RESEARCH INSIGHTS

Leadership as Conversation:

A New Tool to Support Leadership Development

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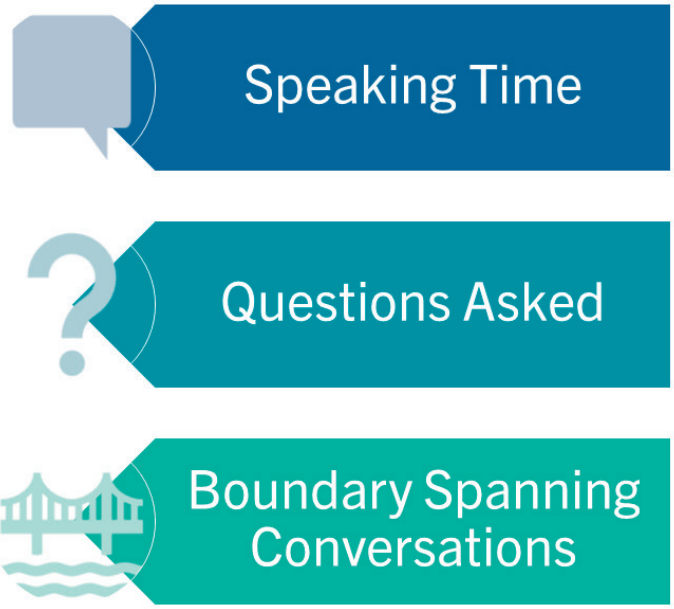
Executive Summary

At CCL, our research suggests that leadership is a social process. That is, leadership is neither a matter of one's inherent traits nor something that's bestowed based on one's job title. Instead, it emerges through social interactions where individuals identify their agreed-upon direction, negotiate proper alignment, and reinvigorate one another's commitment to a collective goal (McCauley & Fick-Cooper, 2019).

With leadership as a social process, one way to support leadership development is through conversational analysis, which captures the dialogue that unfolds among individuals as they strive towards shared outcomes (Liu et al., 2023). Drawing on seminal research (Bales et al., 1951; Sacks et al., 1978), while also leveraging recent technological advances (Hemshorn de Sanchez et al., 2022), we developed a wearable technology system (i.e., HiFi, which is short for *high*-fidelity) and are pilot testing this system within one of CCL's flagship programs – Leading for Organizational Impact (LOI).

Within the program, HiFi 'shadows' leaders working together in a simulated organizational environment and, based on conversational analysis, provides them with rich and nuanced behavior-based feedback linked to important leader outcomes (e.g., influence). This feedback consists of how much time individuals spoke during the simulation, what proportion of their statements were questions, and the extent to which they engaged in boundary spanning conversations with participants in other divisions.



These conversational data become even more powerful when integrated with survey data from the simulation, feedback from peers and program facilitators, and considered alongside personal 360-feedback ratings from their workplaces. For example, we can examine the relationship between the number of conversations across

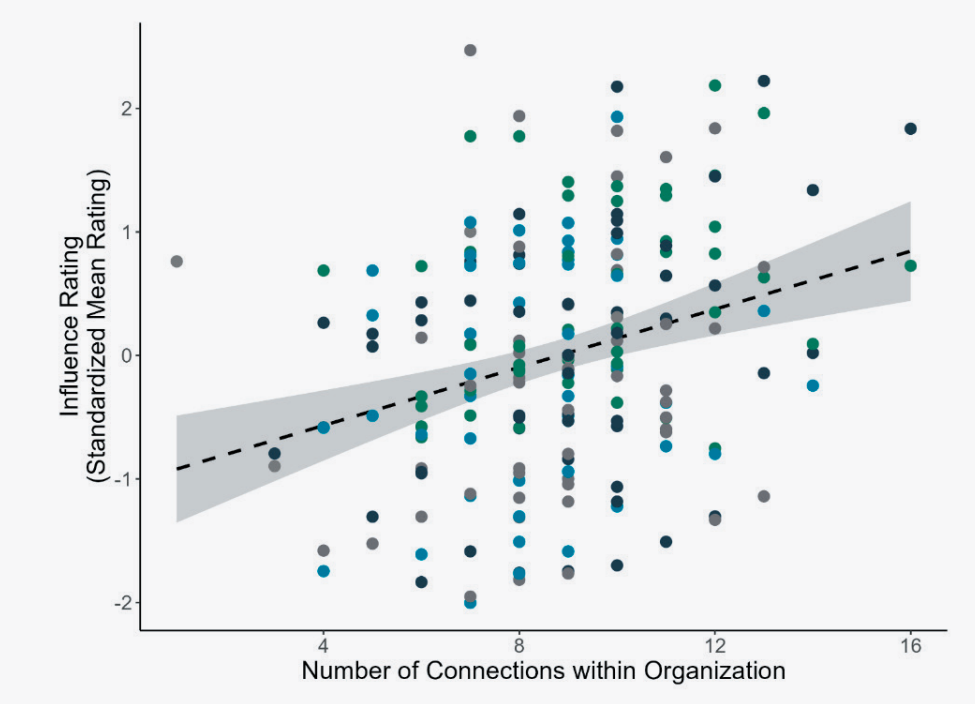


FIGURE 1

boundaries (e.g., to other divisions) and perceptions of influence. More specifically, we find that a greater number of connections is consistently and positively associated with individuals being afforded more influence by their division members. (See Figure 1 on previous page.)

In the LOI program for executives and senior leaders, HiFi plays a significant role in helping leaders work more effectively across boundaries, increase their self-awareness, and understand how measured behaviors impact their perceived influence and effectiveness. Leaders want concrete actions they can take to improve their leadership skills. Using this innovative technology and evidence-based metrics, CCL provides behavioral insight into how leader conversations directly result in specific outcomes. For example, we can quantify how much a leader's boundary spanning conversations contribute to the amount of influence they are afforded by their colleagues. Such insight can be a provocative tool that leaders use to enact behavioral change upon returning to their own organizations. In service of better leadership, conversations are a key lever for leader development.

Leadership is a Social Process That Emerges Within Conversations

Within leadership development programs, our efforts too often focus on the individual. For example, "Great Man" theories of leadership have permeated research studies for decades (Hoffman et al., 2011; Organ, 1996). These studies, which inform leadership development programs, emphasize relatively fixed and innate characteristics that differentiate effective leaders from ineffective ones. Furthermore, leadership can sometimes be equated with titles or hierarchical roles (Simonet & Tett, 2013). That is, influence can be presumed to be largely the purview of a manager or someone with formal authority.

At CCL, we view leadership as a social process that results in shared direction, alignment and commitment (i.e., DAC) (Drath et al., 2008; McCauley & Palus, 2021). From this perspective, leaders help cultivate agreement within a group on its overall goals (i.e., direction), coordinate work within the group (i.e., alignment), and generate mutual responsibility in the group (i.e., commitment). Thus, leadership does not reside solely in an individual, but emerges from the interactions among people working together towards collective outcomes (Denis et al., 2012; Uhl-Bien, 2006). Within this viewpoint, leadership is shared with others, fluid, and constructed during interactions. When developing leaders, therefore, we adopt a relational perspective that explicitly targets what unfolds within collectives (e.g., teams, workgroups, networks, and organizations) rather than solely within individuals.

At the core of any social process are conversations. Conversations support the exchange of information (Mesmer-Magnus & DeChurch, 2009), the voicing of concerns (Chamberlin et al., 2017), the sharing of new ideas (Hughes et al., 2018), and the expression of emotions (Barsade, 2002). As such, conversations hold key information for better understanding how a leader engages with others (Hemshorn de Sanchez et al., 2022; Liu et al., 2023). To engage in effective leadership development, then, we strive to help leaders understand and embrace both their individual agency (i.e., how they show up in their conversations) as well as recognize the power of broader social structures (i.e., understand how collective actions can increase the group's effectiveness) to achieve shared goals.

Such ideas are not entirely new. Leadership science has long treated conversations as a lens through which one can peer into leadership capabilities (Bales et al., 1951; Bass, 1954; MacLaren et al., 2020). However, in recent years research has reemerged demonstrating the power of conversations for revealing important insights for leaders (Di Stasi et al., in press; Gerpott et al., 2019; Lehmann-Willenbrock & Allen, 2018; Lehmann-Willenbrock & Hung, 2023). Recent advances in technology and data analytics now allow for the capture and analysis of real-time leader behaviors that can be used to provide rich, behavior-based feedback. Prominent examples include capturing a leader's vocalization, the physical distance among team members, and how visual attention (e.g., leader gaze, eye contact) is distributed within groups (Hemshorn de Sanchez et al., 2022; Truninger et al., 2021).

