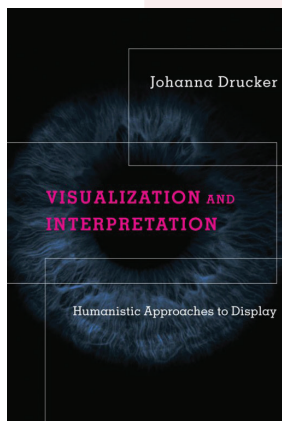


Materiality, Data Epistemology and Enunciation

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Johanna Drucker

Visualization and Interpretation. Humanistic Approaches to Display

Boston, MA: MIT Press, 2020 208 pp., \$ 30.00 (Hbk, ISBN 9780262044738).

Immediately upon its publication, I rushed to read the latest book by Johanna Drucker, Martin and Bernard Breslauer Professor at the Department of Information Studies at UCLA. As I expected, it represents the culmination of her enduring work on the epistemology of images and visualization design. The book's organization reveals Drucker's vast experience in visual epistemology and the interpretation and *production* of visual artifacts. Moreover, it shows the connection between her approach and semiotics, especially concerning enunciation theory. I specifically emphasize the word 'production' because Johanna is not only a well-known scholar in various fields of humanistic research but also a designer in the art world.

Her main research field is visual culture, to which she contributes in forging both with her epistemological interventions, and her artworks.¹ Her theories on visual knowledge have always found a field of experimentation, observation and theorization in experimental typography, visual poetry, and letterforms, fields in which she operates as a book and

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¹ A retrospective of her work as an artist, titled *Druckworks: 40 Years of Books and Projects by Johanna Drucker*, is partly viewable on the Internet: <https://jacket2.org/commentary/druckworks-40-year-books-and-projects-johanna-drucker-catalog>.

sketch artist. Her work as a book artist, exhibited in universities, libraries, galleries, and museums worldwide, has established her as an original theorist of writing and materiality in prose, poetry, and the fine arts,² and in computer code *as regards its nature as writing*.

For semioticians, her work is essential for many reasons. The focus on materiality in every kind of writing, from visual poetry to digital code, is crucial for the path that semiotics is pursuing today, steering it from structuralism towards the Material Turn.³ Drucker's book is critical in understanding that the digital code is not abstract or pure but a kind of writing inscribed in the materialities of recording media and substrates. In this sense, Drucker's work follows in the steps of Nelson Goodman's constructivist epistemology (Goodman 1968), whose work she continues⁴ by proposing a middle ground between autography and allography to describe writing systems. And by writing, I mean the inscription of visual forms in art *and* as computer coding. Generally, she tries to demonstrate that *literature also works as an autographic system* because of its singular page organization, letterforms, and so on and that digital code is not only allographic because every time it is inscribed on the substrate, which is the computer, it becomes unique and specific, that is, autographic.

Visualization and Interpretation is a crucial book firstly because of Drucker's in-depth analysis of all kinds of visual documents – from painting to data visualization. In fact, in this book, she also takes ancient fine art production and especially Rembrandt's work into account and demonstrates that in his paintings *we can find different theorizations of what the painter's view on painting was* through the use of various degrees of precision, and zones of blurring.⁵ Secondly, because it makes propositions about how it's possible to introduce, in the visual discourse regarding data, an *epistemic comment about these data* (Drucker calls the data "capta" to underline that data always originate in *experience* and in its manipulation). So, this book contains not only theory and analysis but also a concrete proposition to change the culture of data visualization through visual devices described in the Appendix (pp. 139-175) containing design prototypes.

² This diversity of her fields of research can also be seen in her book *Graphesis* (2014).

³ In Dondero (2020), I have described and criticized the development of visual semiotics from the structuralist period to the dawn of the age when the materiality of language became relevant in semiotic analysis. For a specific reflection on photographic materiality, see Basso and Dondero (2006) in Italian and for a revised and augmented version in French, see Basso and Dondero (2011). For a general theory and some examples in the anthropology of photographic objects, see the seminal book by Edwards and Hart (eds. 2004).

