THE LENS OF LANGUAGE INTELLIGENCE

A New Perspective on Incident Prevention

By Barry Nelson and Chuck Pettinger

In organizations worldwide, a ritual takes place each morning: the prejob safety meeting, known as job hazard analysis, job safety analysis or pretask planning. Work crews gather to align on the day's tasks, discuss potential hazards and strategize mitigation measures before work begins.

These morning conversations are an essential aspect of safety performance. Hinze et al. (2013) found that these morning meetings were one of 14 differentiating practices associated with reduced recordable injury rates.

The Conversation Problem

Studies have also found that these critical daily planning conversations lack substantive crew engagement, psychological safety to voice concerns and comprehensive hazard analysis to activate crews to work safely. A study by Olson et al. (2016) found that only 25% of surveyed crews attended pretask meetings, and for those present, craft workers spent 0% to 2% of the time contributing to the dialogue. Further, after analyzing thousands of morning pretask planning conversations, the authors found that 40% had only one person speaking, effectively creating a monologue rather than an open discussion to plan, collectively identify risks and develop controls. This lack of genuine communication represents a significant missed opportunity to cultivate leadership, align on expectations and maximize prevention through people engaging in hazard mitigation discussions.

The Paper Problem

While prejob planning has been an industry standard practice aimed at proactively identifying hazards, overreliance on the resulting written documentation poses significant limitations. The quality of information captured tends to range from dubious boilerplate hazard statements without substantive context to simple copy-and-paste jobs from previous plans. In many cases, what was written on the paper plan is seldom what actually gets discussed. Thus, confusion often exists among leaders and crews regarding the purpose and true value of these important daily exercises.

Static documentation fails to capture the nuances of live communication that directly impacts hazard recognition and prevention, including elements such as dialogue quality, questions asked, engagement levels, psychological safety and leadership effectiveness. Highlighting the critical role of team dynamics in safety performance, Hallowell et al. (2019) and others assert that effective safety leadership is more likely to happen when organizations foster a culture where every voice is heard, every concern is addressed, and every action is guided by a commitment to keeping each other safe. Organizational experts have found that high-quality conversations positively correlate with engaged employees, strong safety cultures and reduced incidents (Hinze et al., 2013). Ultimately, the true value has always been in the conversations themselves, not how well the paperwork was filled out. However, objectively measuring and optimizing these conversations at scale has proved an elusive challenge.

Analyzing Human Language With AI

Recent technological innovations in artificial intelligence (AI), machine learning and natural language processing (NLP) are transforming these daily planning conversations from paper checkboxes into catalysts for operational excellence (Pettinger & Nelson, 2024). By leveraging mobile technology to capture worksite planning conversions through video and audio recordings, construction firms can now automatically transcribe and analyze these daily exchanges.

Advanced language models can systematically analyze transcripts of the conversations to pinpoint key traits that enhance project safety and performance. Extensive research highlights that high-quality planning discussions correlate with improved psychological safety, comprehensive hazard analysis, effective communication, stronger care-based leadership, and positive cultural attributes such as engagement, trust and respect (Olson, et al., 2016; Pandit et al., 2019; Pentland, 2012). In essence, the substance and characteristics of these dialogues serve as powerful leading indicators of overall operational effectiveness and safety excellence.

Using Machine Learning to Evaluate Planning Discussions

While the benefits of enhancing prejob conversations have been theorized, only recently have innovations enabled scalable, empirical assessment of the communication dynamics that drive positive safety outcomes. This powerful new capability draws from pioneering work by Pentland (2012, 2015) and other scholars. Introducing groundbreaking techniques such as sociometric badges equipped with sensors, Pentland captured more than 100 data points per minute including team interactions, speech patterns, turn-taking, vocal tonality and body language. By analyzing these variables, Pentland uncovered vital correlations between equal conversational engagement and heightened team productivity and cohesion.