Drawing on seminal research, while also leveraging recent technological advances, we developed a wearable technology system called HiFi. HiFi stands for a high-fidelity measure of collective leadership and represents an automated system that uses unobtrusive, wearable recording devices to capture real-time conversational interactions, allowing us to shadow leaders working together in natural environments. Because of HiFi, CCL has established new ways of systematically capturing and analyzing conversations that build on both the seminal work from earlier studies as well as this burgeoning new research. In this Research Insights paper, we review several emerging findings that can help inform leadership development as well as chart a course for the future.

Using HiFi within the Leading for Organizational Impact (LOI) Program – Initial Findings

Many of our current efforts in this area reflect ongoing pilot testing within CCL's Leading for Organizational Impact (LOI) program. LOI is focused on leaders of organizational functions and business units (e.g., vice presidents, division leaders). Thus, the program is designed to help leaders:

1. balance tactical concerns with strategic possibilities to respond to and influence market forces,
2. shape organizational outcomes and leadership culture as they take on a broader scope of responsibility,
3. work across boundaries to build strategic ties and gain new perspectives,
4. deepen self- awareness to enhance credibility, influence, and effectiveness, and
5. identify the behaviors required to inspire others and align people to organizational outcomes.

A key component of LOI is the Looking Glass, Inc.® simulation (McCall & Lombardo, 1982). The 5-hour simulation requires participants to assume the role of a senior leader attending a high-stakes meeting to address challenges alongside colleagues from 3 divisions of the organization. Within the simulation, more than 150 critical pieces of information are distributed across each of the 24 senior leadership roles in the simulation, which mirrors typical group decision-making contexts (Stasser & Titus, 2003). These critical insights are conveyed through a history of email exchanges that evidence varying levels of urgency and strategic importance regarding 12 corporate issues and 15 divisional issues. The only instructions participants receive are to leave their organization, Looking Glass, Inc., "better than they found it." Therefore, participants are free to manage the organization in whatever way they deem most effective.

To capture the conversations that emerge during Looking Glass, Inc. we use HiFi to compile and analyze participants' conversational transcripts as they move about campus. The use of this technology highlights the 'visible self' for participants and helps to develop greater awareness in leader development (Stawiski & McCauley, 2023). Following the simulation, participants receive targeted, behavior-based feedback about their leadership interactions. Using the Leading for Organizational Impact Survey, this feedback includes a report of 360-degree perception data (e.g., ratings of influence) from fellow simulation participants, conversational feedback data based on HiFi analytics (e.g., amount of speaking time), feedback related to collective performance (e.g., simulation measures of organizational impact and effectiveness), and feedback from other participants and from CCL's facilitators. Participants also receive 360-degree assessments of their leadership from raters in their own organizations via the Benchmarks for Executives™ instrument (Leslie et al., 2015), which allows them to consider how the feedback obtained during LOI may be related to their personal leadership context.

Given the recent introduction of the HiFi system into the Looking Glass, Inc. simulation, we are now able to present initial findings (Table 1).[1] First, we review examples of the data that we share with participants within their feedback reports. Next, we provide an overview of the research questions we are exploring using the conversational data captured as part of this broader effort.

[1] Additional information pertaining to the Looking Glass Inc. simulation as well as the data presented in this report can be found in the technical appendix.

SUMMARY OF ONGOING AND FUTURE RESEARCH EFFORTS INVOLVING HIFI WITHIN THE LOI PROGRAM

Ongoing Research Efforts	Current Findings	Powerful Questions Raised[2]
How does speaking time vary across leaders within the Looking Glass simulation?	▪ Speaking time can vary significantly across participants for the entire organization and within a single division. ▪ Anecdotal observations from both participants and facilitators suggest that leaders benefit from seeing how much they "take space" and "make space" during a conversation.	▪ How much self-awareness do participants have about their own speaking time (e.g., are there blind spots)? ▪ How attuned are other members of a group or team to how much people speak during a conversation?
How do the number of questions asked differ across leaders within the Looking Glass simulation?	▪ The number of questions asked often differs across participants during the simulation. ▪ Understanding how one's rate of questions asked compares to their division appears to be a useful piece of feedback for many participants.	▪ How do the number of questions asked, by both an individual leader and throughout a team, affect the climate within the group? ▪ How is question-asking behavior related to the information that one learns during conversations?
How does boundary spanning emerge during the Looking Glass simulation and what are its effects?	▪ Boundary spanning networks (as captured via turn-taking conversations) can differ substantially across different iterations of the Looking Glass, Inc. simulation. ▪ Boundary spanning behavior is positively and consistently related to perceived influence during the Looking Glass, Inc. simulation.	▪ What factors contribute to an individual's decision to boundary span versus engaging with their own team members? ▪ How does boundary spanning unfold over time?
Future Research Efforts	**Preliminary Findings**	**Next Steps**
How is speaking time related to questions asked?	▪ Many leaders exhibit commensurate levels of speaking time and questions asked (i.e., high-high or low-low). ▪ However, a substantial portion also exhibit higher or lower rates of questions than one would expect based on their speaking time.	▪ What are the joint effects of questions asked and speaking time on others' perceptions of a leader? ▪ How does the nature of what and how things are said, and questions asked, relate to the effects of these behaviors?
How are topics discussed throughout the simulation?	▪ Topics that are, at least at first glance, more urgently related to the effectiveness of Looking Glass Inc. are discussed throughout the simulation while others (e.g., Human Resources) only emerge towards the end.	▪ How do team members decide to voice certain issues with their leaders while remaining silent regarding others?
Are there diminishing returns on discussions?	▪ As more group members spend time discussing a topic, the shared perception of progress gradually plateaus.	▪ What signals exist within a group's conversation that a point of diminishing returns has been reached?

Note. [2]These questions are often discussed with participants during the program. We also anticipate exploring such questions as data accumulates.

TABLE 1

Speaking Time

A key metric of any conversation is how much each individual speaks (Bales et al., 1951). Speaking time is often seen by others as a leadership signal (i.e., that one would like to lead). In fact, speaking time is consistently related to others' perceptions of informal influence (Mast, 2002) and this relationship is so robust that it is sometimes referred to as "the babble hypothesis" (MacLaren et al., 2020). Yet, research shows speaking time is a finite resource within any group. That is, as one person speaks more, there is less available airtime, resulting in others speaking less (Holler et al., 2016; Sacks et al., 1978; Stivers et al., 2009). Therefore, helping leaders understand the average speaking time rates over the course of the Looking Glass, Inc. simulation can be quite useful in allowing them to make comparisons and see to what extent they "took space" or "made space" for others (Sin et al., 2009).

As an example of the new possibilities for participant feedback, Figure 2 displays the proportion of time each member of the executive committee spoke during a recent run of the Looking Glass, Inc. simulation. First, we provide the average amount of speaking time across all executive committee members (i.e., dashed horizontal line). This affords a group-level reference point so that leaders can see how their speaking time compared to that of their peers within the executive committee.

Second, each bar represents the average speaking time of a specific executive during the simulation. For example, we can see that the Vice President for the Commercial Glass Division's (CGD) speaking time is above the executive committee's average, while the Industrial Glass Division's (IGD) Vice President is below the average (i.e., CGD.VP, blue bar vs. IGD.VP, green bar). These data afford personalized feedback for leaders. For example, during the debrief, these data reinforced the VP of the IGD's perspective that they had not surfaced or championed the challenges facing their division sufficiently with other executives during the simulation. Thus, for this individual, these data signaled they may have made too much space for others and not claimed enough space for themselves.

Conversely, the other side of conversational interactions where one is not speaking is that one may be *listening* during the interaction. Helping leaders recognize speaking time is not the only important metric is critical (i.e., in some instances more speaking time may become detrimental). Debrief discussions based on the following graphic have helped leaders consider their ratios of speaking time to (potential) listening time. Seeing the HiFi data is particularly powerful in conjunction with receiving data from the Leading for Organizational Impact Survey, because it allows leaders to see how their speaking:listening ratio may have influenced the flow of information through the simulation and the potential impact on how decisions were made.

AN EXAMPLE OF SPEAKING TIME PATTERNS WITHIN AN EXECUTIVE COMMITTEE

FIGURE 2

Questions Asked

Just as speaking time is often a proxy for desired influence, listening and asking questions also play a key role in leadership. For executives to solve the complex and interdependent challenges they face, they need to seek out information from others to leverage collective experience and expertise. Question-asking behaviors are a way to seek input from others and signal that leaders value the insight, expertise, and leadership their colleagues can offer. Figure 3, which corresponds to the same executive committee discussed earlier, depicts the percentage of questions, out of the total statements made, that each person asked. These data suggest that the Vice President of the Advanced Products Division (i.e., APD.VP, grey bar) had the highest percentage of questions compared to others within the executive team. Interestingly, we also see that the IGD VP's along with being less likely to speak compared to others, is also below the average in terms of percentage of statements that were questions.

