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HOW CAN LEADERS OVERCOME THE BLURRY VISION BIAS? IDENTIFYING AN ANTIDOTE TO THE PARADOX OF VISION COMMUNICATION

ANDREW M. CARTON
University of Pennsylvania

BRIAN J. LUCAS
Cornell University

Evidence suggests that organizational leaders can inspire employees by communicating a vision of the future with image-based rhetoric—words and phrases that are readily envisioned in the mind's eye (e.g., "our vision is to make moviegoers laugh"). Yet research has demonstrated that most leaders do not craft visions with image-based rhetoric, instead favoring abstract language that cannot easily be visualized. We integrate theory on leadership and dual cognitive processing to argue that this problem is exacerbated when leaders focus on word selection when crafting visions because they overemphasize the meaning-based cognitive system (in which they consider the abstract meaning of words) and underemphasize the experience-based cognitive system (in which they can generate vivid mental images of what the future could look like). We introduce a novel tactic to help leaders activate the experience-based system and, in turn, generate and communicate more impactful visions. We also investigate boundary conditions. We test our predictions with three experiments featuring three distinct samples, including one with senior corporate executives and one in which members of the British government crafted visions on the day Britain announced it would exit the European Union ("Brexit").

Some of the most successful organizational endeavors have been credited to leaders who galvanized collective action by articulating a compelling purpose. For example, Bill Gates envisioned a "computer on every desk and in every home,"[1] John F. Kennedy challenged NASA to land "a man on the moon,"[2] and Henry Ford imagined a "motor car for the great multitude" that people could enjoy for "hours of pleasure in God's great open spaces."[3] The extent to which leaders effectively articulate a sense of purpose is central to our understanding of not only how they inspire action, but the very concept of leadership itself, because leading is defined as the process of influencing others to achieve a common purpose (Locke, 1999). Indeed, one of the few points of overlap among a range of modern leadership theories is that the ability to convey a sense of purpose is one of the most essential leadership skills (Bass, 1990; Greer, Homan, De Hoogh, & Den Hartog, 2012; Nanus, 1992; Stam, Lord, van Knippenberg, & Wisse, 2014; van Knippenberg & Sitkin, 2013).

The above examples of Gates, Kennedy, and Ford are telling not only because each leader articulated a compelling purpose, but because they did so by employing image-based rhetoric, which we define as language that depicts objects (e.g., "cars"), actions (e.g., "driving"), and events (e.g., "landing on the moon") that can be observed with one's senses. Leaders can use image-based rhetoric to enliven one of the most important rhetorical tactics for communicating purpose: the vision (Stam et al., 2014). Compared to abstract rhetoric (e.g., "aiming for excellence"), image-based rhetoric engages employees' emotions and provides a shared point of reference

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[1] The full quote is available at: https://www.telegraph.co.uk/technology/3357701/Bill-Gatess-dream-A-computer-in-every-home.html.

[2] The full quote is available at: https://www.jfklibrary.org/Asset-Viewer/Archives/JFKWHA-032.aspx.

[3] The full quote is available at: https://www.thehenryford.org/collections-and-research/digital-resources/popular-topics/henry-ford-quotes/.

around which different subgroups can coordinate (Emrich, Brower, Feldman, & Garland, 2001). By vividly depicting an event or outcome that an organization can one day realize, image-based rhetoric reflects the notion that a vision is a "portrait" of an ideal future (Rafferty & Griffin, 2004) and underscores the very essence of the word "vision"—the ability to see.

Despite the clear reasons for crafting and communicating vivid visions, leaders tend to communicate visions with abstract rhetoric (Carton, Murphy, & Clark, 2014; Emrich et al., 2001), a phenomenon we call the "blurry vision bias." This bias largely stems from the reality that people tend to think abstractly as they ponder the distant future (Trope & Liberman, 2003). Given that dominant perspectives on vision communication assume that leaders can improve vision communication by carefully attending to word selection (Gardner & Schermerhorn, 2004), the solution to the blurry vision bias is ostensibly straightforward: leaders should consciously focus on incorporating image-based rhetoric into their visions. Consistent with this idea, those who argue for the value of imagery in vision communication have implicitly assumed that leaders who are informed of the importance of this type of rhetoric will be fully capable of incorporating it into their visions (Carton et al., 2014; Collins & Porras, 1994; Emrich et al., 2001).

We challenge this assumption by evaluating theory on vision communication through the lens of dual cognitive processing. When people focus their attention directly on language, they activate the part of their mind—the meaning-based system—responsible for considering abstract concepts ("superior customer service") rather than the part of the mind—the experience-based system—responsible for processing sensory information about the outside world and mentally simulating real life experiences ("watching customers smiling as they dine in our lively restaurants"). When leaders do not have an image in their mind, they are less likely to employ image-based rhetoric in their visions. Thus, even leaders who deliberately focus on constructing visions with image-laden rhetoric are likely to continue to craft and communicate abstract visions.

To identify an antidote to the blurry vision bias, we further develop the link between leader communication and dual cognitive processing. We examine a tactic—mentally projecting oneself to a moment in the distant future, akin to mental time travel (Suddendorf, Addis, & Corballis, 2009)—that targets the experience-based system rather than the meaning-based system. Rather than contemplate the distant future abstractly, this tactic impels leaders to imagine the future in vivid detail, as if they are directly observing a future scenario through firsthand observation. When leaders who take a mental leap forward in time are prompted to describe their mental imagery in words, they reflexively employ image-based rhetoric since it represents the most appropriate type of language for communicating vivid images. We further harness theory on dual cognitive processing to identify a personality difference (efficient versus analytical thinking) that explains which leaders benefit most from imagining how the distant future will be experienced firsthand. We test our predictions in three experiments—one launched on the day of "Brexit" (June 24, 2016, when Britain announced it was leaving the European Union) that featured British government employees (Study 1); one featuring leaders with various spans of control (Study 2); and one exclusively featuring upper echelon leaders (Study 3). In this latter study we assess whether the visions executives crafted as a result of our intervention inspired their employees.

Our findings redirect theory on leadership in several ways. Through a framework informed by dual cognitive processing, we shed light on a series of key questions pertaining to vision communication: why the blurry vision bias exists, what tactic can correct it, how this tactic works (mediating processes), and when it works most effectively (moderating processes). In doing so, we first explain why an assumption that underlies dominant perspectives in theory on vision communication as well as the intuition of leaders themselves (that leaders should focus intently on word selection), is incongruent with the nature of dual cognitive processing. We then introduce a parsimonious framework that brings theory on vision communication and dual cognitive processing into greater alignment. As such, we not only provide a deeper understanding of a key leader influence tactic, but also answer calls to more precisely chart the intersections between research on leadership, linguistics, and cognition (Shondrick, Dinh, & Lord, 2010). At a broader level, this integrated framework can change our understanding of how leaders should incorporate imagery on other occasions when they tend to use overly vague language, such as when they provide feedback and give task instructions (Kluger & DeNisi, 1996). We also discuss empirical contributions, including evidence for replicability via preregistered, high-powered designs

(Simmons, Nelson, & Simonsohn, 2011), and evidence for various forms of validity. Finally, our effort is practically useful: given that leaders are unlikely to increase their use of image-based rhetoric merely by being armed with the knowledge that such rhetoric is beneficial, our research illuminates an intervention leaders can use to create a more inspiring view of what their organizations can one day achieve.

THE POWER OF IMAGE-BASED RHETORIC IN VISION COMMUNICATION

Meeting a person who benefits from one's help is more motivating than reading about it (Grant, Campbell, Chen, Cottone, Lapedis, & Lee, 2007); seeing one person die up close affects moral judgment more than does dropping a bomb on thousands from a distance (Eyal, Liberman, & Trope, 2008); and observing a measuring cup containing the amount of sugar in one soda deters soft drink consumption more than reading about caloric content (Heath & Heath, 2010). The effect of this type of vivid detail is not limited to when people witness events first hand, but extends to when they read text or listen to rhetoric that brings this type of vivid detail to mind (Fletcher, Frith, Baker, Shallice, Frackowiak, & Dolan, 1995). In contrast to words that capture ideas and generalities ("liberty," "difference," "excellence"), words that represent the observable world (e.g., "smile," "jump," "yellow") cause people to construct mental images by drawing on a cognitive store of prior encounters with external reality. Research on the vividness heuristic (Nisbett & Ross, 1980) and the identifiability heuristic (Nordgren & McDonnell, 2011) has demonstrated that verbal descriptions of images trigger emotions more powerfully compared to statistics and concepts (Bator & Cialdini, 2000). Beyond driving affective responses, image-based rhetoric compares favorably to abstract rhetoric because it provides a clearer sense of direction (Kluger & DeNisi, 1996). The impact of image-laden rhetoric on emotion and clarity causes people to be spurred into action more than does abstract rhetoric. For instance, a story of a single hungry child elicited more charitable giving compared to statistics about thousands of starving villagers (Small, Loewenstein, & Slovic, 2007), and people were more likely to quit smoking when they read about how their habit caused people to "reel back in disgust from the smoker's putrid odor" than when they read about its adverse health effects (Smith & Shaffer, 2000: 777).[4]

Communicators can use image-laden rhetoric not only to depict the present, but also to provide a snapshot of events that have not yet transpired. As such, leaders can employ imagery when they articulate their organizations' visions of the future. To illustrate, Ekso (a company that makes robotic suits that help paralyzed people walk) created a vision to help one million people get up from their wheelchairs and walk (Edison Investment Research, 2014). Similar to how people find image-based descriptions of the present more compelling and clarifying than abstract descriptions of the present, they find image-laden visions of the future more emotionally engaging and easier to understand than abstract visions because they can simulate future events in their "mind's eye" rather than contemplate the future in general terms (Masuda, Kane, Shoptaugh, & Minor, 2010). This realism boosts motivation. In one study, registered voters from the U.S. who were given an image-laden vision of the U.S. government on the morning of Election Day 2016 were 11.3% more motivated to vote compared to participants given an abstract vision, and in another study full-time employees who were given an image-based vision worked for 47.8% longer on a creative task than employees who were given an abstract vision.[5] This latter effect was partially mediated by the vision's emotional impact and ease of comprehension, suggesting that imagery is both invigorating and clarifying. A vivid vision may also boost motivation by helping employees feel more connected to the organization's overarching purpose, because employees will feel that their day-to-day work is more closely tied to an event that can be witnessed or experienced one day in the future than to an end state that is abstract, amorphous, and unlikely to transpire in real life (Carton, 2018). Notably, the impact of image-laden rhetoric on followers extends beyond motivation: an examination of former U.S. President Barack Obama's visionary rhetoric on diversity found that

[4] Image-based rhetoric also explains variation in performance above and beyond goal specificity (Carton et al., 2014), which is typically conceptualized as the narrowness of a range of possible numeric performance targets (Locke & Latham, 1990). This is because numbers, despite being specific, are difficult to visualize (Guadagno, Rhoads, & Sagarin, 2011), and thus do not impact emotion and attention in the same way that image-laden rhetoric does.

