Information visualizations and the interpellation of a social subject

Visualização de informação e interpelação dos sujeitos sociais

Johanna Drucker

visualization, enunciation, subjectivity

Though rarely used in critical discussion of information visualizations, theories of enunciation created in the context of linguistics and media theory offer an insight into the way graphic displays create and interpellate social subjects. The argument made here is that while the graphic conventions used for the display of information create the appearance of neutral statements, they are actually structured as modes of address. Critical tools can expose the power relations structured into visualizations and address the ways in which a social subject is specifically produced and positioned) within cultural systems. In addition, using the familiar maps of Covid outbreaks as an example, this discussion points to the various ways in which human experience, individual and collective, is erased from view, even as the scale of tragedy and suffering increases. This piece calls for a new critical understanding of the relations between subject production and graphical conventions as a way to read information visualizations and also infuse them with affective force that registers the human dimensions of data.

Visualização, enunciações, sujeitos sociais

As teorias de enunciação criadas no âmbito da linguística e da teoria da mídia, apesar de raramente empregues nas discussões críticas de visualização de informação, proporcionam a compreensão do modo como os dispositivos gráficos criam e interpelam os sujeitos sociais. Este artigo argumenta que não obstante as convenções gráficas empregues na visualização de informação criarem a aparência de enunciações neutras, de fato elas estão estruturadas como modos de interpelação. As ferramentas críticas podem revelar as relações de poder estruturadas nas visualizações e abordar os modos através dos quais um sujeito social, especificamente localizado dentro de sistemas culturais, é produzido e posicionado por estas características. Mais ainda, ao empregar como exemplo os mapas já familiares de surtos de Covid, esta discussão mostra as várias formas através das quais a experiência humana, individual e coletiva, é apagada do contexto, ainda que a escala da tragédia e do sofrimento aumentem. Este artigo incita a uma nova compreensão crítica das relações entre produção do sujeito e convenções gráficas com o intuito de analisar as visualizações de informação, mas também de as infundir com força afetiva que registe as dimensões humanas dos dados.

1 Introduction

Covid maps have become a familiar feature of daily news publications. These often use a chloropleth base, a cartographic convention that presents information according to administrative or bureaucratic boundaries such as those demarcating states, counties, or provinces. While these maps are problematic (the dimensions of geographical area in any particular district do not accurately represent the specific values of numerical data), the maps offer a legible over-view of the hot-spots for the disease. Region by region the numbers vary and the distribution of illness across populations and geographies appears as a mere statement of fact. This many people in this place are ill, have died, are vaccinated, or share in some other demographic feature. Occasionally the maps are live, updated regularly through streaming data that refreshes their display. Some have interactive features such as toggle devices to filter information. But they are universally flat, completely isomorphic with the screen or paper on which their presentations appear. They seem to be just there, without any inflection or perspectival viewpoint, utterly without any indication of where they are in relation to a reader/viewer. This spatial neutrality, appearance of self-evident existence, is itself a construct, but one to which we have become so habituated that it disappears entirely.

At stake in addressing this disappearing act, challenging its neutral stance and un-inflected presentation, is the identification of authority that inscribes an entire point of view system, and with it, the values, power relations, and ethical issues that are bracketed out by that appearance of neutrality. As a complex cultural artifact, an image speaks. It constructs its audience and positions its viewers within the same snares and machinations as any other social sign system. This also means that each individual viewer experiences the direct address made by the image differently, according to their own position within the cultural hierarchies and asymmetries that are structured into human society. Going farther, we can assert that information visualizations are active agents of these structuring conditions, not mere statements or reports about them.

Nonetheless, the flat, frontal, statements made by information visualizations usually give very little indication of whose authorship or authority they inscribe–or how. The simple question of "who speaks" in such a visualization (allowing some license here to equate graphical statements with verbal ones) is difficult to answer except for the attribution of the image to a web or print publication. Such an attribution allows the source to be traced and sometimes for the data to be tracked as well. But those are trails of association and framing that are part of a publication process rather than features of the visualization itself. The question remains, how do information visualizations show the ways in which they produce and interpellate social subjects who then internalize the very values according to which they are positioned?