While sociometric badges are impractical for many work environments, Pentland's core premise spurred the development of new approaches leveraging mobile devices. Nelson and researchers from the University of Buffalo used smartphones and tablets to capture and analyze more than 5,000 pretask planning meetings across 74 construction worksites (Nelson, 2020; Nelson & Hirshfeld, 2020). By harnessing these readily available mobile devices, Nelson could study the dynamics of these critical safety discussions in real-world conditions. Applying machine learning models, Nelson's team assessed each recorded discussion based on factors including:

- participant engagement levels
- expressions of authentic care and trust
- question quality and active listening
- specificity of hazards discussed
- identification of serious injury and fatality (SIF) precursors

Conversation Quality Scores as a Performance Indicator

In one organization studied by Nelson and Hirshfeld (2020), the results were striking: Worksites averaging poor

conversation scores below 2.5 (out of 3) on the aforementioned factors experienced nearly four times more injuries than those conversations exceeding the 2.5 threshold. Findings validated that conversation quality could provide organizations with an additional source of leading indicators that can be scalable across entire organizations.

This research demonstrates the new potential for leveraging AI, machine learning and NLP to systematically decode workplace conversations in a way to potentially correlate language patterns with tangible outcomes such as safety incidents. The combination of automated transcription and machine learning models offers organizations a revolutionary lens into frontline activities such as planning, hazard awareness, communication practices and leadership effectiveness.

Assessing Conversation Quality at Scale

While the value proposition of optimizing pretask safety discussions is clear, manually evaluating thousands of conversations for critical attributes would quickly become impractical and negate the benefits of scalability. This is where AI unlocks these transformative capabilities. Through automated transcription and the application of deep learning language models, safety professionals can comprehensively analyze prework conversations based on the key characteristics of high-impact dialogues. Following is a summary of the steps involved:

1) Transcription using a transformer model and neural network: By leveraging transformer-based models for speech recognition and transcription, the spoken word is converted into text.

Next, advanced neural network architectures such as recurrent neural networks or sequence-to-sequence models are used to refine transcriptions, improve accuracy and accommodate diverse speech patterns.

2) Language translation: Now the language of the transcription needs to be standardized. By using AI models such as Google's Neural Machine Translation (GNMT) or Facebook's M2M-100 for language translation, it ensures seamless conversion of conversations across different languages into a standardized language for further processing.

3) Topic prediction: By employing NLP techniques to extract themes, transformer-based models can be used to identify and group conversation topics such as fall arrest, job scope or heat exhaustion.

4) Topic organization for data visualization: Clustering algorithms such as "k-means" or "hierarchical clustering" are then used to organize related topics based on semantic similarity. This helps facilitate data visualization and analysis of conversation dynamics.

5) Creation of meta topics: Next, NLP techniques such as "sentiment analysis" or "named entity recognition" help identify nuanced insights from individual topics to assess the quality and relevance of discussions. Aggregating these insights across conversations helps create meta topics, enabling a holistic understanding of conversation dynamics and facilitating deeper insights into complex datasets. For example, a meta topic could be high hazards, derived by combining all mentions related to identification and mitigation of high potential hazards throughout the conversation and then comparing this to other conversations throughout the organization.

Extensive research by Nelson and Hirshfeld (2020) and subsequent field deployments have culminated in frameworks such as the "simple seven" meta topic model for holistically assessing each discussion (Figure 1):

1) Care: Do the leaders demonstrate authentic care and concern for crew well-being? Is there mutual trust and respect?

2) Planning: Are expectations for the day's work scope clearly articulated? Does the discussion go beyond surface-level hazard statements?

3) Hazards: Which specific hazards are identified? How thoroughly are they analyzed by the team?

4) Participant engagement: Is there a genuine two-way dialogue with multiple voices actively contributing?

5) Observer engagement: How invested is the supervisor in facilitating open discussion through thoughtful questions?

6) Question quality: Are insightful, open-ended questions being asked to fully explore risks and controls?

7) High hazards: Are serious precursor conditions for potential fatalities and life-altering injuries being recognized?

FIGURE 1
SIMPLE SEVEN

The simple seven elements of highly effective safety planning conversations.

Conversation Scoring for Continuous Improvement

Leveraging machine learning models meticulously trained on expert evaluations by human analysts, organizations can generate standardized ratings for each recorded discussion across these seven domains. A recent model provides an overall conversation quality score on a 35-point scale and can more accurately identify the strengths and weaknesses within an organization's frontline processes.

For example, if a site or project consistently generates pretask planning conversation scores below 20, this quantitative indicator reveals characteristics of low psychological safety characteristics such as one-way communication, poor quality questions and cursory hazard discussion. These identified vulnerabilities enable immediate intervention from supervisors.

