TOWARDS A CODE OF ETHICS FOR JOURNALISTIC CARTOGRAPHY: GRAPHICS PROFESSIONALS' PERSPECTIVES ON VISUAL STORYTELIING

By

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Table of Contents

Tables and Figures

TABLES

FIGURES

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Abstract

In this research, I document an interview study with 17 news cartographers to explore how journalistic ethics are applied to cartographic visual storytelling. News organizations have produced some of the most widely seen and broadly impactful maps in recent memory, placing considerable ethical obligations on news maps and those who make them. This study addresses a research gap: the lack of work exploring which principles influence design decisions in the creation of cartographic visual stories, as well as how cartographers—journalistic or otherwise—interpret and apply ethics to their work. I ask how cartography may be informed by journalistic norms to answer Roth's (2021) call to draw from professional standards to establish tent poles of ethical visual design and storytelling.

Interview participants discussed bringing certain practices and workflows of journalism to their work as graphics professionals. Participants described validating data and interviewing sources as key practices for seeking and reporting truth. To minimize harm, participants informed their work with relevant cultural and historical context, and aggregated data to protect individuals. Participants recommended being skeptical of sources to ensure their work is ultimately serving the interests of the public. Finally, participants identified a public-facing explainer as their primary means of being accountable and transparent. Participant recommendations are summarized in a list of best practices for ethical cartographic storytelling.

Chapter 1. Overview and Significance

Section 1.1. Overview

Maps have become a fixture in the news. Whether charting the results of an election, the spread of a global pandemic, or the consequences of a changing climate, news organizations have produced some of the most widely seen and broadly impactful maps in recent memory. “News cartographer” has become a unique position in some of America’s largest newsrooms, such as *The New York Times, The Washington Post,* and *The Wall Street Journal.* Social media allow news maps to go viral, amplifying their message at an unprecedented speed and scale (Robinson, 2019). This rarified platform places considerable ethical obligations on news maps and those who make them. In a society awash with data, news cartographers are charged with deciding what to map, and how to map it.

Cartography, like journalism, offers an *authored* representation of reality that their audience may see as *authoritative* (Song et. al, 2022). Maps themselves are stories, and the mapmaker’s hand is behind every detail (Caquard, 2011). Yet even as public trust in traditional media has diminished, people are less likely to consider bias or narrative voice in maps as they would in traditional news stories (Tyner, 1982; Griffin, 2020). As a result, news maps are capable of the same ails often critiqued in the news media. Maps can get the facts wrong, misrepresent a community, invade an individual’s privacy, and propagate harmful narratives or misinformation in the name of representing “both sides” of an issue. As put by Roth

(2021: 107), news cartography "can do a great amount of good, but without a visual ethics, [it] can and likely will do more harm than good."

This thesis explores the application of *ethics*: the principles of conduct governing an individual or a group (GIS Certification Institute, n.d.). It concerns the interpretation and application of ethics developed primarily to govern the conduct of journalism. A *journalist*, or reporter, is someone who presents facts or describes events, typically without attempt at partiality. A *cartographer* is someone who represents data on geographic phenomena and processes in the form of a map. Though more explicit in journalism, both trades aim to craft a narrative—the intentional selection and sequencing of facts to promote comprehension and memorability.

The growth of *visual storytelling* in the news industry has led to a confluence of cartographic and journalistic practice. *Visual storytelling* encompasses emergent story formats that combine traditional journalistic narrative with cartographic visualization (Cairo, 2017; Roth, 2021). These stories are often data-driven, and they frequently leverage novel technologies such as 3D visualization, drone photography, and augmented reality (**Figure 1.1**) (Fox et. al, 2019). These stories grew in sophistication over the 2010s as cartographers gained prominent positions at major news organizations (Cairo, 2017; Kosterich, 2020). Importantly, visual stories follow a *hybridized* epistemology—they combine disciplines and blur the line between map and story (Caquard, 2013). High-level story decisions are made by cartographers and professionals with non-journalism backgrounds (Cairo, 2017; Fish, 2020). As a

result, cartographers must engage with journalism ethics, which are rooted in a sense of civic responsibility and are broadly concerned with impartiality, truth-telling, minimizing harm, accuracy, and serving a democratic public (Cairo, 2017; Ward, 2021). These ethics are codified by the Society of Professional Journalists (SPJ), whose framing of journalistic values is widely taught in American universities and recognized by most American professional news organizations (Ward, 2011). A detailed explanation of the SPJ code of ethics follows in Chapter 2.

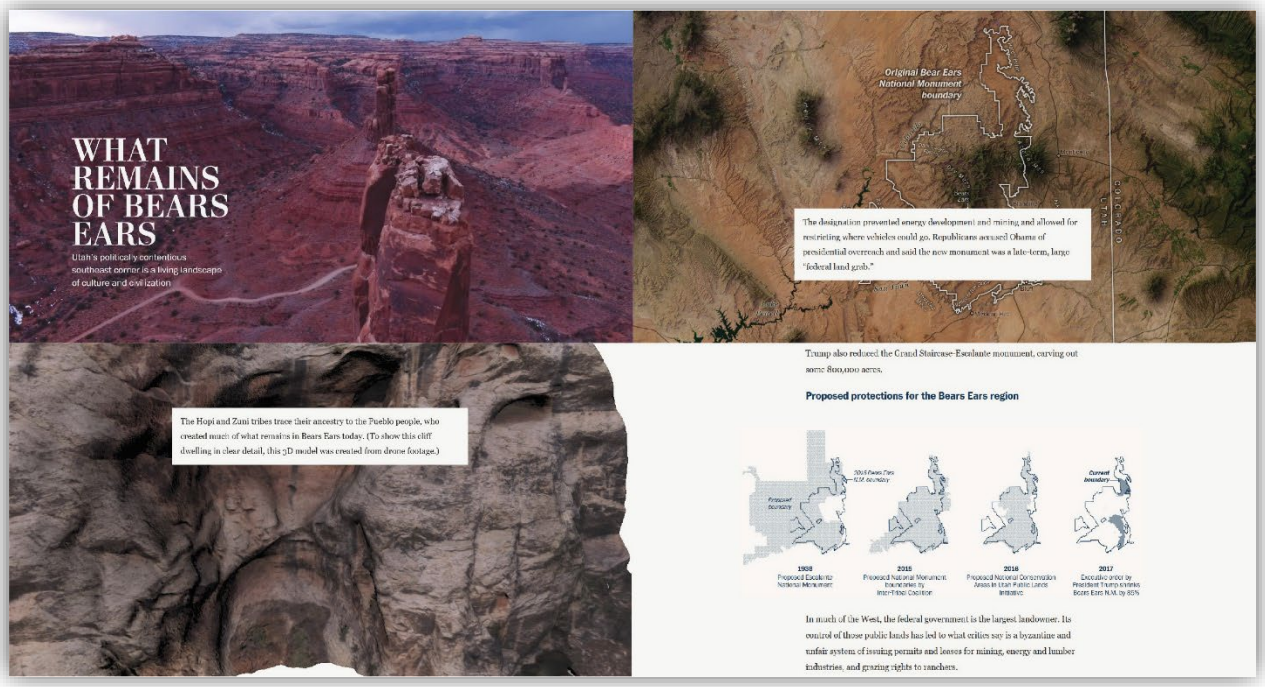


Figure 1.1. The 2019 visual story "What Remains of Bears Ears" by *The Washington Post* blends traditional text-based narrative, cartographic storytelling, drone footage and 3D visualization. Scrolling by the viewer triggers new events and visualizations in the narrative.

Section 1.2. Problem Statement and Research Questions

While research is building on design techniques that support hybridized visual stories, few scholars have sought to understand what principles influence

design decisions in the creation of visual stories, particularly those created by cartographers (Fish, 2020; Roth, 2021). Further, little work has explored how individual cartographers interpret and apply ethics to their map subjects, map design, and mapping workflows. I ask how cartography may be informed by journalistic norms to answer Roth's (2021) call to draw from professional standards to establish tent poles of ethical visual design.

To address this gap, I specifically ask:

1. *How does the SPJ principle "seek truth and report it" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*
2. *How does the SPJ principle "minimize harm" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*
3. *How does the SPJ principle "act independently" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*
4. *How does the SPJ principle "be accountable and transparent" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*

To answer these questions, I conducted *semi-structured interviews* with 17 expert cartographers who work or have worked at American news organizations. I focused on news organizations in the United States for two reasons: (1) My research

questions center around the ethics of the Society of Professional Journalists (SPJ), an American journalism organization whose ethical code is widely taught in American journalism education (Ward, 2011), and (2) Research has identified three American news organizations in particular—*The New York Times, The Washington Post*, and *National Geographic*—as highly influential and innovative in the development of the cartographic visual story (Fish, 2020).

The purpose of this research is not to identify gaps in current literature, but rather to identify gaps between research, codes of ethics and practice. Further, the study design does not explicitly critique journalistic principles such as impartiality, truth-telling, and transparency, though participants were free to do so, and occasionally did. An additional goal is to derive guidelines useful to those who make maps in the news, particularly those who work at organizations that may lack institutional expertise on these topics. I asked each participant how they believe cartographers who work in the news ought to think about and apply each of SPJ's principles in their work, as well as how they think each principle intersects with the mapmaking process. I conducted a *qualitative content analysis* on the interview transcripts, coding for terms that indicate interventions in the *content*, *form*, and *process* behind cartographic visual stories. The results of this interview study establish a benchmark of current ethical thinking by news cartographers.

This thesis proceeds in four additional chapters. In Chapter 2, I review literature on journalism ethics; the *content*, *form*, and *process* framework; and cartographic storytelling to frame the questions I asked news cartographers, as well

as the terms I coded for in the qualitative content analysis. I describe the interview and qualitative content analysis protocols in Chapter 3. I present the results of this research in Chapter 4. Finally, I provide summarized answers to the research questions and present a list of best practices for news cartography in Chapter 5.

Chapter 2. Literature Review

Section 2.1. Journalism Ethics

Journalism ethics is largely derived from the lived experience of journalists and anyone who uses communication technology (Ward, 2011). It regulates both what individual reporters should do in their interactions with other citizens, and the behavior of the press at large as a participant in democratic self-governance. Ethical behavior is distinct from both self-interest and what is required legally. Ward (2011) outlines three defining elements of ethics: Ethics has (1) *identifiable concerns*, such as what is good, right, and virtuous; (2) *seriousness*, concerning such fundamental ideas as rights, freedoms, duties, respect, fairness, and justice; and (3) *impartial stance*, as it requires someone the transcend their ego and consider the impact of their actions on others, and on society at large. Ward describes journalism ethics as a form of *applied ethics*, as it primarily seeks practical conclusions about the responsible thing to do and to marshal reasons for doing it. It is interested in identifying duties, rights, and practical principles. According to Ward (ibid: 54), "persons are responsible when they are willing to guide and restrain their freedom to act according to the impact of their actions on others."

Journalism ethics is a form of *normative reasoning*, as it adjusts to the changing conditions and roles of media. As such, journalism ethics developed gradually and continues to evolve today. The concept of the Fourth Estate—the idea that the media should serve as a check on power equal in importance to the executive, legislative, and judicial branches of government—arose amidst the French and American

revolutions in the 18th century. The modern Western press began to take shape in the early 20th century, prompted by backlash and disillusionment with a highly opinionated press largely controlled by media barons. Journalists began to organize their work around principles that still guide the profession today: "impartiality (or objectivity), truthtelling, minimizing harm, promise-keeping, accuracy, verifying information, and serving a democratic public (Ward, 2021: 8)."

The journalism fraternity Sigma Delta Chi was instrumental in the development of professional media ethics. The fraternity later became the Society of Professional Journalists (SPJ), and in 1926, it published its first journalism code of ethics. The code has been revised several times, most recently in 2014. Other codes of ethics exist, most visibly those of the Radio Television Digital News Association (RTDNA) and the Online News Association (ONA). While no one framework can capture the diversity of thought about how journalists ought to do their work, I chose the SPJ code as the primary framework for this thesis due to its comprehensive scope, prominence in American universities, and recognition by most American professional news organizations (Ward, 2011). The code's four broad mandates are:

1. *Seek truth and report it* - Ethical journalism should be accurate and fair. Journalists should be honest and courageous in gathering, reporting and interpreting information.
2. *Minimize harm* - Ethical journalism treats sources, subjects, colleagues and members of the public as human beings deserving of respect.

3. *Act independently* - The highest and primary obligation of ethical journalism is to serve the public.
4. *Be accountable and transparent* - Ethical journalism means taking responsibility for one's work and explaining one's decisions to the public.

Each of the four codes has obligations elaborated on in following sections. For example, *seek truth and report it* obligates journalists to identify sources clearly to allow the public to judge their reliability and motivations, among other responsibilities. A profound appreciation of these principles is fundamental to journalism. As put by Lewis and Westlund (2014: 13), ethics are the solution to the power of authority: "For journalists, ethical codes and conduct serve not only to guide their choices but also to define who they are as professionals." Importantly, there is constant tension between the proactive principles, such as seeking truth and independence, and restraining principles, such as minimizing harm and accountability. "To report the truth independently may harm an individual's or an institution's reputation, or endanger a military mission. Yet, not to report essential facts about an event so as to minimize harm or avoid offending a minority may violate journalism's duty to report fully and truthfully. In such cases, journalists will have to decide which principles have priority (Ward, 2011: 77)."

Journalism education typically teaches the application of these principles through case studies (Kirtley and Ison, 2015; Price et. al, 2021). However, few case studies exist to demonstrate how these principles apply in cartographic scenarios. The SPJ code applies to all the business of newscraft, including that of news

cartographers. “The traditional rules of journalism—seeking facts, loyalty to citizens, verification, independence, fairness, etc.—apply to visual designers, data editors, and programmers, as much as they apply to all other branches of the journalistic enterprise (Cairo, 2017: 13).”

Scholarship on the emergent subfield of *data journalism* provides insight on how cartographers are likely to engage with the SPJ code of ethics. Data journalism relies on quantitative methods such as statistics or programming to conduct reporting that seeks to uncover hidden truths in the data collected across society (Lewis and Westlund, 2015; Culver, 2016). Just as the public finds maps more trustworthy than other media, the public views data journalism as more rigorous than traditional reporting due to its reliance on quantitative methods (Borges-Rey, 2016). Cartography is a form of data journalism as it is likewise concerned with gathering, preparing, and presenting data.

My research questions concern the four overarching principles of the SPJ code. Subsequent sections review literature on each principle in turn. ***Codes*** for the qualitative content analysis are derived from key concepts that appear in bold. It’s important to note that cartographers are unlikely to engage with every element of the SPJ code. Several SPJ codes concern decisions made in the journalistic process that do not have a corollary in data representation or cartographic design.

Section 2.2. Seek Truth and Report It

How does the SPJ principle "seek truth and report it" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?

The SPJ code asserts ethical journalism should be "should be accurate and fair," and that journalists should "be honest and courageous in gathering, reporting, and interpreting information" (**Table 2.1**). *Accuracy* is understood as the truthful reproduction of an event or activity. *Fair* journalism is that which represents the views of conflicting stakeholders without attempting to unduly persuade the audience toward the validity of a particular position. *Gathering* refers to the process of researching, analyzing, and collecting information in the public interest from sources for publication. *Reporting* applies to the presentation of gathered information in a published story. *Interpreting* covers explaining or relating the meaning of gathered information in a published story, going beyond a description of events.

SPJ Code	Obligation
Seek Truth and Report It	Journalists should take responsibility for the accuracy of their work; verify information before releasing it; use original sources whenever possible.
Seek Truth and Report It	Journalists should remember that neither speed nor format excuses inaccuracy.
Seek Truth and Report It	Journalists should provide context. Take special care not to misrepresent or oversimplify in promoting, previewing, or summarizing a story.
Seek Truth and Report It	Journalists should gather, update and correct information throughout the life of a news story.
Seek Truth and Report It	Journalists should be cautious when making promises, but keep the promises they make.
Seek Truth and Report It	Journalists should identify sources clearly. The public is entitled to as much information as possible to judge the reliability and motivations of sources.

Seek Truth and Report It	Journalists should consider sources' motives before promising anonymity. Reserve anonymity for sources who may face danger, retribution or other harm, and have information that cannot be obtained elsewhere. Explain why anonymity was granted.
Seek Truth and Report It	Journalists should diligently seek subjects of news coverage to allow them to respond to criticism or allegations of wrongdoing.
Seek Truth and Report It	Journalists should avoid undercover or other surreptitious methods of gathering information unless traditional, open methods will not yield information vital to the public.
Seek Truth and Report It	Journalists should be vigilant and courageous about holding those with power accountable. Give voice to the voiceless.
Seek Truth and Report It	Journalists should support the open and civil exchange of views, even views they find repugnant.
Seek Truth and Report It	Journalists should recognize a special obligation to serve as watchdogs over public affairs and government. Seek to ensure that the public's business is conducted in the open, and that public records are open to all.
Seek Truth and Report It	Journalists should provide access to source material when it is relevant and appropriate.
Seek Truth and Report It	Journalists should boldly tell the story of the diversity and magnitude of the human experience. Seek sources whose voices we seldom hear.
Seek Truth and Report It	Journalists should avoid stereotyping. Journalists should examine the ways their values and experiences may shape their reporting.
Seek Truth and Report It	Journalists should label advocacy and commentary.
Seek Truth and Report It	Journalists should never deliberately distort facts or context, including visual information. Clearly label illustrations and re-enactments.
Seek Truth and Report It	Journalists should never plagiarize. Always attribute.

Table 2.1. Adapted from SPJ (2014).

Journalists understand *truth* as more than a simple recitation of facts or description of events. A *fact* is a true statement about the real world (Heinderyckx, 2021). However, as put by Heinderyckx (2021: 145) "even accurate facts, if presented out of context, or strategically selected, can be severely misleading. Factual accuracy is therefore a necessary but insufficient condition for journalism." ***Accuracy*** arises when a journalist interprets facts and conveys them proportionally, with due context and care for whether the sum of those facts realistically describes conditions in the material world (ibid). For cartographers, *accuracy* means extending the same

considerations to their representations of data. These representations can shape a reader's perception of a news event or issue (Cairo, 2012). Data stories and visualizations often involve highly technical and interdisciplinary knowledge. For data visualizers, making that knowledge easy to interpret is fundamental to producing a truthful graphic (Boyles and Meyer, 2016). An interview study conducted with 31 data journalists reveals these professionals apply the ethical obligations of *seek truth and report it* to the design decisions behind a visualization. Ensuring designs don't lead the audience to draw incorrect conclusions is synonymous with *accuracy*. As put by one journalist interviewed by Boyles and Meyer (2016: 5), "practitioners can get distracted by the design elements of newswork, losing sight of the story … they are missing the point; the role of data is to make it easier for your readers to understand the subject."

A common expression among data journalists asserts that "it's not a question of whether your data is dirty, but how dirty" (Vallance-Jones & McKie, 2009). This axiom points to the complicated ethics for a journalist trying to find truth in data compiled by someone else. Precision and completeness are considerations when dealing with any dataset, geospatial or otherwise (MacEachren et al., 2005). A journalist should consider from where the data is coming, who put the data together, and the motives of the data assembler for creating the dataset. In other words, a journalist needs to ***validate*** the data, which includes being able to reproduce the conclusions drawn from said data (D'Ignazio and Klein, 2016; Tong and Zuo, 2019). Vanacker (2021) warns failure to do so leaves journalists open to being manipulated

or ethically compromised by flawed data. Further, Tong and Zuo (2019) showed journalists' lack of knowledge about the context of data creation and its algorithms makes impartiality impossible as a practical matter. This has led scholars to extend the principles of *seek truth and report it* to cover releases of data (Craig et. al, 2017; Roth, 2021; Vanacker, 2021).