2 The social subject

The concept of a social subject is familiar in linguistics, textual studies, and media studies as a product of a work, and contrasts with the idea of a simple consumer or literal reader. The theoretical framework was first fully articulated by the linguist Émile Benveniste (Benveniste, 1966). In his studies of pronouns, he described the concept of enunciation with its dual components of enunciator and enunciated positions. Though Benveniste was describing the social system of language, his idea is readily applied to the study of images. In the 1980s, these theories were systematically used in film and media studies to identify and critique such notions as that of the male gaze or heteronormative semiotic systems built into point of view structures, perspectival constructions, and other visual formats.

This notion of a "subject" of enunciation became a regular part of critical theoretical discussions in the pages of *Screen* magazine, *Camera Obscura*, and *Representations* through the work of such prominent figures as Laura Mulvey, Kaja Silverman, Stephen Heath and a multitude of others (Mulvey, 1975; Silverman 1983; Heath, 1978). They also played a significant role in the post-colonial theories of Homi Bhabha, Gayatri Spivak and others (Bhabha, 1994; Spivak, 1988). The idea of the enunciated subject – the product of a speech act or visual image – remained somewhat harder to grasp for many than the idea of a speaking or enunciating subject. The realization that we are produced as spoken subjects structured by enunciative expressions is not necessarily intuitive. Systems of surveillance and control make this vividly clear, however, since they are explicitly involved with the use of point of view systems that exploit the power asymmetry between viewer and viewed. Michel Foucault's examination of the panopticon as a power system became a much-cited example of the way the optical gaze could create subject positions (Foucault, 1975). Gaytri Spivak's work on the position of the subaltern is premised on recognition of these processes as structures of oppression in language and politics (Spivak, 1988).

As the world of integrated camera eyes and tracking devices reporting constantly on geolocation and identity has extended into nearly every aspect of contemporary daily life online and off, the realization of our being positioned within observing systems has ceased to be a theoretical abstraction. But while such active tracking systems suggest a dynamic interplay between social subject and modes of control, the static (or even interactive) images of information visualizations seem harder to analyze in terms of these operations.

Therefore, pulling this argument into focus requires looking at the specific features of a visualization and aligning them with critical concepts that demonstrate the ways they work to produce subject positions within an enunciative frame. Though hardly a revolutionary concept, given the long history of making these connections in visual art and cinema, this approach has not been part of information studies. The point is to demonstrate that such an approach amplifies a critical

understanding of the construction of authority and authorship in all of the power relations that this inscribes.

3 Visual structures and subjects

Returning to the critics noted above, we can identify a number of key material features they elaborated upon as part of a semiotic system of subject production. All draw on the work of Sigmund Freud and his concept of identification (Freud, 1923). As various film theorists and others noted, the viewing subject identifies with the image but also with the circumstances of viewing (Mulvey, 1975). What this means is that while a viewer might not see themselves as the protagonist of a film or image, nor its narrator, they are still situated within a viewing situation in which they own the experience, see it unfold before their eyes. This identification is a powerful response to the modes of address structured into images and spatial relations.

In visual art, these structures include perspective, framing, and scale, as well as other means of suturing a viewing subject into an image. Perspectival systems are the most obvious of these, since they construct an image from a point of view. High and low vanishing points, the width of the cone of vision, registration of peripheral field – these are all features of the image that inscribe a body, eyes, and positions in space. Most information visualizations do not use vanishing points or the illusion of a three-dimensional space. Even when a third dimension – a z-axis, is added to a visualization, the rendering is generally in isomorphic or orthographic projection. These modes of drawing, taken from engineering and applied mathematics, rather than from traditions of visual art making, do not use vanishing points. They pretend to be an observer-independent presentation of information. However, by their orientation of planes, frontal, flat, oblique, they still inscribe a subject's viewing position. The same, in fact, is true of the flat presentation of the single space of a visualization as if it were simply isomorphic to the screen. In architecture, such a view is considered an elevation, or, depending on what is being depicted, a plan or a section. These are two-dimensional images drawn with adherence to strict Cartesian coordinates and regular metrics. But they address a viewer just as surely as a billboard, newspaper, or poster.