Conversely, discussions rating 25 or higher showcase exemplary traits to be promoted, such as care-based dialogue building trust, proactive identification of SIF precursors, observant supervision actively listening and inclusive engagement across the crew. Standardized scoring allows leaders to synthesize best practices from the linguistic evidence.

Moreover, the specificity of meta topic assessments pinpoints precise areas for continuous improvement. If a project excels in participant engagement but has lagging question quality scores, targeted training can enhance active listening abilities. With quantifiable conversation metrics replacing subjective evaluations, meaningful progress can be tracked over time.

Such capabilities represent a paradigm shift. Small companies can identify and address conversation quality issues undermining improvement efforts. Instead of reacting to injuries, near misses and stagnant performance, language analytics drive proactive risk mitigation by activating an underutilized leading indicator: the daily prejob safety conversation.

Construction Case Study: 18,718 Pretask Planning Conversations Captured

At Joseph J. Albanese Inc., a concrete contractor, communication disconnects in pretask safety meetings led to the adoption of capturing the company's morning planning conversations via mobile devices that were then transcribed and shared.

"Listening makes a huge difference in our overall daily site safety," says Ramiro Contreras, a structural concrete general superintendent at the company. "By engaging with everyone on the crew during our meetings, we build safer, more communicative workspaces."

Authentic Conversations

The core of communication transformation lies in encouraging authentic conversations during daily planning meetings. Instead of dictating what should be discussed, field employees shape the conversation, talking about what matters most to them and how to resolve issues, ultimately producing more valuable interactions. When the dialogue starts with the work at hand, it naturally leads to discussions about safety, hazards and hazard control without feeling forced.

"Using AI technology, we can amplify the voices of our field workers, enabling them to be heard and to share their insights, which humanizes the experience to optimize our field talent," says John Messing, the company's director of safety. "With the AI-based mobile app, we can see and hear what people say, how they say it and how they talk to each other as well as who is talking and who isn't talking,"

This technology enables everyone from top to bottom to learn what is otherwise unknown and therefore unteachable. It allows the team to model best practices and build a culture that truly cares about what the field workers have to say, not just what leadership tells them to do.

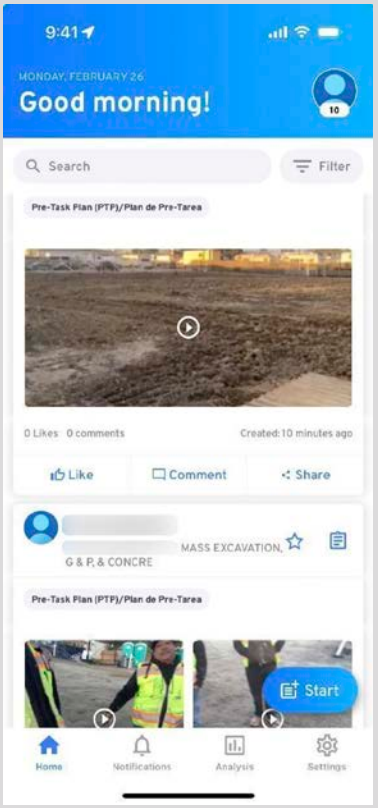
Enhanced Safety Planning

On every jobsite two or three times per week, the project management team, superintendents and safety managers participate in pretask planning meetings. During each meeting, safety concerns are identified, and plans are put in place to ensure the highest possible safety for the workers and others on the jobsite. The users record these meetings, as well as other relevant conversations such as observations and coaching sessions, on their cell phones, where they can make additional notes about the jobsite. The footage is uploaded to a secure server where it is analyzed and stored (Figure 2).

A mobile app provides an easy method for field leaders to capture daily planning conversations. Using this platform has helped the company capture, analyze and store thousands of videos of safety planning meetings across all of its projects. Once the recordings are uploaded, the mobile app works much like an internal social media app through which users can like, share and comment. It is searchable by hazard, controls or SIF precursor topics such as change or fatigue.

FIGURE 2
CAPTURING PRETASK MEETING FOOTAGE

Mobile app used to capture pretask meeting footage.



Over 12 months, the company has captured more than 20,000 video pretask planning conversations led by foremen or superintendents, more than 18,000 video observations, and nearly 3,500 pretask planning coaching sessions by the project management team, superintendents and safety professionals. Capturing and analyzing the video conversations enables the company to gain insights that improve safety planning and help elevate and reinforce the company's culture and core values.