[5] We provide information on both studies' methods in Appendix A at blurryvisionbias.wordpress.com.

his use of image-laden phrases reduced prejudice compared to when he used abstract rhetoric (Stephens-Davidowitz, 2017).

Beyond boosting individual-level outcomes, image-based rhetoric has benefits for collectives because of its effect on social cognition. Vivid snapshots of the future, such as a movie studio's vision to "make moviegoers laugh," have only one basic interpretation, enabling followers from different subgroups to understand a vision's "central merits" in the same way (Stam et al., 2014: 1184–1185). This has implications for coordination: when hundreds or thousands of individuals and subgroups possess not only a mental image of the future, but the *same* mental image, they can more easily coalesce to realize a collective achievement. In one study, an image-based vision more strongly established a shared sense of purpose than did an abstract vision, and, in turn, the former helped boost group coordination and performance (Carton, Murphy, & Clark, 2014).[6] Reflecting these findings, image-laden rhetoric has been credited for galvanizing collective action—including during periods of change and uncertainty, when coordination is challenging (Carton, 2018). For instance, Martin Luther King's "I Have a Dream" speech is thought to have helped spark the U.S. civil rights movement in part because of the glimpses King provided of a future in which "the sons of former slaves and the sons of former slave owners will be able to sit down together" (Mount, 2010). Similarly, Susan B. Anthony helped advance women's rights by conveying a vision of a world that invoked women's equality not only in a general sense, but with language that prompted people to visualize women voting and writing laws alongside men (Stanton, Gordon, & Anthony, 1997).

In addition to enhancing follower outcomes, leaders who use image-based words improve their own standing. In two samples, Emrich et al. (2001) found that U.S. presidents who used image-based rhetoric were perceived to be more charismatic. Emrich et al. (2001) argued that image-based rhetoric has powerful effects on recipients' emotion and cognition, causing followers to view leaders more favorably.

[6] An image-based vision boosted team creativity when leaders complemented it with a focused value system (akin to how Martin Luther King, Jr. centered his images on one core value—equality) so that people not only visualize the future in the same way, but understand the underlying meaning of these images in the same way. However, Carton et al. (2014) found that imagery in vision communication has a direct influence on a shared sense of purpose and coordination.

When this evidence is taken together, we work from the premise that image-based visions are more beneficial compared to abstract visions for leaders as well as the individuals and groups they oversee. Moreover, for all their benefits, research has not yet identified clear downsides to vivid visions. Relative to abstract visions, image-laden visions do not restrict decision alternatives or suppress the ability for organizations to pursue paths that serendipitously present themselves. Consider a vision to "make customers smile." Since this vision can be realized via countless products and services, it does not constrain action.

ILLUMINATING A DESCRIPTIVE–PRESCRIPTIVE GAP

Despite the upside of image-based rhetoric, less than 10% of leaders communicate visions with strong imagery—and, in total, they tend to communicate three to 15 times as much conceptual rhetoric as image-laden rhetoric when articulating visions (Carton et al., 2014; Emrich et al., 2001). Rather than allowing people to "see" the future with rhetoric that depicts scenes with graphic, ambient detail about objective reality, most visions almost exclusively contain lofty postulations (e.g., "change the world" or "serve the community") that possess multiple interpretations and push people to merely consider the future. As such, most visions are not truly "visionary." This pattern, which we call the blurry vision bias, is surprising not only because of the benefits of image-laden rhetoric but also because imagery maps onto the historical purpose of a vision, which is to counter the conceptuality of other rhetorical statements, including missions (Baetz & Kenneth, 1998), ideological appeals (Grant & Hofmann, 2011), and strategic objectives (Miller & Cardinal, 1994).

To understand how the blurry vision bias can be circumvented, we draw on the distinction between two cognitive systems—the *meaning-based system* and the *experience-based system* (Allen, Kaut, & Lord, 2008; Epstein, Pacini, Denes-Raj, & Heier, 1996). The meaning-based system processes the meaning of words, symbols, and other concepts. It is the part of the mind in which people assess data, contemplate ideas, and think abstractly. It stores information according to semantic relationships—that is, the extent to which different ideas have similar meanings. People use the meaning-based system to understand that the word "organization" is closely related to the word "company," but not to the word "pronounce." By contrast, the experience-based system processes

sensory information and underlies peoples' ability to imagine and visualize events. It is the part of the mind in which people encode the size of the room they are in, the colors of the clothes they are wearing, and who is sitting next to them. It is also responsible for autobiographical memories, such as recollections that a person might have of the interior of a previous home or a scenic view from a past vacation. We will now argue that the blurry vision bias (1) exists because leaders overemphasize the meaning-based system, and (2) can be overcome by helping leaders activate the experience-based system by imagining what the world will look, sound, and feel like if and when their company's vision is achieved.

How the Blurry Vision Bias Stems from an Overemphasis on the Meaning-based System

The blurry vision bias arises in large part from how people tend to think about the future. Given that the future has not yet transpired, it cannot be seen or felt. Consequently, as individuals contemplate the future, they tend to rely on an abstract understanding of what it will *mean* ("providing excellent customer service") instead of a mental simulation of how it could be *experienced* ("making customers smile") (Trope & Liberman, 2003). This tendency is pronounced for those who are most likely to craft and communicate visions—upper echelon leaders—because people who possess power tend to think in broad terms about the organization's strategy (Magee, Milliken, & Lurie, 2010; Rucker, Galinsky, & Dubois, 2012; Smith & Trope, 2006).

We argue that the predisposition to think about the future abstractly rather than vividly is exacerbated when leaders are confronted with the need to not only think about the future, but communicate about it. This is because the primary medium of communication—language—tends to reinforce abstract thinking. The language-processing center is rooted in the meaning-based system because it involves the comprehension of symbols (letters and words) (Tulving, 1972). Once this system is engaged, people seek to "make meaning" by building an association between one concept and a second concept in order to improve their understanding of the first concept (Pratt & Ashforth, 2003). Critically, the second concept need not be vivid to impart meaning to the first concept (Rosso, Dekas, & Wrzesniewski, 2010). To illustrate, a leader of an online social networking company can help employees make sense of the future with an abstract phrase such as "helping people make connections." This phrase lacks imagery because it does not describe an observable action, but a leader can still use it to understand what the company aims to achieve. It is certainly possible that a leader could use rhetoric that possesses imagery to better understand this company's future (e.g., "people exchanging the first words of what will be a lifetime friendship"); however, imagery is not necessary to satisfy the meaning-based system's need for comprehension. Since people are more likely to generate and communicate image-based rhetoric when the experience-based system is engaged—yet a focus on language does not activate the experience-based system—leaders who are not explicitly nudged to engage the experience-based system are unlikely to employ image-based rhetoric when articulating a vision. The ironic upshot of this is that leaders who focus on the very medium through which visions are communicated (words and phrases) remain entrenched in the meaning-based system and reinforce their inclination to convey the abstract meaning of the future, rather than provide an image-laden portrait of it.

Although an excessive focus on language exacerbates the blurry vision bias because it causes leaders to overweigh the meaning-based system, dominant perspectives in the literature have assumed that careful word selection is paramount for effective vision communication. In a review of 180 sources containing advice on how to construct visions,[7] we found that 175 (97.3%) encouraged leaders to carefully attend to the selection of words and phrases (see Appendix B at blurryvisionbias.wordpress.com for more detail). Although this is not surprising because language is perhaps the most fundamental characteristic of vision communication (Awamleh & Gardner, 1999), it is problematic because it reinforces the blurry vision bias. More paradoxically, even expert recommendations that explicitly call leaders' attention to the very category of language that elicits imagery (e.g., "use words with lifelike detail") are unlikely to counteract the blurry vision bias because they still target the meaning-based system. Consider a leader who aims to create a vision for a government agency and is countenanced by an

[7] Since the literature on vision communication is vast, it is challenging to review it systematically. Therefore, we introduced a new approach to reviewing the literature: semantic cluster analysis. This approach provides a way to review a body of research comprehensively (capturing the full spectrum of arguments from different articles and books), parsimoniously (grouping sources that present similar arguments under the same broad themes), and representatively (establishing the number of sources that fall into each broad category).

expert to "use words that reflect observable reality, such as what you can see and feel." By being asked to focus on *words* that capture observable reality, this person will be prompted to contemplate the meaning of "observable reality" as a concept, which typically brings abstract ideas to mind (e.g., "helping the country"). Although it is possible that this leader would understand "observable reality" via image-based rhetoric ("when people tell their friends they feel optimistic about their lives"), such rhetoric is not necessary to convey this idea's meaning.