The idea of being addressed by a sign is not necessarily familiar even if we respond to such messages on a regular basis. The daily business of navigating the world requires that we stop at street corners, exit freeways, cinemas, and buildings in a certain manner that conforms to the instructions given by signage. These instructional signs are not written in the language of pronouns. No "Slow" sign in a civic space explicitly says, "You, there, yes, you, slow down." And yet, the implicit address is fully present, as in the famous example from Louis Althusser's essay in which he explains the force of being addressed in public (Althusser, 1970). Taking the notion of being hailed,

that is having someone yell out, "Hey, you!" in a public space, Althusser notes that the response one has to this depends entirely on who one is, how one sees oneself as a social subject within the cultural system. Benveniste's described pronouns such as "you" as "shifters," words that could refer to a variety of individuals – unlike proper nouns or names whose referents are specific. These shifters create subject positions within linguistic utterances that can be occupied by any individual.

The force of Althusser's observations as they link to those of Benveniste and others comes in part from his insistence on the social quality of the subject. An individual is positioned within a hierarchy of social relations, networks of exchange and power. My argument is that the same effect is created in relation to images – which "address" their viewers through, as just noted, a variety of structuring features even though these often disappear from attention because they are so naturalized through our habits of familiar use.

4 Discourse markers

The French literary theorist, Gérard Genette, in Boundaries of the Narrative, made a useful distinction between narrative and discourse as two different modes of address (Genette, 1980). Narrative does not announce or call attention to its frames. When a story is told, it unfolds simply as the expression of a narrator who does not insert themselves into the account. By contrast, discourse is actively framed by statements that connect it to a speaker, someone who identifies themselves and the circumstances of speaking. "I am going to tell you a story," contains a marker of this kind while "Yesterday two men walked into the store" does not. One question for information visualizations is whether it is possible to identify similar distinctions at work in graphical images. The masthead of a newspaper, a by-line, an attribution of authorship – these all serve as discourse markers calling attention to the circumstances of the utterance. By contrast, the stories in the columns generally unfold as narratives unless they are op-ed pieces. But how do acts of framing distinguish narrative and discourse in images – and information visualizations? Is there a convention for identifying the relation of a frame to a viewer – the way the angels in a famous Raphael drawing lean on the edge of the image, their plump elbows crossing into our space? What kind of gesture makes that acknowledgement of the difference and connection between the space of representation and that of viewing–marking the enunciative act as a relation between speaking and spoken positions in graphic terms? Information visualizations rarely acknowledge their frames or structuring features.

Another issue is the challenge of announcing authorship and linking it to structures and systems of authority. Sometimes tracking the author of a website is easy, sometimes not, but in the case of a large institutional site on which visualizations appear, the levels of remove

that conceal the lifecycle of data modeling, production, cleaning, vetting, and visualization often erase whole teams and lifecycles. Recovering these would require its own detective work. And yet, going back to the ubiquitous Covid maps, the impact of visualizations for management of resources and influence on public opinion is enormous, particularly given the lack of accountability in these instruments. Again, no graphical conventions have been established for this purpose.

