International Journal of Communication 16(2022), 3354–3378 1932–8036/20220005

Strategic Temporality: Information Types and Their Rhetorical Usage in Digital Election Visualizations

EEDAN R. AMIT-DANHI[1]
Hebrew University of Jerusalem, Israel

Ideally, the prevalence of political data/information visualizations on social media would enrich political discourse with quality information. However, when examining the rhetorical role of information in visualizations, one must first typify *information*. A review of existing data/information typologies finds them incomprehensive; they omit visual and data-less information and disregard the temporal liminality of election periods. I thus rely on qualitative content analysis of 252 visualizations from the 2016 U.S. election to define the attributes of contemporary political information and explore its role in visualization rhetoric. I amend and amalgamate existing literature to create a *typology of political information*, which then I use to categorize the sample into two rhetorical modes (*Unveiling* hidden past/present realities, and *Imagining* possible futures) to create a second *typology of visualized information-rhetoric*. Overall, my findings reveal that candidates use temporality strategically to persuade while appearing to inform, as the facts of the election future are still pending.

Keywords: political information, information-rhetoric, election campaign, visualizations, temporality, social media

In the digital age, voters gather political information from multiple venues, including traditional news and social media. On social media, candidates may introduce information directly to the public, bypassing traditional filters such as journalistic mediation. This new pathway of disseminating political information is of the utmost importance for the democratic election process, as prospective voters are encouraged to base their choice of representatives on rational, verifiable facts, in hopes of furthering the common good.

Social media brought forth an increased use of political visualizations. Visualizations are visual representations of data and information, created to ease the communication of data and information (Schroeder, 2004). In journalism, their visual attributes have also been used to attract readership and

Eedan R. Amit-Danhi: eedan.amit-danhi@mail.huji.ac.il
Date submitted: 2021-08-19

[1] Acknowledgments: I would like to thank Limor Shifman for her excellent guidance, comments, and advice during the development of this manuscript. I am also thankful to the journal's editorial staff as well as two anonymous reviewers for their insight and helpful observations.

increase attention (Barnhurst & Nerone, 2002). In elections, visualizations are also used to convey strategic rhetoric, intended to affect audiences (Amit-Danhi & Shifman, 2018). Visualizations thus pose both the promise of informatively enriching political deliberations, as well as the danger of corroding it with disinformation. Therefore, the role of information in political visualization rhetoric merits further exploration.

However, to investigate the role of information in visualization rhetoric requires understanding what political information *is*. In what follows, the theoretical framework underlines three major issues in doing so: the exclusion of visual information types, an antiquated binary separation of data from information, and a disregard for the temporal liminality of election information. Thus, I address these issues and typify political information before delving into its rhetorical role. I then describe the methods with which I tackle both tasks: grounded qualitative content analyses of all visualization posted to Facebook by the top four candidates in the 2016 U.S. presidential election. In the findings section, I first introduce a typology for the classification of political information, which I then apply to the sample to reveal a second, two-mode typology of information-rhetoric, which addresses this article's main goal. Finally, an overview of the findings reveals how the liminal temporality of elections enables candidates to address the challenge of seemingly informative communication in uncertainty. Alongside the narrowing of the aforementioned scholarly gap, this article provides crucial insight into the scope and variety of information types visualized by campaigners and highlights the crucial role of temporality in election rhetoric and visual political communication.

Theoretical Framework

Contemporary Visualizations and Visual Political Rhetoric

Recent years have witnessed an exponential rise in the use of political visualizations on social media. Practitioner and scholarly literature has traditionally separated data visualizations from information graphics. Data visualizations are graphic displays reliant on data, which is "primarily, but not solely, numeric" (Kennedy & Engebretsen, 2020, p. 22). Alternatively, an information graphic "explains phenomena graphically but may contain no numeric data, or it presents data in charts alongside other illustrations" (Kennedy & Engebretsen, 2020, p. 22). This study uses *visualizations* as a blanket term that encompasses visual representations of both data and information.

Historically, visualizations have appeared in a number of contexts, most prominently in modern journalism (Barnhurst & Nerone, 2002; Lankow, Ritchie, & Crooks, 2012; Pasternack & Utt, 1990), wherein visualizations have served journalists in both increasing the efficiency of journalistic explanation and attracting readership though the drama and emotionality associated with visual communication (Lankow et al., 2012; Stone & Hall, 1997; Utt & Pasternack, 2000). The tension between the attractiveness of visual communication and the efficiency of informative transfer is crucial to the examination of visualizations because it exposes their dual potential: They may raise the quality of public debate toward a deliberative ideal, or they can be used as visual bait. Thus, much as Barnhurst and Nerone (2002) call to consider the form of news alongside its other components, the form of political campaigns merits further examination. The current study builds on the tensions described by scholars of journalistic visualizations (Barnhurst & Nerone, 2002; Lankow et al., 2012; Pasternack & Utt, 1990) by calling attention to their editorial-like,

strategic aspects: Much like editors assign stories and resources, campaigners select the data sets and information that gets visualized.

Before any differentiation between data visualizations and infographics, visualizations are, first and foremost, visuals. As political visuals, visualizations may fulfill a myriad of communicative functions, including political rhetoric. In the context of this study, I adopt Foss's (2004) definition of visual rhetoric as the "purposeful production or arrangement of colors, forms and other elements to communicate with an audience," which relies on "objects other than words" (pp. 304–305) to extract and deliver meaning. Adopting Walsh's (2015) approach to visual rhetoric, I explore it through classical, semiotic, and critical analytical prisms. Classic visual rhetoric looks into the components of an argument and applies the same analytical logic to both visual and texto-verbal elements. Previous studies have explored visualizations through an inductive approach (Foss, 2004) by deconstructing visualizations to create rhetorical categories that account for both their symbolic and textual narratives (e.g., Aiello, 2020). In the context of this approach, the current study stipulates that the editorial choice of *what* to visualize (any information or data) is immediately reflected in that visualization's textual and visual rhetorical outputs. Contrastingly, a semiotic approach to visual rhetoric delves into the symbolic components that make up visuals and their rhetoric. As political visuals, visualizations may perform many political functions (see Schill, 2012), including agenda-setting, image-building, and ambiguity. Aiello (2020) demonstrates the richness of the semiotic inventory that visualizations offer: from graphic signage (Weber, 2019), through the use of colors and typography (van Leeuwen, 2011) and different visualization modes, to interactivity (see Shneiderman's, 2003, visualization task vocabulary). Each of these aspects may create or alter meanings, suggesting that visualizations' informative meanings stem from both their data or informational origins and their visual displays. Finally, the critical perspective examines the power structures that visual rhetoric perpetuates or undermines (see Allen, 2021, for a critical discussion of implications of migration visualizations, or Nærland & Engebretsen, 2021, for a deliberative systems approach to data visualization). This approach defines the stakes of visualization rhetoric: Political visualizations are both reflective of existing political realities and serve to perpetuate or change them (Amit-Danhi, 2021).

As visualizations migrate into the world of political rhetoric and campaigning, it is important to examine them through multiple lenses: the narratives they convey, their design, and the different types of information they originate in. The latter is especially important, because much of the persuasive power of visualizations stems from their "aura of objectivity" (Kennedy, Hill, Aiello, & Allen, 2016, p. 723) and their association with the perceived impartiality of the numeric. In a world overloaded with subjective and strategic information, numbers represent fairness, signify the scientific and impartial, and are deemed stable (Hansen & Porter, 2012; Kovacic & Giampietro, 2015). Porter (1996) associated politicians' use of data for persuasion with the presumed objectivity of its sources, and a basic distrust of politicians. Cairo (2019), in turn, notes that "politicians . . . throw numbers and charts at us with no expectation of our delving into them" (p. xi) because they assign meaning to data to negate the need for independent analysis. Thus, when politicians visualize data, they harness its perceived value for persuasion.

While studies have taken on the analytical challenge of defining the visualization genre and its political implications, the types of information chosen for political visualizations, and specifically *visual information*, have so far been overlooked. Thus, I use a deductive perspective to visual rhetoric in which

visual rhetoric foregrounds and supports textual rhetoric (Finnegan, 2004; Foss, 2004), suggesting that *information* choices foreground visualization rhetoric and are crucial to its study.

Types of Data, Information, and Their Visualizations

As demonstrated by the preceding definitions of infographics and data visualizations, the distinction between data and information is often treated as axiomatic. This stems from the data information knowledge wisdom (DIKW) framework, which envisions learning as a linear process, starting with raw data and ending in wisdom. Although definitions of its components vary across disciplines, several consistencies emerge: Data are generally defined as unorganized observations or measurements of reality, without context or interpretation (Frické, 2019; Rowley, 2007), and "have no meaning because they reside outside of a human mind" (Baskarada & Koronios, 2013, p. 11). The next component is information, which is defined as data that have been structured, processed, and contextualized to create meaning (Frické, 2019; Rowley, 2007), which "emerges through cognitive processing of data" (Baskarada & Koronios, 2013, p. 11). Thus, the contextualized, structured forms in which audiences may encounter data-oriented meanings are, in fact, information. The next transition in the framework is between information and knowledge, which is defined by Rowley (2007) as a mixture of "information, understanding, capability, experience, skills, and values" (p. 174). Finally, wisdom can be defined as the accumulation of knowledge and the intuition for its application in real life (Frické, 2019; Rowley, 2007).