Journalists consider ***balance*** as fundamental to their work, distinguishing it from commentary, marketing, or propaganda (Ward, 2011). However, the code does not state journalists should attempt to be *objective*, which is typically understood to mean deferring to official sources and remaining separate from communities (Robinson and Culver, 2016). Robinson and Culver (2016: 3) observe "what has served the press well in terms of establishing itself as an authority to tell societal stories – objectivity, accountability, evidence – has not benefited communities of color." Media scholars have demonstrated the mainstream "objective" press's tendency toward stereotyping and racist framing (ibid). Journalism has historically been a profession largely dominated by white people and shaped by a white perspective of the world (Fletcher, 2021). Though many journalists have worked and are working diligently to make the media more reflective of the public it purports to serve, this disparity persists. As recently as 2018, 77% of newsroom employees were white (Grieco, 2018). Journalists of color have often described superiors questioning their ability to be fair or neutral covering racial issues (Fletcher, 2021). Transgender journalists also report a perceived inability to be impartial because of their identity

(ibid). As a result, objectivity has come under scrutiny by a younger, more diverse, and more politically engaged generation of reporters (Ward, 2018).

A similar rejection of objectivity and the "god trick of seeing everything from nowhere" (Haraway, 1988: 581) has influenced cartography. From a design standpoint, Roth's (2009:1) *cartographic problematic* argues "in order to be understandable and usable, a map must abstract reality, removing unnecessary or less important details while maintaining, and there-fore accentuating, features of interest." *Critical cartography* scholarship asserts that maps reflect, as well as perpetuate, systems of power and oppression (Crampton and Krygier, 2005). *Feminist cartographers* call for specific design processes intended to combat inequities, such as rejecting binaries and elevating subjective experiences (Haraway, 1988; Kelly, 2020). These schools of thought reject the map as an objective and authoritative representation of reality. In sum, a cartographer can no more "represent the world just as it is" than a reporter can "report the facts just as they are" (emphasis mine).

A journalist must frequently negotiate between their obligation to s*eek truth and report it* and their obligation to *minimize harm*. A case study offered by Craig et al. (2017) exemplifies the challenge in balancing these codes. The *Journal News* of White Plains, New York, published an interactive map of government records on gun ownership following the Newtown elementary school shootings in 2012 (ibid). The *Journal News* clearly served the public interest in providing information about gun laws and ownership. Further, the data was publicly available and retrieved legally.

However, readers and journalism scholars alike condemned the map for identifying and locating individuals whose addresses and names were contained in the dataset. The *Journal News* ultimately removed the map from its website. Craig and colleagues concluded the *Journal News* failed in their obligation to *minimize harm*, as identification constituted a breach of privacy, and could put legal gun owners at risk for burglary, among other harms.

A common dilemma concerns the release of government datasets, which may contain personally identifiable information. Some have cheered this approach, arguing it allows people to "create their own news" (McBride, 2016: 15). However, Vanacker (2021) cautions that *public data* doesn't necessarily serve the *public interest*, and that publication can cause harm through amplification (emphasis mine). McBride argues wholesale releases of data may conflict with *seek truth and report it*, which implicitly engages with the concept of ***newsworthiness***—whether something is pertinent enough to the public to warrant publication (Shoemaker et. al, 1987; McBride, 2016). *Newsworthiness* is typically determined by at least one of the following traits: timeliness; proximity; importance, impact, or consequence; interest; conflict or controversy; sensationalism; prominence; novelty, oddity, or the unusual (Shoemaker et. al, 1987). Such examples raise important questions: What is the appropriate role of a journalist in disseminating public information? What data is worth publishing? For what data is a map the most appropriate or responsible representation technique?

Section 2.3. Minimize Harm

How does the SPJ principle "minimize harm" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?

Minimize harm obligations instruct journalists to treat "sources, subjects, colleagues and members of the public as human beings deserving of respect" (**Table 2.2**). *Harm* comprises physical harm (threats of violence or incitement to lawless action), relational harm (damage to one's reputation and relationship with others), and reactive harm (damage to one's mental or emotional state).

SPJ Code	Obligation
Minimize Harm	Journalists should balance the public's need for information against potential harm or discomfort. Pursuit of the news is not a license for arrogance or undue intrusiveness.
Minimize Harm	Journalists should show compassion for those who may be affected by news coverage. Use heightened sensitivity when dealing with juveniles, victims of sex crimes, and sources or subjects who are inexperienced or unable to give consent. Consider cultural differences in approach and treatment.
Minimize Harm	Journalists should recognize that legal access to information differs from an ethical justification to publish or broadcast.
Minimize Harm	Journalists should realize that private people have a greater right to control information about themselves than public figures and others who seek power, influence, or attention. Weigh the consequences of publishing or broadcasting personal information.
Minimize Harm	Journalists should avoid pandering to lurid curiosity, even if others do.
Minimize Harm	Journalists should balance a suspect's right to a fair trial with the public's right to know. Consider the implications of identifying criminal suspects before they face legal charges.
Minimize Harm	Journalists should consider the long-term implications of the extended reach and permanence of publication. Provide updated and more complete information as appropriate.

Table 2.2. Adapted from SPJ (2014).

Harm can exist at multiple scales. There is the potential for individual harm introduced in the *Journal News* case study. The gun ownership map was viewed as a breach of the gun owners' ***privacy***—personal information that is deemed not to be in the public interest, the disclosure of which would be considered offensive to a reasonable person. Keßler and McKenzie (2017: 1) argue in the face of increasingly ubiquitous location-enabled technology, society must recognize "location information is different from other kinds of personal information…geoprivacy (and privacy in general) needs to be protected and should not become a mere illusion." Notions of geoprivacy were challenged by the Covid-19 pandemic, as public health interventions hinged on understanding human movement patterns. News coverage of the pandemic likewise explored a variety of approaches to visualizing individual movements (Presby, 2022). Negotiating the potential for a story to harm a person or place often comes down to considerations of power. For example, journalists are instructed to use heightened sensitivity for vulnerable subjects and treat private individuals differently from public figures.

Aggregation refers to the process of anonymizing data so that the results are non-personally identifiable with respect to the individuals in the dataset. This technique can protect individuals by making them unidentifiable (Culver, 2013). However, *aggregation* has been critiqued as a representation technique that removes humanity and individuality (Kelly, 2019; Vermeulen et al, 2020). Further, Fairfield and Shtein (2014: 45) argue "aggregation affects autonomy because the admixture of data from multiple subjects complicates the question of who can

consent to use of the community's information." Protecting individual privacy is further complicated when working with satellite or drone imagery, as these technologies afford journalists a previously inaccessible vantage point (Culver, 2014; Corcoran, 2018).

News coverage may also harm a particular community or group. McBride (2016) offers a case study detailing a Canadian unemployment report. The underlying data omitted a significant share of Canada's Indigenous population. In disseminating the incomplete data without due diligence, McBride argues the news organizations contributed to the underrepresentation of Indigenous peoples. Even sound statistics can be harmful, such as those that depict crime rates for a particular neighborhood or racial group. These statistics often misrepresent these communities when they are reported without adequate ***context*** (Fairfield and Shtein, 2014). Journalism scholars have identified providing *context* as a critical tenet of ethical data journalism, and as a means of negotiating the public interest-harm quandary (ibid; Vanacker, 2021). *Context* refers to the relevant background information and perspectives the audience needs to better understand a news item or dataset, as well as taking special care not to misrepresent or oversimplify in promoting, previewing, or summarizing a story (McBride, 2016). Further, journalism ethics scholars have increasingly called for a so-called "active objectivity" that seeks to emphasize social, historical, and cultural *contexts* in stories—particularly those about race (Ward, 2010; Robinson and Culver, 2016).

Section 2.4. Act Independently

How does the SPJ principle "act independently" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?

Act independently means a journalist must refuse gifts or favors and avoid conflicts of interest (**Table 2.3**). They must do this in service to their highest obligation: that to *the public*.

SPJ Code	Obligation
Act Independently	Journalists should avoid conflicts of interest, real or perceived. Disclose unavoidable conflicts.
Act Independently	Journalists should refuse gifts, favors, fees, free travel, and special treatment, and avoid political and other outside activities that may compromise integrity or impartiality, or may damage credibility.
Act Independently	Journalists should be wary of sources offering information for favors or money; do not pay for access to news. Identify content provided by outside sources, whether paid or not.
Act Independently	Journalists should deny favored treatment to advertisers, donors, or any other special interests, and resist internal and external pressure to influence coverage.
Act Independently	Journalists should distinguish news from advertising and shun hybrids that blur the lines between the two. Prominently label sponsored content.

Table 2.3. Adapted from SPJ (2014).

The public defined broadly refers to the people of a society. It is the party to which a journalist is ultimately accountable; the audience for the journalist's work as well as a fellow participant in the journalistic process (Culver, 2016). The code's framing around obligations to *the public* has its roots in the so-called "social responsibility theory of the press," an idea crystallized in 1947 by the Commission on Freedom of the Press (Hutchins Commission, 1947). It argued that because the First

Amendment protects the news media from government censorship, the press has a responsibility to operate in the public's interest (ibid). Journalism codes of ethics are rooted in "the idea of journalism's centrality to democratic self-governance" and reflect a resulting need to be truthful, free from undue influence and "representative of both the issues of the day and the citizens affected by such issues" (Culver, 2016: 4). The constitutional right to freedom of the press demands that the press *act independently*, in other words. Despite these ideals, Culver (2016) observed the SPJ code of ethics was developed and has been maintained largely within professional journalism circles, without the invitation of public engagement.

Explicit responsibilities to uphold democracy and civic health have no corollary in the professional ethics that govern conduct in cartography. The two preeminent American professional organizations, The Cartography and Geographic Information Society (CaGIS) and the North American Cartographic Information Society (NACIS), do not have codes of ethics. Education in geographic information systems (GIS)—a suite of software applications and methods that support modern cartography—often emphasizes GIS professional ethics (Schuurmann, 2000; Obermeyer, 2021). Importantly, GIS ethics developed primarily to legitimize its role as a *scientific* technology rather than a *communication* technology (ibid).

The GIS Certification Institute (GISCI) is the licensing authority for GIS professionals. Its code of ethics recognizes obligations to *the public*, such as respecting privacy and recognizing the impact GIS work can have on individuals. However, the GISCI ethics fundamentally contrast with the SPJ code in their

framing: journalistic values are always framed around the journalist's obligation to *the public* while GIS ethics balance that obligation with those to the cartographer's employers, funders, and colleagues. Such a situation in journalism would be considered a ***conflict of interest***—a situation that may compromise integrity or impartiality, or may damage credibility, that arises when a journalist's obligations prevent ultimate accountability to *the public*. Further, while most American journalism programs require some version of "media ethics" education, critics of GIS professional ethics argue ethical education in GIS classes is lacking, often relegated to a cursory discussion toward the end of the course (Elwood and Wilson, 2017).

Act independently calls on journalists to be ***skeptical*** of organizations offering exclusive information—a dynamic news cartographers must navigate when pursuing data, such as satellite imagery. Even a large news organization is unlikely to have its own satellite orbiting the planet. As such, commercial satellite data providers such as Planet and Maxxar offer their data to news organizations for free in exchange for attribution (Corcoran, 2018). This data can provide "smoking-gun" evidence for award-winning investigative reporting by providing a perspective it would have been impossible to obtain from the ground. For satellite data providers, the prominent placement is "marketing gold" (ibid: 9).

However, Corcoran (2018) points out several ethical challenges presented by this arrangement. The chief client of these companies is the U.S. government, particularly the intelligence agencies. Therefore, the data that is offered to journalism organizations must be government-approved—a policy known as "shutter

control." Additionally, satellite data companies don't often extend their generosity to smaller publications or freelance journalists. Corcoran details a 2017 case study wherein Maxxar-owned DigitalGlobe required a small team of nonprofit Botswanan journalists to pay $5,000 for images of a construction site for an investigation into government corruption. These examples demonstrate that data providers don't share journalism's principal obligation to the public, and that a journalist should be *skeptical* when working with such companies.

Section 2.5. Be Accountable and Transparent

How does the SPJ principle "be accountable and transparent" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?

Be accountable and transparent demands a journalist take responsibility for the work they publish and explain ethical decisions to the public (**Table 2.4**). *Accountability* means ensuring the journalistic process ultimately serves the public interest, while *transparency* covers making public the workflows, decisions, and products of the journalistic process.

SPJ Code	Obligation
Be Accountable and Transparent	Journalists should explain ethical choices and processes to audiences. Encourage a civil dialogue with the public about journalistic practices, coverage and news content.
Be Accountable and Transparent	Journalists should respond quickly to questions about accuracy, clarity, and fairness.
Be Accountable and Transparent	Journalists should acknowledge mistakes and correct them promptly and prominently. Explain corrections and clarifications carefully and clearly.
Be Accountable and Transparent	Journalists should expose unethical conduct in journalism, including within their organizations.

Be Accountable and Transparent	Journalists should abide by the same high standards they expect of others.

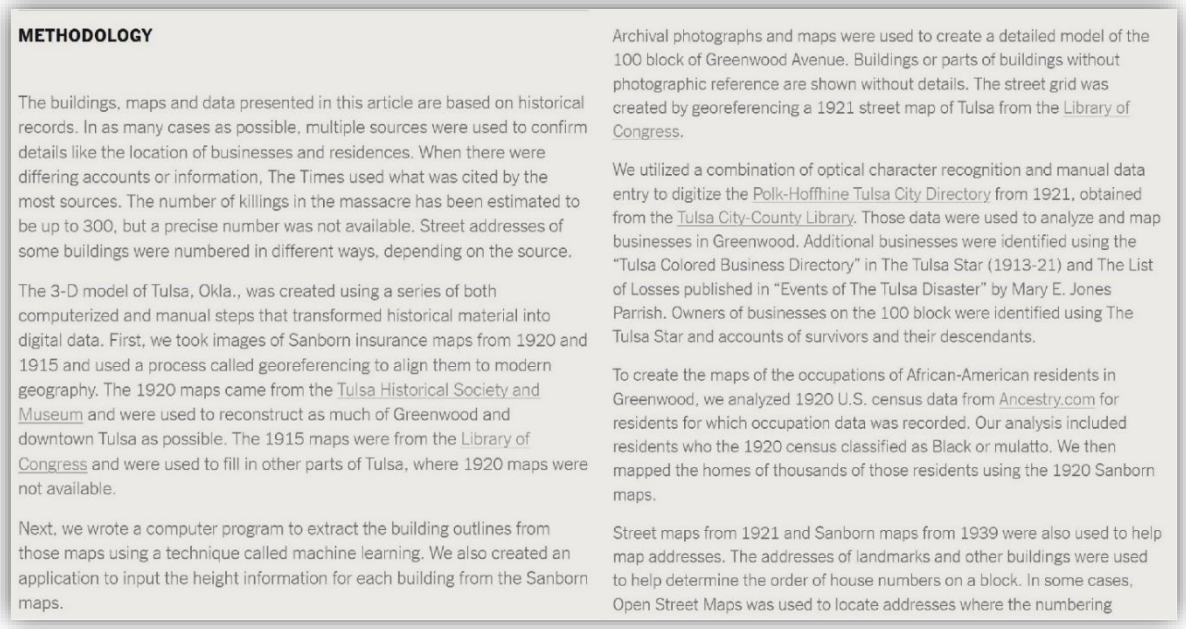
Table 2.4. Adapted from SPJ (2014).

Accountability broadly mandates that a journalist be able to stand behind the content of their story and the methods used to assemble it. Scholars theorize that *accountability* is tied to truth, as it encourages honesty in journalism (Ward, 2011). The most basic and public-facing aspect of *accountability* is the dreaded correction for a misspelled name or incorrect fact. Journalists are obliged not only to update the story with correct information, but to proactively engage with an audience member who contests information in a story. Social media has made it easier for an audience member and a journalist to reach each other. This has had implications for a journalist's obligation to be *accountable*, as they are now expected to engage with "communities of online citizens [who] collectively monitor postings for bias, manipulation of facts, bogus studies and bogus experts" (ibid: 220).

Accountability and notions of honesty are closely linked to ***transparency***, which entails making public the decisions and products of the journalistic process. Karlsson (2010) describes two types of *transparency*. Participatory *transparency* involves the participation of readers. As a proactive mandate, it calls on journalists to engage their audiences in conversations around their stories. This approach of "journalism-as-conversation" compels cartographers and data journalists to explain data products and "promote discussions around the data so that audiences can fully comprehend the final product" (Boyles and Meyer, 2016: 6). Disclosure *transparency* involves explaining how the news is selected and produced. Some

news organizations make the data underpinning stories accessible or share the source code to their applications on repositories such as Github (Lewis and Usher, 2013; Chaparro-Domínguez and Díaz-Campo, 2021).

A widespread manifestation of disclosure *transparency* in data journalism is the ***explainer***, a section typically at the bottom of the story that includes information about the methodology the led the authors to their conclusions (Craig et. al, 2017: 171)(**Figure 2.1**). Lewis (2015) suggests this approach promotes *transparency* by integrating digital norms, such as tinkering, participation and iteration. It ensures greater *accountability* by allowing readers to explore, audit, and obtain their own information from the data behind a story. However, Boyles and Meyer (2016) identified a disconnect between aspiration and practice, finding these story elements are not the norm in American news organizations. Chaparro-Domínguez and Díaz-Campo (2021) found even award-winning data projects rarely made their data available for public inspection, though *explainers* were far more common.



METHODOLOGY

The buildings, maps and data presented in this article are based on historical records. In as many cases as possible, multiple sources were used to confirm details like the location of businesses and residences. When there were differing accounts or information, The Times used what was cited by the most sources. The number of killings in the massacre has been estimated to be up to 300, but a precise number was not available. Street addresses of some buildings were numbered in different ways, depending on the source.

The 3-D model of Tulsa, Okla., was created using a series of both computerized and manual steps that transformed historical material into digital data. First, we took images of Sanborn insurance maps from 1920 and 1915 and used a process called georeferencing to align them to modern geography. The 1920 maps came from the Tulsa Historical Society and Museum and were used to reconstruct as much of Greenwood and downtown Tulsa as possible. The 1915 maps were from the Library of Congress and were used to fill in other parts of Tulsa, where 1920 maps were not available.

Next, we wrote a computer program to extract the building outlines from those maps using a technique called machine learning. We also created an application to input the height information for each building from the Sanborn maps.

Archival photographs and maps were used to create a detailed model of the 100 block of Greenwood Avenue. Buildings or parts of buildings without photographic reference are shown without details. The street grid was created by georeferencing a 1921 street map of Tulsa from the Library of Congress.

We utilized a combination of optical character recognition and manual data entry to digitize the Polk-Hoffhine Tulsa City Directory from 1921, obtained from the Tulsa City-County Library. Those data were used to analyze and map businesses in Greenwood. Additional businesses were identified using the "Tulsa Colored Business Directory" in The Tulsa Star (1913-21) and The List of Losses published in "Events of The Tulsa Disaster" by Mary E. Jones Parrish. Owners of businesses on the 100 block were identified using The Tulsa Star and accounts of survivors and their descendants.

To create the maps of the occupations of African-American residents in Greenwood, we analyzed 1920 U.S. census data from Ancestry.com for residents for which occupation data was recorded. Our analysis included residents who the 1920 census classified as Black or mulatto. We then mapped the homes of thousands of those residents using the 1920 Sanborn maps.

Street maps from 1921 and Sanborn maps from 1939 were also used to help map addresses. The addresses of landmarks and other buildings were used to help determine the order of house numbers on a block. In some cases, Open Street Maps was used to locate addresses where the numbering

Figure 2.*1*. The explainer at the bottom of the 2021 *New York Times* visual story "What the Tulsa Race Massacre Destroyed." The section includes links to the source data, as well as a detailed explanation of the process of creating the story.