AN EXAMPLE OF PERCENTAGE OF QUESTIONS ASKED WITHIN AN EXECUTIVE COMMITTEE

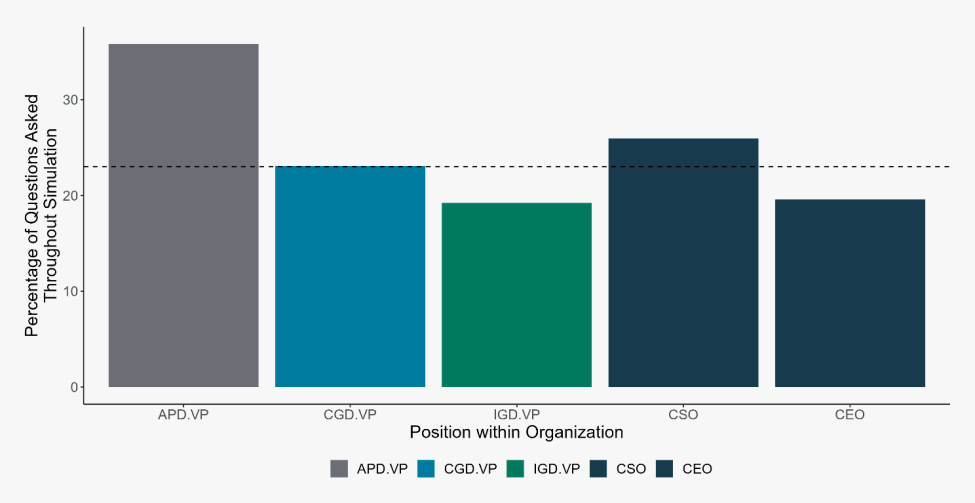


FIGURE 3

Boundary Spanning Conversations

HiFi also affords a broader perspective on how conversations unfold during the Looking Glass, Inc. simulation. Data collected by HiFi align with a key learning objective of CCL's LOI program – helping leaders understand how they can better exert system-wide influence. Specifically, HiFi captures the conversational turn-taking patterns that unfold across the entire organization during the simulation. *Turn-taking* refers to instances where one person stops speaking and another begins (Stivers et al., 2009), and represents a fundamental unit of analysis within conversations as it depicts who engaged with whom (Sacks et al., 1978; Stasser & Taylor, 1991).

When sharing turn-taking data with participants, we provide a graphic that allows them to see their position within the broader conversational network (see Figure 4). Each division within the organization is color-coded (green, gray, blue). Each line connecting color-coded nodes indicates a conversational interaction between those two individuals (i.e., a minimum set of five "turn-taking" exchanges). Within this graphic, thicker lines represent more interactions, such that more turns unfolded between two participants. Individuals represented by larger nodes within the graphic signify those who have a greater number of connections with others (i.e., engaged in more conversational turns) during the simulation.

SAMPLE TURN-TAKING NETWORK FROM A LOOKING GLASS SIMULATION

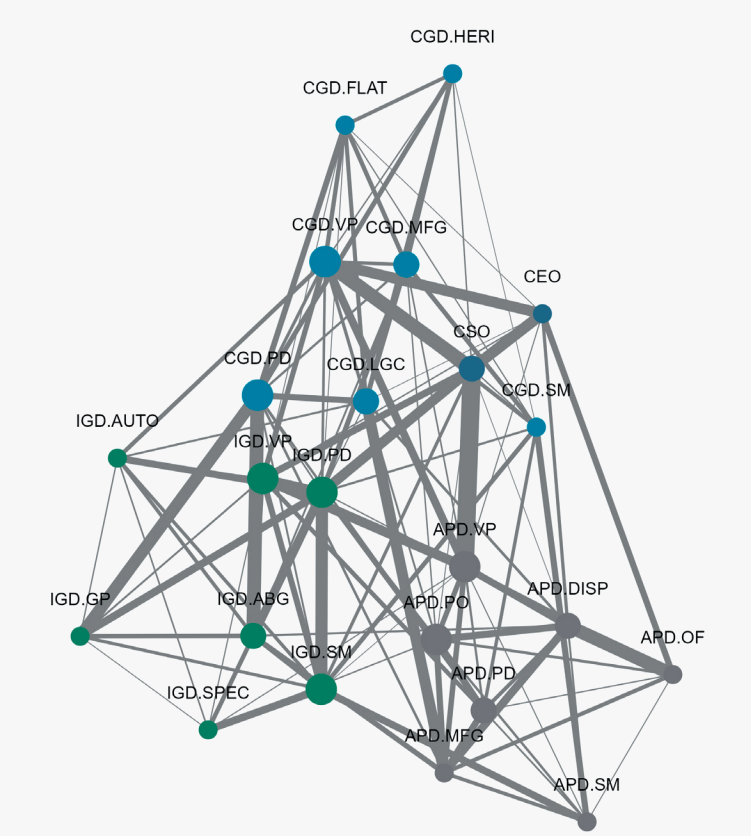


FIGURE 4

Note. Only interactions containing five or more turns are reflected in the network, which helps ensure the network reflects meaningful exchanges, rather than fleeting 'hallway greeting' interactions.

This visualization can give participants a better understanding of several key aspects of their experience during the simulation. First, it depicts who engaged in conversations that spanned horizontal boundaries (i.e., across divisions) and vertical boundaries (i.e., across hierarchical levels) within the organization. Such conversations are evidence of boundary spanning leadership, which is associated with both leader and team effectiveness (Marrone, 2010; Yip et al., 2016). Consider, for example, the distinct connections for the Heritage Plant Manager within the Commercial Glass Division (top of Figure 4, CGD-HERI) versus the LG Coatings Plant Manager (CGD-LGC), both colleagues within the same division. In this simulation, both individuals occupy lower-authority positions (i.e., plant managers versus directors and executives). However, the LG Coatings Plant Manager engaged in a greater number of conversations within and beyond their own division and is therefore more centrally located within the network.

Second, this graphic helps leaders understand who had greater influence within the conversational network versus who remained on the periphery. All else being equal, research suggests that those who occupy central positions within a network exert greater influence over the entire system (Balkundi & Kilduff, 2006; Fonti & Maoret, 2016). As an example, in this run

INFORMAL TURN-TAKING NETWORK (LEFT) VERSUS FORMAL ORGANIZATIONAL CHART (RIGHT)