In their semiotic analysis of the DIKW framework, Baskarada and Koronios (2013) point to a continuum consisting of measurement, meaning-making, presentation, and understanding. However, the linear nature of this process may not be suitable for our current information ecology, in which data and information are not as easily distinguishable as they once were (Frické, 2019; Rowley, 2007). Frické (2009) notes, "All data is information. However, there is information that is not data" (p. 140), suggesting that some informative meanings do not stem from measurements of reality. Election visualizations are rife with such information: The detailing of plans, hopes, beliefs, and warnings are informative without being tied to traditional data.

In some fields, references to data are almost solely numeric, whereas in others (e.g., social sciences, social work, or psychology), data may also describe qualitative measurements. Typologies of data tend to differ in their modes of distinction (e.g., Furner, 2016; Ray, 2017): Mathematical frameworks focus on the attributes of values (e.g. concrete/abstract); code frameworks differentiate data through variable types, such as primitive data (characters, integers, floating-point numbers, fixed-point numbers, Boolean data types and references/pointers), nonprimitive data (objects defined by programmer), and data objects (a group of one or more values; see Schildt, 2014); and information management frameworks focus on the different formulations that data may be provided in: structured and unstructured data (Ludwig et al., 2013) or primary, meta, and derivative data (Floridi, 1995). For data visualization, data types are typically differentiated by their specific fields' distinctions, through common associations between certain data types and specific visualization forms (e.g., temporal data and time-series graphs), or by the use of distinctions related to the type of interpretive work involved in the transformation of a data set into a visualization (Cairo, 2019). In the latter case, a data set will be typified by its visualization-oriented attributes: the number of dimensions it includes or the structure of the database (e.g., tree, network; Shneiderman, 2003).

The data typologies reviewed across visualization studies, computer science, mathematics, human–computer interaction, and information science do not tend to include measurements of thoughts, specifically future-oriented thoughts (such as plans, opinions, warnings, and qualitative estimations). A reasonable suggestion would be that these components reside in the aforementioned overlap between the "D" and "I" components of DIKW. Thus, I turn to typologies of information. Information typologies also differ across scholarly contexts: Information types are differentiated by either their source, the task the information is meant to contribute to (see Boyström's, 1999, domain-, task-, and task-solving information types), the media through which they are conveyed (e.g., Hsieh & Chen, 2011), or their political/moral implications (e.g., misinformative/corrective information; Belgiu & Constantin, 2017). Unlike data typologies, the broad differentiation mechanisms of information typologies and their attention to context lead to the inclusion of future-oriented information. They are considered either task-oriented information (a part of the logical landscape in which a task in performed; see Boyström, 1999), misinformative information (see Belgiu & Constantin, 2017), or social information (e.g., Gorman, 1995). Overwhelmingly, they are neglected in the study of visualizations.

To make data accessible and usable for decision making, analysts gather, cleanse, and store data to make them informative, and data presentation follows (textual or graphical). Thus, visualization is a part of the communicative presentation of information. The visualization format is ideally chosen according to the attributes of data, the meaning extracted from them, and the comprehension capabilities of the audience (Cairo, 2019; Shneiderman, 2003). Different visualization choices lead to different meanings, which then translate into different rhetorical and political effects (e.g., Allen, 2021). Thus, the choice to visualize data-less information may crucially affect the political rhetorical output of visualization.

Deliberative Democracy and the Temporal Liminality of Elections

The preceding sections have highlighted a duality in political visualizations: They may raise the informative quality of public debate toward a Habermasian, rational deliberation in the public sphere, or they may be used as strategic, visual rhetoric. A healthy, informative public debate is a pillar of democratic elections: Ideally, citizens arrive at their voting decision based on their analysis of information gathered through media consumption, combined with their own experiences and world views. In American politics, social media are considered "an important new flow of political information" (Bode, 2016, p. 42), creating deliberative spaces in which opinions are both exchanged and formed (Park, 2019).

The ideal public sphere includes, among other principles, the core pillars of rational deliberation, the ability to justify and validate assertions, respect among participants, and authenticity. These ideas have undergone several theoretical turns (Liston, Harris, & O'Toole, 2013; Owen & Smith, 2015), in which the merits of the digital public sphere, specifically social media (Jennings, Suzuki, & Hubbard, 2021), have been thoroughly examined for their potentials and shortcomings. Throughout these turns, the role of informative efficacy has remained central to the fulfillment of deliberative potentials.

In the specific context of data visualization, Nærland and Engebretsen (2021) explore visualizations from a deliberative systems approach, reiterating that they may increase or reduce the informational quality of public debate, as well as the respect among deliberators and citizens. While they hold the potential to empower citizens and further deliberations, visualizations can also be an effective tool to bolster certain

ideologies (Nærland, 2020). Their negative potentials cannot be denied, whether in the hands of a deliberately manipulative campaigner or an absent-minded designer (Cairo, 2019).

In the information ecology of the digital age, one cannot overstate the centrality of informative efficacy in democratic deliberations, especially in those that precede elections. As citizens are tasked with extracting knowledge from the flood of data and information they are bombarded with (Haider & Sundin, 2020), visualizations hold the potential to alleviate cognitive loads (Cairo, 2019; Nærland & Engebretsen, 2021). Visualizations are used extensively by candidates on social media campaigns (Amit-Danhi & Shifman, 2018; Cairo, 2019). Candidates use social media strategically to communicate with their audiences via various content genres, including visualizations (Amit-Danhi & Shifman, 2018).

Visualizations are often defined in terms of the past and present, since they typically represent data and information about what *is* or *was*. However, in the temporally liminal environment of elections, visualizations also serve to display predictions of what will be. They can be used to deliver projections and suggest future trends (see Otana & Salaverría, 2019; Pentzold & Fechner, 2021). Predictions are a precarious deliberative venture in the uncertain environment of elections because the entire political system is engaged in negotiating a collective future (Wenzel, 2019). While politicians often engage in strategic communication that does not adhere to normative democratic ideals, voters are bombarded with vast quantities of messages, too many to properly decipher or process, in their attempt to filter out lies and misinformation (Jiang & Wilson, 2018). When discussing the future, voters rely heavily on information sources (journalists, politicians, and pollsters) in filtering out "bad" information (Aharoni, Tenenboim-Weinblatt, Baden, & Overbeck, 2020).

Election discourse often revolves around polls, wherein prospective voters reveal voting intentions, which are counted, analyzed, and visualized. Election polls may indeed alleviate uncertainty by allowing the public to gauge what is to come (Jacobs & Shapiro, 2005), and they are considered the closest attainable form of evidence of future election results (Goodell, McGroarty, & Urquhart, 2015; Jacobs & Shapiro, 2005). Herein lies temporal liminality: Polls measure what participants *intend* to do, intentions that may change without consequence. Accordingly, election discourse often mentions margins of error, pollster biases, and participant fraud, and voters consume polls hesitantly (Aharoni et al., 2020; Jacobs & Shapiro, 2005). Thus, in elections, even scientific projections are reliant on the quantification of current plans. Plans do not meet the traditional criteria of data, because they relate to a yet-to-emerge reality. This makes the democratic ideals of rationality and verifiability quite precarious; polls are accepted as the lesser of informative evils in the temporally liminal space of elections. Thus, excluding future-oriented information from typologies leads to a distortion in scholarly understanding of election discourse.

How can one responsibly deliberate the future? In journalistic reporting, this problem is solved through acts of mediated recollection. Tenenboim-Weinblatt (2013) demonstrates how journalists bridge between temporalities through acts of retrospective and prospective collective memory in setting public agendas: "Whereas collective retrospective memory refers to collective recollections of past events from the standpoint of present, collective prospective memory refers to collective remembrance of what still needs to be done, based on past commitments and promises" (p. 92). While these concepts were developed for an ongoing, open-ended event, the use of past events to suggest possible future election scenarios may

also prove quite effective. I propose that candidates may use visualizations to create informative bridges between the past, present, and future, using prospective information (e.g., looking at a candidate's past performance to indicate future behavior) to appear more informative.

To conclude, the studies cited earlier have advanced the understanding of the attributes of political visualizations in digital discourse, but have also exposed insufficiencies in current conceptualizations of political information. I thus pose the preliminary question, "What are the types of political '*information*' that digital political visualizations convey?" as a precursor to the exploration of visualized information-rhetoric. I address this question by proposing an amended typology of political information, which tackles the three issues defined earlier. Subsequently, I explore the main question: "How is information used as a rhetorical resource in contemporary digital political visualizations?" This question results in a second typology, which provides a comprehensive view of the rhetorical outcomes of the visualized use of different types of information in the temporal liminality of elections.