Section 2.6. Content, Form, and Process

The way journalistic ethics come to influence the work of news cartographers can be understood through Kelly's (2020) "Content, Form, and Process" framework (CFP). Kelly argued feminist cartography interventions could be applied to the spatial data being mapped (*content*), the designs applied to the data (*form*), and the mapping workflows followed in the presentation of the data (*process*). This framework has not yet been used to ask how journalistic ethics intervene in the work of cartographers.

Content is the data, information, or layers that are included on a map, or the very subject of a map. The data included represents an early decision by the author about what is worth mapping, as it is inherently exclusionary (Monmonier, 1991;

Kelly, 2020). Just as a cartographer decides what is included, they must decide what is excluded. In the news industry, *content* is influenced by what is *newsworthy* (Shoemaker et. al, 1987). What is newsworthy is typically based on the content's timeliness, consequence, or novelty, and is therefore situated in a political, economic, and cultural context (ibid). Critical and feminist cartography scholars highlight the ways the data itself is socially constructed (Dalton and Thatcher, 2014; Elwood and Wilson, 2017). As such, the SPJ code speaks directly to *content* decisions. For example, a subordinate obligation to *seek truth and report it* directs journalists to "boldly tell the story of the diversity and magnitude of the human experience. Seek sources whose voices we seldom hear."

Form is the medium, outcome, shape or representation of the data—the map, and the designs applied to it. News cartographers employ narrative and design tropes to make the content vivid, promoting comprehension and eliciting an emotional reaction from the audience (Caquard, 2013; Fish, 2020; Roth, 2021). Questions of *form* are rife with concerns about *fairness* (Wahl-Jorgensen, 2017). Just as the written word can be tuned to privilege one perspective or interest over another, so too can the design of a map. The SPJ code provides thorough direction on questions of form for traditional reporting, yet despite ample research on how certain design choices influence map perception (a classic example being the color red's alarming effect), little research has examined how news cartographers answer questions of *form* (MacEachren, 2004; Fish, 2020).

Process is the sequence of steps or tasks for successful map communication (Kelly, 2020). *Process* includes mapping workflows in software such as QGIS and Adobe Illustrator. It describes the conduct of, and techniques used by, the mapmaker (ibid). Many SPJ codes govern the process of creating the news. For example, *act independently* demands journalists "refuse gifts, favors, fees, free travel and special treatment, and avoid political and other outside activities that may compromise integrity or impartiality, or may damage credibility." The nature of the data and algorithms that undergird cartographic visual storytelling places significant processual responsibilities on news cartographers. (D'Ignazio and Klein, 2016; Tong and Zuo, 2019).

Section 2.7. Hybridization and Cartographic Visual Storytelling

Three broad patterns have driven the hybridization of cartography and journalism over the past two decades: (1) The emergence of data journalism; (2) In adapting to the visual culture of the internet, news organizations are increasingly pursuing visual stories, giving cartographers and visual artists greater prominence in the newsroom than ever before; (3) as a consequence of the previous two factors, the proliferation of skills newly deemed valuable in the newsroom, such as data science, programming, and web design (McBride, 2016; Borges-Rey, 2016; Kosterich, 2020).

Newsrooms were much more stratified prior to the internet. As Cairo (2017: 72) writes, "with just a few exceptions, graphics creators lacked journalistic knowledge, and rarely collaborated with reporters on equal footing, or even talked to

them in person." Members of the graphics team primarily visualized material gathered by reporters rather than conceiving of their own stories. This balance of power began to shift at the beginning of the 2010s. Designers who often had been at the forefront of technological innovation in newsrooms began taking more prominent roles and gaining greater editorial independence (ibid). With greater value placed on design and data proficiency, a traditional journalistic education was no longer a prerequisite for a job at major media outlets. Data scientists, user experience (UX) designers, coders and, of course, cartographers, began increasingly shaping the news (Salome, 2017; Kosterich, 2020).

This hybridization is behind the growth and development of visual storytelling (Caquard, 2013; Roth, 2021). Visual stories have a clear entry point, from which the viewer progresses through the story in a linear fashion, seamlessly transitioning between various elements, be they text, photographs, videos, animations, or maps (Steckelberg et. al, 2021; Wu et. al, 2021). Visual stories are compelling, taking advantage of the latest technologies to tell stories in novel ways (Aguilar et. al, 2021). Visual stories follow a narrative, which is key to their salience. Given the wealth of data and information at our fingertips, presenting complex data as stories reduces complexity for readers (Figueiras, 2014; Fish, 2020). It also offers a way to illustrate cause and effect: "Stories tap into episodic memory, as opposed to semantic memory, by presenting information as a sequence of events instead of disconnected facts, which makes it easier to remember them and recognize patterns" (Fish, 2020: 70). Finally, and most relevant for this thesis, many of these stories are cartographic—

they represent space, usually quite vividly (Fish, 2020; Kaplan et. al, 2020; Roth 2021). It is worth noting that a cartographic visual story may be referred to as a "story map," which is distinct from Esri's ArcGIS StoryMaps platform, though the development of the latter has undoubtedly been influenced by the former (Carroll, 2019).

Roth (2021) presents the most exhaustive analysis of the cartographic visual story, categorizing its dominant design tropes and genres (**Table 2.5**). Roth's tropes illustrate tension inherent in the hybridized epistemology that undergirds cartographic visual stories (Caquard, 2013; Roth, 2021). For example, influencing *mood* and *voice* may privilege a particular perspective, inherently drawing from scholarship in feminist and critical cartographies (Crampton 2011). However, heavily privileging a perspective runs contrary to the journalistic principle of *balance*—representing the views of conflicting stakeholders without attempting to unduly persuade the audience toward the validity of a particular position (Wahl-Jorgensen, 2017). Not all cartographic visual stories attempt at impartiality, however. Some are explicitly opinionated, and their designs work to sway the viewer toward the author's argument (Wezerek, 2020).

Trope	**Definition**	**Related terminology**	**Visual design techniques**
Continuity	Unify otherwise disparate visual elements into a logical structure.	Linearity, Conflict and Ambiguity Resolution, Sequencing	Linear three-act narrative; Genre pacing: visual layout, browser scrolling, slide advancement, display time progression, hyperlinking, user contributions, real-time updates; Annotation; Interaction: sequencing, panning, zooming, and detail retrieval; Transitions; fading, panning, swiping, tweening

Mood	Set a visual tone congruent with the narrative and its elements.	Style	Map element design; Marginalia and other adornments; Visual style; Form: line weights, cap/join styles, tapering; Color: palette, primary/accent; Type: typefaces, placement, microaesthetics; Texture: pattern fills, gradients, overlays, dashing; Persuasive styles: authoritative, understated, propagandist, sensationalist; Pastiche styles: antique, surrealist/realism/hyperrealism, modernism, pop/optical art, minimalist
Dosing	Reduce overall complexity of story content into incremental chunks of information.	Modularity	Linear sequencing; Modularized design; Storyboarding; Clear entry point: layout and visual hierarchy; Partitioning: neatlines, negative space, segment annotations; Selective pausing or slow motion in an animation; Genre-specific interactive pacing: browser scrolling, slide advancement, hyperlinked text; Slippy map information pop-ups/detail retrieval
Attention	Emphasize important or unusual information that cannot be missed in the story.	Focalization	Visual hierarchy / figure-ground; Visual accenting: Highlighting and visual variables; Annotation: leader lines, flow arrows, appended geometric frames, opacity masks, numbering, changes in map scale, variable levels of detail, call-outs, labelling clarifications; Dynamic: blinking/flickering, dynamic panning/ zooming, focus + context visualization
Redundancy	Repeats important or unusual information to develop story themes.	Repetition	Visual motifs and symbolism; Figures and Easter eggs; Visual hierarchy and accenting (see Attention)
Metaphor	Brings together seemingly unrelated concepts in a single frame to facilitate understanding of complex narrative elements.	Simile, Symbolism	Associative point symbols; Visual motifs and symbolism; Visual juxtaposition: Overlay; Visual benchmarks; Scenarios; Cartooning and illustration; Hyperrealism; Collage and montage; Humor, irony, and satire
Voice	Embeds situated	Pluralism	Designer voice: reflexivity statement; Character voice: feminist visualization;

	experiences, opinions, and values into the visual story to clarify meaning.		Rethink binaries; Embrace pluralism; Example power/aspire to empower; Consider context; Legitimize embodiment and affect; Represent uncertainties; Make labor visible; Audience voice: commenting, social media, personalized story maps; Typography; Vantage point & projection; Narration: audio (narrated animations) & audiovisual (multimedia visual experiences)

Table 2.5. Roth's (2021) storytelling tropes.

Roth also provides a taxonomy of seven genres these stories take, one of which has emerged as particularly prominent: the longform infographic (Prestby, 2022). Often described as "scrollytelling" by data journalists, the longform infographic presents the narrative text, maps, and other graphics in a linear format (Stolper et al. 2016). The audience can scroll through the story just as they would any other article encountered online. This format allows maps and other visual information to guide narratives of emotion and personal experience (Fish, 2020).

The limited research into the tools and workflows employed in the creation of cartographic visual stories reveals another example of *hybridization*: the merging of journalistic and cartographic practice (Bourges-Rey, 2016). These professionals find data and pitch story ideas as a reporter would (Cairo, 2017; Fish, 2020). Fish (2020) found cartographers at news organizations interviewed scientists and other sources as they developed stories. They increasingly complete their workflow entirely within their own graphics or visuals department (ibid). Thus, the news cartographer presents a ripe opportunity to explore how journalistic norms can inform narrative cartographic design.

Chapter 3. Methodology

Section 3.1. Participants

I interviewed 17 news cartographers to answer my research questions and relate the reviewed literature on journalism ethics to cartographic practice. All participants met three criteria for participation: they must (1) work or have worked in a role at a news organization based in the United States where they designed or supervised cartographic data visualizations; (2) have at least one year of professional experience designing cartographic data visualizations; and (3) be at least 18 years of age. To ensure my sample represented a variety of professional backgrounds, opinions, and experiences, I also developed the following selection criteria to guide interviewee recruitment: (1) at least half of participants should have an educational or professional background distinct from journalism; and (2) at least half of participants should work in news organizations that primarily serve a regional or local audience, as opposed to a national or international audience.

I recruited participants via email, using a standard solicitation template. I acquired prospective participant email addresses through publicly available websites, from previous communication with them, or from other participants who recommended them for the study. Each solicitation informed prospective participants that their participation in the study would be confidential, and that records of the interviews would be destroyed two years after the submission of this thesis. This was to ensure participants felt comfortable sharing unvarnished

thoughts about their work, which potentially reflected opinions about their colleagues or employers. Each participant signed a form consenting to the use of their non-individually identifiable information in the study.

I set out with an initial goal of 20, however, novel insight grew scarce and answers became redundant by interview 17. Ten of the participants were female (10/17) and seven were male (7/17). I asked all participants to provide background information about their education, professional experiences, team size, job title, and familiarity with the SPJ code of ethics. All participants (17/17) had a bachelor's degree and 11 had a master's degree. No participant had a Ph.D. Participants' field of study varied. Seven participants had at least one degree in journalism (7/17). Of those participants with a journalism degree, five had a second degree in another subject (5/17). Five participants had at least one degree in geography (5/17). Four participants had at least one degree in information design (4/17). Three participants had at least one degree in graphic design or fine arts (3/17). Two participants had at least one degree in cartography or GIS (2/17). Two participants had at least one degree in international studies (2/17). One participant had a degree in history (1/17), and another participant had a degree in public policy (1/17). These varied backgrounds prompted unique responses and interesting differences of opinion among participants, examples of which I relate in Chapter 4.

Fifteen of the participants worked in journalism prior to their current role (15/17), with eight working primarily in journalism after receiving their bachelor's degree (8/17). Four participants worked in cartography or GIS prior to their current

role (4/17). Four participants worked in graphic design or information design prior to their current role (4/17). One participant worked in the tech industry prior to their current role (1/17), and another worked in urban planning (1/17). Two participants no longer worked in journalism at the time of the interview (2/17). These participants had most recently worked in journalism within two years of the interview and were asked only to discuss experiences derived from their time in a newsroom.

These profiles approximately met the sampling criterion that at least half of participants have an educational or professional background distinct from journalism. More than half of the participants had no journalism degree (10/17) and worked in a professional field or industry other than journalism prior to joining a news organization (9/17). The sample also met the criterion that at least half of participants work in news organizations that primarily serve a regional or local audience. Eleven of the participants worked or most recently worked at a news organization with primarily a national or international audience at the time of the interview (11/17). However, six of these participants worked at a news organization with primarily a regional or local audience prior to their current role (6/17). Six participants worked or most recently worked at a news organization with primarily a local or regional audience at the time of the interview (6/17). However, four of these participants worked at a news organization with a national or international focus prior to their current role (4/17). In summary, 12 participants had experience at a

local or regional news organization (12/17), while 15 had experience at a national or international news organization (15/17).

Participants' job titles varied. The most common job title was "graphics reporter" (5/17). The second most common was "graphics editor" (4/17), though several participants with this title stated they did have management responsibilities. Three participants managed or directed a graphics department (3/17) at the time of the interview. These three participants had extensive graphics experience prior to their current leadership role and still occasionally did design work themselves. Two participants said their title was "data and graphics reporter" (2/17), which reflected shared responsibilities analyzing as well as representing data. One participant's title was "data journalist" (1/17), which reflected more work analyzing data than representing it. One participant's title was "data visualization developer," and another's title was "news developer," (1/17) which reflected the digital-forward priorities of their newsrooms. Interestingly, no participant said their current job title was "cartographer," despite several participants almost exclusively designing maps in their current role.

Participants' team sizes varied greatly. Four participants worked in a team with fewer than 10 others (4/17). Three participants worked in a team of between 10 and 30 people total (3/17). Most participants worked in a team of 40 or more graphics professionals (9/17). One participant did not provide an estimate of their team size because they were between positions at the time of the interview (1/17). No participant described working alone, though several described a past role where they

were the sole reporter in their organization pursuing graphics or cartography. Most participants were familiar with the SPJ code of ethics prior to the interview (12/17), though participants' levels of familiarity varied from an ability to recite its key principles to a general awareness of them. All the participants who were not familiar with the SPJ code of ethics expressed some level of familiarity with the principles after they were defined during the interview.

Section 3.2. Materials and Procedure

The interviews followed a semi-structured protocol consistent with similar expert-based cartography studies (e.g., Roth, 2015; Fish, 2020). The interviews proceeded in in six sections: (1) background information; (2) seek truth and report it; (3) minimize harm; (4) act independently; (5) be accountable and transparent; and (6) concluding thoughts (including probes about the limitations of and alternatives to the SPJ code of ethics). I refined an initial set of questions following full-length test interviews conducted on two volunteer pilot participants who fit the sampling criteria. I changed the interview protocol substantially following these pilot interviews. I removed, reworded, or rearranged ten interview questions and added five new questions derived from pilot participant feedback. As such, I do not report the test participants' responses with those I interviewed using the updated protocol to ensure consistency and reliability in the results.

I began each interview by informing participants that I was primarily interested in their personal opinions on how news cartographers ought to be thinking about and applying ethics, and that I was not looking for them to critique

colleagues or employers. I also told participants they were welcome to share whatever examples from their experience they thought were relevant. Over the course of the interviews, I also began telling participants that I did not intend to "test" them on whether they were doing things the "right way." I added this disclaimer after I began to observe discomfort among participants revealing perceived shortcomings in their work. I defined each SPJ principle for the participant before asking how they believe cartographers who work in the news ought to think about and apply that principle in their work, as well as how they think each principle intersects with the mapmaking process. I followed up with probe questions derived from the literature review where relevant. I told participants they could decline to answer any question. The interviews were conducted and recorded using Zoom with both participants in a private room. **Table 3.1** shows the key and probe questions used in the interview.

	Background
Key	What is your highest level of education?
Key	In what roles/industries were you employed prior to working in journalism?
Key	What is the size of the team in which you work?
Key	What is your official job title?
Key	Are you familiar with the Society of Professional Journalists Code of Ethics?
	Seek Truth and Report It
Key	The SPJ tenet *seek truth and report it* says "ethical journalism should be accurate and fair. Journalists should be honest and courageous in gathering, reporting and interpreting information." In your opinion, how should cartographers working in the news implement these values in the creation of cartographic visual stories?
Probe	How do you determine whether a dataset or story idea is newsworthy?
Probe	How do you determine whether a map is the most appropriate or effective representation of a dataset or story idea?
Probe	What design or data techniques do you recommend promote accuracy in a cartographic visual story?
Probe	What techniques do you recommend to validate or verify data you did not compile yourself?
Probe	What design or data techniques do you recommend to prevent the audience from drawing incorrect conclusions from a cartographic visual story?

Probe	What design or data techniques do you recommend promote balance or fairness in a cartographic visual story?
Probe	How do you ensure your personal opinions or interests in a story don't compromise your obligation to report the truth?
Probe	**Minimize Harm**
Key	The SPJ tenet *minimize harm* says "ethical journalism treats sources, subjects, colleagues and members of the public as human beings deserving of respect." In your opinion, how should cartographers working the news implement these values in the creation of cartographic visual stories?
Probe	How do you determine the potential for harm, particularly for abstract harms that may not be immediately obvious?
Probe	What design techniques have you employed to minimize harm to populations or individual subjects represented in your cartographic visual stories?
Probe	How have you determined whether a map or dataset needs additional context?
Probe	What do you recommend cartographers consider regarding cultural differences in approach and treatment of data representation and map design?
Probe	**Act Independently**
Key	The SPJ tenet *act independently* says "the highest and primary obligation of ethical journalism is to serve the public." In your opinion, how should cartographers working the news implement these values in the creation of cartographic visual stories?
Probe	Have you ever encountered a conflict of interest in your work? How did you manage it?
Probe	Have you ever had to be skeptical working with data from sources that may benefit from its publication, or that charge for access to the data?
Probe	In what situations do you consider it okay for a private entity to benefit from one of your stories? In what situations do you consider it not okay?
Probe	**Be Accountable and Transparent**
Key	The SPJ tenet *be accountable and transparent* says "ethical journalism means taking responsibility for one's work and explaining one's decisions to the public." In your opinion, how should cartographers working the news implement these values in the creation of cartographic visual stories?
Probe	What design or data techniques do you recommend to promote accountability and transparency?
Probe	How have you determined whether to provide an explainer or methodology with your story?
Probe	How have you determined the content to include in an explainer or methodology?
Probe	How have you responded to a situation where you had to correct a map/story post-publication?
Probe	**Concluding Thoughts**
Key	In what parts of the process of creating cartographic visual stories do you find journalism ethics lacking, if any?
Probe	From what other fields or domains do you draw ethical guidance?
Probe	Is there anything I haven't asked you about that you think I should know?

Table 3.1. The interview protocol.

Section 3.3. Qualitative Analysis

I conducted a qualitative content analysis (QCA) on the interview transcripts to interpret the information in a systematic way. I followed QCA principles consistent with similar expert-based cartographic studies (Caudle, 2004; Roth, 2015). I transcribed the recorded interviews using the Otter.ai automated transcription service. I then ran a quality check on the interviews where I corrected errors in the transcription and unitized participant responses at the statement level. What constituted the "statement level" varied depending on factors such as the complexity of the thought being articulated and the participant's vocal cadence.

I then anonymized and exported these unitized transcripts to Microsoft Excel, where I applied a two-dimensional coding scheme derived from concepts surveyed in my literature review. The first dimension of the coding scheme corresponds to the SPJ code of ethics. I assigned codes to key concepts for each of the four SPJ principles (e.g., Section 2.1), resulting in 17 codes total. If one statement could be categorized by two different codes, I duplicated the statement and assigned it to both codes. Each principle included a broad code to capture additional, related comments that did not fit neatly into the primary codes derived from the literature review. These statements were not typically specific enough to warrant reporting in Chapter 4, however, they were useful for interpreting broad ideas and for summarizing the total volume of discussion for each principle.