⁴ See p. 31, where Drucker states that the distinction between autographic and allographic systems is not so definite. For instance, she takes the typewriter as an example of allographic system. If the distinction between forms in letter code is typically allographic, she points out that changing the font reveals that "the specific properties of instantiation are not just embodied in the letter code, but in the inscriptional form of the characters" (p. 31) and that "a system may be allographic at a formal level, as a notation system, but never at an inscriptional level where an image is produced as a material trace" (p. 31).

⁵ See pages 20-22.

In this review, I'll explain why Drucker's book and her work, in general, are so crucial for semiotics and especially for French structuralist semiotics, and not only for the Digital Humanities community which her book primarily addresses. Firstly, I will describe what Drucker's work and our work in semiotics have in common, notably regarding enunciation theory and the conception of textuality. Secondly, I will address the questions raised in her work that are crucial to make semiotics evolve and enable it to handle the issue of digital displays, that is, digital materiality.

1. Visual Epistemology, Enunciation and Interpretation

Many of the topics and epistemological issues discussed in Johanna's book are fundamental in the French visual semiotics tradition. For instance, the possibility of modeling and interpreting knowledge *by manipulating graphical signs*,⁶ the latter having a *specific* substance of expression, which inscribes knowledge differently from numeric and verbal expressions.

The semiotics which came after Roland Barthes (1977a, 1977b), via the work of Algirdas Julien Greimas (1989), tried to make the humanities and especially language sciences aware of the fact that visual signs can argue, negate,⁷ and reveal contradictions, sensible instability or epistemological uncertainty. Contemporary French semiotics has already described the epistemic instability of fine art and scientific images⁸ and the fact that images can propose to the observer a conflict between multiple positions of observation. Moreover, many semiotic scholars working on scientific images demonstrate that such images may introduce uncertainty or contradiction in human observation through blurring or other visual devices. Still, nobody addressed the question of studying and explaining the utility of inscribing epistemic uncertainty into digital design and data visualization. Semioticians are certainly experts in representational conventions and *nonrepresentational images*, that is, *generative images* – as Drucker calls the images that are themselves arguments about knowledge and belief through forms and traces. However, they have not sufficiently engaged critically and analytically with data visualization.

For Drucker, data visualization must definitely be conceived of as “an enunciative system” (p. 80). However, nonrepresentational images do not merely illustrate already available information. On the contrary, they contain the information at one level and the *comments on this information* at another level. What Johanna calls nonrepresentational

⁶ For an overview on the production of mathematic and artistic knowledge in diagrammatic reasoning, see Dondero and La Mantia (eds) 2021.

⁷ On the relation between enunciation and negation in the visual world, see Dondero (2015). For a critical insight on visual language in Barthesian and Greimasian theory, see Fabbri (1998).

⁸ On this topic, see Dondero and Fontanille (2014).

images, Louis Marin (1989) would have called “presentation of the representation,” the *non-transitive level of communication: the reflective level* in image discourse. In Drucker’s thinking, it could be described as the act of inscription in the visualization of *how we know when we know*, that is, of how we know when we produce or look at a visual artifact. The reflective level can be described as the *how* of the representation act, i.e., as the level of epistemic and ethical responsibility inscribed in the images themselves, reflecting on their composition and, notably, *on their future use in observers’ hands*.

We now reach the core of the discussion on visual enunciation: Who is doing the inscribing? To communicate what? In which way, from what perspective, and with what objective? I wish to insist on this topic by saying that Drucker is, to my knowledge, the only visual theorist who explains the workings of images through enunciation theory, except, of course, for a few French-speaking visual semioticians. In her conception of textuality, every textual system predisposes a particular type of reading because every text models a specific kind of reaction and interpretation. The text itself, on the other hand, according to the critical hermeneutics she embraces, *is changed at every reading*; there is a co-dependency between the text and its readings. In this case, Drucker proposes a *probabilistic* way of understanding the diversity of readings, one that I would define as a middle way between the awareness of the peculiarity of readings depending on culture, personal experiences, and so on, and the static determinism of textual distribution of reader positions that characterized the early period of structuralism in semiotics. On this subject, she states that the approach of the *non-deterministic probabilistic nature of reading practices* “suggests that readings are *interventions within the field of provocation provided by the text*. Here, a text (or work of any kind) is considered a *provocation*, a field of potential or possibility, in which a reading or interpretation is an *intervention*” (p. 4, my emphasis).⁹