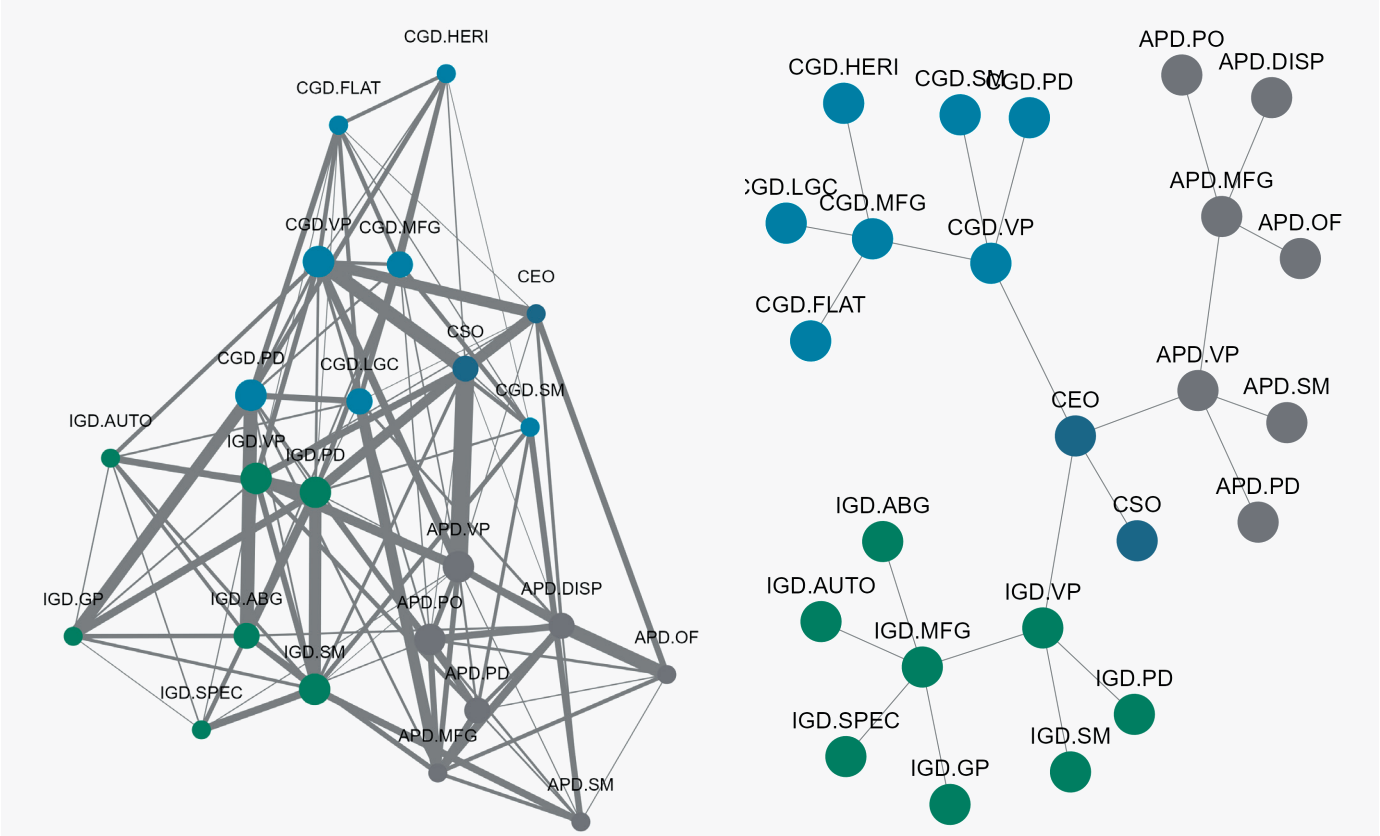


FIGURE 5

of the simulation the Director of Product Development for the Industrial Glass Division (IGD-PD) was centrally located within the network. This shows that often lower- or mid-level leaders who have more boundary spanning conversations can become more central in the network than those who have greater formal authority (e.g., the Chief Strategy and Chief Executive Officers).

Third, we have also found it informative to help leaders consider the extent to which the informal structure that emerged during their run of the Looking Glass, Inc. simulation corresponds to the Looking Glass organization's formal hierarchical structure. Specifically, during several pilot tests of the revised LOI program using the HiFi tool, we shared both the turn-taking network and a network visualization depicting the organization's formal reporting relationships (Figure 5). This comparison helps reinforce the idea that how leaders behave during the simulation creates a network structure that may significantly depart from the formal structure they were given, based on the behavioral choices made during the simulation. It also highlights tensions that can emerge between formal organizational structures and how actors operate within those structures (Yip et al., 2016).

Boundary Spanning and Influence

Finally, the behavioral data captured by HiFi can be most impactful when it is viewed in tandem with the ratings of other participants in the Looking Glass, Inc. simulation. The ratings allow individuals to understand how their behaviors and actions affect both the perceptions of others and the outcomes of organizational decision-making, which are fundamental to the social process that underlies leadership (Banks, 2023; Drath et al., 2008).

Following the simulation, we provide feedback on how one's connections across the broader conversational network, as captured via HiFi, are associated with the influence ratings that participants receive from others at the end of the simulation. Consistent with prior research (Marrone, 2010; Yip et al., 2009), across all pilot tests, there is a positive and statistically significant association between the number of connections a participant forms within the conversational network and how influential they are perceived to be by their division members (r = .34, p <.001). [2]

Given the costs associated with boundary spanning (e.g., time, effort, strain) (Marrone, 2010), this finding helps demonstrate the value of forming connections with others throughout a broader system. Put differently, it answers the question of whether spanning boundaries is worth the potential costs. These results show that boundary spanning is recognized by one's colleagues and can represent a fruitful pathway to exert influence throughout a broader organizational system (see Figure 6). These data allow LOI program participants to reflect on how they might use boundary spanning conversations (and specifically turn-taking within those conversations) to increase the influence they have in their employing organization to create greater positive impact on their own organizational systems.

CCL recognizes that the work of executive-level leadership is complex and ambiguous. Those who enroll in leadership development programs often ask for prescriptive actions they can take to make a positive impact. Embedding the HiFi system into LOI allows CCL to offer these leaders ideas for concrete behaviors – based on empirical data – that they can reliably take to increase their organizational impact, regardless of their hierarchical level in the organization.

PARTICIPANTS WHO MAKE MORE CONNECTIONS ARE MORE LIKELY TO BE SEEN AS INFLUENTIAL

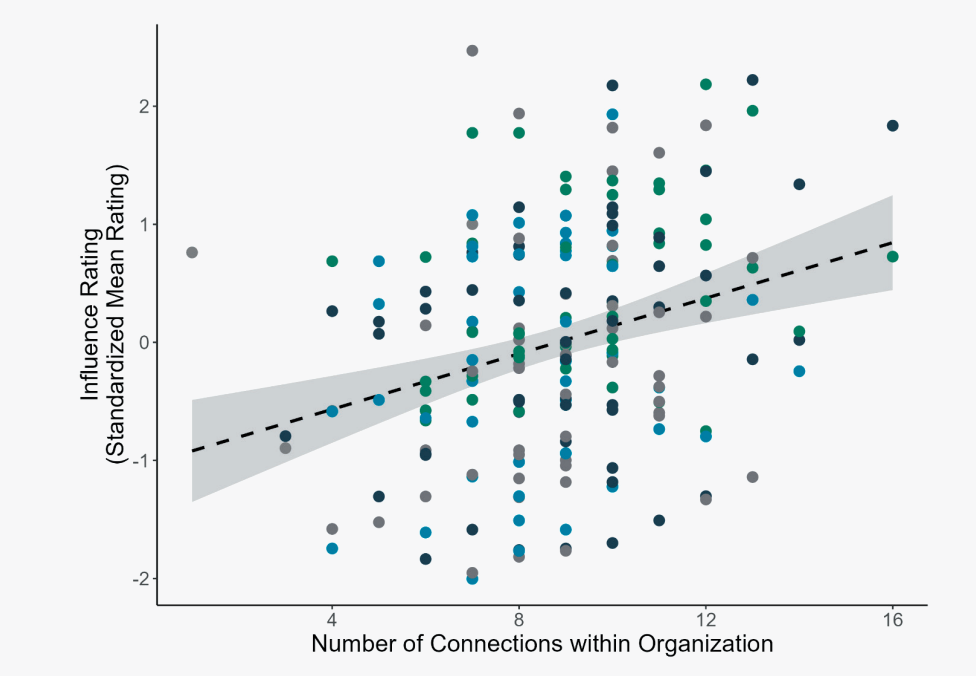


FIGURE 6

Note. Influence is rated within division. Thus, we estimated standardized scores (i.e., z-scores) according to one's division. Each dot represents a participant from a particular pilot test program run. The colors of the dots correspond to each division within the simulation (grey = Advanced Products Division, blue = Commercial Glass Division, green = Industrial Glass Division; dark grey = Senior Executives). The dashed line depicts the typical relationship between the number of connections made during a simulation, per HiFi, and one's rating of influence within their division. The shaded area corresponds to the 95% confidence interval for this effect.

[2] We also estimated an ordinary least squares regression (OLS) model, which controls for several design features (e.g., a participant's average speaking time during the simulation, the role they occupied within the organization, and which pilot test they completed). This model, which is summarized in the technical appendix, also yielded a significant and positive predictive relationship between connections within the conversational network and influence (b = .12, p < .001).

Looking to the Future: Exploring Additional Research Questions with HiFi in LOI

Along with the data already being shared with participants, we're exploring several promising avenues of future research.

How is Speaking Time Related to Questions Asked?

As indicated previously, speaking time is a key metric for capturing one's conversational activity level and is often viewed as a signal of one's attempt to influence others. However, because of the finite amount of speaking time available in a group, we are examining other conversational metrics. By providing feedback to participants about the proportion of their speaking time comprised of statements versus questions, we can show the extent to which they use questions to invite others into the conversation. This allows LOI program facilitators to highlight the inherent tension between speaking (i.e., "claiming space" by talking) versus inviting others into the conversation (i.e., "making space" by asking questions).