Methods

This study is based on a sample of all visualizations posted to Facebook by the top four candidates in the 2016 U.S. presidential election: Bernie Sanders, Hillary Clinton, Ted Cruz, and Donald Trump. This case study was chosen because of the high levels of uncertainty, the prominent usage of visualizations, and the considerable difference in rhetorical approach shown by the candidates. The choice of platform was intended to document visualization strategies directed toward a wide range of audiences, primarily voters (unlike Twitter, which is more geared toward communicating with journalists; see Bossetta, 2018). The sample (N = 252) was collected in two phases, combining automated and manual sampling protocols. First, a JavaScript scraper produced an automated documentation of all Facebook posts by the candidates, from the time of their candidacy announcement to their respective concession or victory. Second, I performed manual selection of visualization posts, relying on an amalgamation of visualization definitions cited in the literature mentioned earlier, which included all posts containing an image or video that conveys data or information through visual encoding (see Cairo, 2019).

Analysis was carried out in three stages, using grounded analysis informed by the literature cited earlier and qualitative content analysis. First, to answer the preliminary question and define information types, I relied on the literature cited earlier to extract suitable types for the classification of the information found in the current sample. As demonstrated in the theoretical framework, the field-specific typologies proved unable to encompass the informational attributes relevant to election discourse. This was specifically due to the lack of classification tools for visual information (i.e., symbols), the muddled distinction between data and information, and the exclusion of future-oriented information types from existing typologies (estimations, plans, fears). Therefore, I removed, integrated, and added elements to existing typologies to create a typology for the classification of election information that addresses the aforementioned issues. Finally, to answer the main question, I used qualitative content analysis to systematically group recurring information types and identify rhetorical forms. To account for the role of information in visualized rhetoric, I classified the sample according to the first typology and produced a second typology, which includes five types of information-rhetoric, divided into two rhetorical modes. Both typologies were sufficiently exhaustive to typify the entire sample.

Findings

A Typology of Information in Election Visualizations

The information typology I created (see Figure 1) to account for the insufficiencies defined in the theoretical review in regard to current conceptualizations of data and information features three layers of informational attributes in election visualizations. The typology is nonhierarchical; the three layers each reflect a different meaning-making aspect of the information classified: its origin (*foundation*), its specific nature/composition (*building blocks*), and its analytical *structure*. In what follows, I detail the components of each layer and how they relate to the mentioned challenges and literature.

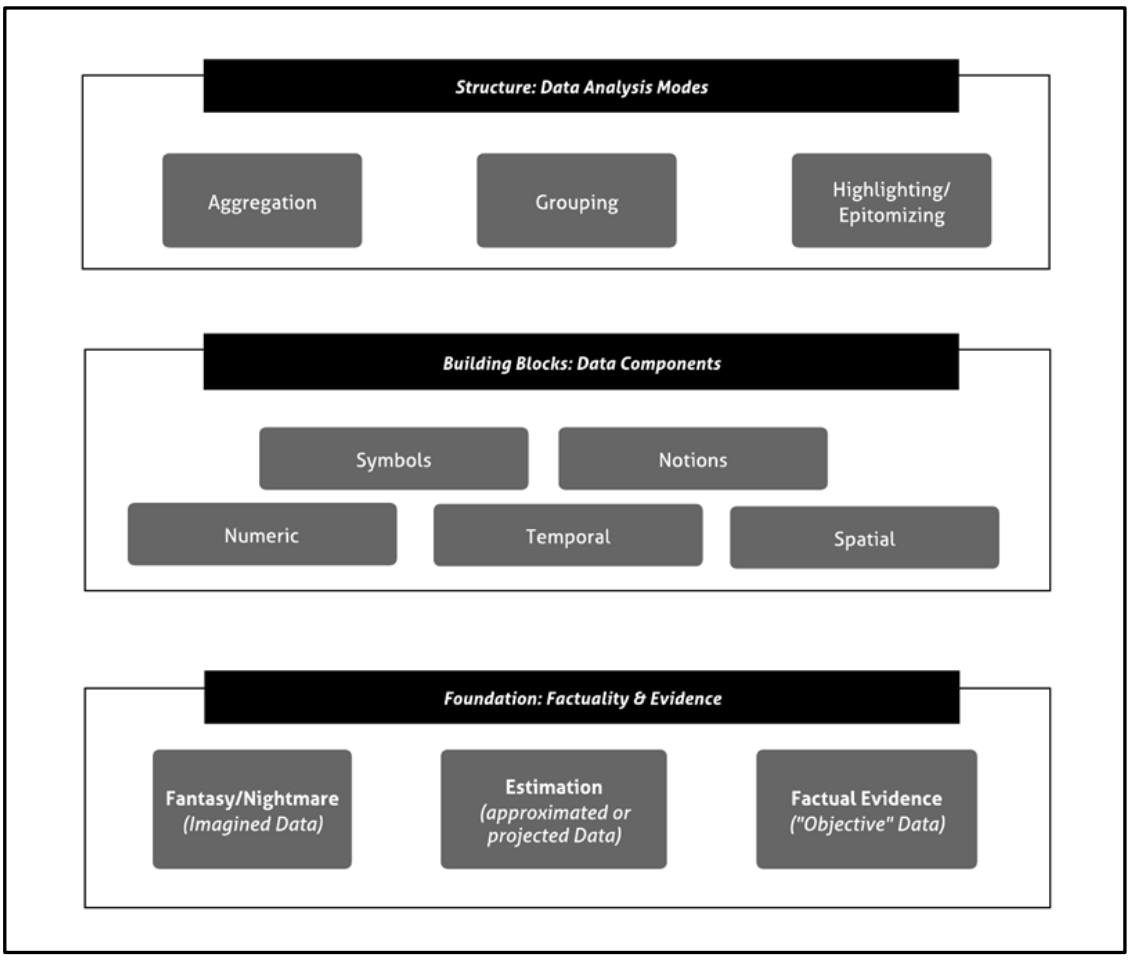

Figure 1. Visualized information: A typology.

Foundations

The foundation is the origin of information—what it is based on. Congruently with the DIKW framework, current typologies tend to focus on data as preliminary to information. However, such accounts rarely allow for contemplating whether data are a valid depiction of reality. In this new typology, I term conventional data foundations as *factual evidence,* given that they are perceived as proof of the realities they depict. For example, in Figure 2, differences between rates of compensation are cited as proof of an unjust economy.

Many election visualizations do not address the past, but project the future. Such projections cannot be founded in traditional data because they measure an upcoming reality. This brings forth two new types of foundations*,* both added to address the temporal liminality of election information. First are *estimations,* which are projections based on factual data: a projection of what *will be*, based on *what was.* For example, Figure 3 is a visualization founded in polling data, wherein participants are asked about their *current* intentions regarding a *future* vote. This results in an estimate of a future outcome, which is irrefutable because it has yet to happen. Second, information about a postelection future can be founded in a *fantasy/nightmare* notion of possible election outcomes. Whereas practitioners may disregard Figure 4 as uninformative, I suggest that it meets the criteria for an information graphic (Kennedy & Engebretsen, 2020): It visualizes information about a desired future state—the prospective president's stance on Israel—whose foundation is a fantasy. Although many visualizations are founded exclusively in one of the three foundation categories, the sample also included units with combined foundation types. For example, Figure 5 presents a *nightmare* scenario of a Trump presidency, via an *estimation* of his first State of the Union address; it does so by using two past realities (famous Trump quotes and an Obama speech) to suggest a prospective future, in a mixture of fantasy and factual evidence.

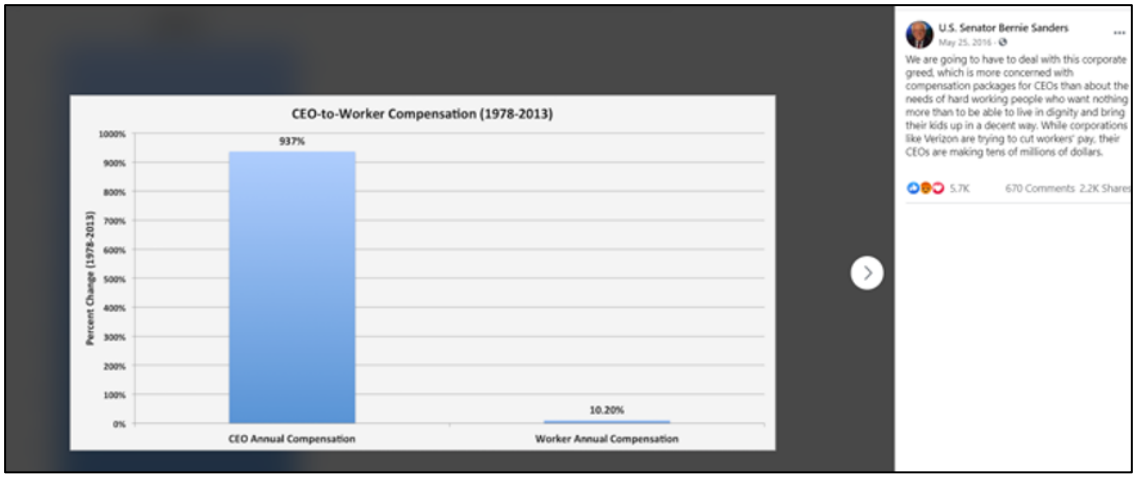

Figure 2. "CEO-to-worker compensation" (Sanders, 2016c).