Positive Impact on Company Culture

The conversations captured are a reflection of the company's culture and the health of its safety systems. High-performing teams engage in effective daily planning discussions, setting the stage for increased jobsite safety with fewer incidents and injuries. Conversely, a lack of meaningful conversations serves as a cultural red flag and highlights potential weaknesses and systemic issues that may hinder overall performance and safety. Teams understand that planning conversations are crucial to identifying and addressing issues before they become real problems.

Not surprisingly, the principles of effective daily planning conversations align with broader concepts of organizational

culture and high-performance teams. Academic research from various fields, even beyond safety, supports the importance of these conversations in building a strong and successful organizational culture.

While improving safety is the main purpose of capturing the morning planning conversations, Messing says that this activity has provided much more. "We're finding that people are more open in expressing concerns and appreciation, and there are significantly higher levels of active participation," Messing says. "The conversations include things that are going well, as well as issues that are concerning and need to be addressed."

The recorded video conversations reveal more than just what people say. More importantly, the videos also reveal how they say it, including facial expressions, conversation turns, voice inflection and the surrounding jobsite. They all provide new insights and observations, including:

- ability and willingness to discuss high-risk hazards
- transparency that people care about each other
- how well field leaders plan for safety
- confidence in field supervisors
- hazards to address so that additional safety measures can be implemented
- engagement between the team members, including active listening
- the health of systems and equipment at the site
- facts about what is happening on the jobsites

The analysis of the recordings provides Messing, his safety staff, the CEO and other leadership members with a window into their company culture that allows them to test and validate assumptions and gain insights into what is going on in the field.

"Using videos has also helped support our positive company culture by showing our team how much we care about their safety and how much we value their insights to improve safety," Messing adds. As a result, from the top down, field workers are more engaged with each other, more committed to safety and more comfortable speaking up. With this process in place, workers of all levels have a voice and can be heard. This approach not only enhances safety but also fosters a collaborative and supportive work environment.

Insights Become Catalysts for Safety Improvement

Beyond gaining insights, select videos are shared in weekly superintendent meetings, giving team members the ability to learn from their peers and gain insights for improvement. "When we share the videos, we focus on the positives," Messing says. "We highlight what went well and provide coaching to reinforce those positive actions. We're finding that field workers at all levels provide feedback, which helps elevate safety on their jobsites."

However, the effectiveness of these training interventions can vary depending on the existing climate within the organization. Research by Edmondson (1999) and Woolley et al. (2010) shows that organizations need fertile soil in place before the seeds of training interventions can grow. In their study of a corporate training program aimed at improving problem solving and communication between managers and subordinates, they discovered that success varied across the company. Improvements were greater in units that had already developed a "psychologically safe" climate in which subordinates felt free to speak up. This highlights the importance of fostering an environment conducive to open communication and feedback for training initiatives to yield optimal results.

Viewing the videos with the superintendents also enables the team to identify issues that need to be resolved or situations that need to be corrected to improve safety. "Utilizing videos has really helped us improve our overall safety performance through the education and coaching of our entire team," Messing says. In fact, after using this AI technology for 2 years, the company has reported a significant reduction in the severity of incidents.

Empowering Field Leadership Through Language Analytics

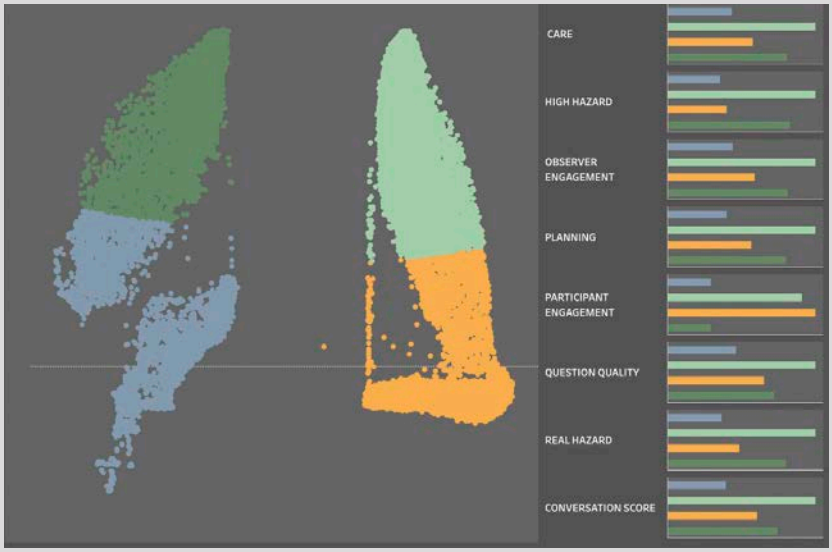
Messing and his team also appreciate the data capabilities that are automatically collected and calculated from the pretask planning conversation video footage using NLP and AI technology. For example, the analytics automatically categorize and score the conversations based on the simple seven: care, high hazard, observer engagement, planning, participant engagement, question quality, and a real hazard. It also works for Spanish-language conversations.