The second dimension of the coding scheme corresponds to the *content*, *form*, and *process* framework (e.g., Section 2.6), which serves to organize participant responses in the results section. I coded each of the 1,071 unitized statements using

both dimensions of the coding scheme, with a single unitized statement always receiving a code from both dimensions.

I summarized the coded statements by extensiveness and frequency. *Extensiveness* describes the number of participants who made a statement regarding that code. *Frequency* describes the total number of statements regarding that code. Although QCA tenets recommend redundant coding to ensure codes are applied consistently, I did not redundantly code the transcripts due to resource and time constraints. **Table 3.2** shows the coding scheme.

Seek Truth and Report It		
S1	Accuracy	The truthful explanation or relation of gathered information in a published story, going beyond a description of events.
S2	Balance	Representing the views of conflicting stakeholders without attempting to unduly persuade the audience toward the validity of a particular position.
S3	Newsworthiness	Whether a news item is sufficiently pertinent to the public interest to warrant publication. Whether a map is the most appropriate or effective representation technique for a news item.
S4	Validation	Steps taken to understand the origin of the data, the methods used to compile it, and the motives of the data assembler. Steps taken to reproduce the conclusions of a dataset or source.
Sx	Seek truth and report it	Ethical journalism should be accurate and fair. Journalists should be honest and courageous in gathering, reporting and interpreting information.
Minimize Harm		
M1	Privacy	An individual's personal information that is deemed not to be in the public interest, the disclosure of which would be considered offensive to a reasonable person.
M2	Aggregation	Steps taken to anonymize data so that the results are non-personally identifiable with respect to the individuals in the dataset.
M3	Context	Providing relevant background information and perspectives for the audience to better understand a news item or dataset.

Mx	Minimize harm	Ethical journalism treats sources, subjects, colleagues and members of the public as human beings deserving of respect.
Act Independently		
A1	Conflict of interest	An arrangement or obligation that may compromise integrity or impartiality or may damage credibility.
A2	Skepticism	Being wary of sources offering information for favors or money. Being critical of sources' motivations or interests in offering information.
A3	The public	The audience for the journalist's work as well as a fellow participant in the journalistic process. The party to whom a journalist's work is ultimately accountable.
Ax	Act independently	The highest and primary obligation of ethical journalism is to serve the public.
Be Accountable and Transparent		
B1	Accountability	Taking responsibility for one's work and acting in a manner defensible to public scrutiny. Replacing incorrect or unclear information in a map or story with correct information.
B2	Explainer	A public-facing description of the journalistic development process. Often includes a methodology and links to underlying datasets.
B3	Transparency	Explaining workflows, decisions and products of the journalistic process; involving the participation of readers in the journalistic process.
Bx	Be accountable and transparent	Ethical journalism means taking responsibility for one's work and explaining one's decisions to the public
Content, Form, and Process		
C	Content	Data, information, or layers that are included on a map, or the very subject of a map.
F	Form	The medium, outcome, shape, or representation the map takes.
P	Process	The sequence of steps or tasks for successful map communication, including mapping workflows and the conduct and techniques of the mapmaker.

Table 3.2. The coding scheme.

Chapter 4. Results

In this chapter, I present the results of the interview study with 17 news cartographers. The results are organized into four sections, reflecting the four research questions and the four principles of the SPJ code of ethics captured by the first dimension of the coding scheme. Each section provides an overview of code extensiveness and frequency, followed by a presentation of results organized into three subsections following the second dimension of the coding scheme: *content, form*, and *process* (CFP). **Table 4.1** presents these summary statistics for the SPJ codes. **Table 4.2** presents the summary statistics for CFP codes.

Description	Code	Extensiveness	Frequency
Seek truth and report it		17	440
Accuracy	S1	15	93
Balance	S2	17	83
Newsworthiness	S3	16	89
Validation	S4	16	98
Seek truth and report it	Sx	14	77
Minimize harm		17	272
Privacy	M1	13	55
Aggregation	M2	16	44
Context	M3	17	142
Minimize harm	Mx	12	31
Act independently		17	175
Conflict of interest	A1	11	32
Skepticism	A2	12	52
The public	A3	17	78
Act independently	Ax	6	13
Be accountable and transparent		17*	184
Accountability	B1	14	57
Explainer	B2	14	74
Transparency	B3	15	49
Be accountable and transparent	Bx	4	4

Table 4.1. Extensiveness and frequency coding results for the Society of Professional Journalists codes. Note: while no single *be accountable and transparent* code was discussed by all 17 participants, every participant discussed at least one of the codes that comprise the principle.

Description	Code	Extensiveness	Frequency
Content	C	17	270
Form	F	16	233
Process	P	17	568

Table 4.2. Extensiveness and frequency coding results for the *content*, *form* and *process* codes.

Section 4.1. Seek Truth and Report It

The *seek truth and report it* principle comprises four primary codes: *accuracy* (S1), *balance* (s2), *newsworthiness* (s3), and *validation (S4)*. A broad *seek truth and report it* (Sx) code also captured additional, related comments. These codes cover a broad range of journalistic activity. As such, it is not surprising that participants evoked this principle more than any other in the entire sample (extensiveness = 17/17, frequency = 440).

Regarding the CFP dimension of the coding scheme, the majority of coded *seek truth and report it* statements referred to steps taken in the journalistic *process* (242). This again speaks to this principle's proactive mandate for journalism. Statements cross-tabulated with *seek truth and report it* and either *form* or *content* also were common, with frequencies of 116 and 82 respectively. **Table 4.3** describes the distribution of *seek truth and report it* codes across the CFP categories.

Code distribution was relatively uniform across the four primary codes. *Validation* (S4) was the most discussed code (extensiveness = 16/17, frequency = 98), reflecting an understanding among news cartographers that they must verify

and question data to derive truth. As put by one participant, "just as we rigorously seek out sources, we also have to rigorously find data, and just as we evaluate sources, we need to evaluate that data too, because data is only as good as what goes into it, and the people who keep it." *Accuracy* (S1; extensiveness = 15/17, frequency = 93), *newsworthiness* (S3; extensiveness = 16/17, frequency = 89), and *balance* (S2; extensiveness = 17/17, frequency = 83) all closely followed, demonstrating a synergistic relationship between the codes that comprise *seek truth and report it*.

Code	Content (C)	Form (F)	Process (P)	TOTAL
Accuracy (S1)	10	31	52	93
Balance (s2)	21	24	38	83
Newsworthiness (S3)	36	22	31	89
Validation (S4)	6	3	89	98
Seek truth and report it (Sx)	9	36	32	77
TOTAL	82	116	242	440

Table 4.3. Distribution of *seek truth and report it* codes across the *content*, *form* and *process* categories.

Section 4.1.1. *Seek Truth and Report It* (S) and *Content* (C)

Participants referred to *content* less frequently (frequency = 82) in statements about *seek truth and report it* than either *form* (frequency = 116) or *process* (frequency = 242). This seems to indicate that for news cartographers, truth and fairness are less about *what* they map, and more about *how* they map.

The exception is *newsworthiness* (S3), which deals directly with the *content* that is worth pursuing and mapping. Thirty-six statements were cross-tabulated S3 and *content* (C), the most of any CFP category within S. Twelve participants (12/17) cited common criteria for *newsworthiness*, such as breaking news and events that

affect many people. One participant said, “that's just kind of how this business works.” As cartographers, these participants looked for geographic angles on stories and frequently cited wars, elections, natural disasters, and climate change as common subjects. Three participants (3/17) mentioned doing “data drop” stories that explored an interesting change in a new dataset. However, there was disagreement around the *newsworthiness* of this type of *content*. One participant mentioned the limitations of these stories, saying, “some people look at newsworthiness as temporal. Like, there's this change that happened. And with the data, we often don't get data at the time that a change has happened. We often see stories reported on changes in the American Community Survey data, or even the census data, and you know that this data lags by about two years from the point in which it was gathered.”

Notably, participants did not discuss the *seek truth and report it* obligation to “boldly tell the story of the diversity and magnitude of the human experience [and] seek sources whose voices we seldom hear” (Society of Professional Journalists, 2014) regarding *content* decisions. This may point to the editorial limits of cartographers charged primarily with visualizing data. However, it may also identify a gap between codes of ethics, scholarship, and practice, showing that cartographers do not use their editorial freedom to pursue stories that elevate underrepresented communities.

Interestingly, five participants (5/17) discussed what makes the *content* of a story “map-worthy”, an explicitly cartographic example of *newsworthiness*, with one

participant saying, “as long as it has some sort of spatial qualifier, it can be made into a map.” However, another participant was more circumspect, arguing, “having locations doesn't imply that you need to show those geographically.” This participant recommended observing “things like the distribution of events that you're looking at. Or comparing and contrasting the patterns of data in one place versus another.” Another participant described a litmus test they often employ: “Is this just a map of population? And if it is, it's probably not worth showing to readers.”

Participants found little agreement on how *balance* (S2) applies to the *content* of a map, with 21 statements cross-tabulated S2 and *content* (C). This again indicates that news cartographers are more inclined toward interventions in *form* and *process* to achieve a *balanced* map. Within *balance*, two participants (2/17) discussed how place labels can be biased. One of these participants described a conflict over whether to use the “East Sea” or the “Sea of Japan” to label the body of water between South Korea and Japan: “So now we do ‘Sea of Japan,’ and then slash or in parentheses we also label it the East Sea, because we're not going to give that territory to Japan. We try to stay is out of that kind of stuff.”

Three participants (3/17) problematized the idea that any *content* could be truly *balanced*. One participant with a background in history said, "you can get it into your head that, ‘I'm just presenting facts and the facts are what they are, so I don't have to worry about anything.’ But what you learn if you really study history in-depth is, that's all a bunch of bullshit…you have biases, you have thoughts, you have urges, you have desires, you make mistakes. Everyone does that, and the multiple of

that is history." Another participant echoed that sentiment, noting, "government maps are not going to map critical cultural institutions that that don't serve the dominant power structure."

Participants also had relatively little to say about how *content* decisions affect a map's truthfulness, as indicated by low frequencies for *accuracy* (S1) and *validation* (S4); ten statements were cross-tabulated S1 and *content* (C), and six statements were cross-tabulated S4 and *content* (C). This is an expected result, as a journalistic understanding of *accuracy* entails interpreting facts and conveying them proportionally, with due context and care for whether the sum of those facts realistically describes conditions in the material world (Ward, 2011; Heinderyckx, 2021). This diverges from a GIScience perspective of *accuracy*, which is typically assessed at the data collection stage. As graphics professionals, participants rarely discussed being involved in the creation of data. The deemphasis of *content* also may reflect an understanding that data itself is not a fundamental source of truth, and that journalistic interpretation is necessary to derive truth.

Section 4.1.2. *Seek Truth and Report It* (S) and *Form* (F)

Many participants stressed that a news map's design should serve as an extension of the story and should share the story's commitment to *accuracy* (S1). Thirty-one statements were cross-tabulated S1 and *form* (F), with the majority of participants (13/17) agreeing that nearly all other considerations are secondary to ensuring a map *accurately* represents the facts. Participants presented a broad array of ideas about how to achieve *accuracy* (S1) in a map's design. Five participants

(5/17) discussed choosing symbolization that is more thematically congruent with the mapped phenomena and message. One participant described changing the design of a map because the proportional symbols used to depict wildfires gave the audience an inaccurate impression, saying, “people perceived it as if the circle covers a certain area, then that whole place is on fire.” Two participants (2/17) described dasymetric design techniques to represent information more *accurately*; one participant mapping land zoned for multifamily housing clipped out areas containing lakes and wetlands, arguing, “if you're not showing that, you're not accurately reflecting where you can build these things.”

Notably, three participants (3/17) brought ideas about thematic congruency to mapping disease, death, and war. One participant recommended symbol choices that humanize the data. Without doing so, the participant feared “[the audience is] going to start dismissing them as just maps with little dots on them. They may not make the emotional connection that you want them to make in order for them to better appreciate the overall truth of the story.” Another participant echoed the importance of fostering emotional connection with the material, arguing, “part of what we do is to evoke a response, and especially with maps, less information is more.”

The Russia-Ukraine war occurred concurrently with the study’s interview phase, and several participants discussed how dynamic and opaque on-the-ground conditions complicated *accuracy* (S1) and required them to consider the authority that audiences attribute to maps. One participant mapping the locations of airstrikes described taking a conservative approach to design, arguing, “if there's stuff that you

don't know, you better not be presenting it in the same kind of way as the stuff that you do know." This participant recommended several design techniques to represent uncertainty, noting, "we work through ways of being a little bit fuzzy. Maybe it's a blurred border, or maybe it's using a range or something like that." Specifically, two participants (2/17) discussed the ethical challenge of representing disputed boundaries between Ukraine and Russia. One participant acknowledged disagreement in the cartographic community over how to represent Crimea, stating, "from the news point of view, unfortunately, I have to put it's annexed by Russia because that's the truth. Like, I can't just give it to Ukraine because it was initially Ukraine territory." This participant suggested the mandate to reproduce events truthfully should supersede political concerns, continuing by saying, "I'm basically reporting to you what is happening on the ground. No, I'm not telling you that this is Russia. I'm telling you it's controlled by Russia."

Three participants (3/17) said the words describing a map can be as important to an *accurate* (S1) representation as the map itself. One of these participants cautioned that the copy needs to be approachable, stating, "I think if you've been practicing in data, visuals, and maps for a long time, you lose sight of the fact that the average person might not know what you mean by year-over-year percent change, or they might not understand that when you say 'median,' what that calculation means." Another participant said it is important to "really humanize the words that we use around describing a chart or a data visual in the headline—and the

label and the annotations—to make it really clear what we are trying to show and what we are not."

Ironically, a cartographic perspective asserts that maps are useful because they are inherently *inaccurate* (Roth, 2009). A minority of participants (4/17) echoed this approach, suggesting *accurate* maps are not necessarily the most detailed. These participants said removing or obscuring information often produces a better map. One participant asserted, "if you have every dot on the map, it's going to be accurate…[but] if it looks like there's one dot when there's really like 10 dots on top of it, it's not accurate." Another participant echoed the sentiment that granularity not as important as the overall message with a frequently used quip: "Nobody's landing a plane based on our maps."

Twenty-four statements were cross-tabulated *balance* (S2) and *form* (F), with participants stressing that a map's design should also share the story's commitment to *balance*. Many participants discussed design techniques to uphold *balance*. For instance, five participants (5/17) linked principles of visual hierarchy to upholding *balance* (S2) because it necessarily influences what the reader sees first, with one participant saying, "be very intentional about the meaning that you're trying to convey. Don't just make a design choice because it looks nice." Five participants (5/17) said color choice is highly influential in a map's *balance*. One participant argued the use of bright colors to highlight information is necessarily going to affect the map's *balance* because it indicates to readers what is important, saying, "don't

use a screaming dangerous looking red for something unless you really want to convey that, like, that thing was screaming and important and dangerous."

Notably, a minority (4/17) problematized the pursuit of *balance* in news cartography, pointing out that well-designed news maps necessarily present a selective framing of facts. One participant said, "you want to have a singular point of view, since that's important to have a story." Another participant said news maps "are designed only to show one really specific thing. So, you're not even able and you shouldn't really try too hard to show too many different perspectives." Another participant described designing a map for a story about development threatening archeological sites; attempting to give both sides equal visual weight muddied the design, reducing its ability to convey truth. The participant found designing two maps better *balanced* the perspectives represented in the story, saying, "if that's something that can't be accomplished on the same map, sometimes it's building multiple maps. So, having two maps that highlight those two different things."

Twenty-two statements were cross-tabulated *newsworthiness* (S3) and *form* (F). Seven participants (7/17) discussed when not to represent data using a map, arguing a map can even obscure the truth in the data if more appropriate representation techniques are ignored. Interestingly, a background in geography or cartography did not predispose a participant toward choosing a map over other forms of data visualization, with one participant who studied GIS saying, "tables are just underappreciated in terms of communicating some information. Sometimes that's easier to understand."

Participants discussed a variety of ways *form* plays a role in map-worthiness. One participant said they prioritize maps that express a clearly visible relationship between two or more variables, noting, “I like to have a bit of a visual correlation happening.” Another participant argued a map should visually do the work of a paragraph, saying, “things that are map-worthy are things that better communicate themselves [in a map], than in words.” One participant who worked on a project analyzing wildfire risk said they saw the potential to create an interactive dashboard out of the data, arguing, “that was incredibly map-worthy because we're not going to write about every single place, but we have data on those like approximately 5,000 different communities. And we made that available as a resource to other people to know what's happening in the community around them.” Three participants (3/17) said the difficulty of designing maps that work on mobile devices was a consideration for map-worthiness. One participant said, “75% of our readers are reading on mobile. So that is also a little difficult. Because as much as I would love to create this big grand desktop viewable map, it's not always possible.”

A negligible three statements were cross-tabulated *validation* (S4) and *form* (F), indicating the act of *validating* or verifying data is far more processual than representational.

Section 4.1.3. *Seek Truth and Report It* (S) and *Process* (P)

Statements cross-tabulated *seek truth and report it* (S) and *process* (P) often reflected how the journalistic and cartographic processes increasingly are one in the same. One participant emphasized, “it all kind of bleeds together. I just kind of view

it as journalism, period," while a second added "when you're making a map, basically, you're making a story. You're reporting a story."

The code *validation* (S4) was cross-tabulated with *process* (P) more frequently than any other code in the sample (frequency = 89), which speaks to the importance of workflows in the data analysis and interpretation *process* that are necessary for producing a truthful map. As one participant wryly observed, "there's a whole series of checks and balances that I think we need to create for ourselves, because *raw* data is often just that. And like, we shouldn't be eating that much fiber." Participants described bringing the same scrutinizing processes to analyzing data as would be levied against a human source. One participant said, "I view data as something that you have to rigorously interview." Another participant said the *process* of 'interviewing' data includes looking for spikes or anomalies, "because sometimes a spike might actually just be because a bunch of things were reported on one day."

Nearly every participant (16/17) stressed the importance of *validating* data prior to publication, with participants recommending a variety of data verification processes, including reproducing conclusions, cross-checking data, and interviewing data creators. Eleven participants (11/17) recommended *validating* data by reproducing its conclusions. One participant said, "it's rare for us to compile our own data, just because it's very time consuming. So, the main way that we would confirm something is, if there is a total line, we'll double check that total and make sure that it matches up with all of the other items above it." Seven participants (7/17)

recommend cross-checking a given dataset with other, comparable data sources, with one participant saying of climate data, “I’ll identify specific points in a dataset, and I'll cross reference it with multiple other datasets, from ideally completely different sources.” Nine participants (9/17) said they recommended having colleagues double-check work, with one saying, “we have asked our colleagues to basically re-run the analysis, but with a different coding language or different software. And ideally, you want the result to be the same.” Sixteen participants (16/17) described interviewing data creators or custodians as an essential step of their data *validation process*. One participant noted, “our version of reporting is like speaking to the people who put that dataset together,” and a second continued, “anytime we're dealing with a new set of data, whether it comes from research or from a governmental organization, it's pretty key to try to understand how that was gathered.”

However, there was disagreement on the practicality of extensive data *validation*. One participant said, “the realistic answer is, in journalism, you don’t often have a lot of time to do that. And we should be doing more of that than we are,” while another said, “sometimes we have to turn things around really quickly. And we would love to double check everything that comes our way. Sometimes we just don't have time. …We just have to trust that the agency or whomever is giving it to us has checked it. That sounds so bad when I say it out loud.” Another participant suggested it is up to the cartographer’s discretion whether data is worth double-checking, saying, “if we've used a dataset in the past and we're just getting an update, and

we've checked it in the past, and it's always checked out…we might skip it on the fifth time." One participant said despite the fast pace of news work, you must take time to verify the locations of news events, particularly those sourced from social media, saying, "we might be a beat behind those who are posting those kinds of things, but we need to be damn sure that we're right."

