Better abstract or concrete, narrating or not: optimal strategies for the communication of innovation

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Abstract

Purpose – This paper investigates how two characteristics of language, abstractness vs concreteness and narrativity, influence user engagement in communication exercises on innovation targeted to the general audience. The proposed conceptual model suggests that innovation fits well with more abstract language because of the association of innovation with imagination and distal construal. Moreover, communication of innovation may benefit from greater adherence to the narrativity arc, that is, early staging, increasing plot progression and climax optimal point. These effects are moderated by content variety and emotional tone, respectively.

Design/methodology/approach – Based on a Latent Dirichlet allocation (LDA) application on a sample of 3225 TED Talks transcripts, the authors identify 287 TED Talks on innovation, and then applied econometric analyses to test the hypotheses on the effects of abstractness vs concreteness and narrativity on engagement, and on the moderation effects of content variety and emotional tone.

Findings – The authors found that abstractness (vs concreteness) and narrativity have positive effects on engagement. These two effects are stronger with higher content variety and more positive emotional tone, respectively.

Research limitations/implications – This paper extends the literature on communication of innovation, linguistics and text analysis by evaluating the roles of abstractness vs concreteness and narrativity in shaping appreciation of innovation.

Originality/value – This paper reports conceptual and empirical analyses on innovation dissemination through a popular medium – TED Talks – and applies modern text analysis algorithms to test hypotheses on the effects of two pivotal dimensions of language on user engagement.

Keywords Communication, Innovation, TED talks, Abstractness, Concreteness, Narrativity, Text analysis, Language

Paper type Research paper

Introduction

With the diffusion of digital communication and the growing need to involve the general public in innovation and technology, inventors, academics, start-uppers, and entrepreneurs, have increasingly invested in disseminating ideas, discoveries, and new products (Manning and Bejarano, 2017; Clingingsmith and Shane, 2018; Wang et al., 2019). Communication and dissemination activities have become important endeavors for innovation specialists to make the general public appreciate the value of studying, investing in, and being informed on the progress of technology and creative areas of human life (e.g. Maritz et al., 2014; Philipp-Muller et al., 2022).

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Digital formats, such as TED Talks, as well as TV and radio shows, such as VH1’s Storytellers and BBC’s The Life Scientific, feature several communication exercises intended to divulge innovation and science to non-technical audience (Miceli et al., 2020). In the last decade, the widespread use of social media has further raised challenges to design effectively the communication of innovators, as they often do not have the typical skills of influencers (Galetti and Costa-Pereira, 2017). In addition, the communication of innovation may pursue different goals: Popularization goals (as in television programs; e.g. LaFollette, 2019) and business-related goals (as in selling and fund-raising campaigns; Bargoni et al., 2022).

Indifferent of the communication means used and the objectives of communicating innovation, it is crucial to understand how to stimulate public appreciation of and engagement with innovation.

Despite the literature on the communication of innovation has analyzed the effect of some linguistic elements (e.g. rhetorical strategies – Short and Anglin, 2019; assertive vs interactive language - McSweeney et al., 2022; Parhankangas and Renko, 2017; objective vs subjective claims – Wang et al., 2021), other crucial language features remain unexplored. Following a recent research stream, which investigates the interaction between what is communicated and how that content is conveyed (e.g. Van Laer et al., 2019a), we propose that communication on innovation, targeted to the general public, can leverage on the type of language adopted. Specifically, we focus on two characteristics of language, that is, abstractness vs concreteness and narrativity. First, we hypothesize that, for communication related to innovation, a more abstract (vs concrete) language generates greater interest in the audience, due to the fit of innovation with higher (i.e. more abstract) construal (Wiesenfeld et al., 2017). We also propose that abstract language is even more appreciated in communication exercises on innovation showing high (vs low) content variety, since abstraction has the capacity to encompass various pieces of information (Erickson et al., 2005), different from concrete language, which tends to be more specific (Barsalou, 1999). Second, we hypothesize that narrativity of language increases the effectiveness of innovation-related communications, due to the fit of innovative projects with the temporal flow embedded in storytelling (e.g. Van Laer et al., 2019b). This effect is stronger for communication exercises featuring a more positive emotional tone, since positive emotions reinforce the achievement of promotion goals (e.g. Sergeeva and Green, 2019). The language elements we examine, abstractness vs concreteness and narrativity, are potentially pivotal in the innovation communication process, as previously demonstrated in other contexts, such as customer service interactions (Packard and Berger, 2021) and online reviews (Van Laer et al., 2019b). Moreover, we elaborate on the contingencies in which the effects of abstractness vs concreteness and narrativity may become even stronger, in the cases of high content variety and positive emotional tone, respectively. The variables included in our conceptual model are easily actionable, as those in charge of communication of innovation can adapt the content to achieve higher audience engagement.

We applied Latent Dirichlet allocation (LDA) to identify a sample of TED Talks focused on innovation topics (Blei et al., 2003). We then measured our key linguistic variables by means of text mining software LIWC and KNIME Analytics, and estimated a series of econometric models to test the hypothesized effects. The findings support our theoretical framework: The use of a more abstract language, particularly when combined with higher content variety, and the employment of a narrative language, particularly when accompanied by a more positive emotional tone, lead to heightened audience engagement.