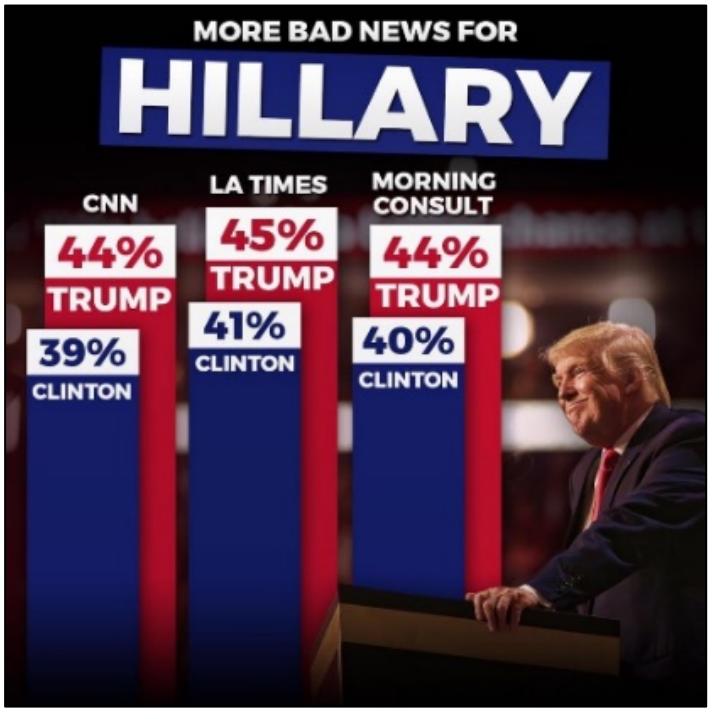

Figure 3. "More bad news for Hillary" (Trump, 2016a).

Figure 4. U.S.–Israel relations visualization (Cruz, 2015a).

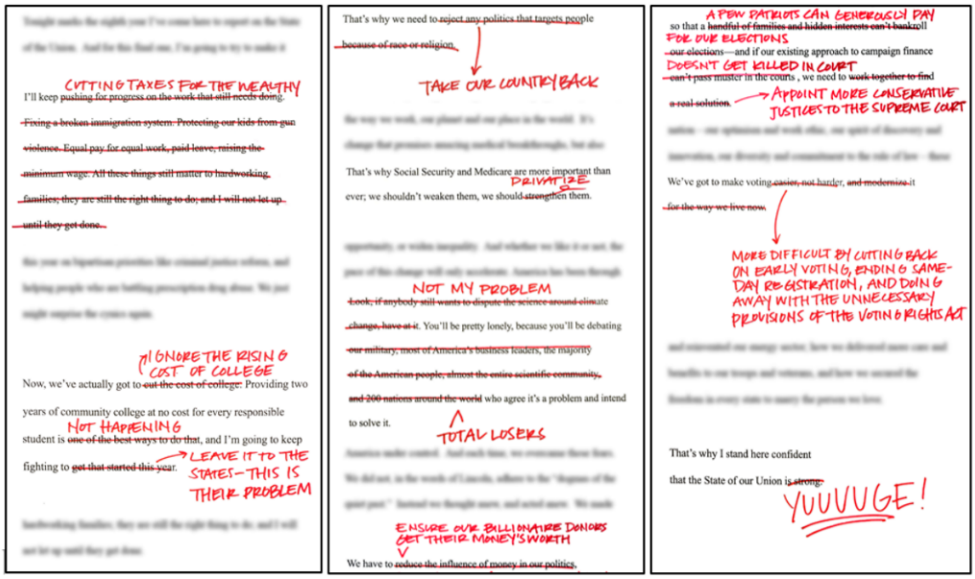

Figure 5. Trump's (future) State of the Union (Clinton, 2016).

Building Blocks

The second layer of the typology refers to what I term the *building blocks* of information. DIKW tradition would require the building blocks of information to be termed as data (Rowley, 2007). However, this perception of information is incompatible with the current sample because it only describes a portion of the information types visualized. For example, a classic DIKW approach would classify Figure 4 as a data-less image. However, as mentioned earlier, it is still an infographic. Its informative value emanates from "objects other than words" (Foss, 2004, p. 305), suggesting that information types adopted from existing literature (numeric, spatial, and temporal) should be supplemented with two additional categories: *symbols* and *notions.*

Symbols do not conform to traditional definitions of data. Nonetheless, they are meaningful and informative. The cultural information imbued in symbols is crucial for the work of decoding visual rhetoric (Aiello & Parry, 2019). Symbols perform a referential function: They connect between various informative components and a relevant context, which serves an informational layer. In Figure 4, the combination of the intertwined hands and the countries' flags visualizes the ideal relationship between the nations. Should the symbolic context be removed from the visualization, the argument would be altered: A flagless version would be as meaningless as an unlabeled bar chart.

However, Figure 4 is not solely symbolic. The image of the joined hands is foregrounded by an informative component that I term *notions:* qualitative assertions (Gorman, 1995) about the world, such as suggested moral assessments, intentions, quotes, and relational information. In Figure 4, the joined hands convey the relationship that the two countries should strive for, thus completing the visualized argument. When typifying future-oriented information, notions are crucial. It is the notion of a prospective vote (a plan) that is

counted and transmuted into a numeric value in a traditional election poll. Because notions are undoubtedly informative in their cumulative form in polls, I argue that they are also informative as singular expressions.

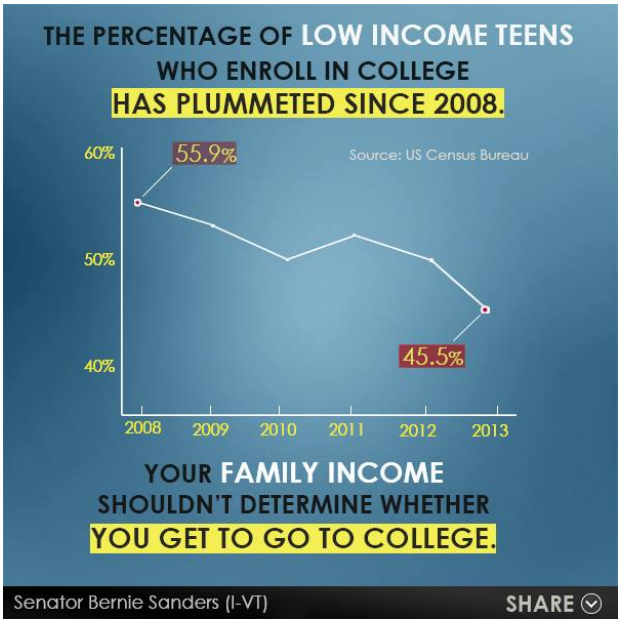

Figure 6. College-enrolled low-income students (Sanders, 2016b).

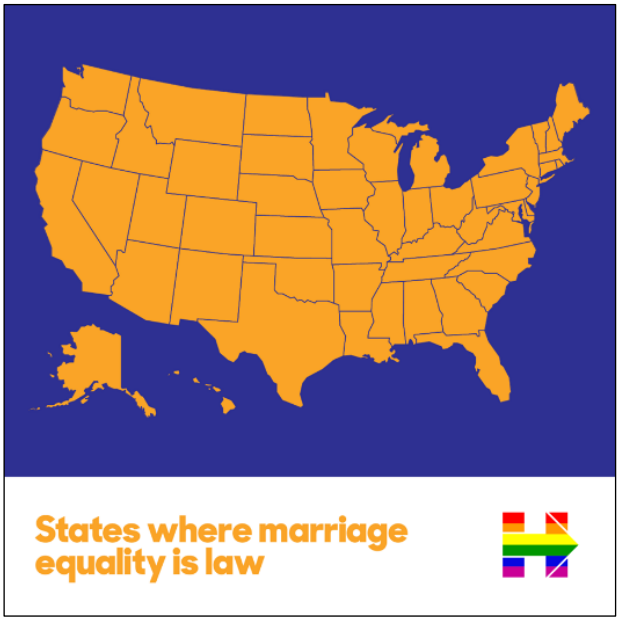

Figure 7. Marriage equality map (Clinton, 2015b).