Notably, three participants (3/17) stressed that not all data can be *validated*. One participant said, "the problem generally comes in when there's not that raw data in there, and we get data that's already been summarized in some way." Another participant suggested in that case, you should still try to check it with relevant experts to see if it "looks" right, saying "not all of the data you get, unfortunately, you can verify…I would verify it with an NGO and just try to compare the numbers."

Fifty-two statements were cross-tabulated *accuracy* (S1) and *process* (P), covering steps taken in the cartographic *process* to ensure a map is truthful beyond data *validation*. Eight participants (8/17) recommended collaborating with subject matter experts to ensure a visualization *accurately* depicts a given phenomenon. One participant said, "can you talk to any professionals involved in this particular topic to get their feedback on what's going on in this area?" Three participants (3/17) described sending for-proof-only copies of maps to experts for feedback. One of these participants recommended, "also sharing it with the reporters as well to make sure what the reporters are seeing on the ground and who they're talking to matches up with the visualization." Interestingly, many reporters would consider it unethical to disseminate full copies of written stories prior to publication.

Six participants (6/17) described working toward *accuracy* by pausing to ask fundamental storytelling questions throughout the *process* of making a cartographic visual story, and then iterating on designs pursuant to those questions. This mirrors approaches in feminist cartography, such as Kelly & Bosse's (2022) assertion that cartographers should "press pause" in their mapping *process* to ask reflective questions. One participant asked, "what are we really trying to illustrate? What is the sentence we're trying to write with this map?" When analyzing data, one participant said they frequently ask, "compared to what?" as a means of qualifying their findings. Another participant described how they "put structure" on data, "stretch" data, or otherwise represent it in as many ways as they can through a *process* of, "iterate, iterate, iterate, and keep a very strong focus on 'What is the question I'm trying to answer? And does this thing I'm doing answer that question?'"

Beyond specific workflows, five participants (5/17) described a sense of responsibility throughout the *process* of ensuring their map is *accurate*, touching on the obligations of *be accountable and transparent*. One participant argued, "we're living in a time where information is more accessible than any other point in our history, and it is up to us to find that source of truth." Another reflected, "I have the technical skill set to break down the stuff that's lurking in these datasets, spatial or otherwise. And so, it's kind of a responsibility to present it in a way that doesn't over exaggerate certain aspects and doesn't cherry pick the data." One participant recommended discarding data if probes reveal it to be unreliable, stating, "it's not like 'this data is really important to our story, so we have to use it. We'll just find a

way to massage it to represent it in a way that hides those inaccuracies.' Often, the decision is just I guess I won't have that map in my story."

Personal biases dominated discussion about *balance* (s2) in practice. Thirty-eight statements were cross-tabulated s2 and *process* (P). Nine participants (9/17) said awareness of personal biases during the design process is essential to producing a *balanced* map, with one saying, "you are coming to the story with your own viewpoint. You are a human. And as a human you're going to have some things that you didn't even realize that you would carry to that story with you." One participant described changing a design after learning about an inadvertent bias, recounting when a colleague "started asked me a bunch of questions, and it made me realize I was going so hard on Ukraine being this amazing place. And I still feel that way. But I have to always remind myself that I can't put my values in something no matter how much it means to me." Interestingly, one participant argued bias isn't necessarily a bad thing, saying, "we're all people who exist in the same world that we're reporting on, and we're all affected by things. Often, that makes the questions that we ask and the way we approach a story more valuable." Five participants (5/17) similarly said it is important to put as many eyes as possible on a map to test for *balance*, with one recommending, "always checking the work you're doing with others, or possibly sending it to the source to confirm, but also maybe sending it to a different source to confirm your findings."

Three participants (3/17) emphasized that data skepticism is important for *balance*. One participant said, "try to look at the opposite side … to someone that

may have a different opinion, and not just follow what the first dataset is telling you." Another participant cautioned you can almost never draw a "hard and fast conclusion" from data, that each finding in the data needs traditional reporting to back it up. Only one participant said they often lack the knowledge required to *balance* perspectives they are tasked with visualizing, noting, "the graphics people are not actually the subject matter experts. We are the experts in mapmaking or data visualization…We try to leverage our reporters' expertise and have them take a look at our stuff and ask them if they actually make sense."

Discussions about *newsworthiness* (S3) in *process* centered around considering and interacting with the audience. Thirty-one statements were cross-tabulated S3 and *process* (P). Eight participants (8/17) said they thought about their audience in the process of deciding what to map, with one saying, "it comes down primarily to what the audience wants, or your best evaluation of what they want." There was some disagreement about the extent to which catering to the audience is ethical. One participant said a map must add value to the reader, stating, "my goal when I'm mapping is that I want my reader to understand the story better. I have to elevate the storytelling by providing a map." Another participant discussed thinking about the potential for a map to go viral, and cautioned, "with like Twitter right now, like everything else, maps can be really misleading. So, if you're going use them for journalism, you've got to be really cautious about what, what is the value of that?" One participant noted, "audiences like maps," and maps tend to get more clicks,

which can lead to maps that are "not necessarily relevant, or the most important story."

One participant's opinion on *newsworthiness* (S3) stood out for its centering the *process* on community engagement. The participant, who had over a decade of experience working as an interactive data journalist for investigative news organizations, suggested mapping historically-marginalized communities demands an extra thorough *process*: "You have to start from asking yourself, am I in communication with those people? Because if you're not, then you're not going to be telling the right stories." The participant continued, saying "the answer doesn't start in the data," and encouraged cartographers to work more like reporters, saying "I don't think datasets are newsworthy or not newsworthy. I think that's backwards. I think you start with a story you want to tell or something you've heard about, and then you figure out what data you want to bring to bear on that." This suggests that a responsible cartographer should seek map ideas in the world beyond their computer screen, initiating outreach and forming relationships that apprise them of story ideas. The approach is expected of reporters, who position themselves as conduits of public sentiment, but it is not typically expected of cartographers.

Section 4.2. Minimize Harm

The *minimize harm* principle comprises three primary codes: *privacy* (M1), *aggregation* (M2), and *context* (M3). A broad *minimize harm* (Mx) code captured additional, related statements. This principle frequently acts to limit the potential for harm implicit in reporting truth. Expectedly, the volume of participant discussion on

minimize harm was second only to *seek truth and report it* (extensiveness = 17/17, frequency = 272).

Regarding the CFP dimension of the coding scheme, the majority of coded *minimize harm* statements referred to steps taken in the journalistic *process* (frequency = 101), which is consistent with the distribution of codes across the interview sample. Statements cross-tabulated with *minimize harm* and either *content* or *form* also were common, accruing frequencies of 87 and 84, respectively. **Table 4.4** describes the distribution of *minimize harm* codes across the CFP categories.

Context (M3) was the most frequent code both within *minimize harm* as well as the entire sample (extensiveness =17/17, frequency = 142). This reflects a profound responsibility on the part of news cartographers to contextualize the data they map. Participants discussed many kinds of *context*, and broadly advised liberally including *context*, with one saying, "we always try to err on the side of too much context or too much surrounding information, as long as it doesn't distract from the main story." *Privacy* (M1; extensiveness = 13/17, frequency = 55) and *aggregation* (M2; extensiveness = 16/17, frequency = 44) garnered less discussion, suggesting news cartographers more frequently must *minimize harm* to groups of people and places they represent than they must for individuals.

Code	Content (C)	Form (F)	Process (P)	TOTAL
Privacy (M1)	21	18	16	55
Aggregation (M2)	12	22	10	44
Context (M3)	50	38	54	142

Minimize harm (Mx)	4	6	21	31
TOTAL	87	84	101	272

Table 4.4. Distribution of *minimize harm* codes across the *content*, *form* and *process* categories.

Section 4.2.1. *Minimize Harm* (M) and *Content* (C)

Discussions about *minimize harm* (M) in relation to *content* (C) broke into three dominant themes: participants discussed (1) the potential for the wrong kinds of stories about communities to put those communities at risk for relational harm, or damage to one's reputation and relationship with others; (2) the potential for individually-identifiable data to put people at risk for physical harm; and (3) omission of certain racial or ethnic groups from a map to potentially cause reactive harm, or harm to one's mental state. These three themes largely corresponded to discussion under the M3, M1, and M2 codes respectively.

Nine participants (9/17) advocated for the importance of providing *context* (M3) to avoid damaging the reputation of a community or to avoid perpetuating harms that have historically affected a community. The code *context* was cross-tabulated with *content* (C) more frequently than any other code in the sample (frequency = 50). Several participants identified types of *content* especially deserving of *context*. Four participants (4/17) advocated for principles of active objectivity, which seeks to emphasize social, historical, and cultural *contexts* in stories—particularly those about race (Ward, 2010; Robinson and Culver, 2016). Interestingly, all these participants had at least one degree in geography, with one participant explicitly describing how their geography background shaped their

approach to journalism, saying, “you need to understand the underlying aspect. There's so much more history here that has shaped the outcome that we're seeing now.” Two participants (2/17) suggested many maps of U.S. cities depict the same underlying social inequities, with one participant saying, “when you're mapping out a city like Chicago that has this history of segregation, you're just going to keep making the same map over and over again. And it's going to be based on where the white people live and where the Black people live…and if you're just making a map and not explaining that or interrogating that, then it’s at the very least not the story and at the worst, contributing to additional problems.”

Four participants (4/17) said the potential for maps to reinforce or generate reputational harm against communities makes them think twice about mapping concentrated poverty without due *context*. Many of these statements also were coded *aggregation* (M2) because of the enumerated data underlying them (see discussion below). One participant asked, “can this map be used to either discriminate against somebody or to stereotype an area?” Another participant said their newsroom specifically stopped making locator maps for crime stories unless they are trying to show an overall trend, because they often depicted the same neighborhoods, arguing, “we just really didn't need to be doing those maps. They may be harming those communities or perpetuating a stereotype about those communities. That is not helpful and is potentially actually harmful.” For this participant, they considered whether the map could be taken out of *context*. The decision came down to “the benefit of putting in a map was not outweighing the potential harm.” Another

participant extended the same thinking to maps depicting public school rankings or test results, saying, “you could put those on a map and say, ‘look, the schools in this area are just terrible.’ And that just reinforces people like, ‘oh, I don't want to go there.’ And you ingrain a pattern of putting resources elsewhere based on how people choose their schools.” Another participant suggested shifting the focus of stories to inequities of wealth and power, provocatively asking, “why don't we do maps of concentrated privilege instead?” These approaches echo the journalistic mandate to “speak truth to power.”

Four participants (4/17) specifically acknowledged the harm maps have historically propagated against Indigenous peoples and recommended providing *context* to counteract that legacy, with one participant stating, “you have to recognize that some [maps] are viewed as tools of colonialism.” Perhaps expectedly, three of these participants (3/17) had degrees in either history or geography. These participants recommended including Indigenous place names in stories about Indigenous peoples, with one adding the nuance, “you should also include the labels and the geographic features of the people trying to actively displace and remove them, because that shit actually happened, and that's important to their identity and their history.” Participants did not discuss including Indigenous place names in maps other than those that depict an Indigenous group.

Twenty-one statements were cross-tabulated *privacy* (M1) and *content* (*C*), suggesting that news cartographers do not deal with individually-identifiable data as frequently as other data journalists. Seven participants (7/17) discussed how to deal

with data that contains personally identifiable information, including but not limited to individuals' home addresses, but five of these seven said it was never okay to identify where people live. One participant said in their newsroom, identifying individuals "is just immediately off the table. We'll just find a different way to communicate this idea." Another participant suggested, "the clarity and information gained from doing something like that is like so clearly outweighed by the personal costs to that person, of showing where this person's house is on this map." One participant made an argument about truth and clarity for the reader, saying "I think we've gotten away from the idea that because it's public, that means that it's publishable. And we're trying to be much more deliberate about only publishing maps and information and data that can tell a story, and that is valuable to people." Finally, one participant pointed out that breaching *privacy* can result in real physical harm, particularly in areas of conflict. In pointing to a case study of mapping internet providers in Ukraine, this participant emphasized, "it's just always good to not include anything that might identify someone in a dangerous situation, especially location-wise."

Notably, three participants (3/17) broke from the consensus on privacy. A first participant specifically mentioned the *Journal News* case study (Culver, 2013; Craig et al., 2017) as an example of where revealing addresses held value, saying "that's where it gets like tough. It is a public record. Maybe you want to know if your neighbor has a weapon." A second participant described considering whether to make a locator map of protests at the home of Chicago mayor Lori Lightfoot, saying,

“I wouldn't be concerned about revealing that information because it's already out there. People are acting on it…But I don't think that holds true for every public figure.” This echoes the *minimize harm* obligation to “realize that private people have a greater right to control information about themselves than public figures and others who seek power, influence, or attention” (Society of Professional Journalists, 2014).

A third participant pointed out that attitudes around publishing *private*, identifiable data have proven fluid during the COVID-19 pandemic. The participant said the pandemic changed a preexisting taboo in news cartography around mapping phone tracking data because it became important to understand human movement patterns. The participant said, “all of a sudden, that went out the window. Phone tracking data was in every publication. Some people were so excited to get this level of detail about how people are moving around.” Participants discussed ways to *minimize harm* with this type of data in relation to *form*.

Twelve statements were cross-tabulated *aggregation* (M2) and *content* (C), with four participants (4/17) suggesting many common sources of population-level data are inherently exclusionary, as they do not account for the diversity of racial and ethnic groups in a community. One participant noted, “there are also a lot of people who identify as mixed race or identify as two or more races. What frustrates me a lot is that often [these people] get grouped into another category.” Another participant said the U.S. Census Bureau omits collecting data on many racial and ethnic groups. *Context* (M3), as summarized above, can be useful for portraying the limitations of

aggregated data. One participant argued omitting Native Americans from population-level data amounted to "another eraser from history. If there's census data showing that less than 0.1% of this community is Indigenous, you might not put that as part of your legend but find a way to mention the other groups. That's part of cultural competency."

Section 4.2.2. *Minimize Harm* (M) and *Form* (F)

The code *context* (M3) was cross-tabulated with *form* (F) more frequently than any other code in the sample (frequency = 38), reinforcing the responsibility of the news cartographer to imbue their design with relevant background information and perspectives. Six participants (6/17) discussed using annotations or captions for *context*. Participants often discussed how the story text can be used to *contextualize* the map, rather than vice versa. One participant said, "in terms of potential harm, I think a lot of it is really padding the graphic with, 'this is what this means, and this is why it might be like that,' and if we're not able to fit it in the graphic, then including it immediately before and immediately after the graphic in a story."

Seven participants (7/17) discussed design techniques that aim to *contextualize* data by reminding readers of the crucial truth that data often represent people, echoing the *minimize harm* obligation to "show compassion for those who may be affected by news coverage" (Society of Professional Journalists, 2014). One participant who mapped the Russia-Ukraine war summarized, "the literal points on the shapefile represent where people are and where soldiers are, or [where] fighting is occurring and where people are dying…at the end of the day, you cannot forget

that the data are people." However, another said the right way to symbolize a large number of victims is still an "open question." One participant critiqued the way many news organizations mapped the movement of refugees from Ukraine, saying, "there was a lot of directional flow arrows and lots of stuff that made it look like there was a swarm of invaders coming into the rest of Western Europe." Many participants related this principle to the design of maps depicting deaths from Covid-19. One participant said they *minimized harm* when they designed a hyperreal 3D basemap of an urban neighborhood ravaged by Covid-19, saying, "I could have just done satellite, but I was able to kind of like create a mood for this particular map that showed density, showed the crisscross nature of these neighborhoods." Another participant considered the *context* of the story to avoid "tasteless" symbols, saying "if you're talking about war or dead people, don't use bloody colors." Another followed a similar line of thought in devising a technique to humanize individual-level Covid-19 death data, saying "we actually treated every single person as an individual and did a ray of light shooting into the sky for every single individual person."

Six participants (6/17) specifically discussed being mindful of the racial *contexts* of color choice, echoing the *minimize harm* obligation to "consider cultural differences in approach and treatment" (Society of Professional Journalists). Five (5/17) participants explicitly said they avoid using racially coded colors to represent racial groups, with one participant saying, "we don't want to be making some inconsiderate color choices. You know, making Asian people yellow, or the Native American population, we're going to indicate that with red. Like, come on." Another

participant said color choice should not reinforce racial hegemony, saying, “what are we elevating? What are we highlighting? What colors are we using that are going to immediately pop off the page? Maybe you don't necessarily need to use those for the most represented groups.” Three participants (3/17) discussed how cultures have varying interpretations of the same colors, with one saying of immigrant communities in their region, “the trust in news organizations in those groups is much lower to begin with. So, if we're designing something that we may not think about, like the color or the language that we use…we should be least aware of the connotations that that they have.” Another participant described working on a story that depicted an Indigenous community, asking, “can we remove the paywall so that they can access it? So ‘do no harm’ especially comes into play when you're dealing with underrepresented groups that you're reporting on, who may lack cartography and data viz tools.”

Interestingly, one participant with a background in history and cartography echoed themes of active objectivity (Ward, 2010; Robinson and Culver, 2016) in relation to *form* in how they approached representing the homeland of Indigenous peoples. The participant rendered traditional Indigenous territory as polygons with fuzzy boundaries, overlaid with present-day state and reservation borders. The participant said this was “a subtle way of saying, this administrative boundary that we call Oklahoma is superimposed on this older level of ownership that was there before it, on some level transcends it.” This serves as a poignant example of cartographic insight informing the journalistic practice of *minimizing harm*.

Twenty-two statements were cross-tabulated *aggregation* (M2) and *form* (F), with nine participants (9/17) discussing design techniques to hide or mask sensitive data. Participants emphasized shifting the focus of a map from individual-level data itself to trends or patterns in the data, with one saying, “there's a synergy between not doing harm, and it being a better map.” Another participant changed a map’s scale to the county level and *aggregated* the data into classes, saying, “that made for a better visual anyways, because it was scannable and human-readable.”

Four participants (4/17) discussed *aggregation* (M2) techniques to *minimize harm* in stories that involved sensitive medical information. One participant said, “there's potential to do harm by putting a dot over an address where someone got called to an opioid overdose, and also there's a question of ‘what is the value of mapping those individual points?’” This participant *aggregated* the individual opioid overdose points into bins of hexagons, because “we don't want to harm people, but also because you can't tell anything from these dots. We want to know, ‘where are the hotspots?’ That's much more useful.” One participant suggested emergency medical services often introduces false precision because the data are recorded at street intersections instead of addresses, summarizing, “maybe we can map something a little bit more aggregated, a little wider out, that's going to show the pattern better.” One participant suggested a heat map, and another a proportional symbol map, as less harmful alternatives in similar situations. Another participant said converting points into a raster is “applicable for any situation where

you want to show the distribution of something, but you don't want identify exact locations."

Interestingly, one participant discussed how the Covid-19 pandemic forced them to reckon with how they *aggregated* data, saying, "we thought about everything in terms of if someone was using our maps or charts to make choices about whether they're going to go to the grocery store that day and expose themselves to a potentially deadly virus." This participant said they redesigned the Covid-19 dashboard at the regional newspaper where they worked, eschewing county-level choropleth maps for proportional symbol and "spike maps." The participant argued these thematic map types better depicted the prominence of the virus in each county and empowered readers to make safer decisions.

Eighteen statements were cross-tabulated *privacy* (M1) and *form* (F), with participants discussing design techniques to protect individuals beyond data *aggregation* (M2). Six participants (6/17) recommended constraining the zoom level or otherwise affecting the scale to generalize the locations of individual-level data. One participant echoed the observation that this also improves storytelling, saying, "increasingly, both not doing super zoomed-in things, and also less interactivity has really been a pattern. There's a lot of reasons for that. One is the potential to avoid harm. Two is being able to zoom in and explore—it's not really a thing that most people want to do."