2. The Lifecycle of Data in Visualization and the Materiality of Languages

The second point I want to address concerns Drucker’s proposal to enhance the awareness of the shaping of data and notably of the *lifecycle* of data through a new

⁹ To go deeper into this idea: “The range of probability of a reading fits the normal bell curve in many instances – readings of a work will tend to cluster around a consensual understanding” (p. 4). And: “How these probabilities emerge – how certain acts of interpretation gain authority – is a problem that will have to be addressed by studying the normative dimensions of textual fields [...]. This probabilistic approach to interpretation extended reader-response theory into a dialogue with indeterminacy as conceived in early twentieth-century theoretical physics.” (p. 51). For a global insight about the relation between data visualization and enunciation system, see the chapter “Interface and Enunciation, or, Who Is Speaking?” (pp. 91-110).

conception of visualization, which she calls “modeling interpretation,” as opposed to the current practices of data visualization, which she calls “data display.” She argues that contemporary data visualization culture makes data manipulation disappear from the final visualization to convey an idea of *user-independent* knowledge of data. As a result, data presentation stands unquestioned. This lack of problematization finally coincides with a false idea of equivalence between phenomena (the experience), data, and their display. This path, made through translation, manipulation, and structuration, that is, the *lifecycle* of data I mentioned before, is completely ignored and concealed in current data visualization. Drucker’s proposition is to introduce *inflections* in data visualization to introduce the epistemic, enunciative level in visualization through “graphical forms capable of expressing ambiguity, contradiction, nuance, change and other aspects of critical consideration” (p. 3), that is, *images capable of performing epistemological work*.¹⁰

Drucker’s book contrasts with the positivistic (and dangerous!), user-independent knowledge model of current data visualization (data display) through an inventory of techniques able to integrate the possibility of showing the degrees of knowledge and certainty about data *inside* the visualization itself – what she calls “modeling interpretation.” She proposes a series of activators, inflectors that express “affective emotionally charged values” (p. 85) and other schematizations of relations between multiple points of view that enables us to indicate that a certain visualization displays data of unequal degree of certainty; some elements are surer, some others are projected, while others are only possible: “Thus, salience might be indicated by glow and luminosity, ambiguity by tonal value and vague boundaries, contradiction by lines of force and so on” (p. 85). In this sense, it’s not only a matter of including enunciation in visualization but also of what we call in semiotics “the veridiction modalities”: what is only possible has to be visually differentiated from the probable and the certain.

Here are some very useful exemplifications (Figures 1, 2, 3), which use graphic contrast to reveal how visualization changes if any single parameter were altered or simply reduced to uncertainty: the model of interpretation would change and readers could become aware that the visualization presented to them is only one possible perspective on the data and not the only valid statement about it.

¹⁰ Another proposition by Drucker addressed to data visualization designers is to use more complex mathematical models than the ones currently used in bar diagrams, flow charts and so on: topological models that are able to describe events in chaos and complexity. See p. 71f. on concept modeling that includes the possibility of expressing events through “relations of before and after, simultaneity, duration, slow and fast time spans, and variable models of historical chronology” (p. 80) rather than doing so through abstract points that are unable to express the density of time.