COMPARISON OF SPEAKING TIME TO QUESTIONS ASKED

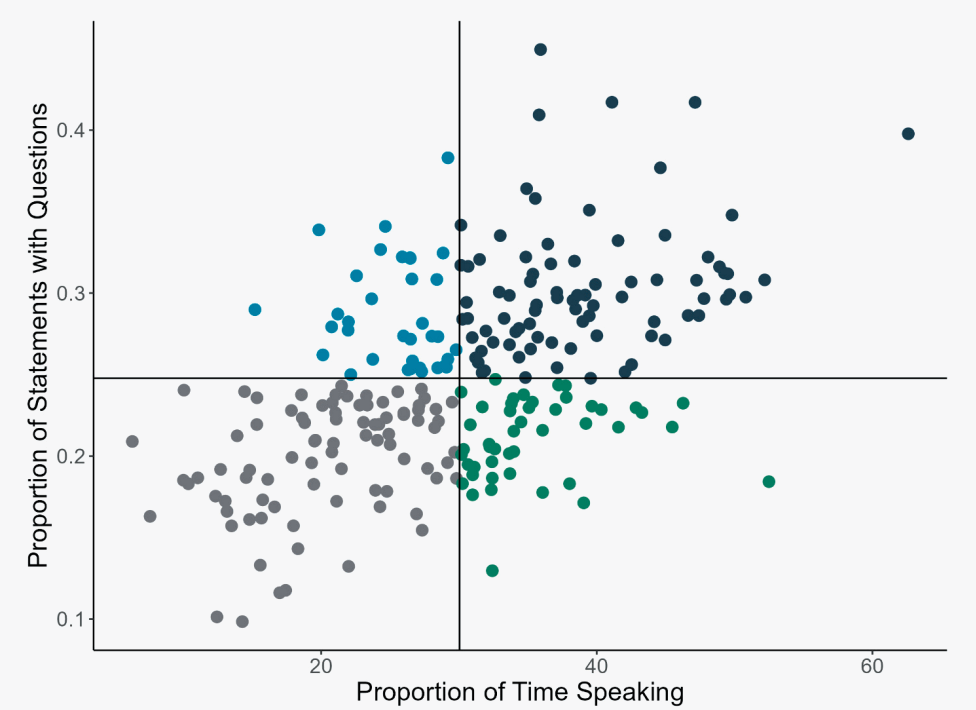


FIGURE 7

Drawing on HiFi data from multiple LOI runs, we've begun to identify important trends. Although speaking time and questions asked are related, they diverge in meaningful ways (r = .53, p < .001). Some individuals exhibit above-average speaking times, but a below-average proportion of questions asked (i.e., 19% of participants; see green dots in lower-right quadrant of Figure 7). These individuals are likely most at risk of being seen as claiming too much space during the simulation, while not affording sufficient space for others. The interpersonal risk of alienating their colleagues can hamper the shared leadership process. Indeed, the leadership risk to the entire system is even greater – that key information will not be shared with the right people, which impacts the ability to make the best business decisions for long-term organizational success.

Conversely, only 14% of participants ask questions at a rate that is higher than what we would expect based on their speaking time (i.e., blue dots in upper-left quadrant in Figure 7). These individuals may be particularly helpful at creating opportunities for others to share information through their limited speaking time and more extensive inquiries.

As additional data accumulates, we anticipate being able to identify key predictors and outcomes of the tradeoff between speaking time and questions asked.

For instance, we may be able to look at how balancing this tradeoff predicts the amount of information surfaced in the simulation. Research shows information sharing is a likely mechanism that influences organizational effectiveness (Zaccaro et al., 2020). Likewise, given recent advances in text data analysis, we envision being able to capture both the content of what is said (e.g., suggestions, contradictions) and the tenor of questions asked (e.g., rhetorical, challenging, appreciative inquiry) (Boyd & Markowitz, 2024). For now, our current data yields powerful insights for participants, especially when coupled with the results of their 360 leadership assessments (Fleenor et al., 2010).

How are Topics Discussed Throughout the Simulation?

HiFi also allows us to consider the content of the conversations during the simulation. Specifically, we can use key terms pertaining to the significant issues facing Looking Glass, Inc. to conduct a content analysis of the conversations within each division. Such information is critical because the topics that are discussed likely have a bearing on the strategic decisions that are ultimately made (Hough & White, 2003). Figure 8 provides an example of these data from two prior runs of Looking Glass. For the sake of parsimony, the figure compares two distinct issues facing the organization: the pursuit of new opportunities and the challenges pertaining to human resources.[3] For both runs, key terms pertaining to new opportunities are, on average, discussed early and often throughout the simulation. Topics related to human resources, on the other hand, only emerge towards the end of the simulation (if at all). This pattern may reflect a task-focused emphasis on the organization's bottom-line (Greenbaum et al., 2023), while engaging with people-related issues in a more cosmetic or superficial manner (Dawkins & Balakrishnan, 2022).

HEATMAP OF TOPICS DISCUSSED DURING TWO LOOKING GLASS SIMULATION RUNS

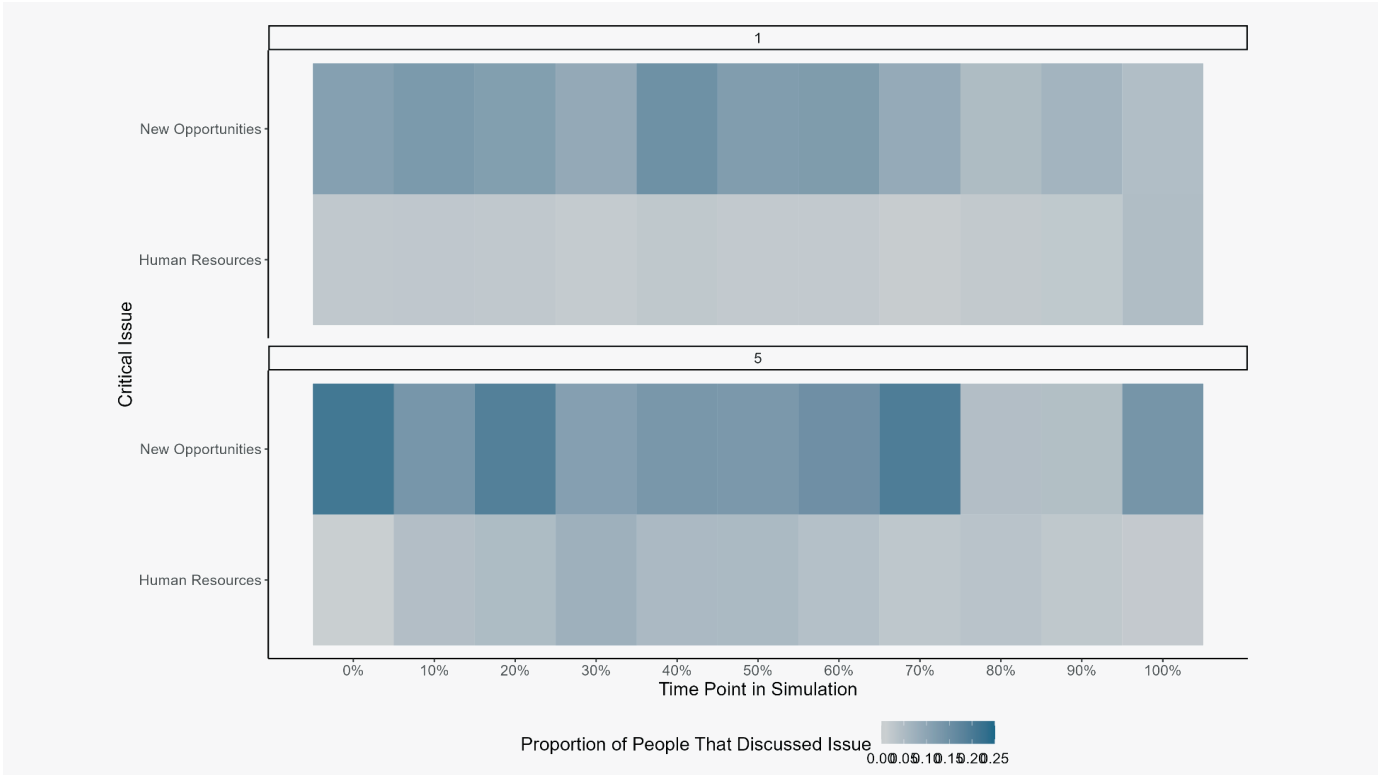


FIGURE 8

[3] Within the appendix, we also report a spline regression model that regresses the proportion of time that participants discuss a given issue on variables reflecting different time points within the simulation. This model indicated significant non-linear effects (i.e., fifth-degree splines); these non-linear effects varied across issues. Taken together, this model, like the trend depicted in Figure 8, suggests that some issues are more likely to be discussed towards the very end of the simulation.