This research contributes to the literature on innovation communication by enriching the discussion surrounding the impact of linguistic attributes on user reactions, as well as by investigating the role of storytelling in determining consumer assessments. Moreover, it provides practical guidance for inventors and innovation specialists seeking the most effective approach to communicate innovations to a lay audience. Furthermore, in the context
of innovations, this research provides insights on how to amplify engagement, an outcome that, in turn, produces significant positive externalities for companies, such as sales (Kumar et al., 2017; Liadeli et al., 2023).

We organize the reminder of the paper as follows. First, we analyze the current literature on communicating innovation and discuss the conceptual analysis underlying our theoretical framework. Second, we present the design of our study and the empirical evidence, with the description of the LDA application for the extraction of the TED Talks on innovation topics, the calculation of the linguistic variables of interest, and the estimation of econometric models employed for testing the research hypotheses. Finally, we discuss the theoretical and practical implications of the present work.

Conceptual analysis
The dissemination of innovative ideas and products has been a subject of scrutiny within the academic discourse, wherein scholars have examined this phenomenon through the dual lenses of innovation popularization (e.g. LaFollette, 2019) and business-related ventures (e.g. Manning and Bejarano, 2017). In the first case, the process of communicating innovations to a general audience can be situated within the framework of science popularization. From this perspective, television programs, which have a longstanding history dating back to 1940, provide the foremost exemplification (LaFollette, 2019). In science popularization exercises, such as in the television shows Scientific American Frontiers and Nova, rendering information more accessible is crucial. Indeed, popularized information tailored to non-specialists induces lay-persons to a heightened concordance with the content, compared to information tailored to an expert audience (Scharrer et al., 2017). Beyond the adaptation of the informational content, the way in which communication on innovation is formatted is also relevant. For instance, the emotions expressed by the speaker and evoked in the listener play an important role in conquering and keeping the attention of the audience (Bassols et al., 2013).

Today, the analysis of the popularization of innovation and science is enriched by the influential role played by social media platforms, which facilitate a close connection between the innovator and the audience. Analogously to influencers and content creators, it becomes relevant to generate distinctive and visually compelling content, while also employing hashtags judiciously (Barashkova et al., 2019). In most cases, innovators may not possess the needed expertise in effective social media communication. Therefore, collaborating with proficient influencers, especially for disseminating content with significant social implications, may represent a more advantageous strategy for innovation specialists (Galetti and Costa-Pereira, 2017). In an endeavor to understand how to divulge innovation, previous studies have proposed several factors that contribute to enhance engagement. These factors include the use of charismatic language (Tur et al., 2022), the establishment of a clear and recognizable source identity, the perception of authenticity in communication, and the fostering of para-social interactions (Zhang and Lu, 2023).

Considering the second conceptual lens, that is, the dissemination of innovation for business-related objectives, the innovator may target an audience of specialists (e.g. institutional investors) with whom initial contact is often established through an elevator pitch (Clingingsmith and Shane, 2018). Additionally, innovators may direct their efforts towards a non-specialist audience. A well-examined instance regarding business-related communication to non-experts involves crowdfunding platforms like Kickstarter. In this context, numerous scholarly works have analyzed how linguistic factors influence the efficacy of communicating innovation. For example, the type of language was studied comparing “ongoing journeys” and “results-in-progress” description styles (Manning and Bejarano, 2017), showing that languages adopting the “results-in-progress” style tend to
garner higher funds in reward-based platforms like Kickstarter (Cappa et al., 2021). Another open issue is whether language should emphasize individual benefits over collective ones. On this matter, the literature presents conflicting evidence. On the one hand, Allison et al. (2015) demonstrated the greater effectiveness of a language centered on aiding others. Conversely, Lagazio and Querci (2018) showed that Kickstarter campaigns emphasizing the social impact of the project tend to underperform. The individualistic (or egoistic) vs collectivistic (or altruistic) frames can be preferred depending on personal characteristics of the audience (Nielsen and Binder, 2021). Finally, studies on business-related perspectives have scrutinized the employment of various rhetorical strategies (Short and Anglin, 2019), the application of assertive language (McSweeney et al., 2022), an interactive linguistic style achieved through the incorporation of questions within textual content (Parhankangas and Renko, 2017), and the objective vs subjective claims (Wang et al., 2021).

Despite these previous contributions, numerous linguistic constructs remain open to examination in the context of communicating innovation to the general public. We aim to contribute to the literature by analyzing the effect of language abstractness (vs concreteness) on user engagement with the communication on innovation, and the moderating role of content variety. We also aim to examine the effect of the use of a narrative language and the moderating role of emotional tone.

Abstractness vs concreteness of language

Communication activities must use adequate language and style to keep the content engaging, accessible, and reliable. In that respect, one of the most relevant dimensions of language is abstractness vs concreteness (Packard and Berger, 2021). Abstractness refers instead to intangible concepts (Packard and Berger, 2021). Abstract terms are less easy to memorize and are related to motivations and desired states (Yang et al., 2011). On the opposite side of the continuum, concreteness is the extent to which words refer to a perceptible, tangible entity (Brysbaert et al., 2014). Concrete terms are easy to remember and to process and are associated to proximal, closer goals.

