing suggestions may facilitate team learning. However, team learning depends not only on information sharing but also on information value and adoption. High-quality information promotes workflow reflection and improvement (Edmondson, 1999) and enables intellectual resource sharing (Colquitt, Lepine, Wesson, & Gellatly, 2011), facilitating team learning. Conversely, low-quality information—presented inappropriately, inaccurately, or irrelevantly—hinders valuable information sharing (Robbins & Coulter, 2011), impeding team learning. Therefore:

**Hypothesis 1:** Team voice quality moderates the relationship between voice quantity and team learning: when voice quality is low, voice quantity negatively relates to team learning; when voice quality is high, voice quantity positively relates to team learning.

Building on Hypothesis 1, team learning triggered by high-quality voice should enhance team performance. First, team learning aims to improve performance and organizational survival (Chen Guoquan, 2007), with extensive empirical evidence supporting its positive effect on performance (Van Der Vegt & Bunderson, 2005; Santos, Passos, & Uitdewilligen, 2016). Second, team learning optimizes teams through self-management, adaptation (Santos et al., 2016), and transactive memory systems (Mo Shenjiang & Xie Xiaoyun, 2009), leading to better performance. Therefore:

**Hypothesis 2:** Team learning mediates the interactive effect of voice quantity and quality on team performance.

Similarly, team learning promotes team innovation, which includes idea generation and implementation (West, 2002; Zhou & Hoever, 2014). For idea generation, team learning requires discussion and construction of diverse perspectives, facilitating knowledge sharing (Jiménez-Jiménez & Sanz-Valle, 2011) and new idea creation. It also requires reflection on work processes (Lantz Friedrich, Sjöberg, & Friedrich, 2016), promoting knowledge change and innovation. For implementation, team learning helps develop better decisions and approaches (Bunderson & Sutcliffe, 2003) to realize creative ideas. Therefore:

**Hypothesis 3:** Team learning mediates the interactive effect of voice quantity and quality on team innovation.

**3.2.2 Negative Effects: The Role of Team Information Overload** Edmunds and Morris's (2000) review identifies a paradox: organizations possess vast amounts of redundant information while accessing little high-quality useful information, causing information overload. Teams face similar challenges. Although voice provides abundant information, only high-quality information

enhances decision quality (Stvilia, Gasser, Twidale, & Smith, 2007). When high-quality voice is abundant, members can more easily attend to and process it, facilitating task completion. However, excessive low-quality voice creates team information overload. First, extracting useful information from valueless data requires frequent task switching, imposing heavy cognitive burdens. Second, processing irrelevant "noise information" depletes limited cognitive resources (Ackoff, 1967; Sparrow, 1999). Therefore:

**Hypothesis 4:** Team voice quality moderates the relationship between voice quantity and team information overload: when voice quality is low, voice quantity positively relates to information overload; when voice quality is high, voice quantity negatively relates to information overload.

Based on Hypothesis 4, information overload caused by low-quality voice should hinder team performance. Teams often complete uncertain tasks in complex environments, requiring substantial cognitive resources for information processing. When limited resources are occupied by invalid information, members lack sufficient resources for task completion (Kahneman, 1973), leading to errors (Oldroyd & Morris, 2012), poor decision quality (Speier, Valacich, & Vessey, 1999), and low efficiency (Byyny, 2016). Additionally, negative emotions play an important role. Information overload creates stress, emotional exhaustion, and frustration (Hemp, 2009; Kouvonen, Toppinen-Tanner, Huuhtanen, & Kalimo, 2005), reducing work engagement and performance. Therefore:

**Hypothesis 5:** Team information overload mediates the interactive effect of voice quantity and quality on team performance.

Similarly, information overload impedes team innovation, which is closely linked to information sharing, attention, and integration (Zhou & Shalley, 2007). Under information overload, these processes cannot function effectively, reducing innovation (Zhou, Shin, Brass, Choi, & Zhang, 2009). When voice contains excessive low-quality information, increased cognitive burden prevents members from acquiring, screening, and integrating innovation-relevant information, weakening innovation capability. Therefore:

**Hypothesis 6:** Team information overload mediates the interactive effect of voice quantity and quality on team innovation.