Content analysis of the conversations captured via HiFi holds tremendous promise for further understanding how leadership unfolds in group settings (Luciano et al., 2018). In particular, the current content analysis, which relies on keywords to identify topics, lacks much of the nuance and subtlety afforded by other text-based analytical techniques. For example, large language models, which account for how words are embedded within the broader structure of a body of text (Kjell et al., 2023), may identify the subtle ways in which gender or formal authority may influence communication patterns. Likewise, there are a range of other text-based models, which move beyond what is explicitly discussed and begin to draw deeper inferences based on the tone, tenor, or nature of the conversation (e.g., sentiment analysis, linguistic inquiry word count) (Boyd et al., 2022; Kahn et al., 2007; Knight, 2021), that may shed light on how or why certain topics are (or are not) discussed.

Are There Diminishing Returns on Discussions?

Even though the current content analysis represents initial forays into these techniques, we've begun to see interesting trends by pairing HiFi data with the traditional survey method capturing participants' perceptions at the end of the Looking Glass, Inc. simulation.

Figure 9 depicts the relationship between how long division members discuss an issue facing Looking Glass, Inc. and how much those members report, on average, making progress on that issue. Interestingly, we've observed diminishing returns on the value of discussing a specific topic. That is, the more members of a division

CURVILINEAR RELATIONSHIP BETWEEN PROPORTION OF TIME DISCUSSING A TOPIC AND PERCEIVED PROGRESS

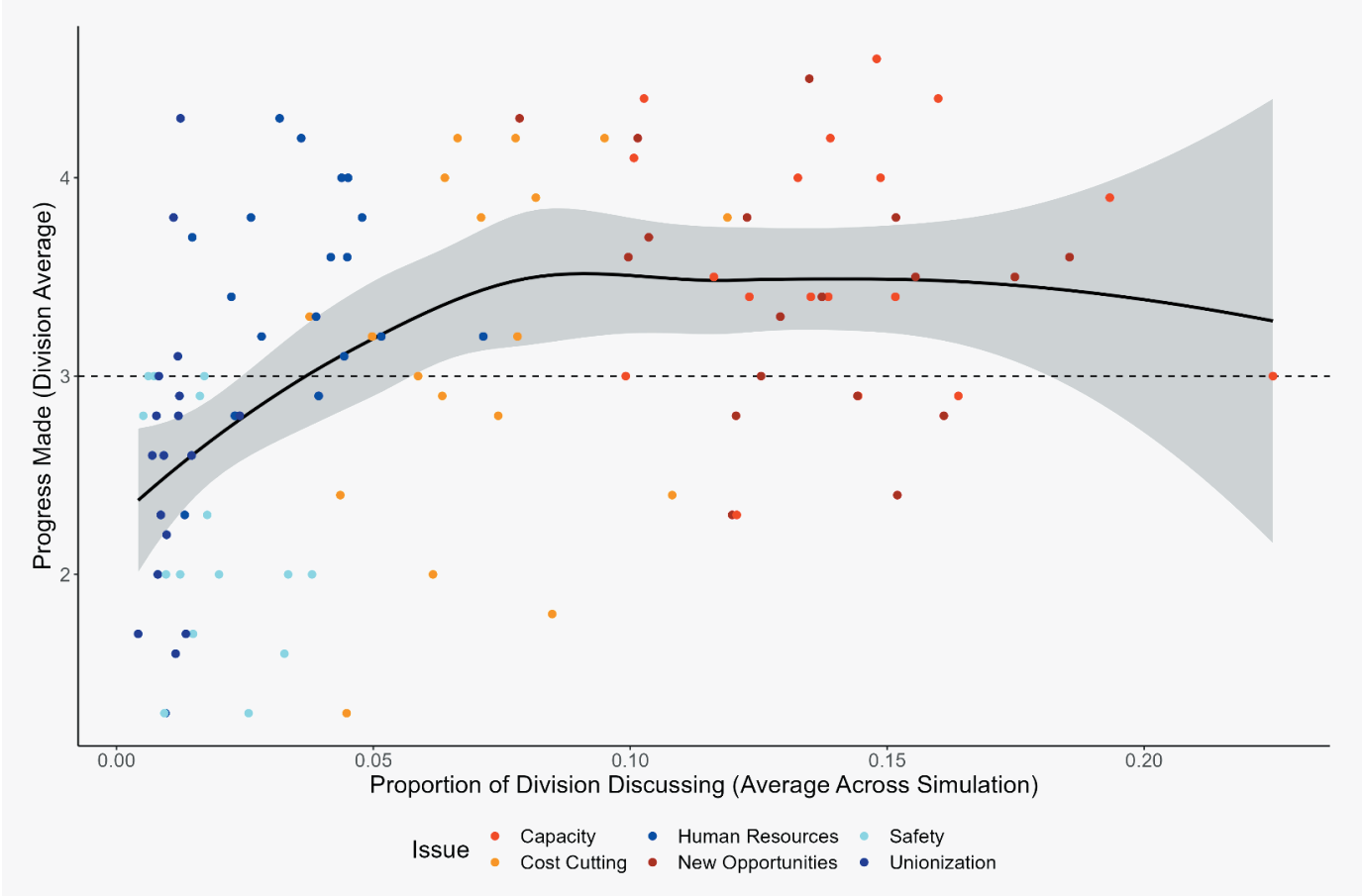


FIGURE 9

Note. The dashed line represents the grand mean for progress made across all issues and pilot test simulation runs. The shaded, gray area reflects a 95% confidence interval covering the predicted value of progress made based on the model used to generate this figure.

discuss an issue, the more discussions tend to yield higher perceptions of progress (i.e., an increasing trend). However, beyond a certain threshold the value of additional discussion time diminishes rapidly (i.e., a flattening curve). This suggests other factors may need to be present to move the conversation towards some level of resolution. For instance, listening and discussion may come at the expense of making decisions or taking action (Bergeron et al., 2023). Clearly, a certain amount of discussion is warranted to elicit all relevant data. However, too much discussion may lead to 'analysis paralysis' – excessive deliberation and overthinking – which can hinder performance.

Conclusion

Conversations are an important medium for understanding the social processes that underlie leadership. Recent advancements in key technologies have led to a resurgence of interest in conversational analyses. In accordance with these trends, and as seen with the findings presented here, we see exciting potential for HiFi – not only as a tool to support the Leading for Organizational Impact program's learning objectives, but also more broadly within other aspects of CCL's work. Unobtrusive data collection methods that provide objective feedback represent an exciting avenue by which to uncover important insights. Because leadership is a social process, such insights help leaders better understand their own agency in the context of shared accountability and highlight unfolding conversations as a key lever for leadership development.

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Participants and Procedure

Participants consisted of attendees in CCL's onsite 5-day Leading for Organizational Impact (LOI) program, which is designed for executives and senior leaders. The data in this report comes from 12 separate runs of LOI and consists of 248 participants and 401,801 utterances (more details on these utterances and the corresponding analyses below). All participants signed consent forms agreeing to participate in this study.

At the end of the first day, participants are provided background information on a 5-hour organizational simulation ('Looking Glass, Inc.'), in which they are expected to self-manage and run a fictitious glass company (Lombardo & McCall, 1982). The organization consists of 3 divisions and 4 hierarchical organizational levels comprised of distinct roles: a Chief Executive Officer; a Chief Strategy Officer, 3 Vice Presidents (one for each division); 9 Directors (three for each division) and 9-10 Plant Managers (3-4 for each division).[4] The divisional Plant Managers report to a divisional Director of Manufacturing (see Figure A1 on page 23 for the organizational chart). Participants are told that the simulation occurs in the context of a quarterly meeting at corporate headquarters for the organization's senior leadership team. Participants are informed that Looking Glass, Inc., must address a range of issues (e.g., financial issues, competitive threats) to leave the organization "better than they found it." Specifically, the stated goal is for participants to reach decisions and identify priorities by the end of the simulation. During the orientation, participants are first shown a video-based company overview. They then meet in their assigned divisions to volunteer for one of the roles in the organizational chart.[5]

The simulation uses a hidden-profile paradigm (e.g., Sohrab, Waller & Kaplan, 2015), which is a group task that requires members to decide among different alternatives based on available information. The available information about various alternatives is distributed among the roles such that no individual can determine the best alternative by relying solely on their own information (see Stasser & Titus, 2003; Tost et al., 2013; Winquist & Larson, 1998). To identify optimal solutions, individuals must verbally communicate and integrate their unique information to see the implications of the full information set (consisting of 12 organization-wide issues and 15 divisional issues) for making decisions. Participants were given 30 minutes at the end of the first day to begin reading the information pertinent to their role but were asked to refrain from communicating about the simulation until it began the next day. Facilitators typically recommend that participants allot three hours to review the information contained in their packet. Prior to leaving the training facility for the hotel, participants were instructed to finish reading their materials that evening in preparation for the simulation, which began the following morning.