Most research on abstractness vs concreteness of language builds upon Construal Level Theory (CLT – Trope and Liberman, 2010). CLT proposes that people or objects are represented at different levels of mental construal depending on psychological distance. Specifically, psychologically close targets tend to be associated with more concrete elaboration. On the contrary, psychologically distant targets fit with more abstract elaboration. Trope and Liberman (2010) suggest that psychological distance may refer to spatial, temporal, or social distances.

Adopting the CLT theoretical background, consumer researchers have investigated the role of abstractness vs concreteness of language in different domains. On the one hand, Packard and Berger (2021) analyzed customer service interactions (calls and emails) and found that employees using a more concrete language generate more customer satisfaction, intention to purchase, and expenditures. On the other hand, Namkoong et al. (2019) examined how Google searches change as a function of causally uncertain events, as represented by tweets on popular events (e.g. Brussels airport bombing, Dwyane Wade announcing to leave the Miami Heat to join the Chicago Bulls). They found that individuals react more positively to abstract (vs concrete) messages in situations of heightened causal uncertainty and that this effect is stronger when the message source is socially prominent. In the context of novel ideas dissemination, Falchetti et al. (2022) demonstrated that a novice audience prefers communication emphasizing the “why” a new idea may work, whereas experts are more sensitive to the “how” a new idea may be put into practice.

Some authors have analyzed the effects of construal fit, that is, the matching between individuals’ styles of information processing (more abstract vs more concrete) and stimuli
construals. Humphreys et al. (2021) found support for a construal matching hypothesis, according to which consumers adopt different levels of construals at different stages of the buying behavior process. Specifically, during the informational stage, consumers tend to use less concrete search queries, whereas during the transactional stage, consumers use more concrete search queries. Moreover, consumers click more on search results fitting with their mindset. Connors et al. (2021) focused on how the relationships between consumers and brands can be improved by leveraging on concrete vs abstract language in marketing communications. They found evidence for a mindset-congruency effect, that is, matching close (distant) brands with concrete (abstract) language in marketing communications produces more favorable evaluations and behaviors. Previous studies, therefore, suggest that abstractness vs concreteness of language should fit with the object of communication exercises.

Building upon these studies, we propose that, when the object of communication concerns innovation, a more abstract (vs concrete) language is more engaging. In the eyes of the general public, innovation is associated with imagination, novelty, and creativity (e.g. Gumusluoglu and Ilsev, 2009; Shafique et al., 2020). As creativity and novelty stimulate individuals to elaborate on a new and different plan to solve open problems, higher construals (i.e. more abstract) appear more likely to fit with innovation (Wiesenfeld et al., 2017). Previous studies have indeed associated temporal distance and creativity ( Förster et al., 2004), suggesting that what refers to the future, such as innovation, matches with abstract construal. In line with this reasoning, Reyt and Wiesenfeld (2015) found that more abstract elaboration leads to more exploratory learning, thus supporting the link between higher construal and novelty also in organizational learning processes.

Based on these arguments, we predict that, for innovation-related communications the expected higher construal implies a greater fit with more abstract language. This prediction leads to hypothesize a positive effect of language abstractness (vs concreteness) on engagement. Formally:

$$H1. \text{ For innovation-related communications, abstractness (vs concreteness) of language has a positive effect on engagement.}$$

There are reasons to believe that the expected positive effect of language abstractness (vs concreteness) on engagement may be enhanced for innovation-related communications that tap into different content facets. Knowledge is organized hierarchically in categories (Markman and Ross, 2003; Rehder and Ross, 2001), ranging from low-level information about stimuli to higher-order categories. Whereas more abstract categories can effectively encompass multiple lower-level bits of information (Erickson et al., 2005), more concrete concepts tend to be more specific (Barsalou, 1999). These arguments suggest that more abstract language may work even better for innovation-related communication exercises that span across several content elements, because abstractness fits better than concreteness with heterogeneous bits of information.

We define content variety as the property of a communication exercise to tap into different topics and types of content (Nam et al., 2017; Moffett et al., 2021). A high content variety communication regards different information bits and covers multiple topics. A low content variety communication is more specific and covers one or just a few topics. For example, a communication on innovation in the field of sustainable mobility with high content variety embraces several sub-topics, such as the effects on future generations, liveability of urban centers, changes in consumer habits, environmental care. Instead, a communication on the same topic, but with low content variety, would focus only on one or a few closely related subtopics. We propose that content variety moderates the effect of language abstractness (vs concreteness) on engagement with innovation-related communication. Because of the greater fit between language abstractness and content variety, we predict that with higher levels of
content variety the effect of language abstractness (vs concreteness) on engagement becomes even more positive. Formally:

\[ H2. \] For innovation-related communications, the effect of abstractness (vs concreteness) of language on engagement is moderated by content variety. Specifically, with higher content variety the effect becomes more positive.