Structures

Traditionally, the transition between data and visualizations involves interpretive work and data presentation. A practitioner (designer or analyst) performs analysis on a database to generate an informational interpretation of data, which is then textualized or visualized (Shneiderman, 2003). For instance, a bar chart is the visualized product of grouping analysis, wherein data are segmented to create comparisons. Analysis is thus an inherent part of the visualization process. Thus, the third and final layer in the typology is *structure*. This layer relates to the analytical processes applied to data/information to produce the visualized message. To encompass a wide range of analytical modes, I define three generalized structures: *aggregation, grouping,* and *highlighting/epitomizing.*

In *aggregation,* information is derived from a collective overview of gathered data. For example, Figure 6 presents a macro-trend across five years in which the percentage of low-income college-enrolled students has deteriorated. Note that the main vessel for informational insight is the cumulative trend across the years, rather than a single datum. *Grouping* is a structure in which information is derived comparatively, by segmenting data into groups (Figures 2 and 3 both use grouping). Both *aggregation* and *grouping* are categories derived from data analysis and visualization literature (e.g., Shneiderman, 2003). Finally, *highlighting-epitomizing* involves the visualization of an idea, concept, or relationship. It is often used to visualize symbol- or notion-based information (e.g., Figure 4), but it can also facilitate the visualization of certain types of quantitative measurements (see Figure 7).

A Typology of Information in Election Visualizations

While the typology of information types can help us define what election information is, it does not explore the rhetorical uses of information. Following a classification of the sample according to the typology in Figure 1, the visualizations were continuously grouped in an iterative process. The rhetorical functions of election visualizations were divided into two temporally oriented modes—*unveiling* and *imagining*—which include five rhetorical categories. Unveiling is a past/present-oriented mode, wherein the readers are invited to discover something about the world in which they live(d). In contrast, imagining provides estimations and fantasies about a future reality that could or should emerge. Within the two modes, each category is characterized by common informational attributes (foundations, building blocks, and structures), which create a distinct rhetorical form. Figure 8 displays the modes and categories and their informational attributes, as well as a unit that exemplifies each category's attributes.

Unveiling

Unveiling visualizations claim to reveal a hidden reality. This mode is divided into two categories. The first is *rewind*, in which a sequence of events is retrospectively revealed to have caused or contributed to a present state. The second is *report*, wherein the attributes of the present state are revealed. Each of these categories is based on a specific configuration of informational characteristics that creates the rhetorical act.

Rewind visualizations rely on both temporal and numeric factual evidence, which is aggregated and grouped to show a retrospective trend. For example, Figure 8a (Trump, 2016b) notes the relative difference in economic growth between two periods. The time axis is segmented to compare the Obama administration's years to the preceding 58 years. This grouping is a rhetorical mechanism: It rewinds history to reveal an alleged turning point and assign blame. Rewind rhetoric can also appear via other structures, like in Figure 6, which uses aggregation to display a downward trend in college enrollment of low-income students.

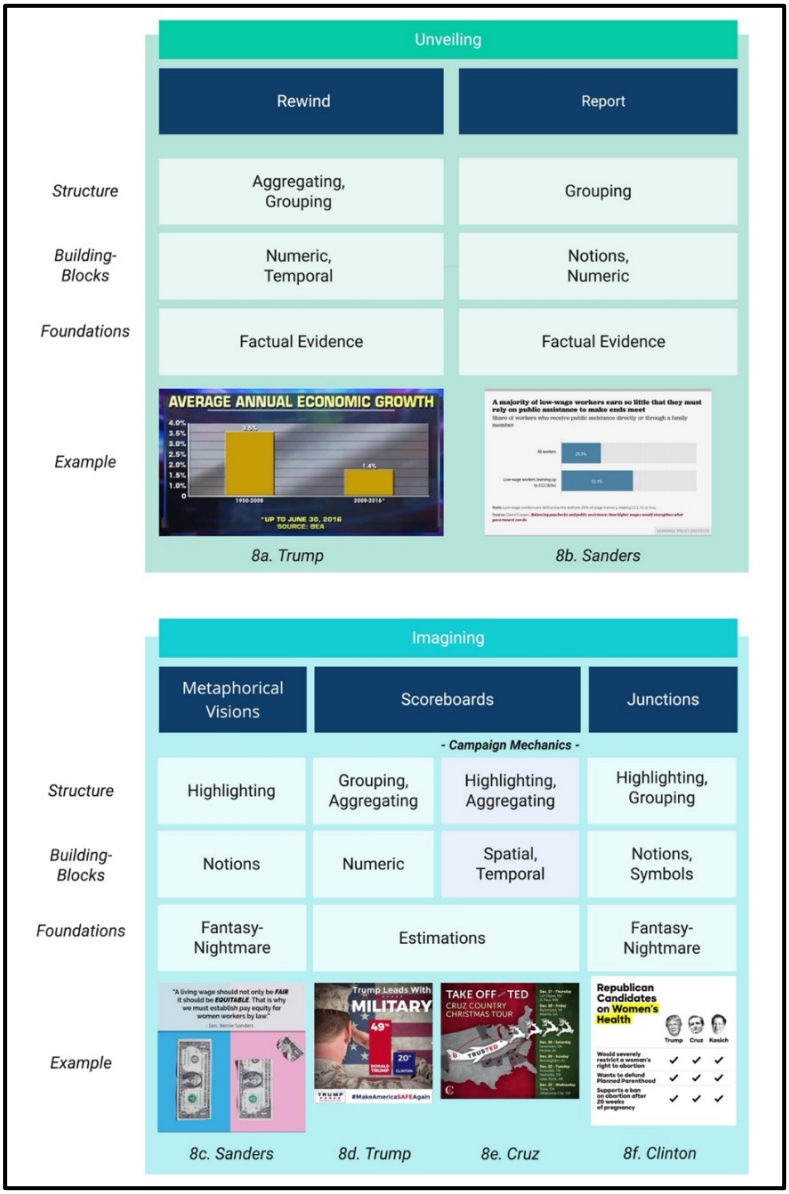

Figure 8. Visualizations: information-rhetoric types and modes.

Report visualizations rely on present-oriented, numeric factual evidence, which is grouped to present a hidden reality, mistreatment, or inequality. Unlike rewind visualizations, which rely on temporality as the leading rhetorical mechanism, report rhetoric relies on the grouping structure to deliver the claim. For instance, Figure 8b (Sanders, 2016a) displays the relative portion of workers who rely on public assistance. The claim is delivered via a comparison between two bars: one displaying the percentage of assistance receivers of "all workers," and a second displaying percentage of assistance-receiving "low-wage workers." The informative attributes of this image show numeric factual evidence, using grouping to showcase issues with the current state of the economy.

Imagining

The second rhetorical mode found in this study involves the use of data and information to suggest, project, predict, or describe yet-to-occur realities. This mode comprises three rhetorical categories: *metaphorical visions,* in which the candidate evaluates the notion of a future state using visual metaphors; *scoreboards*, wherein win/loss scenarios and campaign realities are projected; and *junctions,* in which the reader is presented with the choice between two futures.

The category of metaphorical visions employs the highlighting/epitomizing structure to notions, which are fantastical or nightmarish future scenarios, by using symbolism as a rhetorical mechanism. It revolves not around what the future *will* be, but around what it *should* or *should not be*. This category is exemplified in Figure 4; it is clear, during the latter days of the Obama administration, that Israel and the United States are not as conjoined as Cruz believes they should be. According to this visualization, America should strive to be as intertwined with Israel as the hands are. This category demonstrates how symbols serve as informative components, but also how the epitomizing structure is used as the main rhetorical mechanism. Some metaphorical visions visualizations are presented in a manner that may connotate numerical data. For example, Figure 8c, a visualization by Sanders (Sanders, 2015), presents the *notion* of pay inequality, rather than its numeric reality. The visual reference to a bar chart and the cultural reference to the notion of 78 cents on the dollar produce a visualization that appears more data-oriented than it is.

The second rhetorical category within the *imagining* mode is termed *scoreboards.* This rhetorical type refers to the competitive elements of the election race and enables readers to envision a win/loss future. Because the election outcomes were determined after the end of the sampling period, this category is entirely based on estimations. This category encompasses polling graphics, electoral maps, favorability statistics, and campaign timelines because they all refer to election futures. Scoreboard rhetoric takes two informational sub-forms. The vast majority of information comprises grouped and aggregated numeric estimations in the form of polling data (see Figure 3), whereas a minority also incorporates symbols (see Figure 8d; Trump, 2016c). These symbols *contextualize* the informative-rhetorical argument rather than convey it. Alternatively, scoreboards visualizations also reveal *campaign mechanics*. This subgroup is characterized by a reliance on highlighted and aggregated spatial-temporal estimations of campaign plans. These are not visualizations of policy plans or pledges, but declarations about the near-future activities of the campaign. For example, Figure 8e (Cruz, 2015b) declares, via temporal and spatial estimations, when and where the candidate will visit during his Christmas tour.