A unique feature is the creation of cluster-plot diagrams that help the team visualize the quality of the conversations and how the conversations are expressed (Figure 3). The ability to visualize how similar conversations group to each other and change over time allows the safety team to coach the field leadership on how to improve the environment for more effective conversations.

According to Messing, the technology provides insights that otherwise could not be obtained. "We can easily look at

FIGURE 3
SIMPLE SEVEN CLUSTER PLOT

This cluster-plot diagram reflects individual conversations scored on seven dimensions of quality. Conversations with similar qualities are automatically grouped together and enable the employer to visualize progress and conversation quality improvement over time or between operating groups.



the conversation scores to see who is doing well, for example, seeing how they create engagement, encourage second- and third-level questions and provide clear answers," Messing says. "The AI also shows us how our field leaders are performing. Focusing on having higher impact conversations has improved caring among the team and helped us build a better culture of servant leadership. Gratitude and compassion are hard to teach. It's easier to show when you can observe the actual conversation."

Elevated Safety & Improved Culture of Caring

"By listening to conversations and viewing the analytics, we can identify hidden leaders—the next generation of leaders—who lift up the entire workforce," says Phillip Albanese, the company's president and CEO. "With the help of AI insights, we're building a high-class, high-caliber and high-performance team. AI technology enables us to see and hear what we could not see and hear before. This allows us to think, imagine, reimagine and ultimately act in ways we couldn't do before."

Data analytics can visualize the cultural health of an organization over time. It objectively presents an organization's cultural progression, providing concrete evidence of the impact of changes in daily planning conversations. For companies that are striving to foster a culture of safety, this data-driven approach offers invaluable insights.

Building a Resilient Work Culture With Stronger Leaders

By collecting, transcribing, structuring and analyzing conversations, the company's leaders can uncover hidden opportunities for improvement, foster authentic conversations, and ultimately build a stronger, safer and more prosperous workplace. AI technology and data science have transformed the way company leaders view daily planning conversations, revealing their significance in shaping organizational culture and safety performance. "This innovative approach is not just about technology; it's about the power of understanding and harnessing the insights that lie within our daily interactions," Messing says.

"We've had a very strong adoption rate among our field leaders and workers," Messing adds. "Our workers understand the value of participating, which is a significant step forward in keeping them safe. They know that we value and care about their insights and ideas. They also know that we will provide the training and coaching they need to do their jobs in the safest way possible."

Crane Contractor Case Study: 50% Reduction in Safety Incidents

One crane contractor initially implemented a mobile AI platform to digitally capture and analyze frontline planning conversations. The explicit goal was to foster a more proactive, prevention-focused safety culture and move beyond increasingly stale lagging metrics.

The platform's automated transcription and language analysis features provided visibility into pretask planning processes across hundreds of operator-led discussions. "Suddenly, our company had actual data around culture and a tool that placed ownership in the hands of those carrying out important safety practices," recalls the safety director.

Previously obscured realities became clear, validating both vulnerabilities and strengths that leadership could objectively assess. Through the AI's multidimensional scoring, the firm identified teams, supervisors and locations exemplifying high psychological safety, substantive hazard analyses, and collaborative engagement worthy of being institutionalized as best practices. Conversely, the data exposed pockets with low conversational ratings, indicating one-way communication flows, inattentive supervision and cursory discussions around consequential risks such as dropped objects—weaknesses warranting robust interventions.

Equipped with this intelligence, leadership could provide targeted coaching, develop purposeful incentives, and facilitate focused troubleshooting dialogues to drive systemic improvements in conversation quality. The quantitative insights also highlighted emerging communication leaders worth nurturing as mentors across the organization.