**Narrativity**

One popular approach to the communication of scientific content to the general public consists in using narratives, that is, descriptions that give meaning to stories and aim to involve the audience in the topic at hand (Van Laer et al., 2019a; Miceli et al., 2020). In this direction, a relevant stream of research has investigated the role of storytelling in persuasion and communication activities (e.g. Green and Brock, 2000; Van Laer et al., 2018), showing that well-crafted narratives can transport the audience and boost appreciation of the communicated object in both online and offline contexts. Also, narrative characteristics can be a discriminating feature in distinguishing true and false media messages (Hamby et al., 2024).

The literature on storytelling and narrative persuasion has investigated the structural elements that stories should include in order to generate a persuasive effect on receivers: (1) the plot, which defines the temporal sequence of the events; (2) the characters playing a role in the plot; (3) the climax, which derives from the change of the dramatic intensity along the plot; (4) the outcome, that is, the end state of the plot usually resulting from the characters’ resolution of a problematic event (Van Laer et al., 2014, 2018). High-quality stories transport receivers, allowing them to empathize with the story characters and activate mental imagery (Green and Brock, 2000; Escalas, 2004; Van Laer et al., 2014). As a consequence of narrative transportation, storytelling may elicit emotions and desires, change attitudes and behaviors, and form connections with the audience (e.g. Woodside et al., 2008). Research on the benefits of storytelling suggests that one of its most important area of influence is engagement behavior, implying that the audience is getting involved with the content of communication (De Oliveira Júnior et al., 2022). For example, Aleti et al. (2019) demonstrated that tweets of externally focused celebrities employing a narrative style determines more word-of-mouth than tweets featuring an analytical style.

Narrativity as a language feature is the extent to which a text tells a story (Van Laer et al., 2019b) and depends on the quality of the content (i.e. what is conveyed in terms of structural elements of a story, such as characters and events) and discourse (i.e. how it is conveyed in terms of use of literacy devices to frame the narratives). The highest the quality of narrative content and discourse, the greater the degree of narrativity of a text and its consequences on behaviors (e.g. engagement). Recently, literature on automated text analysis has developed original methods and techniques to assess the degree of narrativity of a text. One promising approach is based on the narrative arc analysis, which aims to identify and quantify the common structure that underlies narratives (e.g. Nalabandian and Ireland, 2019; Boyd et al., 2020). By connecting characteristics of language with the theory of narrativity, Boyd et al. (2020) proposed a framework including three primary processes that describe the dynamics of a story (Freytag and MacEwan, 1960): (1) staging, which refers to the storyteller setting the stage and establishing the context; (2) plot progression, which is the movement of the characters across time and space; (3) cognitive tension, which concerns the conflict that the characters must deal with and resolve. These three narrative processes determine different patterns of verbal behaviors (i.e. use of words) that jointly constitute a common, standard narrative arc. According to this model, texts featuring a higher degree of narrativity (as measured by LIWC 2022 – Boyd et al., 2022) are those showing a decreasing pattern of staging, and increasing progression plot and a reverse-U shape of cognitive tension.
Previous studies aiming at examining the role of storytelling and narrative persuasion in innovation communication showed that using narratives is essential for presenting innovation ideas, getting interest and support from others, achieving understanding of innovation and promoting successful stories to internal and external audiences (e.g. Sergeeva and Trifilova, 2018). Despite being a popular approach, however, the literature on communication of innovation has mostly neglected to measure the impact of narrativity. We propose that, when the object of communication concerns innovation, a higher degree of narrativity, based on the level of adherence to the narrative arc, leads to an increase of user engagement.

Innovation involves imagination, creative thought, and novel ideas. A key component of innovative projects is the capacity to imagine and to construct the future, by sense-making of past events, describing present and anticipating goals to be attained (e.g. Strand et al., 2018). This aspect matches with one of the structural elements affecting the level of narrativity of a text, that is, the story plot (or temporal embedding), which includes the narrative movement and the framing of the story. Temporal embedding indeed represents the chronological flow of the events that indicates the direction of the story, as well as the frame of relationships between story characters and events allowing to make causal inferences (Van Laer et al., 2014, 2019a). When used to communicate innovation topics, therefore, storytelling can help generating future vision and connecting past and future events, as part of ongoing entrepreneurial and innovation processes, to convey new and valuable pursuits towards various audiences (e.g. Manning and Bejarano, 2017). Thus, storytelling features a higher fit with content and purposes of innovation communication. By means of such kind of narratives, people may break away from current life to reconnect with creativity, illumination, and imagination. Research on entrepreneurship and innovation acknowledges that narratives also helps building and contextualizing relationships between actors and artifacts over time, thereby informing the ways in which innovators and their projects interact with core audiences. Finally, narratives have important performative effects as they function as triggers for action towards dynamic goals (Garud and Giuliani, 2013; Garud et al., 2014).

Based on these arguments, we predict that for innovation-related communications the expected higher fit with the narrative arc generates a positive effect of language narrativity on engagement. Formally:

H3. For innovation-related communications, narrativity of language has a positive effect on engagement.