Further compounding this problem are the words and phrases experts use to describe image-laden rhetoric when they recommend that leaders use it in vision communication. Our literature review (see Appendix B at blurryvisionbias.wordpress.com) indicates that experts talk about the general properties that unite different examples of image-laden visions (e.g., "an effective vision. . .creates a vivid image"). Ironically, although a term such as "vivid image" unites countless image-based phrases (e.g., a shimmering screen, a jubilant customer, a sold-out stadium), the term is itself a generic, abstract label rather than one that brings to mind an easy-to-visualize person, object, or action (Guadagno et al., 2011; Rosch, 1978). Advice centered on generic themes will reinforce the tendency for leaders to think about the future at a broad level of abstraction. A leader who is encouraged to create a "vivid image" is thus more likely to tell listeners about general properties of the future (e.g., "devices that advance mobile technology") than walk listeners through a scene laden with visual detail (e.g., "devices that complete hundreds of tasks—from ordering food to starting your car—with the push of a button"). The notion that people think of words at the same level of abstraction as words they heard just moments before is consistent with evidence on the inertia of the brainstorming process, such that new ideas are offshoots of previous ones (Berg, 2014). In this way, advice that focuses leaders' attention on general properties of rhetoric—even image-based rhetoric—will reinforce, rather than counteract, their predisposition to communicate abstractly about the future.

In sum, leaders are not inclined to craft visions with imagery, and even leaders who consciously seek to infuse their visions with image-laden rhetoric are unlikely to do so.

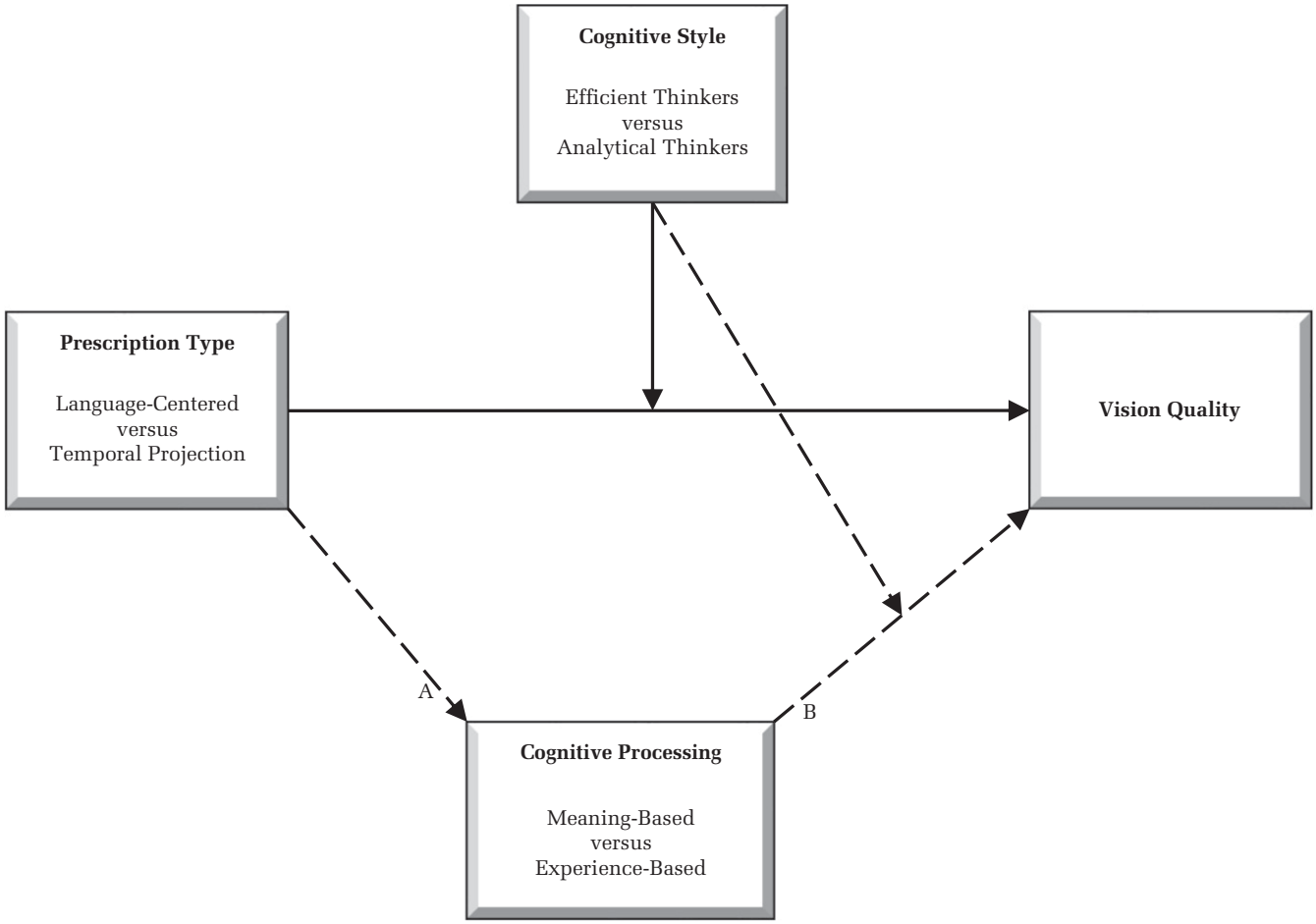
Resolving the Blurry Vision Bias by Activating the Experienced-based System

We posit that leaders will formulate image-based visions most easily when they engage in a two-step process: drawing on the experience-based system and then having this form of cognition "spill" into the meaning-based system by driving the retrieval of image-based rhetoric. First, rather than focusing on selecting words that meet specific criteria, leaders vividly imagine future experiences (Path A in Figure 1). They can do this by mentally projecting themselves to a day in the future and envisioning what the world will look like—such as the shape of buildings, the colors of background scenery, and the expressions on people's faces. This act of psychologically projecting across time, or temporal projection, is a prospective tactic related to mental time travel (Suddendorf et al., 2009), temporal mental simulation (Waytz, Hershfield, & Tamir, 2015), and episodic foresight (Bulley, Henry, & Suddendorf, 2016), except that people focus less on how they will personally look and feel in the future and more on what their organization will look like, as well as how the world will change if their organization's vision is realized. Further, our proposed intervention is distinct from the above-cited tactics because it is used to enhance communication and interpersonal influence, rather than people's private introspection and planning.

After individuals construct mental imagery about the future and are then asked to describe it to employees, they will create words in the meaning-based system (because that system houses the language center); however, they are likely to find it easiest to use image-based rhetoric, given that abstract words will not convey the visual snapshot they see in their mind's eye (Path B in Figure 1). In short, the experience-based and meaning-based systems "cooperate," such that leaders begin the process of constructing a vision by generating mental imagery and only then search for the words to clairvoyantly describe it. Thus, leaders who psychologically skip forward to the distant future before crafting and communicating a vision will open up the boundary between the experience-based and meaning-based systems of cognition.

To illustrate, consider a leader of a social networking company who is asked to "imagine people using yet-to-be-created social networking technology in 10 years." This guidance pushes the leader to psychologically transport to the future and summon a mental image of what it could look like. Once this image has been formed and the leader attempts to describe it, he or she can best do so with image-based words (e.g., "a father in the military talking to his children back home" or "women from neighboring universities typing words that will inspire a social movement"). Abstract words would be insufficient for describing a mental image. Along these lines, we

FIGURE 1
Theoretical Model



Notes: The solid lines represent direct effects: the main effect of prescription type on vision quality (Hypothesis 1) and the interaction between prescription type and cognitive style on vision quality (Hypothesis 2). The dashed lines represent the conditional indirect effect (Hypothesis 3) that explains the Hypothesis 2 interaction. In line with Hayes (2013), the interaction on the second stage should only be interpreted in tandem with the path between temporal projection and the mediator.

expect that leaders who deliberately take a mental leap forward to a moment in the distant future (which we hereafter label as both "temporal projection" and "mental time travel") will employ more image-laden rhetoric than even those who consciously set out to construct visions with such rhetoric.

Hypothesis 1. Leaders who mentally project themselves to the distant future (i.e., temporal projection) will use more image-laden rhetoric in vision communication compared to leaders who emphasize word selection.

Although this hypothesis relates to the quantity of image-based rhetoric, in our studies we account not only for the amount of image-based rhetoric, but the quality of the images. In addition, we assess overall vision quality, which, according to our literature review, is driven not only by whether a vision possesses imagery, but also whether it is specific, achievable, and reflects the core values and identity of the organization and its members. Although it is outside the scope of this paper to construct hypotheses about the impact of temporal projection on these three dimensions, in our studies we assess its effect on all dimensions of vision quality. If leaders who mentally project themselves deep into the future are able to boost one core dimension of vision quality (imagery) while not harming—or even while boosting—the others, then it will yield a net benefit such that they will construct and communicate higher-quality visions compared to leaders who make deliberate attempts to boost vision quality

through careful word selection (i.e., tactics that engage the meaning-based system). As another way of approximating overall vision quality, we assess whether the visions leaders craft as a result of mental time travel are effective enough to increase the extent to which their employees are inspired at work.

The Moderating Role of Cognitive Style

The link between temporal projection, mental imagery, and imagery in vision communication is likely to be influenced by an individual difference pertaining to the willingness to accommodate experience-based processing (Cacioppo, Petty, Feinstein, & Jarvis, 1996; Epstein et al., 1996). Although this individual difference exists as a continuous dimension, it is best appreciated by contrasting its two poles: whereas *efficient thinkers* prefer not to engage in over-analysis, *analytical thinkers* are methodical and have a strong "need for cognition." Efficient thinkers are likely to let mental imagery freely influence the way they communicate. They are not inclined to override imaginative thinking with controlled logic, supplant snapshots that they envisage in their mind's eye with semantic analysis, or impute an abundance of abstract meaning into their mental glimpses of the future (Epstein et al., 1996). That is, efficient thinkers are comfortable focusing on a single graphically defined scenario, rather than forming general impressions. As such, we expect that efficient thinkers will let vivid images loom large in their consciousness and guide their search for words and phrases when they seek to communicate their thoughts to others.