Three participants (3/17) described extending the design principles for protecting *privacy* to nonhuman data. One participant recommended, "being very

careful with how you're representing wildlife data so that these animals can't be harmed, or their migration routes can't be impacted by poachers." This participant balanced the potential for harm in a map by drawing a generalized polygon to show the range for endangered wolves, saying, "the biologists have exact lat-lon locations for the wolf dens and where they're introducing them…It would be really cool to map this, but we shouldn't. Because there's a lot of people that are anti-wolf, and that could bring harm to these animals." Another participant recommended techniques to mask the locations of historical artifacts, saying, "even if it's very unlikely a looter in Guatemala is going to look at your map…as a point of respect to the archaeological field, you don't put specific locations of archaeological sites on maps." This participant said to hide the points, "I'll add a random amount of movement to every single dot, so the points don't actually overlap with where exactly they are, but you still get a sense of distribution."

Section 4.2.3. *Minimize Harm* (M) and *Process* (P)

Participant discussion around how *minimize harm* influences their workflows described a *process* that is largely introspective, with participants focusing on factors they consider or questions they ask in the *process* of making cartographic visual stories. One participant summarized the premise from which these considerations arise, saying, "cartography has a lot of power because by depicting a space you're producing a perception of that space and by producing a perception of that space you're giving people ideas about that space."

Many participants said they have a responsibility to consider *context* (M3) because their maps may give people ideas about a place and the people who live there. Fifty-four statements were cross-tabulated M3 and *process* (P). Eleven participants (11/17) discussed taking special care throughout the *process* of mapping marginalized communities to consider historical *context* and the implications of coverage. One participant defined this approach as "thinking about audiences that have historically been harmed by journalism and continue to be harmed." This participant continued, recommending, "thinking about narratives that already exist that are harmful. And then saying, is this graphic that I'm making actively contributing to the harm?" One participant made the analogy to a "code smell," an idiom in programming that indicates a characteristic in the code that is indicative of larger problems, testing maps by asking, "does this map reinforce conventional wisdom? If it does, I think that's a code smell…Anytime you're reinforcing conventional wisdom about race, oh man, that's a red flag…Why are we mapping conventional wisdom? That's not going to help anybody." This participant made a provocative call to pursue story angles that go against conventional wisdom, arguing, "conventional wisdom is usually wrong anyway." Another participant echoed that approach, saying maps should provoke the audience to "change something about the way they think or the way they behave, because otherwise, what's the point?"

One participant with a background in history discussed how the aesthetics and techniques that undergird cartography largely developed to support the interests of Western European colonial states, saying, "understanding that, you now need to

consciously think about how you're going to work within that framework to go in a different direction… I think if more journalists kept that in mind, you see less harm done by maps today." This participant said in their *process*, "I just try and think about the way that I'm depicting certain groups. I'm trying to find out how they prefer themselves to be depicted, or even whether they want to be depicted at all." This participant described doing extensive research on Indigenous and historically marginalized communities they map, saying, "being, you know, a boring white guy, I'm not going to inherently know what a member of a Quilombo community in Brazil wants out of a map…but I can at least listen and approach things in good faith and recognize I'm going to make mistakes and keep going regardless." Another participant suggested the nature of the news business limited their capacity for reflexivity, saying, "you cannot always get it right. But again, it's about knowing you have bias and trying to do the best you can within time constraints."

Participants identified interpersonal feedback as one of the primary ways they determine if a map needs additional *context* (M3). One participant recommended, "proactively showing things to colleagues to make sure that your eyeballs aren't the only ones on this thing." Another participant said this is important when "trying to convey more complex ideas. It would also be useful to grab a reporter, somebody else, another colleague who is not primarily a visual thinker, or somebody who doesn't work in the field of databases or cartography, to see what they think about the thing and to watch them and see if they interpreted the way that you thought they would." This participant continued, recommending, "playing devil's advocate as

much as possible in that process, showing it to people and getting a sense of what they think they're seeing." Four participants (4/17) argued sharing drafts of maps is helpful to understand different cultural *contexts*, with one saying, "the more eyes you can get on it, the more likely you're going to get more feedback on a culturally sensitive representation of things."

Five participants (5/17) referenced the *minimize harm* obligation to "consider the long-term implications of the extended reach and permanence of publication" (Society of Professional Journalists, 2014) as important *context*. One participant said "as a publisher, when we put things out on the internet, we'll be cautious about how it's going to be used." One participant argued the potential for maps to go viral obliged news cartographers to be thoughtful, saying, "this is an interesting ethical question with Twitter right now. Maps can be really misleading. So, if you're going to use them for journalism, you've got to be really cautious about what is the value of that? What's the news value? Why put this on a map?" Another participant said of potential viewers on Twitter, "what is this information going to tell them? Is it going to reinforce a stereotype?"

Interestingly, one participant called for cartographers to reflectively "take a step back and look at the conventions that we've used in the past and whether those were used because that was just what we had always done, or if they are still serving a need." In doing so, this participant decided to deemphasize maps in stores about urban crime, which became a salient political issue in the *context* of the 2022

election, saying, “I started to worry that we were actually playing into that stereotype by continuing to give these stories more visual heft than maybe they ought to.”

Privacy (M1) and *aggregation* (M2) featured less prominently in discussions about *process*, suggesting news cartographers see more interventions in *content* and *form* to *minimize harm* with these types of data. Sixteen statements were cross-tabulated M1 and *process* (P). Six participants (6/17) discussed decision-making around how to manage the harm implicit in granular data, echoing considerations expressed in Section 4.2.1. Interestingly, one participant who worked at a large international news organization said they are rarely the one who makes the final call on whether to identify individuals, saying, “it's more of an editorial decision, rather than a map design decision, often, where it happens further up the chain. You never get to the point where you're like, ‘oh, how do I design this map that has really sensitive or harmful information in it?’”

Ten statements were cross-tabulated *aggregation* (M2) and *process* (P). Another participant who worked at a large international news organization shared a similar experience about deferring to editorial discretion regarding data *aggregation*. This participant said, “I don't handle the data. We have a team that handles the data…I don't know the math that they used. I asked once, ‘if I'm going to map this, am I going to put someone in trouble because I map them too close to their home?’ They're like, ‘no, we've masked this.’ So, I don't even know the exact location.” These anecdotes point toward an experiential difference between cartographers at large news organizations, who may often specialize in data

visualization, and those at smaller news organizations who may often take on more reporting and data analysis responsibilities.

Section 4.3. Act Independently

The *act independently* principle comprises three primary codes: *conflict of interest* (A1), *skepticism* (A2), and *the public* (A3). A broad *act independently* (Ax) code captured additional, related comments. This principle proactively calls on journalists to avoid entanglements that might compromise integrity or damage impartiality. The volume of discussion on *act independently* was lowest among the SPJ principles in participant discussions (extensiveness = 17/17, frequency = 175).

One potential explanation for the relatively low discussion of *act independently* is that the majority of coded statements referred to steps taken in the journalistic *process* (frequency = 119). This is expected, as the obligations of *act independently* are largely oriented around a journalist's personal conduct, and therefore have less clear connection to *content* (frequency = 32) or *form* (frequency = 24). **Table 4.5** describes the distribution of *minimize harm* codes across the CFP categories.

The public (A3) was the most frequent code within *act independently* (extensiveness = 17/17, frequency = 78). This code captured statements where participants defined *the public* to whom they were accountable. It identified several considerations and responsibilities news cartographers think about in relation to *the public* such as a sense of pluralism in their audience. One participant said, "you need

to be aware of you have a wide range of readers," and another said, "your audience might not be who you think it is." *Skepticism* (A2; extensiveness = 12/17, frequency = 52) was less frequent and *conflict of interest* (A1; extensiveness = 11/17, frequency = 32) was the least discussed code in the entire sample. These results suggest there may be fewer ways for a cartographer to comprise their work than

Code	Content (C)	Form (F)	Process (P)	TOTAL
Conflict of interest (A1)	7	1	24	32
Skepticism (A2)	9	0	43	52
The public (A3)	14	18	46	78
Act independently (Ax)	2	5	6	13
TOTAL	32	24	119	175

Table 4.5. Distribution of *act independently* codes across the *content*, *form* and *process* categories.

Section 4.3.1. *Act Independently* (A) and *Content* (C)

There was less discussion than expected about *act independently* and *content*. Literature identifies several ways data selection could compromise impartiality or credibility. Participants were more likely to relate these concerns to the perceived *balance* (S2) of their map, as discussed in Section 4.1.1. Participants identified few instances when a *content* decision could prevent accountability to *the public*.

Fourteen statements were cross-tabulated with *the public* (A3) and *content* (C). Five participants (5/17) discussed considering *the public* regarding *content* decisions, with one saying, "it is important to "always tie it back to what…readers want to read." This code captured statements about how audience expectations factor into *newsworthiness* (S3) discussed in Section. 4.1.1. The redundant coding

results point toward news cartographers' preference to consider *the public* in relation to *form* or *process*.

Fewer participants than expected discussed specific kinds of *content* they were *skeptical* (A2) of, with the bulk of discussion captured in *process*. Nine statements were cross-tabulated A2 and *content* (C). One participant described being skeptical of data from commercial satellite imagery vendors, saying, "the intelligence community invented aerial imagery. So, we had some questions about the vendors," however, this participant continued, "that was more just like practically speaking, 'will they work with us?' Not so much, 'what's in the data?' Or, 'what's out of the data?'" However, another participant critiqued the perception that satellite imagery is "viewpoint-neutral," suggesting it can still be taken out of context to "advance some goal of the company or a government entity." Another participant suggested they don't typically feel the need to be *skeptical* of satellite data, saying, "normally these [remote sensing] companies aren't really agenda-driven. They're tech companies, basically. We do have a policy of not really getting data from agenda-driven organizations." Another participant said of data from organizations with an explicit political agenda, "we don't use that data because it might be biased in some way. I always prefer going to an academic source or a government source." However, another participant directly contradicted that sentiment, arguing, "a lot of the data that we might be seeking to map comes from official public sources, but there's so many assumptions that they are making in the questions they're asking." Interestingly, one participant was *skeptical* of open-source data such as that from

the database Natural Earth, arguing, “[borders] change all the time…and we have disputed territories, and the only journalism guideline is you have to just be accurate. But by being accurate, like who do you follow?”

Seven statements were cross-tabulated *conflict of interest* (A1) and *content* (C), which is not unexpected. It is a highly *processual* code, with few *content* applications. It concerns a reporter’s personal conduct, such as owning a stock in a company or donating to the campaign of a political candidate they are charged with covering. One participant shared an anecdote about entering into an agreement with Google to receive free satellite imagery in exchange for attribution, saying they didn’t think it constituted a *conflict of interest*: “it was very clear to us that Google was benefiting from the PR of handing out those images. But I don't think any of us ever really thought it was in an inappropriate way.”

Several participants discussed questionable *content* that they concluded ultimately did not pose a *conflict of interest*. One participant described seeking satellite data on a landslide from a private vendor because the data provided by the U.S. Geological Survey wasn’t of sufficient resolution. This participant said, “I think you're kind of abrogating your duty if you don't try and get the more detailed data.” Another participant mapping trends in real estate said newsrooms commonly used data from a private provider with a clear interest in having their data disseminated, saying of the data, “that is the best. It's the most comprehensive or complete. Like, it's better than what you can get through public channels.” Another participant described a similar dynamic regarding private data on power outages, indicating that

it is common for news organizations to pay for such data. These participants unanimously endorsed attributing data to its source to remedy concerns about impartiality, directly mirroring the *act independently* obligation to "identify content provided by outside sources, whether paid or not" (Society of Professional Journalists, 2014).

Section 4.3.2. *Act Independently* (A) and *Form* (F)

Just twenty-four statements were cross-tabulated across all *act independently* codes and *form*. This identifies the relatively few ways *act independently* relates to a map's design, which in not surprising. The literature review did not reveal a way to visually represent *act independently* in data journalism or cartography.

In defining *the public* (A3) for whom they designed, participants identified traits such as the assumption that readers are time-scarce, not interested in interacting with maps, and mostly looking at visualizations on a phone. Eighteen statements were cross-tabulated A3 and *form* (F). One participant said, "something isn't serving the public if the public can't understand it, can't access it, can't decipher it. So, put things in as simple of language as possible. Make things clearer to people to understand, to be able to see something and take away information from it and not misinterpret it." Another participant curtly summarized, if you are not "visualizing in as clear a manner as possible, you're not serving the public."

Several participants stressed simplicity in design because *the public* at large does not have the educational background or interests of most cartographers or

journalists. As one participant said, “represent and talk to an audience that has different education levels. Let's make things as simple and straightforward as possible. Let those principles of cartography…guide us, but also be able to define and describe those things. Try to make it as clear as possible so it's not up for interpretation about what the map is showing.” A second participant noted varying levels of geographic literacy across *the public*, and recommended design choices that allow the reader to easily locate the mapped phenomena, such as a locator map: “once you've done cartography for a while, it's kind of background information. But it's still so important for serving the public.” Finally, a third participant suggested that cartographers cannot expect *the public* to like maps as much as they do, saying, “not every audience can be kept interested with purely or primarily a spatial representation, and then only certain spatial representations.”

One statement was cross-tabulated *conflict of interest* (A1) and *form* (F). This participant worked in a nonprofit newsroom that was funded primarily by private donations. The participant said, “we have a big disclosure form at the bottom of every story. If a donor was mentioned in that story, then we say that, but they play no role in our journalism and that maintaining that separation is a really big part of what we do there.” This approach reflects the *act independently* obligation to “prominently label sponsored content” (Society of Professional Journalists, 2014).

No statement was cross-tabulated *skepticism* (A2) and *form* (F). This is expected, as the code’s definition is highly *processual* and presents few applications for design.

Section 4.3.3. *Act Independently* (A) and *Process* (P)

The majority of *act independently* statements were cross-tabulated with *process*. Participants largely discussed the *processes* they follow to limit the potential for data or imagery to comprise the integrity of their work. Participants also discussed the need for *processes* that acknowledge a plurality of audiences. Forty-six statements were cross-tabulated *the public* (A3) and *process* (P). One participant who worked at a metro newspaper said, "we have to think about, is everyone from like a sixth grader up to your 80-year-old grandmother, are they going to be able to generally get the idea?" Interestingly, one participant advocated a dynamic process of targeting an audience based on the news organization's values, saying, "if your problem is that a white rural audience does not want to read about structural racism, I would ask you to think about, 'well, what about the audience we don't currently have which we want?'"

Two participants (2/17) described experiences where their obligation to *the public* was compromised by an employer's objection to a story. One participant mapping residential segregation received pushback from their news organization's owner about word choice, saying, "we had to fight really hard to use the word 'segregation' and 'racism' in the story. In the end, we got it through, but that was an uphill battle." This participant worked at a regional news organization and said they faced a "theoretical worry from management about readership. Like, 'is your reporting going to go too far?'…'you're going to alienate some of your rural readers by leaning too far into this.' I really think we have a responsibility whenever you start

feeling that twinge you've got to fight in the opposite direction. Like, you have to go in completely the opposite direction, and ask yourself, 'why is this a problem?' Like, either it's true or it's not." Another participant echoed that sentiment, noting when they map, they do not think about whether it will benefit their employer, saying instead, "when I map, the goal is how will this benefit my reader?" This participant said that means exposing uncomfortable truths, arguing, "an article or data visualization is not going to make everyone happy…but part of serving the public is presenting things accurately."

Interestingly, one participant suggested that audience considerations drive newsroom decisions even when news organizations do not fully understand how *the public* responds to visuals. This participant said, "I think that's an ethical concern because you don't really know how people are going to ingest your work. And there's a lot of assertions that get thrown around in a newsroom about, 'this is what the audience wants. This is what the audience thinks. This is what people really responded to.' And the reality is, there's just actually no research and we're making it up." This participant suggested in many local and regional newsrooms, editors often presume stories that unveil racism will offend reader. The participant argued against that framing: "it seems like the audience we already have is one of our problems."

Forty-three statements were cross-tabulated *skepticism* (A2) and *process* (P). Nine participants (9/17) suggested it was important to be *skeptical* of a sources' motive in disseminating data, with one participant saying, "everybody's doing something for a reason. And you can't just be a pawn in somebody's big game. So,

you've got to think critically about who it is that's given you the stuff. And what it is that they're trying to accomplish." This participant recommended researching a potential source's funders. Another participant said, "if I'm doing a political story, and maybe only a certain think tank has the data I want…I just need to look at the 'about us [page]' and be like, 'okay, do they lean to a certain side?'" Another participant noted, "somebody like Johns Hopkins University, who is putting out data about COVID, probably doesn't have a whole lot of motive" beyond improving public health. Another participant described being *skeptical* throughout the *process* of working with police data, saying, "you really have to work against the grain of what this data was designed to do to tell a story about what's actually going on in the world versus what police activity is doing…this is not a scientific study of crime. This is a data management tool of a particular agency."

Four participants (4/17) discussed *skepticism* that arose in the *process* of working with satellite imagery companies. One participant described how these companies proactively send news organizations imagery following a news event, saying, "the purpose of them sending those images out, it's not altruistic. It's so that they can get their name next to it and say, 'this is courtesy Maxxar Technologies.' And they have a very specific attribution that they request. So, yeah, we keep that in mind." One participant noted these companies' contracts with the U.S. Department of Defense complicate independence for a journalistic trying report critically on government activities. This participant said, "we definitely had some questions about some of these satellite vendors given who they want their client base to be. 'Were

they willing to go along with us on some of the projects we wanted to do?'" Another participant cited the policy of "shutter control," saying, "they famously won't give us stuff over certain sensitive targets because they have contracts with high-power defense [agencies] with the U.S. government."

Five participants (5/17) recommended techniques similar to those captured by the code *validate* (S4) in Section 4.1.3 when discussing how *skepticism* informs their *process*, with one participant summarizing, "independence for cartographers and all journalists really means questioning the data and questioning the assumptions behind how that data was gathered." These participants said they will not simply redo a graphic or republish conclusions without interrogating the underlying data. One participant said, "we have a policy where we won't recreate or analyze data unless we have the raw data. We're not in the business of recreating graphics…without knowing what went into them." Another participant said the issue with public or private data comes when "they've already decided the way that they want the public to consume it." Another participant echoed this, saying, "I've kind of grown to strongly dislike Tableau and Power BI for that reason, because it gives government agencies and public or private [companies] this facade of being like, 'see, we're making our data available, we're making it public on the internet.'…If I want to download the data and do my own analysis…that's very difficult." Another participant noted PDF reports frequently present this challenge, saying, "our reporters will be like, 'see this map on page three? We just want to do this map, right?" And I'm like, 'cool, but I don't have the data for that, and I'm not going to

begin to try to trace it or something to try to redo it. We need to ask them for the data.' Sometimes that works, and sometimes it doesn't."

Participants rarely discussed entering into an agreement that presented a *conflict of interest* (A1). Instead, participants discussed arrangements that could appear to be a *conflict of interest* from the readers' perspective. Twenty-four statements were cross-tabulated A1 and *process* (P). One participant who worked in a nonprofit newsroom described working on a story about the cost of rent and homeownership when the advertising department told them the realtors association wanted to sponsor it. The participant said, "we can't do that. It looks like they would benefit from this story." This participant said the perception of an inappropriate relationship alone was enough to kill the sponsorship. Another participant suggested sponsorships present a *conflict of interest* journalists and cartographers must navigate as newsrooms increasingly turn toward grants and corporate partnerships to make up for losses in advertising revenue. This participant suggested relying on corporate sponsors is okay "as long as you can do that in a way that you're not injecting their agenda into your story, and you're making sure that they're not directly profiting from it." One participant described a situation that did cross the line, saying, "we did have a satellite company where they were like, 'we want you to give testimonials about this and all this stuff.' And we were like, 'we're probably not going to do that.'" Another participant described their newsroom doing unpaid events advocating for Google's mapping products, saying, "we were I think giving a tacit endorsement that, 'hey, we think this is a this is a good product.' The good news

is we did think it was a good product, but there's probably a conflict of interest there…I think the reason we did it for as long as we did is because we felt like 'well, this is genuinely what I would advise people to use.' If there was a way better product, I would tell people to use that."