As the conversational data accumulated over time, the firm could visualize the impacts of its interventions and empirically track progress, which could not be achieved through manual audits or observations alone. Leadership's commitment to action, founded on objective insights, catalyzed measurable culture change.

Most crucially, the improved conversation quality translated to safety performance gains. Within the first year of sustained implementation, the organization achieved a 20% reduction in safety incidents. This trajectory further accelerated, with a 50% reduction realized in year two.

"Leaders could easily quantify and demonstrate all the improvements crews had made according to high-impact safety indicators," the safety director explains. "This information helped other departments be more aware of the intrinsic value of an engaged safety culture."

"The objective was to move attention away from lagging, retrospective metrics to what was actively taking place in the field that would spur key preventative actions," the safety director says. "As teams improved using the AI analytics, they also gained efficiencies in planning highly effective safety conversations that could happen in less than 5 minutes."

Beyond these compelling outcomes, this contractor's journey exemplifies the path toward maximizing the potential of language AI to enhance prejob safety processes:

- clearly define improving team engagement and hazard awareness as a priority
- secure leadership commitment to prevention through people
- implement scalable technology to continuously capture reality
- use empirical linguistic data to identify model behaviors
- develop a coaching culture to proliferate best practices
- quantify impacts to sustain organizational commitment

While change management remains essential, this company's success demonstrates how innovative language AI can operationalize strategies that enable organizations to cultivate robust cultures of safety where open communication, observant leadership, psychological safety, and thorough risk assessments become the norm.

Utilities Case Study: 47% Reduction in Serious Safety Incidents

While the potential of language analytics is compelling across sectors, a large North American utility's implementation demonstrates the impacts that are achievable. The utility sought to elevate engagement quality and hazard awareness during pretask safety briefings critical for operations such as electrical switching and switching routing.

Initially adopting a mobile AI platform to capture field conversations, the utility rapidly acquired more than 100,000 transcribed briefing recordings from frontline teams across its service territory. Language models then analyzed each

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interaction based on meta topics such as planning clarity, care-based facilitation, crew participation, and identification of life-critical hazards.

Within weeks, previously obscured operational realities became visible through standardized conversation scoring. Emerging pockets of excellence with high ratings offered examples of effective leadership, psychological safety, and proactive risk management worth proliferating. However, the data also exposed vulnerabilities demanding immediate intervention, including consistently low scores at other sites signifying cursory discussions, inattentive supervision, and surface-level situational awareness around life-altering hazards like arc flash and switching errors.

Armed with this objective evidence, the utility could provide targeted development and restructure team assignments to strategically upskill at-risk groups. Existing mentors were paired with inexperienced teams requiring the most support on improving briefing quality. Concurrently, the evolving conversational data allowed leadership to quantify progress and sustain cross-functional commitment.

Within 1 year, the percentage of teams achieving "green" conversation scores of 28 or higher increased from 12% to 36% across the organization. Meanwhile, the population scoring in the severe "red" range of 14 or below decreased by 73%. Most importantly, these metrics translated to a 47% reduction in serious safety incidents.

As the initiative's executive sponsor reflected, "By using our daily briefing conversations as proactive leading indicators, we gained the capability to modernize our approach—predictive analytics replacing perpetual reaction to unwanted outcomes. The AI-based language insights empowered our people to get ahead of risks rather than getting ahead of us."

Getting Started: The Path to Sustainable Language Analytics

Given the potential of language analytics for driving safety improvement, a clear road map for enterprise-wide adoption and sustainment is crucial. Drawing upon lessons learned from many successful deployments, the following factors should be considered:

- **Problem identification:** Avoid framing this as merely introducing another technology solution. Begin by clearly defining whether ineffective daily planning conversations represent an existing systemic challenge undermining hazard mitigation and continuous improvement. Explicitly map the current state realities and shortcomings to prioritize.
- **Leadership alignment:** Outline the future state and secure visible commitment from executive sponsors and operational leaders. Articulate how optimizing these mission-critical conversations can measurably drive desired safety outcomes and broader business objectives such as efficiency, risk reduction and culture alignment.
- **Field engagement:** Proactively address frontline workforce trust and concerns through change management techniques. Invite respected employees to help cocreate the implementation approach based on their direct experiences, apprehensions and aspirations. Position the initiative as activating their voice and expertise.
- **Realistic expectations:** While AI can provide unprecedented operational insights, meaningful and sustainable culture change still requires parallel human-led interventions such as coaching, creating shared accountability, consistently modeling desired behaviors over time, and celebrating successes.
- **Capability development:** In addition to technical training, equip safety professionals and leaders with vital skills for interpreting conversation analytics, providing constructive feedback, facilitating focused improvement dialogues and nurturing continuous learning based on the intelligence gathered.
- **Iterative refinement:** Leverage the evolving conversational data as a method to help identify standout communicators worthy of being formally developed as mentors who can share best practices across the organization.