In contrast, analytical thinkers are more inclined to consciously override the influence of mental imagery on how they communicate. Since they prefer complex problem solving and effortful thought, they tend to think at a high level of abstraction. By definition, abstract thinking involves drawing connections across disparate domains and contemplating general principles, rather than specific events (Rosch, 1978). Therefore, even if they are capable of vividly imagining a single future event, analytical thinkers are likely to explain their understanding of the future using abstract categories that represent the broader meaning of that event (Kahneman, 2011). For instance, an analytical thinker who imagines customers smiling may consider the broader meaning of this type of scenario and craft a vision in which "customers are always satisfied." In this way, a natural disposition toward abstract cognitive processing leads analytical thinkers to favor concepts, rather than words that pertain to sensory experiences.

In short, since they prefer to "abstract out" to make general summations, analytical thinkers are likely to possess a stronger barrier between the experience-based and meaning-based systems compared to efficient thinkers. Thus, exercises that trigger experience-based thinking (e.g., mentally projecting oneself into the distant future) are less likely to "spill" into the meaning-based system for analytical thinkers than for efficient thinkers. In this way, the *generation* of mental imagery via a vivid mental simulation of the distant future is less likely to lead to the *communication* of imagery via image-based rhetoric. This is a critical distinction because leaders can only influence others through explicit communication. In short, analytical thinkers are not likely to be as amenable as efficient thinkers will be to letting temporal projection influence their communication.

Hypothesis 2. Individual cognitive style (efficient versus abstract thinking) and prescription type (temporal projection versus language-based prescriptions) will interact, such that temporal projection will boost the use of image-laden rhetoric in vision communication more for efficient thinkers than for analytical thinkers.

Altogether, our logic leads us to predict that the relationship between temporal projection and image-based rhetoric will be mediated by the experience-based system and moderated by cognitive style, such that the relationship between temporal projection, mental imagery, and imagery in vision communication will be stronger for efficient thinkers than for analytical thinkers (see the dashed lines in Figure 1). That is, analytical thinkers override the link between the generation of mental images and the communication of images to a greater extent than do efficient thinkers.

Hypothesis 3. The role of mental imagery as a mediator between prescription type (temporal projection versus language-based) and image-laden rhetoric will be moderated by cognitive style, such that the mediated relationship will hold more for efficient than for analytical thinkers.

METHOD

We tested the hypotheses in three studies. We aimed to promote external validity by recruiting a diverse set of participants, including a sample with British government officials and a sample with senior corporate executives. All three studies were experiments, thereby establishing internal validity.

In study 3 we assessed whether the visions that senior executives craft as a result of mentally projecting themselves to a moment in the future are superior for inspiring their own employees. Thus, we establish predictive validity not only for our primary intervention (temporal projection / mental time travel), but also for imagery in vision communication. Finally, in addition to testing our predictions three times, we sought to establish the replicability of our findings by preregistering the hypotheses and methods for studies 2–3 and running one high-powered design with 700 full-time employees (study 2). All data are available from the first author.

Study 1: Brexit Experiment

Sample and design. We sought a context that would establish ecological validity, such that vision communication was timely and meaningful. Imagery in vision communication can be especially useful during periods of change because it crystallizes the ultimate goal of a change effort (Heath & Heath, 2010; Kotter, 1996). For this reason, we launched an experiment involving British government employees on June 24, 2016, the day the United Kingdom announced that it would exit the European Union ("Brexit") as the result of the vote of British citizens.[8] The Brexit vote marked the beginning of a transition many experts considered more daunting than any the U.K. government had experienced since the end of World War II. The day of the vote was known well in advance, allowing us to plan the exact timing of the launch of the experiment. In fact, we began the experiment just a few hours after David Cameron announced his resignation as prime minister (the highest ranking office in the British government).

The sample consisted of 166 government officials from the United Kingdom. The results remained substantively the same when retaining nine participants who failed an attention check, so we included them to increase statistical power. The sample included council members from provincial governments, heads of department, executive officers, education officers, national parks managers, heads of communication systems, administrators in the National Health Service, and principle engineers. We identified participants via an online database (prolific.ac). The average participant age was 37, with an average of 11.3 years of experience, and 66% were female. A number of participants commented after the experiment was over about the relevance of Brexit to their jobs. We were explicit that the timing of the study was due to Brexit and we emphasized the government transition that would take place. Beyond the opportunity to examine a context involving change, we sampled government employees because vision communication is viewed as essential among government leaders, who must unify various stakeholders. Despite the unique context, our aim was to ensure that participants focused on crafting a vision for an organizational purpose in addition to a political purpose. Thus, we emphasized that participants should craft a vision relevant to both the British government overall as well as their own company, agency, or unit.

Procedure. We constructed six conditions in a between-subjects design. We did not drop any cases from any of these conditions or perform analyses before the data were collected, and we stopped data collection only when no further participants who met our sample requirements volunteered. One condition was a control group, in which we asked participants to write a vision statement without any prompts or prescriptions. The next four conditions featured what we call *language-based prescriptions*, because they involved explicitly instructing leaders to incorporate certain categories of words into their visions of the future. As noted earlier, scholars have converged on four desirable attributes in a vision: imagery, specificity, achievability, and values. Participants were explicitly asked to choose words that reflected these attributes. We ensured that the wording of the prescription in each condition included the most frequently invoked words that authors across the 180 sources identified in our literature review used to describe each attribute. This ensured that each prescription was confined to a unique, delineated domain. We constructed each prescription to be similar in word count. For the *imagery / vividness prescription* we noted that "a picture is vivid when it is depicted as if it could be seen and felt. It should simulate a visual representation or an image of an event. A vivid statement is picture-like. It portrays action, events, and objects with lifelike detail." For the *specificity prescription*, we explained, "Specificity refers to a statement's clarity and exactness. A specific statement is distinct, easy to understand, and can be interpreted in only one way. Statements that are simple are often clearer. A vision that is specific is free from ambiguity." For the *achievability prescription*, we stated, "Achievability refers to whether a statement

[8] British citizens voted on Brexit the day before the departure was announced (June 23, 2016).

describes an end-state or event that can actually be attained. An achievable vision is a vision that can one day be realized. That is, it can actually be accomplished in the future." For the *values prescription*, we noted, "Your statement should reflect your values (standards for what is desirable). It should communicate a core ideology—what is both meaningful and important. It should convey an idealized goal that directs action. Those who hear your vision should be motivated and inspired. They should aspire and dream to attain the vision."

The final condition involved an experimental manipulation of our core construct, temporal projection. We asked participants to psychologically project themselves deep into the future and construct a mental picture of what a moment in the distant future could look like. We adapted the experience-based prescriptions found in our breakdown of the existing literature (see Appendix B at blurryvisionbias.wordpress.com). As with the other conditions, we accounted for the government's multiple layers by first asking participants to make sure they created a vision that was aligned with the goals of the entire British government. We then asked them to customize the vision to the specific entity in which they worked so that it would be motivating for those in their immediate working environment. Specifically, they were told, "Imagine you enter a time machine and emerge in the future just after your company has achieved its vision. What does this future look like? Take a picture with your camera. Think of how to make your vision embody what you saw in the picture you took."[9] Although time machines do not exist, the time machine intervention combines a hypothetically credible and psychologically real experience that utilizes the cognitive processes needed to envision the future (Schacter, Addis, & Buckner, 2007). We label this intervention the "mental time travel condition," or the "time machine condition."

[9] To determine whether the word "company" was appropriate to represent the government entities in our sample, we conducted three tests. Prior to running the experiment, two British citizens reviewed all wording and agreed that "company" was an appropriate term. We then found that 100% of a sample of 81 government employees from Britain noted that the word "company" is appropriate for describing a government entity in response to a "yes or no" question. Third, we conducted an archival analysis, which suggested that this word is used to capture various entities (e.g., "fire company," "military company"), especially in Britain. This word also generalizes well to the samples we use in studies 2 and 3.

Measures. Consistent with our theoretical model, the mediator (mental imagery) was measured after the manipulations but prior to when participants crafted visions. We adapted items from research on mental imagery (Babin & Burns, 1998) (e.g., "Right now there is a visual scene playing in my 'mind's eye';" 1 = disagree to 7 = agree; $\alpha = .90$). To assess our moderator (analytical versus efficient thinking), we employed the scale created by Epstein et al. (1996) in their validation of an analytical thinking measure. An example item is, "I prefer complex to simple problems" (1 = disagree to 5 = agree; $\alpha = .66$). As noted in our theorizing, this construct is unidimensional, such that people range from highly efficient to highly analytical in their thought style.

For the primary dependent variable, image-based rhetoric, we employed the Coh-Metrix dictionary, an online database of 4,825 words coded by adult raters according to the extent to which each word represents an image (Graesser, McNamara, Louwerse, & Cai, 2004). Each word was assessed from 100 (weak imagery) to 700 (strong imagery). The imagery score was the average amount of imagery per word in each vision. This measure has several advantages. It has been psychometrically validated. Further, it optimizes reliability—since it is automated it codes each appearance of the same word in the same way. Reliability is further enhanced given that each word in the dictionary has been coded by thousands of adults. This measure is especially appropriate given that individual words are the "raw material" for imagery. That is, a statement cannot elicit mental imagery if it contains abstract words (e.g., "protocol") rather than image-laden words (e.g., "smile"). In a subsequent section (entitled "Supplementary Analyses") we report the results of analyses with an alternate measure of this dependent variable to ensure that our results are robust. This alternate measure uses human coders to assess the overall imagery of the higher-order components of each phrase (clauses and the entire statement) and allowed us to retain the validity and reliability of the automated coding we are using in our primary analyses while increasing confidence that the results would translate to individuals hearing an entire statement from a leader.

We then assessed the three other features scholars have identified as central to vision quality (specificity, achievability, and values). We used the Coh-Metrix dimension hypernymy to measure specificity (see Crossley, Salsbury, & McNamara [2009] for how this is accomplished via categorization hierarchies). Visions were achievable to the extent that they could be attained. Given that this could only be inferred at the

statement level, two coders blind to the study hypotheses coded this dimension on a scale from 100 to 700 ($\alpha = .65$). Because a small number of values is ideal (Carton et al., 2014), for each statement we counted the number of times participants invoked the nine values that practitioners most frequently use (Carton et al., 2014; Hansen, 2010; O'Reilly, Chatman, & Caldwell, 1991). We checked to ensure that the imagery participants created was congruent with the values they invoked.