Examples from 18th and 19th century visualizations provide as exemplary demonstrations of these issues as those in use today, and show how deeply ideological assumptions are linked to the graphic formats. William Playfair's elegant charts express the contents and spirit of what was known as "political arithmetik," a method of quantifying the human condition for purposes of social management (Playfair, 1786). Playfair's charts established many of the conventions on which bars and lines are still plotted to compare values, variables, and change over time. Playfair's charts had careful frames, setting them off from their surroundings as rhetorical arguments. The copperplate scripts and hand-drawn lines stretched taut and fine with the aid of straight-edge rulers show evident traces of being made. Within the graphic language of the time, they are fully authoritative. At this historical distance, they reveal some of the made-ness by which they can be characterized. However, the larger issue of concealment and obfuscation remains. The images provide no access to the process by which Playfair's graphs were produced or how the data was gathered, modeled, processed, and plotted. By contrast, in the crudely typographic tables that announced the Bills of Mortality in the same era, a very different, direct tabular report was at work. These are early public notices of statistical information about deaths from various causes and as such are precursors to the display of data in which Playfair was involved. The granularity of data in the Bills actually reveals much more about the individual human beings being accounted for than Playfair's elegant graphs whose smooth curves and bars are one step removed from descriptive information.

5 Human Impact

The conventions initiated by Playfair have certain features that persist in contemporary information graphics. Again, invoking graphs of Covid statistics as an example, the daily tracking of increases or decreases in cases, hospitalization, deaths, and vaccinations involves aggregation of information that effectively erases individual human identities and experience. This erasure can be understood simply as an unavoidable consequence of quantification. The representation of human experience as numeric or quantitative information strips away any record of the pain or tragedy of the events. As a contrast, in her work tracking the impact of Covid on Black communities in the United States, Kim Gallon initiated a commemorative approach that gave a

face to every death and loss (Gallon, 2020). The Covid Black project faced other challenges as the site became overwhelmed. Compassion fatigue set in, as face after face, memory after memory, mounted to the point where it was difficult to give each individual the attention they warranted. The effort to find an alternative to datafication, to the lack of humanity that Gallon perceived in the way Black lives were being counted, resulted in a call for a Black Feminist Data practice. Covid Black continues its work, mapping data with fine-grained filters while also recognizing and honoring individuals.

Other ways of creating subject identification with representation of information might be borrowed from pictorial conventions in European art. These include perspectival structures that acknowledge point of view, depiction of scenes, and use of color and atmospheric effects to create an emotionally compelling presentation. An 1805 painting of the Deluge, by the British romantic painter, Joseph Mallord William Turner, depicts bodies tossed on the waves of rising waters, a dramatic sky rent by lightning, a landscape in which trees are bent from wind, broken and battered, and in which the human tragedy brought about by the natural disaster is depicted in graphic detail.

By contrast, graphics that are concerned with the presentation of statistics about where rising sea levels will affect human settlements are generally hyper-rational. They are intent on accuracy, on showing quantitative information without distortion. The effect is a rhetorical flattening of the information. Rather than creating an impact, such even-handed presentations can be readily set aside, ignored, treated as statements to be analyzed with cool judgment. While rationality and accuracy play a crucial role in human affairs, the human costs of unfolding events might be served by pictorial means that create an emotional response as well. The hard line of separation between the arts and the social sciences may need to blur. Affective dimensions of human experience need a range of graphical expression and rhetorical force missing from most common visualization conventions. Bar charts do not scream, columns do not weep, scatter plots do not sigh or express sadness at tragic loss. And yet, they are used to document events of monstrous human proportions.

6 Lifecycle features

Some standards for revealing the constructed-ness of information graphics might serve to establish ways of documenting the lifecycle of production, also crucially absent from current conventions. Such standards might include a description of the data model and its sources, sample size, and other features of the data production that would qualify its neutrality, demonstrate that the data were, in fact, capta, made and not found. Graphic methods for showing the lifecycle of production could also track the cleaning and transformation of data, show where outliers or anomalies were eliminated, or where they

remain. Self-consciousness about the data process and what is lost from view in a final visualization would create a new layer of insight into information display. This would demonstrate not only that the data had been made, and the visualization was an authored work, not a mere statement, but give some insight into how this had unfolded.

Finally, such conventions need to identify the authority on which the process depends. By whom and from what social and political position is the visualization produced. The assumption of neutrality, cloaked in apparent rationality, that is central to the identity and operation of information visualizations, is simply an obfuscation of the made-ness and constructed-ness by which it assumes authority. Finding graphic methods, as well as textual documentation means, to undo these presumptions is essential to deconstructing the power that attaches to their work as instruments for highly distanced bureaucratic management of human lives and global resources.