The final information-rhetoric category within the imagining mode is termed *junctions.* This form involves presenting the reader with a choice between two or more possible outcomes. Because it compares two *hypothetical* futures, this category cannot be founded in factual data and is highly reliant on grouping. For example, the video *How the Republicans Steal Progress* uses humoristic depictions of Republican stances and promises that when Clinton wins, "we'll send them back to GOPville . . . we'll protect our progress and keep American families strong" (Clinton, 2015c, 1:12–1:20). The video depicts imagined notions of both desirable and undesirable futures and directs the viewer toward a favored, Clinton future. Junctions can also be implied, as the depiction of a horrible election future implies an alternative: the vote that prevents it. For example, Figure 8f (Clinton, 2015a) contrasts three Republican candidates' stances on women's health issues. Clinton suggests that the three are alike, and therefore, if one shares her disdain for the quotes, she is the reasonable choice.

These findings indicate that the informational attributes of digital political visualizations are pivotal to their rhetorical outcome. In Figure 9, I include rewind, report, metaphorical visions, and scoreboards visualizations. Although all four employ or evoke the same bar-chart format, they perform distinctly different rhetorical acts: predicting outcomes, epitomizing notions, tracing back processes, and reporting injustices. This is due to the informational differences between them; the same visualization form is used to display facts, estimations, and fantasies. Thus, in contrast to the previous scholarly focus placed on design strategies in studying political visualizations, the current study highlights the role of *information* in visualized political rhetoric.

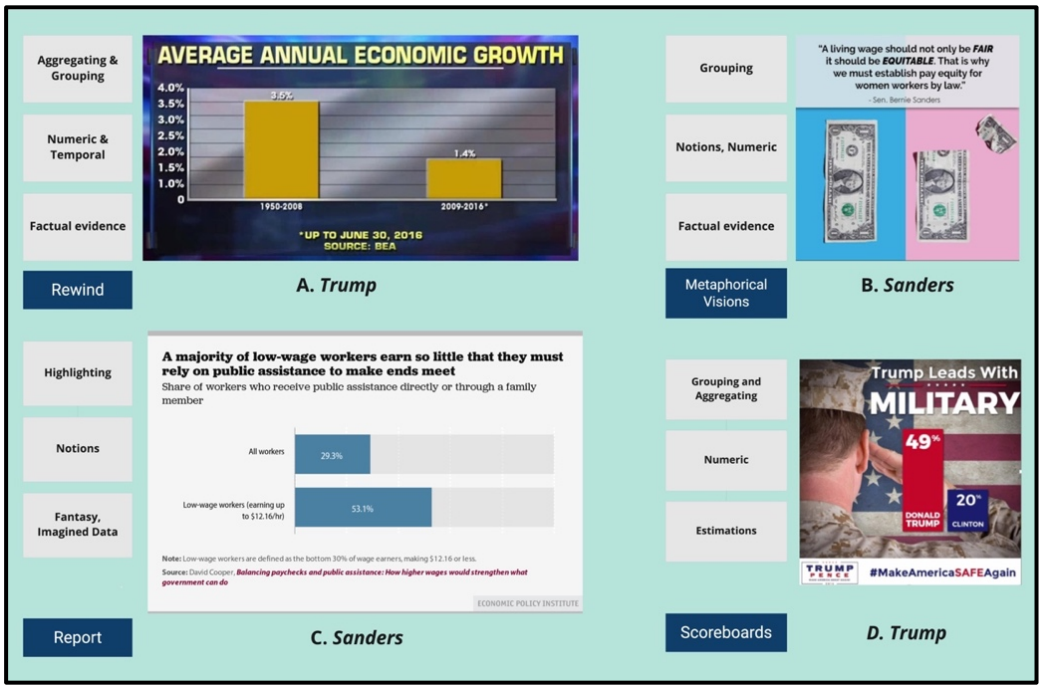

Figure 9. Visual similarities and informational distinctions.

Discussion

This study aimed to explore and define the role of information in election-oriented visualization rhetoric. Having exposed three scholarly chasms in regard to contemporary political information, I first constructed a typology of informational attributes in political visualizations. The first typology was subsequently applied to a sample of election visualizations to examine the types of rhetoric that emerge from recurrent formulations of informational attributes, resulting in a typology of information-rhetoric in political visualizations. Next, I reflect on the strategic application of temporality throughout the findings to demonstrate how mediated collective memory (Tenenboim-Weinblatt, 2013) serves campaigners in delivering seemingly well-founded rhetoric.

Retrospective memory involves the act of recollection of the collective past from a present standpoint (Tenenboim-Weinblatt, 2013). Within the mentioned typology, retrospective memory was applied in the unveiling categories, wherein candidates engage in different acts of recollection. In rewind rhetoric, candidates refer to a collective past to assign blame or accolade for a present state. The argument regarding the relationship between the past and present is then used to imply a similar relationship between the present and the future—for instance, if Democrats slowed down the economy before, surely they would do so again (see Figure 8a). In other words, the candidate refers to the past without explicitly invoking the future; it is already implied by the temporal liminality of elections. Alternatively, because report rhetoric involves revealing the hidden facts of the present, it engages in retrospective collective memory more subtly: Instead of relying on the past to suggest a future, candidates apply a retrospective approach to the present. They reveal the details of the present from the standpoint of a collective future. Numeric data are introduced to create a collective memory of inequality or injustice that the intended audience may look back on from a future perspective. The reliance on retrospective memory benefits candidates in two ways: First, they appear responsible and trustworthy because they rely on factual evidence; and second, they construct a collective memory of the present that serves them in agenda-setting in the near future. Furthermore, while the two unveiling categories are used competitively and include grouping functions to highlight "good" and "bad" choices, both appear to be furthering rational, informative deliberation, framing the candidate as ethical and earnest rather than competitive.

However, by relying on retrospective memory, the candidates avoid the main rhetorical challenge of election discourse: They do not discuss the election or its possible outcomes. Prospective collective memory affords them the ability to do so through a "collective remembrance of what still needs to be done" (Tenenboim-Weinblatt, 2013, p. 92). This type of mediated collective memory is invoked in two of the imagining categories. In both junctions and metaphorical visions, candidates use notion-based quotes from the past and present to prospectively suggest what needs to be done in the future. In junctions rhetoric, prospective memory is employed in the context of a comparison between candidates. They are contrasted based on their past statements and acts, suggesting that their past behavior indicates the right voting choice. Junctions rhetoric amalgamates competitive, issue-oriented, and personalization themes, as well as factual evidence and notions. Similarly, metaphorical visions evoke prospective memory by way of declarative acts, meant for future temporal references. The candidates present a visualized quote, which serves to align them with specific values (pay equity in Figure 8c; U.S.–Israel relations in Figure 4) and to declare their intentions. By promoting their own quotes, they submit their statements as prospective evidence, to be recalled after the election. Metaphorical

visions enable candidates to focus on alignment with policies and values, rather than overtly persuade. Thus, the informational approaches of both junctions and metaphorical visions address the challenge of visualizing information in an uncertain environment by way of prospective memory: They recall promises made and broken by adversaries, providing proof thereof via quotes and notions for future prospective references. In the temporally liminal environment of elections, prospective memory enables candidates to discuss the unknown through immeasurable notions. The quotes by which junctions compare candidates' merits, and by which audiences are invited to evaluate metaphorical visions, portray future intentions rather than evidence of past accomplishments. As such, they are irrefutable. This aligns candidates with democratic ideals, highlights the importance of their values, and dismisses their adversaries.

Not all election information-rhetoric engages in recollection. While presidential campaigns last approximately a year, voting takes place over several weeks, and results are only revealed after Election Day. How does one visualize the outcome of a horse race when all horses are mid-gallop? Candidates use the liminal temporality of elections yet again. With scoreboard, they visualize ephemeral data to create a sense of substantial evidence for their competitive stance. These visualizations are dependent on two information types: polling data and reports of short-term campaign plans. First, polls are among the most common forms of election information: an ephemeral measure of voters' current intentions, which is widely accepted though increasingly mistrusted (Goodell et al., 2015). However, when polling mishaps occur, the perceived fault lies with the polling agency or the poll participants (Aharoni et al., 2020), leaving the candidates unscathed by virtue of their allegiance with trustworthy, scientific agents (Porter, 1996). The second form of ephemeral evidence is reliant on campaign plans. Here, candidates use their own campaign schedule to prove their viability as competitors, a rhetorical form that is also reliant on plans, given that campaign schedules often change. Overall, the reliance on ephemeral data as proof allows candidates to still use the political power of data, but exempts them from accountability for inaccuracies. The ephemerality of these information types also extends to their visualizations: Once the race is won, they are forgotten.