Controls. In a questionnaire, we accounted for the possibility that the mental time travel condition has more powerful effects on vision quality because it is a more intrinsically motivating task, using a four-item scale from Grant (2008). We also accounted for participant engagement by measuring the time participants spent on the task during the unbroken period after participants were all exposed to the manipulation. To test for the possibility that the mental time travel condition yielded positive effects because the instructions were easier to follow, we included a four-item measure of cognitive fluency, adapted from prior fluency research (Lucas & Nordgren, 2015; Schwarz, Bless, Strack, Klumpp, Rittenauer-Schatka, & Simons, 1991). We also accounted for an individual's level in the organizational hierarchy. Finally, we assessed each participant's power via the number of direct reports he or she oversaw.[10]

Results and discussion. Correlations and descriptive statistics are provided in Table 1. We included the control variables in all models; however, the results remained substantively the same when controls were not included. We analyzed the data using analysis of covariance and ordinary least squares (OLS) regression (see Table 2 for regression results).

In support of Hypothesis 1, the mental time travel condition ($M = 406.902$, $SD = 28.398$) boosted image-laden rhetoric in vision communication more than did any other condition ($M = 395.383$, $SD = 24.259$), $F(1,159) = 5.663$, $p = .019$, $\eta^2_p = .034$. The R^2 for the model was .062. To further parse these results, we constructed a coding scheme with separate fixed effects for: (1) all four language-based conditions, and (2) the no-instruction control condition with the mental time travel condition as the reference category (Cable, Gino, & Staats, 2013), and found that mental time travel significantly increased imagery in vision communication compared to all four language-based conditions, $F(1,158) = 5.19$, $p = .024$, $\eta^2_p = .032$, as well as the no-instruction control condition, $F(1,158) = 3.91$, $p = .049$, $\eta^2_p = .024$ (see Figure 2a). Mental time travel also induced a greater amount of average imagery compared to each individual condition, including the condition in which leaders were explicitly instructed to use vivid language, and a model including fixed effects for each condition established that the mental time travel condition was the only one of the five experimental interventions that induced significantly more imagery compared to the control condition. We also tested the effect of the mental time travel condition on our measures of the three other elements of vision quality (specificity, achievability, and values) and did not find differences for any of these variables ($p > .1$ for all variables). Consequently, we can conclude that temporal projection via mental time travel boosts a key aspect of vision quality (image-laden rhetoric) without affecting the other three elements, thereby resulting in a net improvement in vision quality.

In support of Hypothesis 2, there was a significant interaction between prescription type and cognitive style, $F(1,157) = 12.45$, $p = .0005$. The simple slope was significant for efficient thinkers ($b = 16.72$, $SE = 5.24$, $p = .001$), but not for analytical thinkers ($p = .42$). We plotted the data at the 25th and 75th percentiles of observed values of the moderator. As shown in the top graph in Figure 2b, efficient thinkers generated visions with significantly more image-laden rhetoric in the mental time travel condition than in the language-based conditions, whereas analytical thinkers did not benefit from mental time travel relative to the other conditions.

We then tested our prediction that mental imagery would mediate the relationship between mental time travel and imagery in vision communication more among efficient compared to analytical thinkers—a second-stage conditional indirect effect (as shown in Figure 1, we expected that all leaders who mentally projected themselves to a moment in the distant future would experience mental imagery, but leaders who are analytical thinkers would be more inclined to override the effect of mental imagery on vision communication). We tested the conditional indirect effect with bootstrapped confidence intervals using Hayes' (2013) PROCESS. The mediator (mental imagery) was censored such that a disproportionate number of cases were located at the lowest value (about twice as many cases had a value of 1 than any other value; the distribution was otherwise normal). We accounted for this with truncated regression (Breen, 1996). Bootstrapped confidence intervals at

[10] The results reported below remained at the same levels of significance when we included other measures of hierarchy, including reward power and status.

TABLE 1
Studies 1 and 2: Descriptive Statistics and Correlations

	Mean	*SD*	1	2	3	4	5	6	7	8
Study 1										
1. Vision imagery	397.464	25.357								
2. Temporal projection	0.180	0.385	.175*							
3. Mental imagery	3.389	1.688	.134*	.369**						
4. Analyt. vs. eff. thinking	2.251	0.661	0.012	.159*	−0.042					
5. Intrinsic motivation	4.578	1.490	0.063	0.065	.258**	−.230**				
6. Time on task (seconds)	112.566	162.641	−0.034	.164*	−0.008	−0.012	0.032			
7. Fluency	4.601	1.215	0.070	−0.004	.271**	−.215**	.316**	−0.074		
8. Level in organization	3.729	1.218	−.158*	0.002	0.055	0.067	−0.030	−0.014	−0.019	
9. Direct reports	2.934	11.202	0.065	−0.062	−0.032	−0.049	0.107	−0.032	0.032	−.305**
Study 2										
1. Vision imagery	394.210	28.507								
2. Temporal projection	0.150	0.355	.220**							
3. Mental imagery	4.037	1.571	.133**	.278**						
4. Analyt. vs. eff. thinking	2.253	0.855	0.015	.094*	−0.021					
5. Intrinsic motivation	4.886	1.570	0.012	0.054	.379**	−.266**				
6. Time on task (seconds)	123.795	111.986	0.001	−.150**	.070	−0.050	.158**			
7. Fluency	5.070	1.110	−0.029	−0.005	.075*	−.301**	.303**	0.068		
8. Level in organization	3.330	0.894	0.021	0.007	−0.072	0.055	−.139**	−0.025	0.000	
9. Direct reports	4.890	12.358	−0.002	0.045	.112**	−0.038	.081*	0.000	0.025	−.404**

Notes: In Study 1, $n = 166$ and in Study 2, $n = 652$. Coding: 1 = Temporal Projection, 0 = other conditions.

*$p < .05$

**$p < .01$

***$p < .001$

TABLE 2
Studies 1 and 2: Main Effects, Interactions, and Conditional Indirect Effects (Hypotheses 1–3)

Variable	*b (SE)*	Variable	*b (SE)*	Variable	*b (SE)*	Variable	*b (SE)*
STUDY 1							
Study 1 Main Effect (Hypothesis 1)		**Study 1 Interaction (Hypotheses 2)**		**Study 1 Conditional Indirect Effect (Hypothesis 3)**			
DV: Image-Based Rhetoric		**DV: Image-Based Rhetoric**		**DV: Mental Imagery**		**DV: Image-Based Rhetoric**	
Intrinsic motivation	.491 (1.388)	Intrinsic motivation	−.376 (1.392)	Intrinsic motivation	.151 (.082)	Intrinsic motivation	.664 (1.603)
Time on task	−.010 (.012)	Time on task	−.011 (.012)	Time on task	−.001 (.001)	Time on task	−.007 (.013)
Fluency	1.113 (1.693)	Fluency	.909 (1.661)	Fluency	.218* (.105)	Fluency	1.874 (2.072)
Organizational rank	−3.125 (1.677)	Organizational rank	−2.846 (1.629)	Organizational rank	.100 (.100)	Organizational rank	−3.445 (1.926)
Direct reports	.053 (.184)	Direct reports	.063 (.178)	Direct reports	−.003 (.010)	Direct reports	.006 (.186)
Temporal projection	12.200* (5.127)	Temporal projection	−55.324** (19.756)	Temporal projection	1.307*** (.284)	Temporal projection	7.480 (6.057)
		Analyt. vs. effic.	−4.822 (3.3663)			Mental imagery	3.925 (4.712)
		Temporal Projection × Analyt. vs. effic.	27.948*** (7.922)			Analyt. vs. effic.	2.297 (8.631)
						Mental imagery × analyt. vs. effic.	.077 (2.071)
					Indirect Effect (*b*)	**Indirect Effect 95% CI**	
				Effic. thinkers	5.60	(1.60, 12.88)	
				Analyt. thinkers	5.36	(−.17, 12.35)	
STUDY 2							
Study 2 Main Effect (Hypothesis 1)		**Study 2 Interaction (Hypotheses 2)**		**Study 2 Conditional Indirect Effect (Hypothesis 3)**			
DV: Image-based Rhetoric		**DV: Image-based Rhetoric**		**DV: Mental Imagery**		**DV: Image-based Rhetoric**	
Intrinsic motivation	.124 (7.373)	Intrinsic motivation	.034 (.761)	Intrinsic motivation	.370*** (.044)	Intrinsic motivation	−1.465 (.942)
Time on task	.009 (.010)	Time on task	.010 (.010)	Time on task	.001 (.001)	Time on task	.010 (.010)
Fluency	−.824 (1.035)	Fluency	−.877 (1.064)	Fluency	.008 (.058)	Fluency	−.647 (1.165)
Organizational rank	.636 (1.349)	Organizational rank	.687 (1.346)	Organizational rank	.082 (.075)	Organizational rank	.398 (1.457)
Direct reports	−.009 (.097)	Direct reports	−.015 (.097)	Direct reports	.006 (.005)	Direct reports	−.023 (.098)
Temporal projection	18.063*** (3.134)	Temporal projection	−.767 (9.061)	Temporal projection	.944*** (.163)	Temporal projection	16.515*** (3.271)
		Analyt. vs. effic.	−1.754 (1.479)			Mental imagery	.437 (2.003)
		Temporal Projection × analyt. vs. effic.	7.886* (3.533)			Analyt. vs. effic.	−5.027 (4.311)
						Mental imagery × analyt. vs. effic.	.723 (.865)
					Indirect Effect (*b*)	**Indirect Effect 95% CI**	
				Effic. thinkers	1.83	(.16, 4.16)	
				Analyt. thinkers	1.14	(−.35, 2.88)	

Notes: DV = Dependent variable. In the main text we report an *F*-test from an ANCOVA for Hypotheses 1 and 2 based on convention in terms of how hypotheses are reported in experiments; however, since it is necessary to report regression coefficients for Hypothesis 3, in this table we maintain consistency by reporting regression coefficients for all hypothesis tests.

* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 2
Studies 1–3: Main Effects and Interactions (Hypotheses 1 and 2)

Figure 2a: Main Effect of Prescription Type on use of Image-based Rhetoric in Vision Communication for Studies 1−3

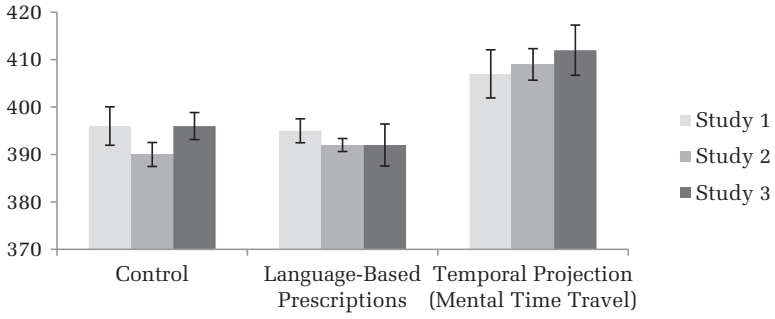
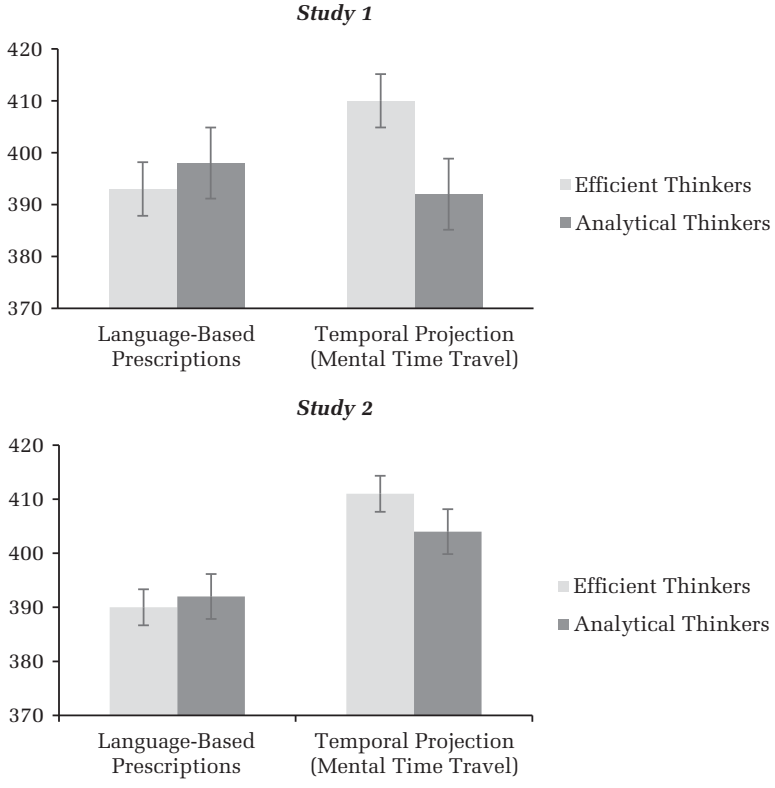


FIGURE 2b
Figure 2b: Interaction between Prescription Type and Cognitive Style on use of Image-based Rhetoric in Vision Communication for Studies 1 and 2



Notes: For all graphs the error bars are 95% CIs. In study 3 the only language-based prescription that was tested involved explicit instructions to include image-based rhetoric.

the 25th and 75th percentiles of the moderator demonstrated that the indirect effect of mental time travel on leaders' use of imagery in vision communication via the activation of mental imagery excluded zero for efficient thinkers (indirect effect = 5.60; 95% CI: 1.60, 12.88) but not analytical thinkers (indirect effect = 5.36; 95% CI: −.17, 12.35). As a robustness check, we corrected for censoring of the mediator as a dependent variable via tobit regression in STATA (Breen, 1996). The results remained substantively the same, providing further support for this hypothesis.

The Brexit experiment provided support for the hypotheses. This context has advantages in that it is a controlled experiment featuring a situation (extreme change) that would serve as an incentive for participants to improve their ability to craft and communicate visions of the future. However, the unique nature of a sample of British government officials raises questions about the generalizability of temporal projection to other contexts. Further, in addition to assessing vision quality by breaking down leaders' visions according to the four quality-based attributes, it would be helpful to assess vision quality by measuring the extent to which the recipients of visions perceive them to be inspiring. Additionally, it would be beneficial to assess the effectiveness of temporal projection with a larger sample size. To gain greater confidence in our results, we conducted two more studies to establish these forms of validity and reliability. In Study 2 we tested our hypotheses in a high-powered replication study, as well as with five subsamples of leaders with varying numbers of direct reports. In Study 3 we tested temporal projection with a sample of corporate executives and assessed the extent to which the executives' employees were inspired by the visions they crafted as a result of psychologically leaping forward to a moment in the future.

Study 2: Replication with High-powered Design and Leaders with Large Spans of Control

We first sought to increase confidence in the replicability of our results by conducting a follow-up study that included key adjustments in line with recommendations by Button et al. (2013) and Munafò et al. (2017). Before collecting data, we preregistered our sample parameters, sample size, hypotheses, conditions, and measures at aspredicted.org (please see https://aspredicted.org/5av33.pdf for the official document). Further, we recruited a larger sample (100 full-time employees per condition) to increase confidence in the replicability of the findings (Simmons, Nelson, & Simonsohn, 2011). This sample size also enabled us to isolate subsamples of leaders with different numbers of direct reports, which could be illuminating since leaders are likely to wield more influence and have greater experience crafting visions as they oversee a greater number of employees.

Design, sample, and procedure. We recruited 700 full-time employees across seven conditions. In addition to the six conditions featured in Study 1, we added a seventh condition: leaders who are given all four language-based (i.e., meaning-based) prescriptions at the same time.[11] We accessed full-time employees through a filter on Mechanical Turk, a population shown to provide data quality superior to university labs and equivalent to many work settings (Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010). Part-time employees and unemployed workers could not participate. Participants came from various countries (including China, Honduras, India, the Netherlands, Philippines, Singapore, Ukraine, and the United States). The average age was 35, and 48% were women. To boost generalizability, participants created a vision for one of two industries—either financial services or health services. Forty-four participants who did not

[11] In the first two studies we compared temporal projection to four separate conditions, such that each condition reflected one of the language-based (meaning-based) prescriptions. We did this in order to (1) reflect the existing literature, in which we found that over 80% of experts recommended only one of the four approaches, thereby boosting our method's ecological validity, and (2) ensure that the amount of advice we gave to participants in each condition was the same. In terms of this latter issue, the word count for each condition was constrained by our need to include words and phrases that have been used in the literature (see Appendix B at blurryvisionbias.wordpress.com) so that our instructions represented how scholars described each of the four themes. The mental time travel condition (47 words) was thus similar in length to each of the other four treatment conditions (which averaged 43 words), and therefore the prescriptions differed in terms of content, and not volume or detail. In contrast, all four language-based prescriptions put together would be 172 words long—four times as long as the mental time travel prescription. However, including such a condition would rule out the possibility that leaders who are given more advice (all four language-based prescriptions at once) will generate better visions. Finally, we made minor changes to the wording of the mental time travel condition in order to further improve its fidelity to the literature and to the theoretical construct; see Appendix B (blurryvisionbias.wordpress.com) for the exact wording.

complete the task, and four that failed an attention check, were excluded from the analyses, as specified in the preregistered document, leaving a final sample of 652. However, the results we report below remained substantively the same when these participants were included. We used the same measures as in the Brexit experiment. The scales were reliable: $\alpha = .94$ for mental imagery (the mediator) and $\alpha = .83$ for cognitive style (the moderator). We once again used ratings of achievability by two blind undergraduate coders, following the same procedure ($\alpha = .65$).

Results. Using analysis of covariance (ANCOVA), we again found support for our first hypothesis. Participants in the mental time travel condition ($M = 409.269$, $SE = 33.25$) communicated visions with significantly more image-laden rhetoric than those in the other conditions, ($M = 391.611$, $SD = 26.80$), $F(1,645) = 33.219$, $p = .00000001$, $\eta^2_p = .049$. Further analyses revealed that the mental time travel condition yielded visions with significantly greater image-laden rhetoric than did the control and language-based conditions when tested separately (see Figure 2a).[12] The mental time travel condition also induced significantly more imagery compared to each individual condition, including the condition in which leaders were explicitly asked to use vivid language, and a model including fixed effects for each condition established that the mental time travel condition was the only one of the six experimental interventions that induced significantly more imagery than the control condition. Regarding effects on other aspects of vision quality, leaders who were in the mental time travel condition also crafted visions that were more achievable ($p = .0000000000001$). We did not find differences between conditions for specificity or values. The R^2 for the model was .051.

[12] To further parse these results, we constructed an alternate coding scheme with separate fixed effects for (1) the no-instruction control condition, (2) all four language-based conditions independently, and (3) all four language-based prescriptions at the same time, with the time machine condition as the reference category (Cable et al., 2013). The time machine condition caused leaders to communicate visions with significantly more image-laden rhetoric compared to those in the no instruction control condition, $F(1,643) = 22.775$, $p = .000002$, $\eta^2_p = .034$, those who received the four language-based conditions independently, $F(1,643) = 28.999$, $p = .0000001$, $\eta^2_p = .043$, and those who received the four language-based prescriptions at the same time, $F(1,643) = 20.628$, $p = .000007$, $\eta^2_p = .031$.