There are reasons to believe that the expected positive effect of language narrativity on engagement may be amplified for innovation-related communications featuring a more positive emotional tone. Narratives often elicit emotions or feelings (Escalas et al., 2004) allowing to develop the story plot up to the climax, which indeed represents the emotional and narrative construction leading to a key turning point in the story (Van Laer et al., 2014). Consistent with the literature on storytelling, previous research on communication of innovation has also showed that future vision and imagination embedded in narrating innovative projects often imply a more emotional style of audience engagement (e.g. Manning and Bejarano, 2017). Moreover, anecdotal stories of innovation tend to be engaging and emotionally-laden or marked (Sergeeva and Green, 2019).

In communication exercises on innovation, the link between stories and emotions may be stronger when the narrative construction is based on positive emotions. Discussing emotion narratives, Lazarus (1999) has claimed that different emotions have different “plots.” For example, in a positive tone narrative, achievement of a goal may result in a sense of joy, whereas in a negative tone narrative failing to achieve goals produces regret. Therefore, narratives depicting specific emotion plots should evoke the corresponding feelings in the
audience. Higgins (1998) has emphasized that experiencing positive emotions motivate
individual to reach promotion goals, whereas avoiding negative emotions regulate
prevention behaviors. These contributions suggest that, for innovation-related
communications, storytelling may work even better when it uses a more positive
emotional language, because emotional stories using a positive tone reinforce the way
innovators seek empathy, understanding, and support from others when presenting their
innovative projects and goals to be attained.

Consumer language research has demonstrated that linguistic features associated with
emotions play an important role in driving user engagement (e.g., Berger et al., 2023). We
consider the emotional tone of a text as a psycholinguistic variable, which summarizes the
presence of positive and negative emotions in a text and varies from very negative tone to
very positive tone. We propose that emotional tone moderates the effect of language
narrativity on engagement with innovation-related communications. Because of the greater
fit between language narrativity and a more positive emotional tone, we predict that with
higher levels of emotional tone the effect of narrativity on engagement becomes even more
positive. With lower levels of emotional tone (i.e., more negative emotional tone), the same
effect disappears since narratives reflecting more negative emotion plots are likely to induce
the corresponding feelings in the receivers, thus reducing their engagement. Formally:

\[ H4. \text{ For innovation-related communications, the effect of narrativity of language on engagement is moderated by emotional tone. Specifically, with more positive emotional tone the effect becomes more positive.} \]

Figure 1 synthesizes our conceptual model.

We tested our hypotheses analyzing the transcripts of a sample of TED Talks on
innovation and estimating the effects of our main predictors and moderators on engagement
with the talk.

![Figure 1](#)

**Figure 1.** The conceptual model

Source(s): Author’s own work
Empirical evidence

Research design

On March 2023, we scraped the transcripts, tags, likes and views of all TED Talks in English, published from October 2008 to March 2022. After that date, tags, which are important pieces of information for our empirical analysis, were no longer available. TED Talks are video-presentations from important speakers on technology, education, and science, and represent, therefore, an ideal context to study how language features impact engagement with communication exercises on innovation. Also, the structural characteristics of TED Talks, such as the 18-min duration limit, the focus on the speaker, positioned at the center of the stage, and the use of slides to accompany the presentation, reduce the heterogeneity of the performances. After excluding pure art performances (with no transcript) and one talk which features only one TED-specific tag, our sample included 3,225 talks. We excluded tags related to the specific type of event (e.g. TED-ed, TED en español) and tokenized tags with common stems (e.g. “books” and “book” were both analyzed as “book”).

Classifying TED talks

We applied Latent Dirichlet allocation (LDA) on the talks’ tags to extract a set of topics and to classify the talks accordingly. LDA (Blei et al., 2003) allows analyzing texts by means of a probabilistic model that identifies latent (i.e. not observable) topics characterized by common texts – in our application, tags. LDA is arguably the most popular topic model (Schwarz, 2018) and permits to cluster observations into a certain number of topics based on the posterior probabilities to belong to a specific topic. LDA has been applied to analyze and classify several types of textual data, such as the description of technological products (Crocco et al., 2022; St John et al., 2022) and studies on digital transformation (Madzik et al., 2023).

To select the optimal k-topics solution, we employed the default values of the alpha (0.25) and beta parameters (0.1; Schwarz, 2018) and used the perplexity index (the lower the better), supplemented with qualitative interpretation of the extracted topics (e.g. Zhao et al., 2015). This led us to select the 8-topic solution, including Innovation (representative tags: technology, innovation, computers, future; N = 287), Business sustainability (business, sustainability, design, environment; N = 389), Social issues (social change, society, activism, global issues; N = 649), Nature (nature, biology, animals, science; N = 265), Medical sciences (health, science, medicine, health-care; N = 450), Self (personal-growth, psychology, life, self; N = 475), Creative arts (art, entertainment, creativity, music; N = 331), and Education (animation, culture, education, history; N = 379). Since our goal is to test our model on innovation-related communications, we selected the 287 TED Talks that were classified in the Innovation topic and conducted econometric analyses on this sub-sample.

Data and measures

We measured our dependent variable, engagement with the talk, summing the natural logarithms of likes and views. Likes and views are perfectly correlated and are both right-skewed, thus suggesting normalizing the distributions by applying the log-transformations.