### 3.3 Study 3: Enhancing Positive Effects and Suppressing Negative Effects—The Role of Leadership Training

Study 3 explores practical approaches to enhance positive effects and reduce negative effects of team voice. Leadership plays a crucial role in organizations, being key to performance improvement and goal achievement (Chatalalsingh & Reeves, 2014). This study proposes that team leaders are critical for voice to exert positive effects. First, leader responses directly influence subsequent voice attitudes and behaviors (Yan Yu & He Yanan, 2016; Mowbray et al., 2015). Second, as central figures, leaders need to accept voice to make correct

decisions. Third, as team guides, leaders must not only process voice themselves but also guide members to elaborate on critical suggestions, posing significant challenges to voice management capabilities—requiring primary processing and screening of team voice. Therefore, this study will develop a training system to enhance leaders' voice management abilities, including: (1) Voice knowledge: teaching definitions, forms, and potential positive and negative effects; (2) Voice discrimination skills: training leaders to identify useful versus noise voice; (3) Noise voice handling skills: developing abilities to manage low-quality voice, such as ignoring it; (4) High-quality voice processing skills: developing abilities to guide discussion, information exchange, and implementation planning for valuable suggestions.

Enhanced voice management capabilities enable leaders to more easily identify and screen high-quality voice while guiding members to focus on it, promoting team learning. Conversely, low voice management capabilities prevent filtering useless information, increasing information overload. Specifically, when overall team voice quality is high, voice quantity positively relates to team learning and negatively to information overload. Teams with trained leaders can better utilize voice to promote learning and avoid overload. When overall voice quality is low, voice quantity negatively relates to team learning and positively to information overload, hindering positive team functioning. However, if leaders receive voice management training to selectively eliminate low-quality voice and guide attention to high-quality voice, the negative impact of low-quality voice on performance and innovation can be mitigated.

## 4. Theoretical Framework

As a proactive information-sharing behavior, team voice represents members' intellectual contributions to improving team operations and should theoretically facilitate task completion. However, existing findings show team voice can have both positive (Halle, 2016; Liang et al., 2017) and negative effects (Detert et al., 2013). Although scholars have begun examining different outcomes, empirical research remains limited and underlying mechanisms are unclear. This study explores team voice outcomes and mechanisms from the group information processing perspective (Hinsz et al., 1997) to expand and deepen existing research.

Current voice research focuses on whether employees make suggestions (Detert et al., 2007; Van Dyne et al., 1998) and how to encourage more voice (Rasheed et al., 2017; Ng et al., 2015), implicitly assuming voice inevitably benefits organizations. However, the content and integration quality of shared information affect team effectiveness (Wu Meng & Bai Xinwen, 2012). Voice impact should consider not only quantity but also information value. Therefore, this study distinguishes voice quality and quantity, constructing and testing a dual-path model.

The positive path suggests voice effects operate through team learning. After

voice is expressed, members process this information for subsequent development or task completion. Information processing includes goal setting, attention, encoding, storage, retrieval, processing, response, feedback, and learning (Hinsz et al., 1997; Lü Jie & Zhang Gang, 2013), all influenced by information quality and quantity interactions. High-quality information promotes workflow reflection and improvement (Edmondson, 1999) and enables intellectual resource sharing (Colquitt et al., 2011), facilitating team learning. More high-quality information enables faster attention and processing, enhancing team learning. Team learning literature shows it optimizes decision-making, generates new ideas, and improves performance (Chen Guoquan, 2007). Thus, voice positively affects performance and innovation through team learning.

The negative path suggests voice harms teams through information overload caused by excessive low-quality voice. When low-quality voice overwhelms limited cognitive capacity, it triggers information overload, wasting time and energy while depleting cognitive resources needed for task completion (Kahneman, 1973) and innovation. Information overload also creates stress, emotional exhaustion, and frustration (Hemp, 2009; Kouvonen et al., 2005), hindering intellectual contributions to innovation and task completion. Thus, voice negatively affects performance and innovation through information overload.

Practically, this study proposes developing a leadership voice management training program based on the dual-path model. As central team figures controlling work processes (Hinsz et al., 1997), leaders should help filter invalid voice. Trained leaders can identify and process low-quality voice promptly, reducing its negative effects, while guiding members to focus on high-quality voice, enhancing its positive impact. The findings will reveal voice mechanisms and provide theoretical foundations for managers, while the training program will contribute practical value to management work.

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[2] Since existing research on voice outcomes at both team and organizational levels is limited and their mechanisms are similar, organizational-level voice outcome studies are included here.

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