Consistent with Hypothesis 2, the interaction between temporal projection and cognitive style (analytical versus efficient thinking) was significant, $F(1,643) = 4.981$, $p = .026$. As depicted in the bottom graph in Figure 2b, the amount that efficient thinkers increased their use of image-laden rhetoric in the time machine condition versus the conditions with language-based prescriptions ($b = 23.13$, $SE = 3.94$, $p = .00000001$) was greater than that of analytical thinkers ($b = 9.83$, $SE = 4.71$, $p = .037$). We then tested for moderated mediation, such that mental imagery would mediate the relationship between mental time travel and image-laden rhetoric more among efficient thinkers than among analytical thinkers. Similar to the Brexit experiment, the mediator (mental imagery) was censored such that a disproportionate number of cases were represented at the lowest value (the value of 1 was represented almost twice as frequently as the next highest value, 5, on the scale from 1 to 7; the distribution was otherwise normal). We again accounted for this with truncated regression (Breen, 1996). Providing support for this hypothesis, 95% bootstrapped confidence intervals at the 25th and 75th percentiles of the moderator demonstrated that the indirect effect of mental time travel on image-laden rhetoric through the activation of mental imagery excluded zero for efficient thinkers (indirect effect = 1.83; 95% CI: .16, 4.16) but not analytical thinkers (indirect effect = 1.14; 95% CI: −.35, 2.88). As a robustness check we corrected for censoring of the mediator as a dependent variable via tobit regression in STATA (Breen, 1996). The results remained substantively the same, providing further support for this hypothesis.

We then examined whether this effect held for leaders with different spans of control (operationalized as the number of direct reports). Span of control did not significantly moderate the effect of temporal projection on image-based rhetoric ($p = .90$), suggesting that temporal projection is robust to a leader's span of control. To illustrate, temporal projection significantly increased imagery in vision communication relative to the other conditions for leaders with the following number of direct reports: 10 or more ($n = 95$, $p = .004$), 20 or more ($n = 41$, $p = .048$), 30 or more ($n = 22$, $p = .005$), 40 or more ($n = 15$, $p = .035$), and 50 or more ($n = 11$, $p = .045$).[13]

To gather preliminary evidence related to whether imagery in vision communication has useful

[13] Given the sample sizes we excluded covariates in order to preserve an acceptable variable-to-observation ratio.

downstream consequences, a health care employee rated the inspirational power of visions created by leaders of the 25 largest units among participants who crafted visions for health care services. We did not discuss the coding with the rater after the initial training, review the codes with her, or ask her to recode any of the statements. Rather, we analyzed only the results she sent us the first time. Inspiration, which was rated on a scale from 100 to 700, was predicted by leaders' use of imagery in vision communication ($r = .513$, $p = .012$). We followed up on these preliminary results in Study 3 by assessing the effect of leaders' visions on their employees, thereby establishing that the time machine condition not only increases leaders' use of image-laden rhetoric in vision communication, but that this use of imagery enhances the inspiration of the leaders' own employees.

Study 3: Replication with Senior Corporate Executives

We sampled 123 senior corporate executives who work at major firms. In addition to establishing internal validity by again using an experimental format, this served as another ecologically valid context because senior executives have broad influence. Participants crafted vision statements for their own companies, thereby increasing external validity. Since we anticipated that it would be challenging to recruit a large number of upper echelon leaders, we compared the two most important experimental conditions between subjects (the time machine condition versus the condition in which participants were explicitly instructed to employ visions with imagery). Additionally, prior to the manipulation participants constructed a vision without any instructions, allowing us to use it as a within-subjects control and to account for random effects for each subject. This was helpful because unique participant-level variation was introduced in terms of the content of the visions since all leaders crafted visions for their own companies (rather than for the same content domains, as in the prior two studies). We again preregistered the details of the experiment prior to data collection (please see https://aspredicted.org/39tj7.pdf for the official document).

We recruited participants over a five-month period. We required that individuals occupy one of the top few positions in either their company or a large division. The sample included CEOs, COOs, CTOs, vice presidents, heads of department, partners, regional managers, and firm owners (average age: 37, 42% female). The leaders' average company size was 10,610 employees, and the average number of people each leader directly oversaw was 28, although they often indirectly oversaw a much larger set of employees because hundreds or thousands of employees were formally under their rank. We planned to include the full set of questionnaire items, including those related to the mediator and moderator, but we initially got a limited response rate (presumably because of upper echelon executives' time constraints). To ensure an adequate response rate when working with a sample of executives, we followed Ashford, Wellman, Sully de Luque, De Stobbeleir, and Wollan (2017) by paring down survey length. Thus, the only part of the experiment we administered for all cases was the experimental manipulation—a limitation mitigated by our testing of the mediator and moderator in both studies 1 and 2. (In the discussion section we explain that this is not likely a practical limitation because leaders who want to employ this method will only need to engage in temporal projection via the time machine exercise and not fill out a questionnaire.) We also gave the option to leaders to send their visions to a coworker to assess the visions' inspirational power ($n = 100$; average age: 38, 43% female). We used the scale on inspiration from Thrash and Elliot (2003)[14] and the same measures of imagery and vision quality as studies 1 and 2. Interrater reliability for ratings of achievability was acceptable ($\alpha = .70$).

Given that each executive crafted two visions (a control vision and a treatment vision), we analyzed the data using linear mixed models, which accounts for random effects of each participant—an approach considered superior to other methods for assessing repeated measures because it makes fewer assumptions and leads to less biased estimates, including those of the variance-covariance matrices (Bell & Jones, 2015). Further, it permits a direct test of the

[14] In 65 cases we used the full four-item scale (a = .928). In the remaining cases we could only use a single item because of participants' time constraints, and thus we used the first of the four items since it was the most representative. Among those who responded to all four items, this item had a .900 correlation ($p < .00000001$) with the four item scale, enabling us to analyze all participants together (Ashford et al., 2017). We ran analyses in two ways to ensure that our results were robust—on the subsample who responded using the full four-item scale and with the full sample controlling for cases that had one item versus those that included all four. The results were robust to both approaches (the p values for all effects were less than or equal to .001 in all cases).

mediating role of image-laden rhetoric in the relationship between temporal projection and employee inspiration. Consistent with our predictions, when including fixed effects for the control condition and the language-based condition with the mental time travel condition as the reference category (Cable et al., 2013), we found that executives who employed mental time travel communicated visions with more imagery compared to visions created by executives who were explicitly told to include imagery, $b = -19.34$, $t = -3.66$, $p = .0003$ and more imagery compared to visions created in the within-subjects control condition, $b = -21.08$, $t = -4.65$, $p = .00001$ (see Figure 2a). The effect of mental time travel versus the other conditions combined was also significant, $b = 20.51$, $t = 4.80$, $p = .000003$. Regarding effects on other aspects of vision quality, temporal projection caused leaders to craft visions with fewer values ($p = .041$), which, as noted above, is associated with greater vision quality, and marginally increased the achievability of their visions ($p = .08$).

We then tested how temporal projection impacts employee inspiration once leaders have communicated their visions to their employees. We found that bootstrapped estimates of the 95% confidence interval of the indirect effect ($b = .10$) between leaders' use of mental time travel, the amount of image-laden rhetoric in leaders' visions, and their employees' level of inspiration excluded 0 [95% CI: .01, .29]. The confidence intervals for this indirect effect continued to exclude zero when including the three other aspects of vision quality as covariates. Finally, when we tested the effect of all four elements of vision quality simultaneously as mediators between temporal projection and employee inspiration, imagery was the strongest mediator and the 95% confidence interval of the overall indirect effect ($b = .14$) excluded 0 [95% CI: .01, .36].

SUPPLEMENTARY ANALYSES

There is consensus among linguists that individual words are the most important ingredient for eliciting imagery because they serve as the "raw material" that determines whether people are capable of seeing a word in their mind's eye (e.g., "yellow" versus "protocol") (Guadagno et al., 2011). However, imagery is also shaped by how individuals interpret higher-order components of language, including clauses and the entire statement as a whole (Pinker, 1995). Thus, we tested an alternative measure of our dependent variable featuring undergraduate raters. Two raters who were blind to the study hypotheses were trained by assessing 50 randomly selected visions of varying image strength and quality, including several visions that were pretested to vary according to imagery and not any other dimension. We then assessed whether they correctly identified statements that were more versus less image-laden. They then independently rated a randomly selected subsample of 50 participants' visions at two levels of analysis: (1) distinct clauses within each vision statement (e.g., "cars driving through the streets"), and (2) the entire vision statement as a whole. If there were multiple images across a statement, the raters assessed how well the different images complemented each other. We did not discuss the coding with the raters after the initial training, review their codes with them, ask them to alter codes, or retrain them to achieve higher reliability. Rather, we analyzed only the results they sent us the first time.

We first assessed reliability at the clause level. It was possible to assess intrarater (within-person) reliability because most visions had multiple clauses in which separate images could be embedded (e.g., "people driving their cars," "commuters riding the subway"). Along these lines, there was acceptable reliability among separate clauses within each individual vision for both the first rater ($\alpha = .952$) and the second rater ($\alpha = .766$). We then assessed interrater reliability. First, we assessed it for different clauses within each statement (the clause level). Reliability was acceptable for the first ($\alpha = .767$), second ($\alpha = .670$), and third ($\alpha = .702$) clauses; there were not enough statements with more than three clauses to perform analyses. We then assessed interrater reliability for imagery of the vision statements as a whole. This level of reliability was also acceptable ($\alpha = .811$). We then assessed predictive validity. Mental time travel boosted the overall image quality of leaders' visions for the first rater at both the clause level, $F(1,43) = 4.717$, $p = .036$, and statement level, $F(1,43) = 5.209$, $p = .028$, as well as for the second rater at both the clause level, $F(1,43) = 9.420$, $p = .004$, and statement level, $F(1,43) = 7.323$, $p = .010$.

GENERAL DISCUSSION

Given that leadership involves inspiring people to achieve a common purpose (Hemphill & Coons, 1957; Locke, 1999), the ability to establish a sense of purpose is central to effective leadership. The results of our three experiments, featuring samples ranging

from British government officials to senior corporate executives, can redirect research on one of the most important rhetorical tactics that a leader uses to establish a common purpose—a vision of the future.