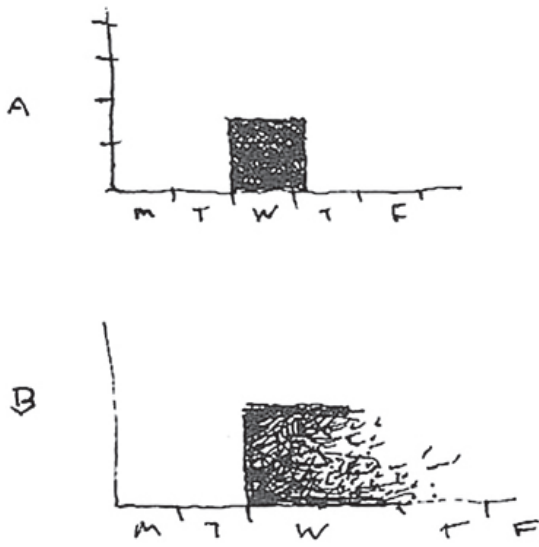


Figure 1. J. Drucker, *Visualization and Interpretation*, page 140.

All these suggestions regarding alternative data visualizations reveal not only the epistemic complexity of data (the fact that every cluster of data depends on a particular degree of knowledge stabilization and on different experience domains that need to be translated into a global vision) but also place the viewer in the perspective of the ‘present’ of the point of view (the position of “now”) concerning past and future positions (developments, possible transformations and so on) through depthwise stratification and perspective devices. Figure 3, especially, makes evident, through the difference between a frontal standard interface and a ‘popped-out’ alternative interface, “the point-of-view system, its alignments, its changes of scale, and its indexical connection to provenance information” (p. 165, my italics).

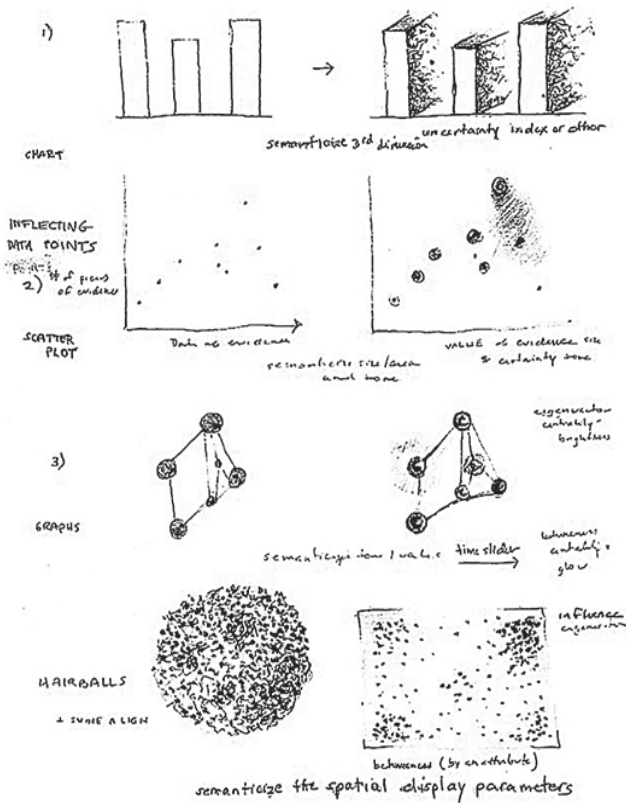


Figure 2. J. Drucker, *Visualization and Interpretation*, page 148.