To conclude, when candidates employ report, rewind, and junctions rhetoric, they use collective memory to distinguish themselves based on past/present evidence; metaphorical visions rhetoric supplies declarative notions for future prospective issue-based comparisons; and competitive data are used as ephemeral material in scoreboards, meant to be discarded shortly thereafter. Returning to the normative democratic framework that informs this article’s exploration of information and its efficacy in visualized political rhetoric, my findings reveal a confluence of political interest and strategic temporality. In the temporally liminal environment of elections, while the facts of the election future are still pending, political actors perform informational acrobatics by relying on other temporalities to discuss issues and the election competition. Consequently, they appear to be reliable and informative while promoting persuasive, competitive, precariously founded information-rhetoric.

Conclusions

In this article, I sought to reexamine contemporary political information and to define its rhetorical uses in digital political visualizations. I introduced a typology for the classification of political information, which accounts for existing scholarship’s inadequacy to meet the attributes of visualized information-rhetoric in temporally liminal election discourse. Following the application of the first typology to all visualizations

posted by the top four candidates in the 2016 U.S. elections, I presented a second typology of visual information-led rhetoric. I defined two rhetorical modes of election information-rhetoric, unveiling and imagining, and five rhetorical types. An overview of the findings in light of the literature revealed that candidates strategically employ mediated collective memory to avoid overt speculation by relying on the past and present or by relying on the political strength of ephemeral election data.

This study contributes to the exploration of digital political visualizations and election-oriented learning on social media in three main venues. First, the information typology suggests an inclusive approach that is geared toward temporally liminal political environments and visual information and is thus more likely to aid in the study of other prevalent political phenomena. Second, the article highlights the notion of strategic temporality in visual election rhetoric and the obscuring of polls' ephemerality. This study's final contribution is in challenging the veteran distinction between data visualization and information graphics (infographics). It suggests that data and information are no longer sufficiently distinct to be separated for political research and the study of visual political learning. These contributions are limited by several constraints. The study is based on an American sample and thus reflects systemic characteristics and rhetorical traditions. It also examines visualizations posted to Facebook rather than other visually oriented platforms. Finally, it does not address the audience's perspective, which may be key to understanding information's true role in influencing election-oriented behavior.

These limitations may be addressed by future research through applying the typologies to election visualization samples across several geographic and political contexts, as well as different platforms, and applying additional methodologies to document the impact of different information-rhetoric forms on prospective voters. Finally, future research may explore other forms of strategic communication through the triple prism of foundation, building blocks, and structure. I hope that the inclusive conceptualization offered by the first typology will lead to a more nuanced understanding of political information, which will supply the study of phenomena, such as misinformation and disinformation, with better analytical tools.

References

Aharoni, T., Tenenboim-Weinblatt, K., Baden, C., & Overbeck, M. (2020). Dynamics of (dis)trust between the news media and their audience: The case of the April 2019 Israeli exit polls. *Journalism, 23*(2), 337–353. doi:10.1177/1464884920978105

Aiello, G. (2020). Inventorizing, situating, transforming: Social semiotics and data visualization. In M. Engebretsen & H. Kennedy (Eds.), *Data visualization in society* (pp. 49–62). Amsterdam, The Netherlands: Amsterdam University Press. doi:10.5117/9789463722902

Aiello, G., & Parry, K. (2019). *Visual communication: Understanding images in media culture*. London, UK: SAGE Publications.

Allen, W. L. (2021). The conventions and politics of migration data visualizations. *New Media & Society*. Advance online publication. doi:10.1177/14614448211019300

Amit-Danhi, E. R. (2021). Facts of (financial) life: Political power and re-visualization strategies. *Convergence, 28*(1), 92–108. doi:10.1177/13548565211045533

Amit-Danhi, E. R., & Shifman, L. (2018). Digital political infographics: A rhetorical palette of an emergent genre. *New Media & Society, 20*(10), 3540–3559. doi:10.1177/1461444817750565

Barnhurst, K. G., & Nerone, J. (2002). *The form of news: A history*. New York, NY: Guilford Press.

Baskarada, S., & Koronios, A. (2013). Data, information, knowledge, wisdom (DIKW): A semiotic theoretical and empirical exploration of the hierarchy and its quality dimension. *Australasian Journal of Information Systems, 18*(1), 5–24.

Belgiu, C., & Constantin, J. (2017). Political marketing campaign. *Logos Universality Mentality Education Novelty Section: Political Sciences and European Studies, 4*(2), 25–33. https://doi.org/10.18662/lumenpses.3

Bode, L. (2016). Political news in the news feed: Learning politics from social media. *Mass Communication and Society, 19*(1), 24–48. doi:10.1080/15205436.2015.1045149

Bossetta, M. (2018). The digital architectures of social media: Comparing political campaigning on Facebook, Twitter, Instagram, and Snapchat in the 2016 U.S. election. *Journalism and Mass Communication Quarterly, 95*(2), 471–496. doi:10.1177/1077699018763307

Bøyström, K. (1999). *Task complexity, information types and information sources: Examination of relationships*. Tampere, Finland: Tampere University Press.

Cairo, A. (2019). *How charts lie: Getting smarter about visual information*. New York, NY: W. W. Norton.

Clinton, H. [Hillary Clinton]. (2015a, April 2). *Trump's attacks on women's health are inexcusable—and the rest of the Republican candidates are just as bad*. hrc.io/1St92h4 [Facebook status update]. Retrieved from https://www.facebook.com/hillaryclinton/photos/a.889773484412515.1073741828.889307941125736/1114645158592012/?type=3&theater

Clinton, H. [Hillary Clinton]. (2015b, June 26). *Map of the day/week/month/year/decade/century/millennium. Share if you live in a state where marriage equality is law* [Facebook status update]. Retrieved from https://www.facebook.com/hillaryclinton/photos/a.889773484412515.1073741828.889307941125736/933117560078107/?type=3

Clinton, H. [Hillary Clinton]. (2015c, December 21). *The American people like progress a lot. . . but the grinches in GOPville? It seems they do not* [Facebook status update]. Retrieved from https://www.facebook.com/watch/?v=1036194373103758

Clinton, H. [Hillary Clinton]. (2016, January 13). *Don't let this happen* [Facebook status update]. Retrieved from https://www.facebook.com/hillaryclinton/posts/1051092494947279

Cruz, T. [Ted Cruz]. (2015a, June 5). *SHARE if you agree we need a President who will #StandWithIsrael!* [Facebook status update]. Retrieved from https://www.facebook.com/tedcruzpage/photos/a.495661567463.299907.69983322463/10153349170417464/?type=3&theater

Cruz, T. [Ted Cruz]. (2015b, December 12). *Mark your calendars for the #CruzCountry Christmas Tour — RSVP details coming soon! SHARE to spread the word!* [Facebook status update]. Retrieved from https://www.facebook.com/tedcruzpage/photos/a.495661567463.299907.69983322463/10153753026587464/?type=3

Finnegan, C. A. (2004). Doing rhetorical history of the visual: The photograph and the archive. In C. A. Hill & M. Helmers (Eds.), *Defining visual rhetorics* (pp. 195–214). Mahwah, NJ: Erlbaum. doi:10.4324/9781410609977

Floridi, L. (1995). Internet: Which future for organized knowledge, Frankenstein or Pygmalion? *International Journal of Human-Computer Studies, 43*(2), 261–274. doi:10.1006/ijhc.1995.1044

Foss, S. K. (2004). Framing the study of visual rhetoric: Toward a transformation of rhetorical theory. In C. A. Hill & M. Helmers (Eds.), *Defining visual rhetorics* (pp. 303–314). Mahwah, NJ: Erlbaum. doi:10.4324/9781410609977

Frické, M. (2009). The knowledge pyramid: A critique of the DIKW hierarchy. *Journal of Information Science, 35*(2), 131–142. doi:10.1177/0165551508094050

Frické, M. (2019). The knowledge pyramid: The DIKW hierarchy. *Knowledge Organization, 46*(1), 33–46. doi:10.5771/0943-7444-2019-1-33

Furner, J. (2016). "Data": The data. In M. Kelly & J. Bielby (Eds.), *Information cultures in the digital age* (pp. 287–306). New York, NY: Springer. doi:10.1007/978-3-658-14681-8_17

Goodell, J. W., McGroarty, F., & Urquhart, A. (2015). Political uncertainty and the 2012 U.S. presidential election: A cointegration study of prediction markets, polls and a stand-out expert. *International Review of Financial Analysis, 42*, 162–171. doi:10.1016/j.irfa.2015.05.003

Gorman, P. N. (1995). Information needs of physicians. *Journal of the American Society for Information Science, 46*(10), 729–736. doi:10.1002/(SICI)1097-4571(199512)46:10<729::AID-ASI3>3.0.CO;2-2

Haider, J., & Sundin, O. (2020). Information literacy challenges in digital culture: Conflicting engagements of trust and doubt. *Information, Communication and Society*. Advance online publication. doi:10.1080/1369118X.2020.1851389