Upending an Assumption in Research on Leader Communication

Image-based rhetoric improves vision communication (Masuda et al., 2010), yet leaders include little of it when communicating visions of the future (Emrich et al., 2001). Consequently, employees often have a blurry view of what their organizations are trying to achieve (Carton et al., 2014). Given that visions are communicated through verbal and written language, it is tempting to assume that the remedy to the blurry vision bias would involve a focus on selecting more appropriate words and phrases. Indeed, our review of 180 sources on vision communication (see Appendix B at blurryvisionbias.wordpress.com) suggests that the vast majority of experts assume leaders are best positioned to improve vision communication by carefully scrutinizing the words they choose. Our findings upend this assumption. Leaders who averted their immediate attention from the words they use and instead imagined what it would be like to witness their organizations realizing their visions one day in the future (i.e., temporal projection, or mental time travel) communicated visions that possessed greater imagery while not altering (and, in three cases, boosting) the other features of vision quality (achievability, specificity, and the expression of values).

Incorporating Dual Cognitive Processing into Theory on Leader Vision Communication

To explain why the blurry vision bias persists, as well as approaches to correct it, we provided support for a theoretical framework that integrates previously disconnected ideas from research on leadership, linguistics, and dual cognitive processing (Shondrick et al., 2010). In turn, our findings illuminate both why temporal projection is effective for improving vision communication (i.e., the psychological process that explains its effectiveness) and when it is most effective (i.e., which leaders benefit most from it).

Using dual cognitive processing to identify why temporal projection boosts vision quality. Our findings suggest that an explicit focus on word choice causes leaders to overemphasize the abstract meaning of words and leaves the experience-based system of cognition deactivated. The experience-based system graphically simulates the observable world and thus positions leaders to craft image-based rhetoric about the future. Even when leaders attune to the properties of language responsible for triggering mental images (verbs and nouns that describe observable reality), they become so focused on language that only the language center of the brain is activated (Tulving, 1972). Since the language center is a component of meaning-based processing rather than experience-based processing, leaders do not adequately engage the experience-based system, and, in turn, do not transcend their natural inclination to formulate abstract visions rather than vivid ones, even when they are explicitly instructed to consider the types of words that visually represent observable reality. In contrast, leaders who mentally project themselves to a moment in the future when their organization's vision has been achieved benefit from activation of the experience-based system. Individuals are prompted to "see" what the observable world will look like when their vision is realized—such as facial expressions customers make as they enjoy an event, or the look of a new technological device. Once individuals construct a "movie scene of the future" to "play" in their minds, they need to do little conscious wordsmithing to communicate a more inspiring vision. Rather, they can increase the effectiveness of their vision communication by translating this mental movie scene into words. In doing so, they are able to retrieve the words needed to communicate a vision that is vivid while also strong in terms of other aspects of vision quality (specificity, achievability, and the expression of values).

Accordingly, the most powerful method for redressing the blurry vision bias is a circuitous one—a path that detours in the system of cognition that is oftentimes neglected by scholars and practitioners. Although meaning-based processing is critical because it allows individuals to use data-driven and evidence-based decision protocols (Pfeffer & Sutton, 2006), as well as engage in sensemaking and higher-order cognitive processing (Simon & Newell, 1971), our research suggests that deliberate steps need to be taken to activate the experience-based system. Since the future has not yet transpired, it is not currently being experienced (as is the case with the present), nor has it already been experienced (as is the case with the past). Accordingly, people inherently do not contemplate the future with sensory information. An active intervention (i.e., temporal projection) thus helps leaders simulate what the future could look like and better communicate about it.

Using dual cognitive processing to identify who benefits the most from temporal projection. Our incorporation of dual cognitive processing also contributes to theory on leadership by illuminating which leaders are most likely to benefit from psychologically projecting themselves to an important moment in the distant future. Leaders who are efficient thinkers (i.e., are predisposed to make intuitive decisions) allow the imagery that they conjure in the experience-based system as a result of temporal projection to influence the language they use when communicating visions (Epstein et al., 1996). In contrast, leaders who are inclined to think complexly (i.e., analytical thinkers) do not benefit as much from such an intervention. Their cerebral nature blocks mental imagery from influencing their rhetoric. Although analytical thinkers are often extolled for their capacity to systematically vet situations and reach sound conclusions, our findings add to concerns raised in recent research related to the downsides of analytical thinking—such as a decreased ability to be decisive (Dalal & Brooks, 2013) and a reluctance to exploit the upsides of intuition (Dane & Pratt, 2007). In the case of vision communication, leaders who are inclined to let their imagination reign free are likely to be the most effective vision communicators.

Implications for Leader Communication in Other Domains

By establishing that current understanding of leader communication is misaligned with the nature of dual cognitive processing and then updating our understanding of how these two areas of research intersect, scholars can better understand how to incorporate theory on dual cognitive processing into research on other aspects of leader communication. One such topic involves feedback. In a meta-analysis of dozens of studies, Kluger and DeNisi (1996) found that individuals improve their performance when they are given concrete feedback about which task-specific behaviors they should enact ("please arrive to work at 9 am") rather than general feedback ("please be more conscientious"), yet leaders often provide general feedback about personal traits. To take corrective action, leaders can mentally simulate specific task behaviors in the experience-based system prior to giving employees feedback. Similarly, when giving task instructions leaders often know a task so well that they fail to appreciate what it is like not to know it, leading them to communicate in terms that an expert can understand (abstract jargon) rather than in terms a novice can understand (concrete detail related to learning new behaviors) (Keysar, Lin, & Barr, 2003). Leaders who engage their experience-based system by imagining what it is like to perform a specific job may give better task instructions. Finally, our framework can inform theory on culture. Leaders who tell stories are often more effective at communicating an organization's culture compared to those who only communicate values (Schein, 1990). It is possible that leaders who use mental time travel to "jump backward" in time will be more likely to identify vivid moments from the organization's past that they can convey as stories to exemplify their organization's desired culture.

Empirical Contributions, Practical Contributions, and Limitations

We augmented our theoretical contributions by making a number of empirical contributions: (1) using a method that allows for a blend of internal and external validity, (2) boosting internal validity further by controlling for confounds and directly assessing mediating mechanisms, (3) demonstrating that our theory works with several ecologically valid samples, (4) replicating the core effects multiple times, (5) introducing a new approach to reviewing an extensive body of literature, and (6) testing four dependent measures, such that we included two separate measures each for vision imagery and overall vision quality—one that approximated the constituent elements (the parts that make up the whole) and one that approximated a holistic "gestalt" impression.

In terms of practical contributions, our paper can help close a gap between the existence of knowledge (image-laden visions have beneficial consequences) and the implementation of that knowledge (identifying the theoretical conditions that help leaders craft and communicate image-based visions) because we not only established the effectiveness of temporal projection, but provided a recipe in the methods section for how it can be implemented. It is our hope that organizational leaders can use the methods in this paper to construct a mental catalog of images and paint a vivid portrait of the future that galvanizes organizational members. Another practical contribution relates to our finding that analytical leaders struggle to harness the potential of temporal projection. This lends credence to the idea that organizations may be best served by coupling an

inspirational visionary with a cerebral strategist who manages operational details—a dichotomy famously embodied by Steve Jobs and Tim Cook at Apple in the mid-2000s.

There are several limitations with our paper. Although we found consistent results for moderated mediation across two studies, we urge caution with respect to the interpretation of these effects because of the nonnormal distributions of the mediator and moderator, and that fact that these effects appear to be driven by an extremely strong relationship between the independent variable and the mediator ($p < .0001$), which in turn amplifies the moderated effect on the path between the mediator and the dependent variable. Although this meets the criteria for a significant conditional indirect effect (Hayes, 2013), the moderated effect is less powerful than the mediated effect. Another consideration is the mental time travel manipulation. Although the word "company" was vetted, and its face validity determined, for the Brexit study, it may have been less appropriate for participants who worked in agencies. A final limitation relates to the Brexit sample. Although we sampled leaders with large spans of control and high-ranking positions in Studies 2 and 3, some participants in the Brexit study did not have high-ranking roles.

A number of future directions are likely to be fruitful for scholars who seek to build on the current findings, as well as to address the limitations of our studies. It may be useful to explore whether temporal projection generalizes to team leaders. For instance, we ran a supplementary experiment using the same experimental design as in study 3. Daytime and executive Masters of Business Administration students ($n = 121$) crafted visions for a team they oversaw. Linear mixed models established that those in the mental time travel condition communicated visions with more imagery, $b = 10.03$, $t = 2.49$, $p = .01$. Future research could also examine the role of nuances of vision communication that were outside the scope of this paper, including delivery, cadence, and follower characteristics (Awamleh & Gardner, 1999; Stam et al., 2014). Additionally, scholars may examine whether individuals can sustain their ability to communicate high-quality visions long after engaging in temporal projection—a possibility that seems likely due to the length of time that visual thoughts occupy memory (Tulving, 1972). Finally, scholars can explore tactics leaders use to further refine their visions after they have engaged in temporal projection and converted their mental imagery to words.

CONCLUSION

Leaders can promote effective individual and collective action by conveying a vivid sense of what the distant future could look like. Image-laden rhetoric is a vehicle that enables leaders to achieve this, yet our findings suggest that leaders are inclined (and advised) to engage in rhetorical tactics that cause them to communicate vague descriptions of the future. In contrast, temporal projection—a tactic that impels leaders to vividly imagine a real-life scenario in the distant future and then translate it into words—can help leaders craft and transmit high-quality visions. Temporal projection places leaders into a mindset that exploits the often untapped resource of the imagination, leaving them poised to communicate a verbal portrait that captures attention and inspires action.

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Andrew M. Carton (carton@wharton.upenn.edu) is an assistant professor of management at The Wharton School at the University of Pennsylvania. He obtained his PhD from Duke University. He studies how leaders establish a shared sense of purpose, as well as how they manage intergroup conflict.

Brian J. Lucas (brianlucas@cornell.edu) is an assistant professor of organizational behavior at the School of Industrial and Labor Relations at Cornell University. He received his PhD from Northwestern University's Kellogg School of Management. He studies the psychology of creativity, as well as ethics and morality.