We measured language abstractness using the bootstrapped version of the MRC psycholinguistic dictionary (Paetzold and Specia, 2016). The MRC dictionary assigns a score of concreteness from 100 to 700 to over 85,000 English words. Using KNIME Analytics, we inverted the concreteness score (800 – x) and computed an average score per talk, in which higher scores indicate more abstract language and lower scores indicate more concrete language. For instance, Sam Harris’ TED Talk on artificial intelligence [1] shows a high average abstractness score, as it mostly features abstract words (e.g. malevolent, virtue, intuitions). Differently, Sajan Saini’s TED Talk on the Internet [2] shows a low average abstractness score, as it mostly includes concrete terms (e.g. glass, water, cable).
We measured narrativity using the LIWC 2022 narrative arc module (Boyd et al., 2022). The narrative arc considers three components of a story: *staging, plot progression, and cognitive tension*. The LIWC 2022 narrative arc module quantifies the three components based on the use of specific, representative language features and assess the extent to which a text follows the normative behaviors typical of “good” narratives. The LIWC 2022 Narrativity scores range from $-100$ to $+100$. A narrativity score of $+100$ implies that the analyzed text aligned perfectly with the normative shapes of three components; a narrativity score of $-100$ suggests a text that does not adhere at all to narrativity patterns. For instance, Raffaello D’Andrea’s TED Talk on drones [3] was classified as a high narrativity talk in our analysis, due to strongly positive scores on staging, plot progression, and cognitive tension – i.e. this talk adheres clearly to the narrative arc normative patterns. On the opposite, Qiuqing Tai’s TED Talk on social media short videos [4] shows strongly negative scores on the three dimensions – i.e. this talk does not fit the narrative arc standards.

We measured content variety by summing up the tags attached to each talk, assuming that talks that were linked (by TED Talks’ content managers) to more topics feature more content variety. For instance, Amit Sood’s TED Talk on the Google’s Cultural Institute and Art Project [5] features 22 tags, from beauty to technology, from data to history, thus showing high content variety. Differently, Rodney Brooks’s TED Talk on robots [6] features just two tags, robots and work, and is therefore a good example of low content variety communication.

We measured Emotional Tone by means of the LIWC 2022 *Tone* variable, which assumes values between 0 (very negative tone) and 100 (very positive tone). For instance, Thomas Suarez’s TED Talk on app development [7] shows a high emotional tone score, as it features a majority of positively-valenced words (e.g. good, fortune, like). On the contrary, Eva Galperin’s TED Talk on cyber-security [8] shows a low emotional tone score, as it includes several negatively-valenced words (e.g. bad, threats, abuser).

We controlled for a set of variables characterizing the specific talk or that previous research has proposed as relevant variables in text analysis applications. Specifically, we measured trend (by means of a temporal counter, to account for time effects), talk duration in seconds, the LIWC authenticity (e.g. Cascio Rizzo et al., 2023), time-perspective and motion-perspective (e.g. Stolarski et al., 2020), and first persons’ pronouns (e.g. Packard et al., 2018). Moreover, to control for talk complexity, we used the Age of acquisition dictionary (from the MRC psycholinguistic dictionary; Paetzold and Specia, 2016), which assign higher scores to words that are acquired later and are therefore more complex. We computed an average score of complexity for each talk. Table 1 shows descriptive statistics and correlations between the variables.

### Econometric models

To facilitate the interpretation of interaction effects, we mean-centered the independent, moderating, and control variables. Since a White test suggests that the model is heteroskedastic ($\chi^2(77) = 131.60, p < 0.01$), we use robust standard errors to ensure correct inference. To test $H1$ and $H3$, we have first estimated a direct-effects model. To test $H2$ and $H4$, we have then estimated a model including the two relevant interaction terms. Table 2 shows the results.

In the direct-effects model, the effect of abstractness is positive ($b = 0.04, p < 0.01$), suggesting that more abstract language generates higher engagement with the talk. The effect of narrativity is positive ($b = 0.01, p < 0.05$), implying that language fitting with the narrativity arc determines higher engagement with the talk. These results support $H1$ and $H3$.

In the interaction-effects model, we have found that the abstractness $\times$ content variety term is positive ($b = 0.01, p < 0.05$). Probing this interaction, we have discovered that when content variety is very low (at its 10th percentile) or low (at its 25th percentile) the effect of...
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<td>-0.01</td>
<td>1.00</td>
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<td>-0.03</td>
<td>-0.20</td>
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**Note(s):** Correlations larger than |0.12| show \(p < 0.05\); correlations larger than |0.15| show \(p < 0.01\)

Engagement = Ln Views + Ln Likes

**Source(s):** Authors' own work
abstractness on engagement is not significant \( (b_{\text{very low}} = 0.02, p > 0.33; b_{\text{low}} = 0.02, p > 0.15) \), but the same effect is increasingly positive from median to very high levels of content variety (at its 50th, 75th, and 90th percentiles: \( b_{\text{median}} = 0.03, p < 0.02; b_{\text{high}} = 0.05, p < 0.001; b_{\text{very high}} = 0.07, p < 0.001 \)). This evidence confirms that the positive effect of abstractness on engagement, that is, the boosting effect of language abstractness, is even stronger for talks with higher content variety, supporting H2. Figure 2 depicts this interaction effect.