By thoughtfully using this approach, organizations can progress from reactively reviewing checklist-based prejob plans to proactively harnessing dynamic conversational intelligence. This elevated capability exponentially enhances frontline hazard awareness, care-based leadership impact, regulatory compliance, precision risk mitigation and a sustainable culture of safety.

The Intersection of Language & Safety

As Pentland (2012) says, "In the final analysis, it's not what we say, but how we say it that matters most." In organizations, rising above persistent safety challenges requires cultivating an authentic culture of prevention and care through the most fundamental human capacity: language.

By decoding the daily conversations using innovative language AI and machine learning, the safety professional can transition from an overreliance on enforcement-based safety driven by lagging metrics to an approach centered on fostering respect, gratitude, trust and collective hazard ownership through the

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creation of environments with a higher probability for psychologically safe conversations. The technology provides a method to automatically capture and analyze the conversational realities unfolding each morning, pinpointing coaching opportunities, elevating emerging leaders, mitigating risks with targeted interventions, and ultimately saving lives.

The stories of our lives are told through our words, and this sentiment holds particular weight in the context of daily planning activities within organizations, where commitments to safety are paramount. Today, these planning sessions are augmented by an "intelligent witness," a system or tool that ensures spoken words align with meaningful actions for safety. This ensures accountability and reinforces the importance of safety in everyday operations. Frontline leaders play a crucial role in this process. As they communicate with those facing the real dangers of work, they embody and transmit the organization's culture. Their words and actions set the tone for safety practices, emphasizing its significance, and promoting a safer work environment for all.

Conclusion

Organizations are just scratching the surface of using AI-powered language analytics to enhance safety conversations, operations and culture across many industries. The case studies presented demonstrate how organizations can leverage advanced technology to gain valuable insights into their pretask safety discussions, identify strengths and vulnerabilities, and ultimately drive measurable improvements in safety performance.

However, it is crucial to approach these findings with a critical perspective. While the correlations between language patterns and safety outcomes are compelling, more extensive research and validation are necessary to definitively establish causal relationships between specific language use and the prevention of serious injuries and fatalities. Safety performance is influenced by a complex interplay of factors, including leadership commitment, robust processes, accountability, and genuine employee engagement across multiple areas. Technology should be viewed as an enabler of these efforts rather than a standalone solution.

The approaches discussed in the article, such as encouraging interactive safety briefings, leaders expressing appreciation for raising safety concerns, and analyzing aggregate conversation data can indeed be constructive techniques. However, these techniques should be integrated into a broader systematic approach to improving safety culture. Building genuine trust within an organization requires consistent follow-through, and shifting mindsets and behaviors demands a clear vision, ongoing reinforcement, alignment of processes and measurement of key cultural indicators.

While the innovative use of AI and language analytics in pretask safety conversations holds great promise, it is essential to recognize that technology alone cannot guarantee improved safety performance. Organizations must adopt a comprehensive strategy that encompasses leadership commitment, employee engagement, robust processes and a strong safety culture. By leveraging the insights provided by AI-powered tools as part of a holistic approach, companies can work toward creating safer work environments and preventing injuries and fatalities. Further research is needed to validate the specific links between language patterns and safety outcomes, but the potential for AI to support and enhance safety efforts is undeniably promising.

A final thought from the authors: The intent of this article is to inspire and awaken the imagination of the safety profession. Our goal is to share our insights and provide a mental framework upon which you can build. Nothing would make us happier than knowing that this work has, in some way, given you the permission needed to unleash an otherwise constrained human imagination. We believe the answers are already known; they have just been too expensive or difficult to operationalize. Herein lies the real power of computational linguistics. **PSJ**

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Cite this article

Nelson, B. & Pettinger, C. (2024, Dec.). The lens of language intelligence: A new perspective on incident prevention. *Professional Safety, 69*(12), 39-45.

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