7 Dashboard delusions

Returning to the Covid maps, since they are so much in front of our eyes these days, one last consideration is the illusion of omnipotence they support. The Johns Hopkins site is as useful an example as any, with its skilfully-designed interface (Hopkins, 2022). The resource is well-maintained, updated throughout the day and across the years in which the pandemic has raged. The site aggregates information from many sources, all vetted by the respected Hopkins Coronavirus Resource Center. As the "About" tab in their menu bar reveals, they are supported by the reputable Bloomberg Philanthropies and Stavros Niarchos Foundation and draw on more than two hundred and sixty authoritative sources for their data. Thoroughly documented, the site offers up-to-date information about many aspects of the pandemic and the way it is being addressed in terms of tracking, prevention, spread, treatments, and other issues. As per professional standards, the information notes sources and cites authoritative references. But it still does not offer a window into the longer history of the data and its production, models used and decisions made.

The options for visualizations appear in their own menu bar, offering views of a global map, a United States map, and other facets of the virus broken out into specific topics. The global map shows the continents in dark-gray against a midnight-blue ocean. Data about cases, deaths, incidences, and vaccines are color coded in red, green, and white to correspond with bar-graph displays of the same information in a column to the right. The viewer can zoom into the map to get information on specific regions and cities. The act of zooming in and pulling back is one of the gestures that supplies a sense of omnipotence, as if all information were immediately accessible at any time, scale, and across these key factors. The sense that everything is available, present in the image is reinforced by the

way the interface allows the visualizations to be filtered and searched, manipulated by the basic features of scale and selection.

The omnipotence is an illusion, manufactured by the experience of the interface. We are not, in fact, in a position of power in relation to the information. Nor are we seeing "everything" about the pandemic in the visualization. We are reading a highly structured environment in which curated data (albeit responsibly and carefully curated) is presented to give a sense that the viewer has all the essential information about Covid at their fingertips. Missing are fundamental issues – like cost, distribution of resources, concentration of health care workers in relation to illness, economic stresses, political tensions, cultural inequities, and of course, the "human" face that Gallon struggled to put to the disease in its impact on one segment of the population. These are not criticisms of the Hopkins site. They are observations about the nature of visualization and its limits with respect to the difference between what the visualization shows and how it appears. That is, it shows specific data points and not others, but appears to be a complete view of Covid-19 as a global pandemic.

8 Interpellation

This act of viewing and engaging with and through an interface returns us to another theme introduced earlier – that of the interpellation of the subject into the circumstances of viewing. Identification with this situation of viewing is built into the interface design of a site like the Hopkins dashboard. Seated in front of it, with direct access and capacity for manipulation, the viewer identifies and connects with a signifying system whose circuit closes with use. The dashboard's design is intended to engage a human operator, pull them into the interaction with its features, put them, as it were, in "the driver's seat" of the site. Those gestures and actions are built in from the outset. Dashboards, after all, were one of the earliest interfaces, used in flight simulators for training purposes to produce the illusion of being seated in a cockpit within reach of controls. The point of view system was a crucial motivation for the design.

This is true in print interfaces as well, such as that of a codex book, a newspaper, or signage systems though this structure is less obvious. All are conceptualized in relation to use, inscribing the assumed human subject into their design. A codex book has to be able to be held and read. A body is part of its design as surely as it is part of a dashboard in a car or on a screen. This is true of a newspaper, which sometimes exceeds the limits of arms or becomes too difficult to read at certain distances. Signage locations must take sight lines into account, and their positions in space are in effect an inverse of surveillance. If a sign can be seen, it can see you, the viewer, in return. These are ergonomic features, but are intimately related to reading and viewing practices – and the structuring a subject position into the scene of use.