The materials provided to participants consist of a set of extant email messages and reports for each role containing unique and shared information. The email messages reflect prior correspondence among the roles included in the simulation as well as with other members and departments of the fictitious organization. Across the various roles there were 642 distinct e-mails and reports that dealt with several issues pertaining to the entire organization (e.g., production capacity) as well as those that were particularly relevant for specific divisions (e.g., invoicing problems). It is important to note that the emails reflected correspondence that happened prior to the simulation (henceforth, we refer to this as the extant email network). During the simulation,

[4] To have program enrollment flexibility, the simulation allows for up to two plant manager roles to be added or dropped. Also, prior to the start of the program, participants are intentionally assigned by facilitators to one of the three divisions such that demographic characteristics are balanced (e.g., gender, country of origin, ethnicity).

[5] The exceptions to this general process are the CEO and the CSO Director roles. These roles are decided based on a self-nomination process whereby 'candidates' give a brief speech about why they want to be considered for one of those roles. All participants then place candidate votes for those two positions, which determines who occupies both roles (Truninger et al., 2021).

OLS MODEL REGRESSION INFLUENCE ON BOUNDARY SPANNING AND SPEAKING TIME

Term	Unstandardized Estimate	SE	Z-Statistic	*p*
(Intercept)	-2.17	0.33	-6.62	0.00
Connections within Conversational Network	0.13	0.03	4.09	0.00
Speaking Time	0.03	0.01	5.11	0.00
Pilot 2	0.12	0.29	0.43	0.67
Pilot 3	-0.39	0.28	-1.40	0.16
Pilot 4	-0.02	0.28	-0.07	0.95
Pilot 5	-0.41	0.29	-1.42	0.16
Pilot 6	-0.34	0.29	-1.19	0.24
Pilot 7	-0.15	0.28	-0.55	0.58
Pilot 8	-0.25	0.27	-0.95	0.34
Pilot 9	-0.29	0.29	-1.02	0.31
Pilot 10	-0.18	0.28	-0.66	0.51
Pilot 11	-0.10	0.27	-0.39	0.70
Pilot 12	-0.28	0.28	-0.99	0.32
Commercial Glass	0.19	0.16	1.17	0.24
Executive Committee	0.50	0.17	2.97	0.00
Industrial Glass	0.34	0.16	2.13	0.03
Model Summary				
R^2	0.27			
F-statistic	5.23			
P	<0.001			
df	16			
N	242 participants			

Note. Advanced Products Division (APD) and the first pilot run serve as reference groups.

TABLE A1

all interaction among participants was face-to-face (i.e., the information sharing network) rather than mediated via technology (e.g., email, Microsoft Teams). In addition, the simulation materials were developed in conjunction with several subject matter experts from the commercial glass industry and were scrutinized to ensure that they exhibited mundane realism, sufficient complexity, and relevance to the challenges typically faced by senior executives (McCall & Lombardo, 1982; Young et al., 2021).

When participants arrived at the training facility the following morning, facilitators gave a brief overview of the day. Instructions were that the simulation would last for exactly 5 and a half hours, inclusive of a final "CEO's meeting" in which the executive team (CEO, CSO, Divisional Vice Presidents) would communicate concluding thoughts to the entire organization. The facilitators stated they would be observing participant behavior but would not be interacting with any participants during the simulation. Participants would be interacting with one another via face-to-face verbal communication. Other than these sparse guidelines, participants were allowed to manage and behave in whatever manner they

deemed best. In fact, during the simulation, participants moved freely about the campus, held separate meetings among different actors, and continued their activities during a working lunch.

As per the informed consent and information session, lanyards with audio recorders were distributed to all participants. Participants turned on their recorders and, separately, recorded a brief introductory phrase that allowed the researchers to match each recording to the individual's role in the simulation. Participants kept their audio recorders on during the entire simulation. At the conclusion of the simulation, participants shut off their recorders, which were then collected.

Supplementary Results

OLS Model for Influence. Table A1 (previous page) provides a summary of a regression model predicting a participant's level of influence, as ranked within their division, and the number of connections they made within the conversational network as captured by the HiFi system. This model includes fixed effects for the division that a participant belongs to and the specific pilot run of LOI that they attended. The coefficient for boundary spanning is positive and significant (B = .13, p = < .001), which indicates that individuals who formed more connections within the conversational network were more likely to be seen as influential by their division members.

OLS Model for Timing of When Issues are Discussed. Table A2 provides a summary of a spline regression model predicting the average proportion of participants discussing an issue within a particular iteration of Looking Glass Inc. on the time points within the simulation. Time is operationalized as 10 equidistant segments (i.e., first 10% of the simulation, second 10% of the simulation, etc.). To reflect the potential non-linear effects, the spline regression model features five knots corresponding to the, roughly, 1st through 5th simulation segments. This model includes fixed effects for the issues being discussed. Of most interest are the coefficients for the interactions between various issues and the time segment within the simulation. Those interactions at later time segments (i.e., 4th and 5th segment) are generally significant and positive ($B_{Avg. - Segment\ 4}$ = .16; $B_{Avg. - Segment\ 5}$ = .06). This suggests that, compared to the referent issue (i.e., New Opportunities), there is a sudden uptick in the proportion of group members discussing these other issues towards the end of the simulation.

OLS MODEL REGRESSION INFLUENCE ON BOUNDARY SPANNING AND SPEAKING TIME

Term	Unstandardized Estimate	SE	Z-Statistic	*p*
(Intercept)	0.16	0.01	11.61	0.00
Capacity	-0.03	0.02	-1.65	0.10
Cost Cutting	-0.10	0.02	-5.28	0.00
Customer Satisfaction	-0.14	0.02	-7.32	0.00
International Expansion	-0.15	0.02	-7.60	0.00
Human Resources	-0.14	0.02	-7.26	0.00
Shipping	-0.15	0.02	-8.02	0.00
Hazardous Waste	-0.15	0.02	-8.04	0.00
Raw Materials	-0.15	0.02	-7.77	0.00
Safety	-0.16	0.02	-8.16	0.00
Energy	-0.15	0.02	-7.97	0.00
Unionization	-0.16	0.02	-8.20	0.00
Organizational Dynamics	-0.12	0.02	-6.00	0.00
Time- 1	0.00	0.03	-0.14	0.89
Time- 2	-0.08	0.03	-2.72	0.01

TABLE A2 *CONTINUED NEXT PAGE*

TABLE A2 *CONTINUED*

Term	Unstandardized Estimate	SE	Z-Statistic	*p*
Time- 3	0.05	0.03	1.65	0.10
Time- 4	-0.18	0.03	-6.80	0.00
Time- 5	-0.06	0.02	-3.32	0.00
Capacity:Time- 1	0.05	0.04	1.16	0.25
Cost Cutting:Time- 1	0.04	0.04	0.92	0.36
Customer Satisfaction:Time- 1	0.01	0.04	0.16	0.87
International Expansion:Time- 1	0.05	0.04	1.28	0.20
Human Resources:Time- 1	0.02	0.04	0.50	0.61
Shipping:Time- 1	0.03	0.04	0.83	0.41
Hazardous Waste:Time- 1	0.06	0.04	1.43	0.16
Raw Materials:Time- 1	0.03	0.04	0.76	0.45
Safety:Time- 1	0.01	0.04	0.26	0.79
Energy:Time- 1	0.03	0.04	0.84	0.40
Unionization:Time- 1	0.02	0.04	0.43	0.67
Organizational Dynamics:Time- 1	0.04	0.04	1.08	0.28
Capacity:Time- 2	0.06	0.04	1.45	0.15
Cost Cutting:Time- 2	0.08	0.04	2.05	0.04
Customer Satisfaction:Time- 2	0.08	0.04	1.85	0.07
International Expansion:Time- 2	0.09	0.04	2.19	0.03
Human Resources:Time- 2	0.12	0.04	2.85	0.00
Shipping:Time- 2	0.08	0.04	2.01	0.05
Hazardous Waste:Time- 2	0.13	0.04	3.23	0.00
Raw Materials:Time- 2	0.08	0.04	1.92	0.06
Safety:Time- 2	0.12	0.04	2.92	0.00
Energy:Time- 2	0.08	0.04	1.94	0.05
Unionization:Time- 2	0.08	0.04	1.91	0.06
Organizational Dynamics:Time- 2	0.04	0.04	1.07	0.29
Capacity:Time- 3	0.00	0.04	0.03	0.98
Cost Cutting:Time- 3	-0.05	0.04	-1.08	0.28
Customer Satisfaction:Time- 3	-0.05	0.04	-1.22	0.22
International Expansion:Time- 3	-0.03	0.04	-0.77	0.44
Human Resources:Time- 3	-0.05	0.04	-1.20	0.23
Shipping:Time- 3	-0.04	0.04	-0.97	0.33
Hazardous Waste:Time- 3	-0.05	0.04	-1.02	0.31
Raw Materials:Time- 3	-0.05	0.04	-1.15	0.25
Safety:Time- 3	-0.06	0.04	-1.45	0.15
Energy:Time- 3	-0.04	0.04	-0.91	0.36
Unionization:Time- 3	-0.01	0.04	-0.18	0.86
Organizational Dynamics:Time- 3	-0.01	0.04	-0.14	0.89
Capacity:Time- 4	0.06	0.04	1.76	0.08
Cost Cutting:Time- 4	0.11	0.04	3.13	0.00