![Figure 2](image)

**Figure 2.** The abstractness \( \times \) content variety interaction

**Source(s):** Author’s own work
We have also found that the narrativity × tone term is positive ($b = 0.00, p < 0.05$). When probing this interaction, we have found that when tone is very low (at its 10th percentile) or low (at its 25th percentile) the effect of narrativity on engagement is not significant ($b_{very\ low} = -0.00, p > 0.88; b_{low} = 0.00, p > 0.40$), but the same effect is increasingly positive from median to very high levels of tone (at its 50th, 75th, and 90th percentiles: $b_{median} = 0.01, p < 0.02; b_{high} = 0.01, p < 0.01; b_{very\ high} = 0.01, p < 0.001$). This evidence confirms that the positive effect of narrativity on engagement increases for talks featuring positive emotions, supporting H4. Figure 3 depicts this interaction effect.

Assumptions’ checks
We have checked the tenability of OLS assumptions to verify that our results can be trusted. First, as mentioned, having violated the homoskedasticity assumption, we have used robust standard errors. Second, multicollinearity is not an issue, as VIF are all lower than 1.88. Third, since the data are temporally ordered, we have tested for autocorrelation. The Durbin–Watson statistic is 1.99, which falls in the region of acceptance of the null hypothesis of absence of autocorrelation. Finally, the fact that the engagement measure is a reaction to the talk features (i.e. language dimensions) and the presence in the model of several control variables, we can confidently conclude that the model does not suffer from evident endogeneity problems.

Robustness analyses
To ensure the stability of the presented results, we conducted a series of robustness analyses. First, the two interaction effects remain stable when including one multiplicative term at a time ($b_{Abstractness\ \times\ Content\ variety} = 0.01, p < 0.05; b_{Narrativity\ \times\ Tone} = 0.00, p < 0.05$), with the same pattern of simples slopes. Second, we re-estimated the models using different measures for our key moderators. Specifically, we used the original number of tags (without excluding those related to specific TED events and without tokenization) as an alternative measure of

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**Figure 3.** The narrativity × emotional tone interaction

Source(s): Author’s own work
content variety, and the Lexical Suite valence measure (0 = very negative, 9 = very positive – Rocklage et al., 2018) as an alternative measure of emotional tone. Using the alternative measures of the moderators provide further confirmation to the presented evidence ($b_{Abstractness \times \text{Content variety}} = 0.01, p < 0.05; b_{Narrativity \times \text{Tone}} = 0.01, p = 0.01$). Third, we used a different measure of language abstractness vs concreteness, applying the Brysbaert et al. (2014) dictionary, again reversing the scores to get a measure in which higher scores indicate more abstract language and lower scores indicate more concrete language (to the best of our knowledge, there is no an alternative automatic measure of narrativity). The results stay the same (Direct-effects model: $b_{Abstractness} = 3.47, p < 0.05; b_{Narrativity} = 0.01, p < 0.05$; Interaction-effects model: $b_{Abstractness \times \text{Content variety}} = 0.52, p < 0.05; b_{Narrativity \times \text{Tone}} = 0.00, p < 0.05$). Also, crossing these alternative measures in various ways left the results unchanged or slightly better. Finally, we re-estimated the models excluding five talks with less than 500 words and one talk with more than 4,000 words, which may be outliers. Results even improved in terms of inferential evidence (Direct-effects model: $b_{Abstractness} = 0.04, p < 0.01; b_{Narrativity} = 0.01, p = 0.01$; Interaction-effects model: $b_{Abstractness \times \text{Content variety}} = 0.01, p < 0.05; b_{Narrativity \times \text{Tone}} = 0.00, p = 0.01$). Overall, these additional analyses provide confirmatory evidence of the stability of the results and support to our hypotheses.

**General discussion**

This paper examines the impact of two distinct language attributes, abstractness vs concreteness and narrativity, on the level of engagement elicited by communication on innovation targeted to non-expert audiences. By conducting a series of econometric analyses on a sample of TED Talks on innovation, extracted by means of a Latent Dirichlet allocation application and enriched by means of text mining software to measure the key linguistic variables, we have demonstrated that the adoption of more abstract (vs concrete) language and the use of a narrative language in the discourse exert a positive influence on audience engagement. These two effects are moderated by the content variety and the emotional tone of the speech, respectively. Specifically, the influence of abstract language is stronger with higher content variety, and becomes null in cases of limited heterogeneity in the topics covered. Additionally, the impact of the narrative language increases with a more positive emotional tone and becomes null when a negative emotional tone is prevalent.