Section 4.4. Be Accountable and Transparent

The *be accountable and transparent* principle comprises three primary codes: *accountability* (B1), *explainer* (B2), and *transparency* (B3). A broad *be accountable and transparent* (Bx) code captured additional, related comments. This principle states that journalists should take responsibility for the work they publish and explain ethical decisions to the public. The volume of discussion on *be accountable and transparent* was on the lower side among the SPJ principles in participant discussions (extensiveness = 17/17, frequency = 181), which was expected. *Be accountable and transparent* largely governs a journalist's personal conduct, though arguably to a lesser extent than *act independently*.

Regarding the CFP dimension of the coding scheme, the vast majority of coded *be accountable and transparent* statements referred to steps taken in the journalistic *process* (108). There was also significant discussion related to *content* (63), but relatively little discussion related to *form* (10). **Table 4.6** describes the distribution of *be accountable and transparent* codes across the CFP categories.

Explainer (B2) was the most discussed code within *be accountable and transparent* (extensiveness = 14/17, frequency = 74). This is expected, as literature

identifies a public-facing explanation of the development process as one of the primary ways data journalists put this principle into practice, with one participant recommending, “not acting like you are just simply presenting the data as it is. Because often, that's not the case. Often a lot of the graphics or visuals we make, the data have been manipulated.” *Accountability* (B1; extensiveness = 14/17, frequency = 57) and *transparency* (B3; extensiveness = 15/17, frequency = 49) garnered similar volumes of discussion, reflecting the synergistic nature of these two codes.

Code	Content (C)	Form (F)	Process (P)	TOTAL
Accountability (B1)	9	1	47	57
Explainer (B2)	49	2	23	74
Transparency (B3)	10	5	34	49
Be accountable and transparent (Bx)	1	1	2	4
TOTAL	69	9	106	184

Table 4.6. Distribution of be accountable and transparent codes across the content, form and process categories.

Section 4.4.1. *Be Accountable and Transparent* (B) and *Content* (C)

The majority of *be accountable and transparent* and *content* cross-tabulations referred to the importance of including an *explainer* (B2), as well as the *content* that should be included in the *explainer*. Forty-nine statements were cross-tabulated B2 and *content* (C), a close second to *context* (M3; frequency = 50) for code with the most *content* cross-tabulations. This approach reflects a strong commitment among news cartographers to disclosure *transparency,* or explaining

how the news is selected and produced (Karlsson, 2010). Notably, participants nearly always used the term "methodology" to refer to the *explainer*.

Regarding the *content* to include in the *explainer*, twelve participants (12/17) said it should include information about where they retrieved the mapped data, as well as a hyperlink to the data source. One participant said, "we'll have a box at the bottom that says about the story, here's where we got the data. 'Do you want to go look at it? You should be able to go get it yourself.' Another participant observed the web has enabled news organizations to more thoroughly explain how their stories come together than they could through a print product, saying, "you can just link to the sources that you're talking about. You can provide the level of detail you think is appropriate, and then link to four research papers that give a lot more detail on things that you're talking about." Another participant suggested the shift from print to digital media has allowed *explainers* to be as long as they need to be, "because in print, space is always at a premium. You don't have the luxury of printing a 600-word methodology section to accompany your story, usually. Or if you do want to do that, something else isn't going to go into the paper."

Twelve participants (12/17) said the *content* of an *explainer* should include information about the steps taken to analyze or augment the data. Participants suggested they aim to find a balance of including just enough detail without boring the reader. One participant asserted *explainers* should not be step-by-step-detailed, saying, "explainers are not at the level of creating a recipe…if you're publishing something as a story, I would lead people along without boring them in the minutia."

This participant recommended against jargon only a statistician or data analyst would be familiar with, saying, “you have to recognize that an audience for an explainer needs to be somewhat parallel to the audience that you're writing for in general.” Another participant echoed that sentiment, saying, “it’s just that balance of being transparent, but also making it a useful part of the story and not just legalese.” One participant recommended not including details behind color choice or details about the software used, saying, “that's usually conference presentation-type stuff.” Another participant summarized, “the right level of detail is just the amount that…makes the case of why they should trust us, and why they should feel confident and trusting what they read in the story.”

Eight participants (8/17) said the *content* of an *explainer* depends on the sophistication of the data work, with one participant saying the *content* “scales based on the complexity of the underlying data and methodology.” Many of these statements were double-coded with *process* when participants identified specific data analysis *processes* that may warrant an *explainer*. Those statements are reported here to avoid redundancy in Section 4.4.3. One participant said of whether to include an *explainer*, “there's not a very clear bar. But maybe there shouldn't be.” One participant said, “not everything needs that. It kind of depends on, ‘how complicated was it? How much work went into the reporting?’” Another participant said an *explainer* is not needed “if your story is just a single map…with a couple layers of information from reliable sources…there's no analysis behind it.” One participant said, “a lot of news projects basically feel like research papers sometimes.

There's a lot of analysis that can go into a piece. Especially in those cases, if the news org itself is doing something new, I think it's great to have a pretty long methodology." Another participant echoed that sentiment, saying, "if there was extensive in-house analysis outside of me just downloading census data and mapping it, if there's a lot more steps happening…doing some sort of different analysis to compare a longer timeframe or something like that, that's where we would do a more extensive methodology." Another participant said, "if we're doing a regression analysis or combining lots of different datasets from different time periods from different agencies to try to create our own complete dataset, or if we have compiled our own dataset, which we have done for some projects, then we'll write a methodology."

Three participants (3/17) suggested complex analyses sometimes warrant creating a separate webpage for the *explainer*. One participant suggested this is useful for readers who have a greater investment in the story, saying, "not everyone's going to read it. Probably most people are not going to read that. But if people are interested, if they have questions, if they're skeptical, at least they have a place to look."

There was relatively less discussion regarding *content* (C) and either *accountability* (B1) or *transparency* (B3). Ten statements were cross-tabulated B3 and *content* (C), all capturing statements about important information for the reader to know about an individual graphic. These examples of *transparency* often resulted in a note included with a map. One participant said they were working with a dataset

that varied significantly from year-to-year, saying “it's actually very important to know what year or what vintage, what time it's from.” Another participant added a note to a hyper-real rendering of the Earth, saying “that wasn't a hot button issue or anything, but we added a little note when we published it, at the bottom that was like, ‘this is a map this is made from data, this is not a picture of the Earth's surface.’”

Nine statements were cross-tabulated B1 and *content* (C). Five participants (5/17) suggested having a byline on the story made them more *accountable* for their mistakes. One participant said starkly, “I think the most terrifying part of my job is like, my name is stamped right there.” Another participant noted news organizations have not always seen it that way, saying, “having bylines for graphics people is still something relatively new… but if the graphics person doesn't have a byline, how can you hold that person accountable?” Another participant suggested the byline allowed the reader to contact the person responsible for the story or graphic, saying “we put our name there, you can reach out.”

Section 4.4.2. *Be Accountable and Transparent* (B) and *Form* (F)

Just nine statements were cross-tabulated between the *be accountable and transparent* codes and *form*, the lowest frequency of any SPJ-CFP cross-tabulation. Two statements were cross-tabulated *explainer* (B2) and *form* (F), both description the location of the *explainer* at the bottom of the story. One statement was cross-tabulated *accountability* (B1) and F, describing the location of a correction in a story.

Five statements were cross-tabulated *transparency* (B3) and *form* (F), capturing the only statements participants made about the principle specific to map design. One participant mapping climatic phenomenon said it was important to be transparent about the limits of a visualization, saying "we worked with the dataset that we had, and we made choices that were that were necessary to make this illustration of a thing. It wasn't a simulation; it was like an illustration of a phenomenon." The low volume of discussion about *be accountable and transparent* and *form* suggests news cartographers do not interpret this principle as particularly relevant to map design. This presents a potential gap between codes of ethics, scholarship, and practice. For example, cartography scholars describe how showing a design during multiple stages of iteration can improve *accountability* and *transparency* by inviting the public to examine the cartographer's design choices (Kelly and Bosse, 2022).

Section 4.4.3. *Be Accountable and Transparent* (B) and *Process* (P)

The bulk of *be accountable and transparent* statements were cross-tabulated with *process* (frequency = 106), the most derived from the code *accountability* (B1). Forty-seven statements were cross-tabulated B1 and *process* (P). Five participants (5/17) said taking responsibility for your work means telling colleagues if you have doubts about your findings, with one participant recommending, "being honest with your team and being willing [to say], 'I feel not great about this.' These participants said honesty is crucial even when it could be disruptive, with one describing a

situation where their reservations about a map surfaced at the eleventh hour: “you go through that whole process and you get to the end, and everyone's waiting on you, and it's 6:30 and the presses are ready to fire up and [I] had to make the decision that, no, actually I can't do that.” Another participant suggested an unwillingness to be honest about doubts will catch up with you, saying, “at some point, you're going to end up in a situation where you're going to have to lie or obfuscate.”

Sometimes, such *accountability* is not enough to catch every mistake in the *process* of creating the graphic. Six participants (6/17) acknowledged the nature of their work made it impossible to avoid making mistakes. One participant bluntly stated, “you're going fuck up. It's probably already happened, and you just didn't notice. And it's probably also going to happen, and someone else is going to notice.” This participant suggested the responsible and healthy approach to such situations is to “be aware that you need to go back, think about what you did wrong, [and] work on what you're going to do better next time. In doing that, I think you're going to do a better job of building up public trust, and building up a broader sense of accountability than trying to get it perfect every single time, because that's not possible.” Another participant said it is easy to make mistakes in a map when you are not familiar with the geography. This participant recommended deferring to local expertise in most cases, saying, “you're never going to beat someone with like 30 years of lived experience in an area over three, eight-hour shifts. It's impossible. And you shouldn't expect to do that.”

Participants said *accountability* means correcting mistakes, echoing the *be accountable and transparent* obligation to "acknowledge mistakes and correct them promptly and prominently" (Society of Professional Journalists, 2014). Six participants (6/17) said it is important to engage with detractors or those who request a correction, though participants agreed it is not possible to engage with everyone. One participant noted the question of who to respond to is complicated, "especially in the age of Twitter, trolling, and Covid. When we were doing Covid dashboards, we had a lot of conversations about like, is this person worth engaging with or not?" One participant recommended only responding to those who are engaging in good faith, saying, "some people hassle journalists just because they don't agree with what they map, or what they say on their maps or in their stories." One participant described being criticized by seismologists on Twitter for reporting an incorrect measurement, saying, "not all journalists reply to people. But I did. And I said, 'thank you for pointing out the mistake. Next time, please don't hesitate to tag me or email me if you see something inaccurate, because we try our best, but sometimes we still get them wrong, especially for breaking news.'" This participant said responding to criticism advanced *accountability*, saying, "I'm here for it. If you spot something that's not working, message me. You've studied this all your life, and I'm just trying to map it for my readers." One participant said you should still consider the opinions of detractors even if you do not respond to them, saying, "if someone's just a crank…you can dismiss them. But if someone's disagreeing with you…in a way that they could have logically arrived to, based on a series of coherent principles, that's something that you should at least consider." This participant

continued, “you don't have to respond to them. I think that's a completely unrelated decision. But you should think about it. You should think about why they arrived at that conclusion, and maybe what you did as a designer, to perhaps provoke that conclusion.”

Interestingly, one participant complicated *accountability* in the digital age, arguing against the idea that the internet could preserve their work because deprecating technologies often break things, saying, “information you publish is out there I don't want to say in perpetuity, unfortunately, because a lot of technologies change.” Interestingly, the ephemerality of interactive news maps complicates the adage that journalism is the “first draft of history,” though participants did not elaborate on the implications for their work’s provenance.

Much of the discussion about *transparency* (B3) addressed interpersonal conduct between colleagues and the data journalism community at large. Many statements involved the engagement of readers, reflecting the values of participatory *transparency*, which calls on journalists to engage their audiences in conversations around their stories (Karlsson, 2010). Thirty-four statements were cross-tabulated B3 and *process* (P), with one participant nothing that data journalism is inherently complex, and that any attempt at transparency requires patience, saying, “I do think we have to explain…I have this assumption that people understand something, and they just don't. They don't have the basic level understanding required to understand what you're doing. And being snide about that or being defensive about that is incredibly destructive.”

Twelve participants (12/17) said *transparency* involves documenting your workflow so that it is reproducible. One participant said, “when you're using tools like model-building and really higher-level GIS stuff…you want that to be reproducible. You want to be able to sit down and show your editor, here's how I came to this conclusion, here's the assumptions I made, here's the pieces that went into it.” One participant described how they mentally internalized the virtue of *transparency*, saying, “if a reader had been sitting next to me the entire time that I've been working on this story, and they've been watching everything I do, and listening to every conversation I have with sources, and then if they look at the map, or read the output of that reporting, would they feel wronged or as though something were hidden from them?”

Ten participants (10/12) said they aim to be *transparent* by making public their workflows and techniques, with one participant bluntly saying, “there's no reason why you can't tell me where you got your shapefile from.” Another participant suggested there is no downside to being open to collaboration, saying, “I am much more impressed by the collaborations people have done and the openness that people have…Hoarding resources [and] knowledge is the opposite of what we should be doing. No one does better work that way. I can't think of a single example where the mad geniuses of the world are doing the best work.” Another participant echoed the call for a collaborative approach, saying, “sharing methods is a great way of being transparent and also passing it forward to the new generation and to other people. But it also makes my job easier if I don't have to do everything.” Another participant

said news cartographers had a responsibility to be transparent and collaborative, saying, “ultimately, the information that you put forward is meant to be a public good. Therefore, help other people to recreate it in their part of the country…run a simultaneous story on how you did this, or put information on GitHub and make your information be something that other people can repeat if they choose.”

Several participants discussed posting source code to GitHub, with one saying, “I love when people are putting things on GitHub. Especially when you do something complicated, show your work,” Another participant noted GitHub promotes responsible work, saying, “your average reader isn't going to go to your GitHub, but it is nice to have the option to make things transparent that way, and at least maybe there are other journalists who can go in and learn from it or explore and be like, ‘hey, this looks off.’” Another participant suggested this approach is beneficial within their own newsroom, saying, “we run a data blog. Now, whether it actually gets a read or not is not a concern of mine. It's more internal for us.”

Interestingly, one participant recommended being *transparent* with sources about the angle of a story, saying, “you've got to be really upfront about, ‘this is the story we're going to tell. This is how we want to use it.’ Cartographers, any journalist, need to develop like a sort of relationship…‘your name is going to be on this thing that we've published. What does that mean for you?’” Another participant recommended, “when you're reaching out to people just being very upfront with who you are, which is…something you don't think about all the time in cartography and GIS.” This participant maintained journalistic rules about whether a conversation is

“on the record” apply equally to conversations they have as a cartographer, saying, “even though you're on the graphics side, you still need to make sure you follow those kinds of rules.”

Several participants described their *processes* for writing an *explainer* (B2), or ways an *explainer* aided their reporting *process*. Twenty-three statements were cross-tabulated B2 and *process* (P). One participant said they often run their methodology past colleagues. The participant said they often include an *explainer* if “they don't really get how you got there [or] how you found these things.” One participant suggested it was important to subject an *explainer* to an editing *process*, saying, “it's your job as a journalist or cartographer to put down literally every single little tidbit. The editor’s job is to come in and be like, ‘you don't necessarily need to include all this information.’” Another participant echoed this sentiment, saying, “I know the editor might edit stuff out. But as a journalist, it is important to me to put every single thing I know into a note or methodology. The editor can then decide this is important to the story.”

One participant said they often referred back to past *explainers* they wrote to get a head start on similar projects, saying, “in three years when I have to come back and make the same chart or same map for a different story, I know where I got that data.” Another participant described leveraging another reporter’s *explainer*, saying, “as a reporter, I say, ‘oh, this is really great. Now I can take this data and the process that you've written, and then do something for my own neighborhood or for my own area.” Another participant spoke admiringly about ProPublica’s *explainers*, saying,

“the way that their news apps team and data teams like write up their methodologies and the datasets they pull from and how they process them is just really great because it doesn't feel like it's being guarded.”

Chapter 5. Conclusion

This research consolidated contemporary perspectives on ethical cartographic visual storytelling by news cartographers. Specifically, this study sought answers to the following questions:

1. *How does the SPJ principle "seek truth and report it" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*
2. *How does the SPJ principle "minimize harm" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*
3. *How does the SPJ principle "act independently" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*
4. *How does the SPJ principle "be accountable and transparent" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*

Overall, news cartographers are clearly thoughtful about their design decisions. They consider the many ways their maps could misrepresent an issue or harm those depicted in it. Additionally, they view their role as encompassing a wide range of responsibilities beyond design. News cartographers do quantitative work, analyzing and verifying data to derive truth prior to representing it. News cartographers also

have a responsibility to engage others. They interview those who create and maintain the data they seek to represent to ensure their work is accurate. They talk to the public about their work, promoting accountability and transparency by making their processes and products accessible. In some areas, ethical thinking reflects the relative youth of news cartography compared to other aspects of the journalistic enterprise. News cartographers more often create visuals in service to other newsroom departments than they do pursue their own stories. Further, news cartographers are highly reliant on preexisting datasets from "official" sources. Relying on these datasets tends to sideline those that aren't a part of the dominant power structure. It also risks missing the stories for which there is no public data available. A key next step for this work entails taking on responsibilities ascribed to traditional reporters, such as pitching stories, forming relationships with covered communities, and compiling in-house datasets. Additionally, cartography education still focuses almost exclusively on map design. A key next step entails informing lesson plans with processes and workflows identified in this study. News cartographers clearly coalesce around certain ethical principles, such as data verification and providing context. The results of this study provide a first stroke toward the development of a code of ethics for journalistic cartography. More work is needed to codify these ideas and recommendations. A key next step is the development of a formalized news cartography code of ethics, following a process that is transparent and collaborative. This process should be open to those who make news maps as well as voices comprising the breadth of data journalism, visual storytelling, and cartography.

Section 5.1 provides a brief overview of answers to the four study questions. Section 5.2 presents one of the knowledge products of this research, a list of ethical storytelling best practices. Section 5.3 presents another knowledge product of this research, a survey of ethical debates in journalistic cartography offering key steps forward for the profession. The chapter concludes with Section 5.4, which discusses the limitations of this study.

Section 5.1. Overview of Study Questions

I set out to establish a benchmark for current ethical thinking by news cartographers. I asked each interview participant how they believe cartographers who work in the news ought to think about and apply each of SPJ's principles in their work. I provide a summary of insights towards each of the research questions below.

1. *How does the SPJ principle "seek truth and report it" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*

Participants said nearly all other considerations are secondary to ensuring their maps *accurately* and fairly represent the facts. This responsibility manifests throughout their design workflow. Regarding *content,* participants expressed a responsibility to find data that is relevant, trustworthy, and reasonably impartial. Though for news cartographers, truth and fairness are less about *what* they map, and more about *how* they map. This finding is surprising, as journalistic ethics assert the ethical importance of deciding what stories are worth telling.