TABLE A2 *CONTINUED NEXT PAGE*

TABLE A2 *CONTINUED*

Term	Unstandardized Estimate	SE	Z-Statistic	*p*
Customer Satisfaction:Time- 4	0.17	0.04	4.65	0.00
International Expansion:Time- 4	0.18	0.04	4.81	0.00
Human Resources:Time- 4	0.18	0.04	5.00	0.00
Shipping:Time- 4	0.18	0.04	4.84	0.00
Hazardous Waste:Time- 4	0.19	0.04	5.20	0.00
Raw Materials:Time- 4	0.18	0.04	4.89	0.00
Safety:Time- 4	0.20	0.04	5.54	0.00
Energy:Time- 4	0.17	0.04	4.77	0.00
Unionization:Time- 4	0.16	0.04	4.51	0.00
Organizational Dynamics:Time- 4	0.12	0.04	3.27	0.00
Capacity:Time- 5	-0.01	0.03	-0.42	0.68
Cost Cutting:Time- 5	0.03	0.03	1.22	0.23
Customer Satisfaction:Time- 5	0.05	0.03	1.79	0.07
International Expansion:Time- 5	0.09	0.03	3.18	0.00
Human Resources:Time- 5	0.08	0.03	2.85	0.00
Shipping:Time- 5	0.06	0.03	2.30	0.02
Hazardous Waste:Time- 5	0.08	0.03	3.03	0.00
Raw Materials:Time- 5	0.07	0.03	2.71	0.01
Safety:Time- 5	0.06	0.03	2.36	0.02
Energy:Time- 5	0.06	0.03	2.20	0.03
Unionization:Time- 5	0.08	0.03	3.00	0.00
Organizational Dynamics:Time- 5	0.09	0.03	3.36	0.00
Model Summary				
R^2	0.85	0.04	1.45	0.15
F-statistic	15.10	0.04	2.05	0.04
P	<0.001	0.04	1.85	0.07
df	77	0.04	2.19	0.03
N	286 issues	0.04	2.85	0.00

Note. Advanced Products Division (APD) and the first pilot run serve as reference groups.

TABLE A2

OLS Model for Progress on Issues. Table A3 (next page)provides a summary of a regression model predicting the average rating of division progress made on an issue. The primary predictor is the proportion of group members who spoke about the topic, on average, during the simulation as captured by the HiFi system. This model includes fixed effects for the division that a participant belongs to and the specific pilot run of LOI that they attended. The coefficient for linear effect of the proportion of group members discussing a topic is positive and significant (B = 4.59, p = <.001), while the curvilinear effect is negative and significant (B = -2.27, p < .001). This pattern of results, depicted visually in Figure 9, indicate that as individuals within a division, on average, increasingly discuss a topic, the ultimate effect on the perceived amount of progress made gradually declines.

OLS MODEL REGRESSION INFLUENCE ON BOUNDARY SPANNING AND SPEAKING TIME

Term	Unstandardized Estimate	SE	Z-Statistic	*p*
(Intercept)	3.17	0.13	24.49	0.00
Connections within Conversational Network	4.59	0.71	6.48	0.00
Speaking Time	-2.27	0.70	-3.22	0.00
Pilot 2	-0.02	0.16	-0.10	0.92
Pilot 3	-0.17	0.16	-1.08	0.28
Pilot 4	-0.41	0.16	-2.56	0.01
Pilot 5	-0.28	0.16	-1.80	0.07
Pilot 6	-0.72	0.16	-4.44	0.00
Commercial Glass	0.03	0.11	0.24	0.81
Industrial Glass	0.13	0.11	1.15	0.25
Model Summary				
R^2	0.26			
F-statistic	8.50			
P	<0.001			
df	9			
N	231 issues/division			

Note. Advanced Products Division (APD) and the first pilot serve as reference groups. We excluded the executive committee from these analyses because several of their members (i.e., the vice presidents) are cross-classified with their respective divisions.

TABLE A3

LOOKING GLASS ORGANIZATIONAL CHART

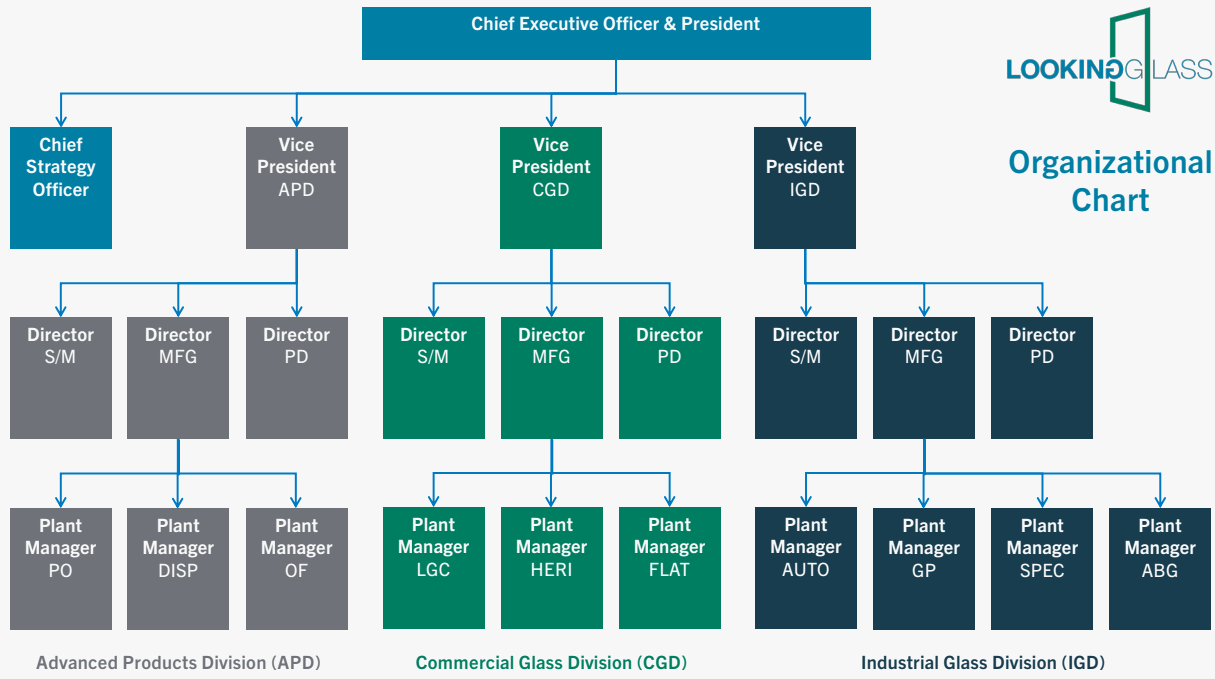

FIGURE A1

About the Authors

Andy Loignon, PhD

As a Senior Research Scientist at CCL, Andy Loignon currently works on projects related to collective leadership, work teams, and socioeconomic status in the workplace. For work teams, he is exploring how groups engage in different actions and processes dynamically to reach their objectives. For emerging leaders, his research focuses, in part, on how young people can overcome socioeconomic barriers and thrive as effective leaders. You can find some of his other research by visiting his Google Scholar page.

Diane Bergeron, PhD

Diane is a Senior Research Scientist at CCL. Her research areas include women's leadership, employee bereavement, and leader listening. She is particularly interested in how workplace helping can hinder women's career advancement; how organizations and managers can best support bereaved employees; and how leader listening is related to employees' speaking up with ideas and innovations. More of her research is listed on her Google Scholar page.

Karissa McKenna

Karissa McKenna is the product manager and a lead designer of CCL's Leading for Organizational Impact and Leadership Development Programs. She designs, manages, and facilitates leadership development solutions that leverage cutting-edge research to guide leaders in building the organizations of tomorrow while addressing the complex challenges of today.

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