Our research integrates and contributes to a recent literature that aims to study the effects of linguistic constructs and language type on consumer reactions (Humphreys and Wang, 2018). With reference to the literature on the communication of innovation, several studies have tried to investigate the effects of specific determinants, such as the use of rhetorical strategies (Short and Anglin, 2019), the application of assertive or interactive language (McSweeney et al., 2022; Parhankangas and Renko, 2017), and the use objective vs subjective claims (Wang et al., 2021). We complement the existing literature by introducing determinants that have not yet been thoroughly examined. Specifically, we demonstrated that the employment of abstract language, when coupled with sufficient content variety, boosts audience engagement. Secondly, our study makes a noteworthy contribution to the debate on the effects of storytelling – a narrative expedient that has garnered substantial attention for its potential to positively impact consumer reactions (e.g. Van Laer et al., 2019a). While the innovation literature has previously examined the role of storytelling in communicating the innovation process, with a particular focus on the comparison between “ongoing journeys” and “results-in-progress” (Manning and Bejarano, 2017; Cappa et al., 2021), our research extends this body of work by measuring the degree of narrativity used to communicate innovation and demonstrating that stories fitting with the narrative arc (early staging, increasing plot progression, reverse-U shaped cognitive tension; Nalabandian and Ireland, 2019; Boyd et al., 2020) significantly enhances audience engagement. Moreover, we
establish that this effect is contingent upon emotional tone, revealing instances where storytelling can be more effective or fail to engage.

Our research offers several managerial implications that can aid innovators, start-uppers, and entrepreneurs in effectively communicating novel ideas or products. First, our findings advocate in favor of the use of abstract language. For instance, in the case of popularization goals, to describe an innovation reducing pollution effects, it is preferable to use an abstract language encompassing a multitude of concepts (enhanced quality of life, reductions in diseases, fostering a better future for upcoming generations, promoting the economy through green incentives, etc.), rather than delving deeply into a singular aspect. To provide a practical illustration in the case of business-related goals, a company might describe a new product emphasizing its tangible attributes (e.g. newly developed components) or alternatively, underline the benefits it conveys using a more abstract approach. Our results indicate that the latter strategy proves more effective, particularly, when the content of communication exercise exhibits sufficient heterogeneity. Second, our research recommends that practitioners employ a narrative language. This notion aligns with Bassols et al. (2013), emphasizing the equal importance of content style management alongside the content itself. Accordingly, the presentation of innovation should be articulated adhering to a structural framework characterized by a diminishing sequence of staging, an escalating plot progression, and a reverse-U pattern of cognitive tension (i.e. narrative arc). Furthermore, the moderating influence of emotional tone is relevant in several types of content. For example, in a discussion on the benefits of technological innovations regarding sustainability (e.g. Dhliwayo and Chebo, 2022), the use of narrative language can increase the engagement and work even better with a more positive emotional tone. On the opposite, discussions concerning innovations frequently encompass topics such as the perils of artificial intelligence (De Bruyn et al., 2020) or issues related to privacy concerns (Martin and Murphy, 2017; Sestino et al., 2023). In these instances, where the emotional tone of the discourse leans towards the negative end, using a narrative language fails to yield benefits. Thus, it is advisable to employ a narrative language exclusively when expounding on the merits of an innovation (characterized by a positive tone), rather than when centering the discussion on potential hazards (marked by a negative tone).

Our research is subject to some limitations that offer opportunities for future investigation. First, our data analysis was confined to a single context (TED Talks) mostly related to the popularization goal. Despite we do not expect an impact of the type of goal (i.e. popularization vs business-related) on the investigated relationships, future studies might consider contexts oriented exclusively towards selling or fund-raising objectives, such as Kickstarter. Second, TED Talks have structural characteristics predefined by the organizers, such as the standard duration, and the opportunity for speakers to use speech support tools like slides. Despite the fact that TED Talks peculiarities reduced noise in our analyses, future research could analyze contexts in which the communication format is different, for example by analyzing longer interventions or in which speakers do not use support elements like slides. Third, forthcoming research might seek to replicate our findings within an experimental setting, thereby enhancing the internal validity of the results. Overall, tests of assumptions and robustness replications give us confidence in the presented evidence, but experimental research can provide further support to our conceptual model. Forth, due to the use of secondary data, considerations related to the audience personal characteristics, which could potentially moderate the hypothesized relationships, were not taken into account. For instance, future studies could consider factors like the audience level of expertise (Alba and Hutchinson, 1987) or its degree of involvement (Celsi and Olson, 1988), which may change the impact of employing an abstract style or a narrative language on audience engagement. Lastly, future research could explore the effects of abstractness (vs concreteness) and narrativity on other outcomes. For example future studies may focus on metrics of attention...
on the type of interaction generated by the content of communication, performing text analysis on the comments (e.g. Unnava and Aravindakshan, 2021).

Notes
1. https://www.ted.com/talks/sam_harris_can_we_build_ai_without_losing_control_over_it
2. https://www.ted.com/talks/sajan_saini_the_hidden_network_that_makes_the_internet_possible
5. https://www.ted.com/talks/amit_sood_every_piece_of_art_you_ve_ever_wanted_to_see_up_close_and_searchable
6. https://www.ted.com/talks/rodney_brooks_why_we_will_rely_on_robots
7. https://www.ted.com/talks/thomas_suarez_a_12_year_old_app_developer
8. https://www.ted.com/talks/eva_galperin_what_you_need_to_know_about_stalkerware

References


Strategies for communication of innovation


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