This issue of surveillance becomes eerily present in online interfaces. Techniques like those enabled by the ever-present "cookies" that record information about users and store them in individuals' browsers for later use (e.g., to note certain preferences), or automated form filling, or other tracking operations, are part of a constant low level of surveillance. Even when a camera eye is not visually tracking, the networked operations are being logged. Rather than the Foucauldian model of a panopticon, in which a central observer is able to survey a full 360-degree field of vision, in networked environments, the contemporary subject is situated within the multiplicity of "gazes" and transactions according to a not-always fully voluntary reciprocity of tracking. Here the subject is again interpellated (or sutured) into the system, and subjected to the many modes of observation that position them within structures of power. As social subjects, we are always positioned in relation to status, money, access, influence, limits and possibilities. And, as social subjects, we internalize many of those features into our identity. When I was a young woman without much money or social status, I understood myself to be outside of many systems, and would not enter certain establishments because I had already excluded myself from them. I positioned myself in accord with my internalized understanding of how I was perceived as a social subject. While visualizations and online interfaces do not generally work with similar techniques of exclusion, they do assume and inscribe subject identities within their designs. Language, images, other cues are indicators of the assumed user. This reciprocity of design and user is where the subject is inscribed, but the act of interpellation occurs through identification and use by an individual.

9 Conclusion

Several benefits arise from approaching information visualizations through these critical frameworks. The first is to shift basic understanding of the presentational mode of visualizations into a representational one, seeing the images not as flat, neutral statements, but as constructions. This opens the possibility of seeing them as structuring images, not statements, and as images that position viewers within a larger semiotic system of identification (through the act of seeing oneself in an image) and interpellation (through recognition and active psychological engagement). These enunciative actions take place in relation to visual systems as surely as they do in linguistic ones, even if the task of identifying the graphical features that function as shifters is difficult. Modes of address are, however, structured into graphical images through formal features – frontality, perspective, framing devices, and interactive elements. Becoming more aware of the ways this suturing happens, and that it happens, is essential to understanding the machinations of power enacted in our interaction with screen display and information visualizations.

By building in devices and features such as frames, documentation, and discourse markers that call attention to these strategies, we can expose some of the habitually obfuscated aspects of the ways we are enunciated by visualizations and the way they inscribe power relations within which we are positioned. The Covid maps presume to speak with an authority from which the viewer is excluded, made to feel subject to the authoritative knowledge of those others connected to domains of professional expertise, even as the individual human beings suffering from the disease are erased from view. We might consider how a changed interface might alter individual and collective notions of agency in relation to unfolding events.

References

Althusser, L. (1970). Idéologie et appareils idéologiques d'état. Translated in *Lenin and Philosophy*, New York: Monthly Review Press. 1971.

Bhabha, H. (1994). *The location of culture*. London: Routledge.

Foucault, M. (1975). *Surveiller et punir*. Paris: Gallimard.

Freud, S. (1923). The Ego and the Id. *On Metapsychology*. Penguin Freud Library 11, 1987.

Gallon, K. (2021). Covid Black is using data and creating space to honor Black lives lost. *The Grio*. https://thegrio.com/2021/02/24/covid-black-data-kim-gallon. Accessed 1/8/2022.

Heath, S. (1978). Notes on Suture. *Screen*, *18*, Winter.

Johns Hopkins Coronavirus Dashboard. (2022). Johns Hopkins University of Medicine. Baltimore, MD. https://coronavirus.jhu.edu/map.html

Mulvey, L. (1975). *Visual pleasure and narrative cinema*. Screen, 16(3), 6–18.

Playfair, W. (1786). *The Commercial and Political Atlas*. London.

Spivak, G. (1988). Can the Subaltern Speak? In C. Nelson, & Lawrence, G. (eds.). *Marxism and the Interpretation of Culture* (pp. 271–313). Basingstoke: Macmillan.

About the author

Johanna Drucker
drucker@gseis.ucla.edu
University of California, Los Angeles, USA

Submission date/*Artigo recebido em*: 8/1/2022
Approvement date/*Artigo aprovado em*: 18/1/2022