Regarding *form*, participants said a key pillar of conveying truth involves presenting data clearly. Participants' approach to design mirrors Tufte's (1983) data-ink ratio, striving for simpler designs that leave little for the reader to misinterpret. As one participant said, "every mark should have a meaning. Every pixel should have a purpose." Put another way, if the ethical imperative of a graphic is to serve truth, any design choices that obfuscate the truth are unethical. As a result, participants will choose not to make a map if other visualization techniques prove more appropriate. Participants noted a well-designed news map necessarily shows only one thing, which complicates *balance*. Telling a balanced visual story typically requires multiple visuals. Additionally, participants said the words around a map matter just as much for accuracy and fairness as the map itself. When designing politically contested areas such as annexed territory or disputed borders, participants aimed to represent them in a way that matched material conditions on the ground, often considering the presence of a military and who controls civic institutions. This result is not surprising, but it presents an interesting departure from critics who contend this approach legitimizes unjust territorial claims.

Regarding *process*, one of the main ways participants applied this principle to their work is by *validating* data. *Validate* was the most discussed *seek truth and report it* code (frequency = 98). Just as a reporter should interview several sources for a story, a news cartographer must "interview" data by reproducing its conclusions, cross-checking it with other data sources, and looking for anomalies. Participants said it was also their duty to interview data custodians and subject

matter experts, both to ensure their maps are *accurate* and to understand how the data was collected. If probes of a dataset reveal it to be unreliable, it should be discarded. In pursuit of a truthful visualization, participants guided their data analysis and design by such fundamental questions as “what is the sentence we’re trying to write with this map?”, and “what is the question I'm trying to answer, and does this thing I'm doing answer that question?” Throughout their *process*, participants said they attempt to limit the extent their personal biases influence the story by subjecting their maps to editing and feedback. Time and resource constraints often limited the extent to which participants said they could follow these best practices. Surprisingly, participants endorsed sharing drafts with sources to check for accuracy, a practice which is often viewed as unethical in traditional journalism. Additionally, some participants encouraged news cartographers to engage in traditional reporting practices such as initiating outreach with communities and forming relationships to develop story ideas. These responsibilities are typically viewed as outside the purview of news cartographers or graphics professionals.

2. *How does the SPJ principle “minimize harm” manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*

Participants identified several ways news cartography can cause harm. For example, the wrong kinds of stories about communities could play into stereotypes or reinforce conventional wisdom. A story also could breach an individual’s *privacy*

and put them at risk for physical harm. Surprisingly, cartographers at local and regional news organizations in the sample did not have more to say about minimize harm than those at national or international news organizations. This runs contrary to a belief popular in journalism that if a news organization is closer to the communities it covers, its coverage is likely to be more nuanced and less harmful.

Regarding *content*, participants described the importance of emphasizing social, historical, and cultural *contexts* in stories—particularly those about race. *Context* was the most discussed *minimize harm* code, and the most discussed code in the entire sample (frequency = 142). Participants said *context* is especially necessary when mapping data that reflect racial population distribution, when mapping concentrated poverty, and when mapping Indigenous groups. Participants also viewed sources of population-level statistics as inherently incomplete, omitting or simplifying the racial and ethnic diversity they purport to measure. Participants said they would not reveal the locations of individuals in a map without consent, as the harm implicit in identification nearly always outweighed the benefit to the story. Though there was some surprising disagreement, with some participants suggesting there were certain instances when the news value of revealing individuals prevailed.

Regarding *form*, participants said they aimed to imbue their designs with relevant background information and perspectives. Participants recommended annotations to clarify key points for a reader and representation techniques that reflect the human lives represented in the data. Participants said they were mindful of how certain colors can be associated with a particular race or ethnicity.

Participants often *aggregated* data that could be individually identifiable, pursuing representation techniques such as hexagon bins and heatmaps. They also hid sensitive people, places, or things by constraining the zoom level or drawing generalized polygons. Participants noted there is often a synergy between these harm-reducing techniques and improving the clarity of a map's message. They generally preferred presenting trends or hotspots over granularity. There was less overall discussion than expected regarding *form* and *minimize harm*. This is significant given the prominence of map design in the work of the news cartographer and in cartographic education.

Throughout their mapping *process*, participants considered their stories in the *context* of historical harms as well as harmful narratives that exist today. Participants were averse to maps that contribute to stereotypes or reinforce conventional wisdom, aiming instead for maps that were novel or subversive. Participants also considered the potential for their maps to go viral or be taken out of *context*. Participants viewed interpersonal feedback as one of the primary ways to *minimize harm*. They typically relied on their colleagues and sources to check for clarity and cultural sensitivity.

3. *How does the SPJ principle "act independently" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*

Participants identified relatively few ways a news cartographer's obligation to serve *the public* could be compromised, potentially reflecting fewer avenues for a

conflict of interest than there are for a reporter whose job may require them to form close interpersonal relationships with sources and make explicit promises to gain access to information.

Regarding *content,* some participants were *skeptical* of satellite imagery, noting images can be taken out of context to advance an agenda. In general, participants generally sought out data from public sources, though some noted government data can be inherently biased toward government interests. Participants unanimously endorsed disclosure to allay concerns about integrity or impartiality, particularly when paying for data from a private source.

Regarding *form,* participants said they aim to serve a diverse *public* that does not tend to have the educational background or geographical interests of cartographers. They aimed to serve this *public* through simplicity of design, not taking for granted that the audience will understand map design conventions.

Participants primarily interpreted *act independently* as relevant to their mapping *process*. Participants viewed *the public* plurally, with some arguing the pursuit of truth will likely satisfy one audience to the offense of another. Presenting truth should remain the primary goal, even if risks alienating a particular segment of *the public*. Participants were generally *skeptical* of organizations offering data, considering their motivations and interests in disseminating the data. Participants advised against recreating maps if they were not provided access to the raw data, as doing so risks promulgating the data creator's interests. Participants said it was generally okay to use data from private sources that request attribution for use,

though a *conflict of interest* may arise if a news cartographer provides testimonials or endorsements.

4. *How does the SPJ principle "be accountable and transparent" manifest in the content, form, and process of cartographic visual stories produced at news organizations in the United States?*

Participants identified a public-facing *explainer* that documents their workflow as the primary way for a news cartographer to *be accountable and transparent*. Surprisingly, participants did not find this principle particularly relevant to *form* despite increased interest from cartographers in sharing design drafts. Additionally, no participant endorsed transparency around personal views or positionality. This is not surprising given the news industry's prerogative to present its product as fair and balanced, but it is notable.

Regarding *content*, participants said an explainer should include information about the source of the data, as well as a hyperlink to the original data source. Participants said the *explainer* should also include information about steps taken to analyze or augment the data, writing for a general audience. The *content* of the *explainer* should scale based on the complexity of the data work. If the data work is sufficiently complex or the story conclusions particularly consequential, a more detailed methodology on a separate page may be warranted. Participants noted having a byline on stories held them *accountable*, allowing readers to reach them more easily with questions or clarifications.

Participants imbued their mapmaking *process* with honesty, even when that meant stopping a story from being published because they were not confident about the integrity of their work. Participants acknowledged the nature of their work made avoiding mistakes impossible and described a responsibility to respond to critics who seemed to be engaging in good faith. Participants expressed a responsibility to explain their workflows and conclusions, both internally and to the broader public. Many participants shared the source code behind their applications and analyses.

Section 5.2. Best Practices

Participants identified many specific practices that promote more ethical cartographic visual storytelling. They are presented here organized by SPJ principle. These best practices are not intended as a set of absolute rules to be followed in every potential occasion, but as a resource for news cartographers to reference when faced with an ethical decision on how to act.

Section 5.2.1. Seek Truth and Report It

A cartographer must:

- Verify, interpret and corroborate data to derive truth. Data is not a fundamental source of truth. Datasets are not inherently newsworthy or map-worthy.
- Be a data skeptic and explore your data to derive truth:
    - Look for spikes or anomalies.
    - Reproduce conclusions.
    - Cross-check with similar data.
    - Have colleagues double-check your work.
    - Interview data creators and custodians to understand how it was collected.
    - Run the data by relevant experts.

- Discard data if it is unreliable or inaccurate beyond the point an annotation could clarify.
- Prioritize maps that express a clearly visible relationship or pattern. A map can obscure the truth if more appropriate design techniques are ignored.
- Have someone else look at your map; send for-proof-only copies of maps to experts for verification.
- Be mindful of contested borders and place names. Place labels and political boundaries are partial.
- Account for what is missing from the data. Dasymetric design techniques make for more accurate representations of continuous, discrete data.
- Represent the known differently from the unknown; use fuzzy design techniques such as a blurred border or range.
- Consider the words describing a map as important as the map itself; write about data in easy-to-understand prose; avoid jargon.
- Consider removing or obscuring information often produces a better map.
- Use red rarely and with purpose.
- Pause to ask questions while mapping: what is the sentence we are trying to write with this map? Compared to what? What is the question I am trying to answer and does what I'm doing or showing answer this question?

Section 5.2.2. Minimize Harm

A cartographer must:

- Provide the reader with the appropriate context required to understand any mapped dataset or phenomenon.
- Remind the reader the data represent people; consider the context of the story and avoid tasteless symbols.
- Emphasize social, historical, and cultural contexts in maps depicting race, class, or power; reconsider mapping data that mirrors general population distribution, particularly if that data matches racial distributions.
- Consider whether your map feeds into stereotypes or conventional wisdom. Statistics and enumerated data are not viewpoint-neutral.
- Find ways to mask individuals in a dataset. The benefits of identifying where people are located or where they live are almost always outweighed by the costs incurred by that person.
    - Aggregate into hexagon bins, administrative units, a raster, a heatmap, etc.
    - Constrain the zoom level.
    - Do not support information retrieve.
- Consider that aggregation can protect individuals but also remove humanity from the data; aim to find a balance.
- Consider that many sources of population data do not account for the diversity of racial and ethnic groups in any community.

- Consider the racial contexts of color choice and the varied ways cultures interpret the same colors.
- Consider that hotspots and trends are almost always more useful and less harmful than individual granularity; there is typically a synergy between maps that are less harmful and maps that are more useful to the reader.
- Subject maps to interpersonal feedback.
- Reflect on established practices that may be contributing to harm and assess whether they still serve a need.

Section 5.2.3. Act Independently

A cartographer must:

- Consider that the public is not as geographically literate or data literate as a cartographer; a map is not serving the public if the public cannot understand it.
- Understand that just because a map will make the audience uncomfortable, that does not excuse obfuscating or equivocating the truth.
- Be skeptical of companies offering data or imagery in exchange for attribution; consider whether a satellite image includes appropriate context.
- Avoid agreements where you are compelled to aid the marketing efforts of a company or product in exchange for data.
- Disclose all funding sources that may give the audience the impression of a conflict of interest.
- Research the motives and funders of agenda-driven organizations before using their data.
- Do not rely on data if you cannot get access to the raw data; do not reproduce conclusions or redo a map.

Section 5.2.4. Be Accountable and Transparent

A cartographer must:

- Provide an explainer or “methodology” for any story that involves in-house analysis; provide just enough information for the reader to understand what you did without boring them in the minutia.
    - Include data attribution and links to source data.
    - Include information about steps taken to augment or analyze the data.
    - Scale the detail of the explainer with the complexity of the data work.
    - Consider making a separate page for an explainer if the work is sufficiently complex or consequential.
- Have a byline on a story so readers can reach them with questions or corrections.

- Be honest with colleagues about doubts in a story even if it means killing a story.
- Engage with those who seek corrections or clarifications.
- Be willing to explain the process and results of your work; be patient and understanding.
- Document their workflow; foster collaboration by making workflows and code public.
- Be transparent with sources about the direction of the story.

Section 5.3. Ethical debates in journalistic cartography

This study revealed notable gaps between literature and practice, as well as differences of opinion in how news cartographers interpret and apply ethics to their work. This section aims to condense the most salient gaps and debates to inform future research into cartographic visual storytelling.

The first gap concerns one of the study's frameworks: the Content, Form, and Process framework outlined by Kelly (2020). Most participant discussion centered upon steps in the journalistic *process* (frequency = 568, or 53%). This suggests that news cartographers view ethics primarily through the lens of their personal conduct and story crafting workflows. Statements about *content* also were common (frequency = 270, or 25%). Unexpectedly, map design figured less prominently in how participants discussed ethical storytelling. *Form* was referenced least often (frequency = 233, or 22%) of the three CFP codes. This is significant considering the prominence of design in the work of a news cartographer, as well as in cartography education. These findings suggest cartography education should foreground the importance of *process* in ethical storytelling. Cartography education could perhaps integrate these findings by incorporating lessons about data analysis and verification

as well as engaging the public with maps post-publication. These findings add a professional perspective to cartographic scholarship that seeks to recontextualize the map away from a final product and more as a *process* (Underwood, 2022).

Second, these findings suggest cartographers at major news organizations may not be using their position to "boldly tell the story of the diversity and magnitude of the human experience [and] seek sources whose voices we seldom hear" to the extent best practices encourage. When participants pitched their own stories, they primarily sought to explore a geographic angle on a news item of interest, or an interesting change in a new dataset. Many participants primarily mapped natural disasters, climate change, wars, the Covid-19 pandemic, and politics. Further, the results of this study indicate that for news cartographers, ethics are more about *how* they map than *what* they map. However, journalistic ethics contend that the choice of which stories are worth telling is an ethical concern of the highest magnitude. This gap is significant. News cartography has produced some of the most widely seen and impactful maps in recent memory. As a result, news cartographers are ultimately charged with deciding what stories are worth mapping. News cartographers must assert agency in news organizations to pitch their own stories, broadening the breadth of story angles they pursue and aiming to elevate underrepresented voices. Some news cartographers have created poignant examples that bridge this gap by bringing visual heft to narratives of racial injustice (e.g., Parshina-Kottas et al., 2021; Dottle et al., 2021), Indigenous land dispossession (e.g., Lee and Ahtone, 2020), and migration (e.g., Underwood, 2022), however these stories are the exception.

Institutional barriers likely prevent news cartographers from exercising the agency afforded to traditional reporters. Though visual journalists have grown in prominence and number in recent years, there is still a sense they are sidelined in newsrooms. One participant said, "data journalism and mapmaking as a whole is still working towards being a professionally recognized thing in the journalism industry." A key aspect of professional recognition for news cartographers should be editorial agency. In pursuing their own stories, news cartographers must be prepared to assume the responsibilities of a traditional reporter, such as being in contact with communities they are representing, initiating outreach, and forming relationships. To do less is to pigeonhole news cartographers as programmers and designers as opposed to storytellers concerned with reporting truth.

Third, the findings revealed an open debate over whether truth or balance could exist in any dataset, pointing to a gap between journalistic ethics and the perspectives of news cartographers with backgrounds outside of journalism. Three participants (3/17) doubted whether "truth" exists in the *content* they map, or whether it could ever be truly achieved. As one participant poignantly observed, "journalists suffer from a similar problem that scientists do, where the entire field is built around the pursuit of truth…so, you start getting the sense that it actually exists." Similarly, there was disagreement over whether news cartographers can achieve balance in a map, and to what extend balance is a virtue worth pursuing. One participant noted bringing personal views into their work "makes the questions that we ask and the way we approach a story more valuable." These perspectives align

with critical and feminist mapping interventions around objectivity and reflexivity in cartography (Haraway, 1988; Crampton and Krygier, 2005; Kelly, 2020). There also was a debate over whether public sources are more credible than private sources, and whether data from explicitly political or agenda-driven organizations should be trusted at all. Surprisingly, no participant suggested a source can be explicitly agenda-driven and still provide quality data. These findings present an interesting gap. While the SPJ code does not state that journalists should defer to official sources, many participants did so in practice. This approach has tended to sideline or harm communities of color whose perspectives are often juxtaposed against "official" narratives (Robinson and Culver, 2016). Further, critical and feminist perspectives assert that all data is political, even those from official sources (D'Ignazio & Klein, 2016). These gaps suggest the debates around objectivity in the news are just as relevant to news cartographers as any other member of the newsroom. Additionally, many powerful examples of investigative reporting have resulted from journalists compiling their own databases where no such public database exists (e.g. Tate et al., 2019). In concordance with the call for editorial agency expressed above, cartographers should similarly aim to be less reliant on preexisting public datasets and instead pursue opportunities to compile their own databases.

Fourth, participants identified interpersonal feedback as one of the primary ways to minimize harm in the maps they produce. Participants relied on interpersonal feedback to check maps for cultural competency, determine if a map needs additional context, and assess their maps for overall clarity and

comprehensibility. While feedback has clear merit, it should be noted that relying on colleagues or superiors for feedback also can reinforce hegemonic beliefs. Participants noted quality feedback often depends on the extent to which a newsroom is representative of the communities it covers. The lack of diversity in the news industry complicates the value of interpersonal feedback as a method to minimize harm. Relying on people of color to ensure stories are culturally competent demands additional time and labor from those who are often underrepresented in the news. This gap suggests that news cartographers are obliged to form relationships in communities they cover and educate themselves about relevant cultural, social, and racial contexts for the areas they map. Interestingly, one participant suggested local journalists are better suited to *minimize harm* because they are closer to the communities they cover, and likely more aware of the immediate consequences of their work. The study results do not necessarily support that conclusion. Of the 272 coded *minimize harm* statements, 38.6% came from participants who most recently worked at a local or regional news organization at the time of the interview. Those participants comprised 6/17, or 35.3%, of the sample. Local journalists therefore did not have more to say about *minimize harm* in terms of volume of discussion. This suggests news cartographers at national and international organizations are engaging with ethical questions around harm just as much as those who are perceived to be closer to the communities they cover.

Finally, these findings reveal the current limits of transparency practiced by news cartographers, exposing two key gaps. Participants universally endorsed

transparency around methodologies, data workflows, and sharing of their application source code. However, while most participants acknowledged the role personal biases play in shaping their work product, no participant endorsed being publicly transparent about their positionality or relation to a story. Feminist cartographers advocate the practice of reflexivity (Kelly, 2020), which aims to be transparent about the ways identity, prior experience, biases, and values influence work. Further, no participant discussed being transparent about the design process. The low volume of discussion about *be accountable and transparent* and *form* suggests news cartographers do not interpret this principle as particularly relevant to map design. Cartography scholars advocate for more transparency around the design process (Roth, 2021). Examples of design transparency include sharing concept drawings, works in progress, and abandoned iterations. This type of transparency is practiced in cartographic professional circles (e.g., Tierney, 2018). However, no participant saw this type of transparency as part of their ethical obligations as a journalist.

Section 5.4. Study limitations

These findings have several limitations. The study design was influenced by my experience as a student in a journalism program at an American institution of higher education as well as my experience as a professional journalist working at an American news organization. These experiences predisposed me toward the Society of Professional Journalists code of ethics as my framework for this research, as it was the primary framework through which I learned to think about and apply journalism

ethics. Additionally, my lack of familiarity with non-English language news sources limited the scope of my research questions to American news organizations. This limitation is significant. News cartographers from other countries would have equally if not more interesting answers to the questions I pose in this study. In the face of globalized media, scholars are increasingly calling for a global media ethics (Ward, 2021). This gap leaves room for subsequent research that explores the ethics of news cartography internationally.

Although QCA tenets recommend redundant coding to ensure codes are applied consistently, I did not redundantly code the transcripts due to resource and time constraints. Additionally, the subjective nature of participant responses means conclusions are based primarily on the opinions of people who make maps at American news organizations. These opinions may reflect the most practical decisions under demanding circumstances, rather than the most optimal or ethical decisions. Another limitation is the open-ended nature of study questions. Participants generally provided ethical recommendations in broad terms, with limited discussion about specific case studies to uphold anonymity. Subsequent research should explore specific case studies in ethical visual storytelling to build on and test the best practices revealed in this study. An additional limitation regards the sample size of 17. While this sample fits with previous cartographic interview studies, it cannot possibly capture the diversity of backgrounds and experiences that undergird news cartography.

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