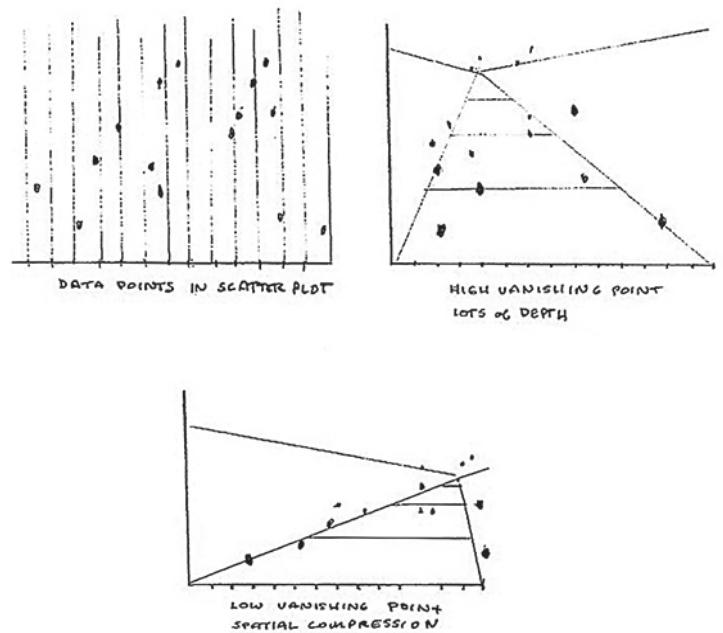


Figure 3. J. Drucker, *Visualization and Interpretation*, page 166.

In this sense, Drucker tries to make visualizations that help readers realize the ‘what if’ and not the ‘this is’ of a visualization: “One potent critical tool for deconstructing the singularity and invisible authority of any statement is contrast (...) No statement, taken as a single, self-evident expression of data, or of features of phenomena expressed as data, can provide this reflection on the process of this production” (p. 54-55).¹¹

The devices proposed by Drucker show that “every presentation of data is the outcome of a probabilistic inquiry, a ‘what if’ proposition, not a ‘what is’ statement” (p. 57). She uses them to demonstrate that the distinction between *mathesis* (the knowledge system privileging lack of ambiguity and formal explicitness such as in mathematics and computing) and *graphesis* (the knowledge system where “every instantiation is specific, characterized (however minutely) by individual differences” (p. 22) is not the same as the distinction between digital and analog systems. Computer systems as well are able “to inscribe the specificity and particularity that are inherent features of visual knowledge production” (p. 27). Indeed, digital images are not equivalent to digital encoding, which has an unambiguous character. Between the two, some translation processes (which Drucker calls “indexical chain,” p. 33) are such that they differentiate every image in every instant of its manifestation on display. Even if the code string can be repeated, “Every digital trace is unique by virtue of its physical materiality” (p. 32).

Drucker shows the passages between one mode of existence and another to draw readers’ attention to these processes of translation and remediation from code to display. Similarly, in semiotics, we try to describe this process through the modes of existence,¹² that is, from the virtualization of the code to the realization of an image in its printed version, with the intermediary stage of actualization, that is, the stage of processing and inscribing the general instructions and unambiguous code into a unique, rooted trace.

In my view, it’s possible to draw a parallel between this process of mediation between the level of the unambiguous sign and the level of rootedness with Peirce’s diagrammatic stage and Nelson Goodman’s diagrammatic system. For Peirce, diagrammatization is the process between generality and specificity, between what can be iterated and what is unique. For Goodman, a diagram does not belong to the purely allographic system, where the visualization loses any relation to its recording medium and to the local situation it is supposed to represent. A *diagram* would

¹¹ This idea according to which the contrast allows to relativize a statement has been developed in Dondero & Fontanille (2014): no single image can be considered scientific if it is not “completed” (preceded or followed) by other images that test its validity or invalidity.

¹² On modes of existence in semiotics, see Fontanille (2006).

at least partially belong to the autographic system, with the degree of belongingness to be determined. The autographic system covers a broad range, from pictoriality, characterized by a high degree of syntactic and semantic density of the elements composing the image, to diagrammaticity, defined by a low syntactic and semantic density level. Because of this low-density level, the *diagram* can bridge the transitional area between the establishment of the imprint (in autography) and the notational and unambiguous character of the signs (in allography). In other words, the *diagram* combines the inherence of the recording medium with the transposability of the code.

At the end of this text, I'd like to suggest that it will be heuristic to use the notion and methodological operability of the diagram to describe the relation between *mathesis* and *graphesis*, especially their association, in data visualization and, more generally, in interface systems. Thus, the concepts of enunciation and diagrammaticity (defined as a tool for reasoning through the manipulation of material objects) can help interpret and produce more ethical and epistemic-dependent interface devices that make subjects conscious of their critical position within the system of the current distribution of power.

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