Hansen, H. K., & Porter, T. (2012). What do numbers do in transnational governance? *International Political Sociology, 6*(4), 409–426. doi:10.1111/ips.12001

Hsieh, Y. C., & Chen, K. H. (2011). How different information types affect viewer's attention on Internet advertising. *Computers in Human Behavior, 27*(2), 935–945. doi:10.1016/j.chb.2010.11.019

Jacobs, L. R., & Shapiro, R. Y. (2005). Polling politics, media, and election campaigns: Introduction. *The Public Opinion Quarterly, 69*(5), 635–641. doi:10.1093/poq/nfi068

Jennings, F. J., Suzuki, V. P., & Hubbard, A. (2021). Social media and democracy: Fostering political deliberation and participation. *Western Journal of Communication, 85*(2), 147–167. doi:10.1080/10570314.2020.1728369

Jiang, S., & Wilson, C. (2018). Linguistic signals under misinformation and fact-checking: Evidence from user comments on social media. *Proceedings of the ACM on Human-Computer Interaction, 2*(CSCW), 1–23. doi:10.1145/3274351

Kennedy, H., & Engebretsen, M. (2020). Introduction: The relationships between graphs, charts, maps and meanings, feelings, engagements. In M. Engebretsen & H. Kennedy (Eds.), *Data visualization in society* (pp. 19–32). Amsterdam, The Netherlands: Amsterdam University Press. doi:10.5117/9789463722902

Kennedy, H., Hill, R. L., Aiello, G., & Allen, W. (2016). The work that visualisation conventions do. *Information, Communication and Society, 19*(6), 715–735. doi:10.1080/1369118X.2016.1153126

Kovacic, Z., & Giampietro, M. (2015). Beyond "beyond GDP indicators": The need for reflexivity in science for governance. *Ecological Complexity, 21*, 53–61. doi:10.1016/j.ecocom.2014.11.007

Lankow, J., Ritchie, J., & Crooks, R. (2012). *Infographics: The power of visual storytelling*. Hoboken, NJ: Wiley.

Liston, V., Harris, C., & O'Toole, M. (2013). Bridging normative democratic theory and Internet technologies: A proposal for scaling citizen policy deliberations. *Policy & Internet, 5*(4), 462–485. doi:10.1002/1944-2866.POI349

Ludwig, H. M., Mueller, T., Kresser, F., Finke, T., Buchmann, D., Koch, M., & Fuerst, K. (2013). *U.S. Patent No. 8,458,189*. Washington, DC: U.S. Patent and Trademark Office.

Nærland, T. U. (2020). The political significance of data visualization: Four key perspectives. In M. Engebretsen & H. Kennedy (Eds.), *Data visualization in society* (pp. 63–73). Amsterdam, The Netherlands: Amsterdam University Press. doi:10.5117/9789463722902

Nærland, T. U., & Engebretsen, M. (2021). Towards a critical understanding of data visualisation in democracy: A deliberative systems approach. *Information, Communication & Society*. Advance online publication. doi:10.1080/1369118X.2021.1968922

Otana, A., & Salaverría, R. (2019). Playing with readers' expectations: Types of predictive infographics in digital media. *MonTi: Monografías de Traducción e Interpretación, 5*, 187–210. doi:10.6035/MonTI.2019.ne5.8

Owen, D., & Smith, G. (2015). Survey article: Deliberation, democracy, and the systemic turn. *Journal of Political Philosophy, 23*(2), 213–234. doi:10.1111/jopp.12054

Park, C. S. (2019). Learning politics from social media: Interconnection of social media use for political news and political issue and process knowledge. *Communication Studies, 70*(3), 253–276. doi:10.1080/10510974.2019.1581627

Pasternack, S., & Utt, S. (1990). Reader use and understanding of newspaper infographics. *Newspaper Research Journal, 11*(2), 28–41. doi:10.1177/073953299001100204

Pentzold, C., & Fechner, D. (2021). Probabilistic storytelling and temporal exigencies in predictive data journalism. *Digital Journalism, 9*(6), 715–736. doi:10.1080/21670811.2021.1878920

Porter, T. M. (1996). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton, NJ: Princeton University Press.

Ray, M. (2017). *Data types (Transact-SQL)—SQL Server*. Microsoft. Retrieved from https://docs.microsoft.com/en-us/sql/t-sql/data-types/data-types-transact-sql?view=sql-server-ver15

Rowley, J. (2007). The wisdom hierarchy: Representations of the DIKW hierarchy. *Journal of Information Science, 33*(2), 163–180. doi:10.1177/0165551506070706

Sanders, B. [U.S. Senator Bernie Sanders]. (2015, August 8). ["A living wage should not only be FAIR it should be EQUITABLE. That is why we must establish pay equity for women workers by law" – Sen. Bernie Sanders] [Infographic]. Retrieved from https://www.facebook.com/senatorsanders/photos/a.91485152907.84764.9124187907/10154130965877908/?type=3&theater

Sanders, B. [U.S. Senator Bernie Sanders]. (2016a, February 19). *It is outrageous that in the United States of America, people working 40 hours a week are living in poverty* [Facebook status update]. Retrieved from https://www.facebook.com/senatorsanders/posts/10154560707857908

Sanders, B. [U.S. Senator Bernie Sanders]. (2016b, March 3). [College enrolled low-wage students] [Facebook post]. Retrieved from https://www.facebook.com/senatorsanders/photos/a.91485152907.84764.9124187907/10154591072827908/?type=3&theater

Sanders, B. [U.S. Senator Bernie Sanders]. (2016c, May 25). *We are going to have to deal with this corporate greed, which is more concerned with compensation packages for CEOs than about the needs of hard-working people who want nothing more than to be able to live in dignity* [Facebook status update]. Retrieved from https://www.facebook.com/senatorsanders/photos/a.91485152907.84764.9124187907/10154828835822908/?type=3&permPage=1

Schildt, H. (2014). *Java: The complete reference*. New York, NY: McGraw-Hill Education Group.

Schill, D. (2012). The visual image and the political image: A review of visual communication research in the field of political communication. *Review of Communication, 12*(2), 118–142. doi:10.1080/15358593.2011.653504

Schroeder, R. (2004). Interactive info graphics in Europe—added value to online mass media: A preliminary survey. *Journalism Studies, 5*(4), 563–570. doi:10.1080/14616700412331296473

Shneiderman, B. (2003). The eyes have it: A task by data type taxonomy for information visualizations. In B. B. Bederson & B. Shneiderman (Eds.), *The craft of information visualization* (pp. 364–371). Burlington, MA: Morgan Kaufmann.

Stone, G., & Hall, P. (1997). Do newspapers graphics have two dimensions? *Visual Communication Quarterly, 4*(4), 4–10. doi:10.1080/15551399709363364

Tenenboim-Weinblatt, K. (2013). Bridging collective memories and public agendas: Toward a theory of mediated prospective memory. *Communication Theory, 23*(2), 91–111. doi:10.1111/comt.12006

Trump, D. J. [Donald J. Trump]. (2016a, July 25). *More bad news for CROOKED HILLARY today! It is time to MAKE AMERICA SAFE AND GREAT AGAIN! – DJT* [Facebook status update]. Retrieved from https://www.facebook.com/DonaldTrump/photos/a.488852220724.393301.153080620724/10157368945620725/?type=3&theater

Trump, D. J. [Donald J. Trump]. (2016b, July 31). *#CrookedHillary = Obama's third term, which would be terrible news for our economic growth - seen below* [Facebook status update]. Retrieved from https://www.facebook.com/DonaldTrump/photos/a.488852220724.393301.153080620724/10157402851445725/?type=3&theater

Trump, D. J. [Donald J. Trump]. (2016c, July 31). *MAKE AMERICA SAFE AGAIN!* [Facebook status update]. Retrieved from https://www.facebook.com/DonaldTrump/photos/a.488852220724.393301.153080620724/10157331528640725/?type=3&permPage=1

Utt, S. H., & Pasternak, S. (2000). Update on infographics in American newspapers. *Newspaper Research Journal, 21*(2), 55–66.

van Leeuwen, T. (2011). Multimodality and multimodal research. In E. Margolis & L. Pauwels (Eds.), *The SAGE handbook of visual research methods* (pp. 549–569). London, UK: SAGE Publications.

Walsh, L. (2015). The visual rhetoric of climate change. *Wiley Interdisciplinary Reviews: Climate Change, 6*(4), 361–368. doi:10.1002/wcc.342

Weber, W. (2019). Towards a semiotics of data visualization—an inventory of graphic resources. In *23rd International Conference Information Visualisation* (IV) (pp. 323–328). Paris, France: IEEE. doi:10.1109/IV.2019.00061

Wenzel, A. (2019). To verify or to disengage: Coping with "fake news" and ambiguity. *International Journal of Communication, 13,* 1977–1995.