Transmutations: Aesthetic Explorations for the Subjective Signification of Signals and Data

The project "Transmutations: Aesthetic Explorations for the Subjective Signification of Signals and Data" focuses on using biological data, such as DNA and other physiological parameters, to transform them into artistic representations. Through translation, transduction, and transcription processes, the project approaches the traditional ways of understanding identity and human experience, proposing subjective and visual representations of the data. Through an integration of art and technology, the potential of biological data to offer meaningful experiences is explored, emphasizing the ethical and political implications of personal and biotechnological data exploration. The transmutation of these data in a context such as art and the digital realm not only raises questions about identity, but also opens a reflection on how technology, culture, and biology are intertwined in the construction of our contemporary being.

1. Introduction

In today's world, biological data has gained unprecedented prominence, advancing our understanding of the human body and redefining its relationship with technologies. The use of devices such as smartwatches, biometric sensors, and advances in biotechnology is transforming how data not only describes biological phenomena but also shapes identities and cultural practices. This convergence raises questions about how the body is interpreted and represented in a data-mediated environment.

The project *Transmutations: Aesthetic Explorations for the Subjective Signification of Signals and Data* is situated at this intersection, proposing the translation of biological data into meaningful aesthetic experiences. Beyond its informative dimension, it seeks to explore how these signals transform human subjectivities. According to Haraway (1985), the boundaries between the biological, technological, and cultural are porous, opening up new ways of conceiving identity and the body. In this context, the project is framed around three key processes: transduction, translation, and transcription.

María José Ríos Araya
Master in Media Arts, Universidad de Chile, Santiago, Chile
lelex76@gmail.com

Ricardo L. Vega Mora
Escuela de Diseño, Pontificia Universidad Católica, Santiago, Chile
rivegam@uc.cl

Transduction focuses on the transformation of one form of energy into another, such as when the variability of heart rate is translated into sound changes in rhythm and intensity. This process reveals how technologies not only extend our sensory capabilities but also reconfigure our experience of the world.

Translation transforms numerical data or biometric signals into artistic forms that are understandable, bridging the gap between scientific languages and more poetic or aesthetic ones. This process not only presents biological data as objective information but also re-signifies it by transforming it into visual or auditory narratives that appeal to both emotion and critique. By incorporating an aesthetic dimension, these narratives go beyond their technical nature, fostering an emotional connection that invites the experience of data as something deeply human. Furthermore, this approach could stimulate a more critical reflection on power structures, data hegemony, and their impact on society, broadening their meaning towards ethical, cultural, and subjective dimensions.

Finally, transcription addresses the symbolic materiality of data, inscribing it in cultural media such as textiles, sculptures, or interactive installations. By doing so, data is not only physically recorded but also integrated into space and the body, opening new dimensions of interaction.

The concepts of transduction, translation, and transcription serve as central strategies in the project, though their roles need clarification. Translation refers to the transformation of data into perceptual forms: visual, auditory, or textual, that carry emotional and critical weight. Transduction involves converting biometric rhythms into sound or light, focusing on embodiment and immediacy. Transcription centers on inscribing data into physical objects, like textiles or installations, emphasizing materiality. These strategies, while interconnected, each contribute uniquely to the aesthetic and conceptual exploration of the project. This differentiation helps avoid confusion with terms like "encoding" and clarifies each strategy's role in the critical and sensory experience.

Other terms we are exploring in the project are:

Encoding: To correctly display characters, the system (computer, webpage, etc.) needs to know which characters to use. These elements can be letters, numbers, punctuation marks, among others. Encoding means changing something from one format to another to make it easier to understand and process. It is going from one domain to another.

Decoding: Decoding is the opposite process. It involves transforming a sequence of symbols into something comprehensible to humans, such as converting encoded data back into letters, words, or numbers that we can read and understand. Again, it is going from one domain to another.

Mapping: Among the encoding and decoding, does a set of rules that establish the relation between domains, a kind of function that allows going from one to the other. This is the place where subjectivity can have an aesthetic and exploratory role (Manovich 2002).

2. Project Description: Transmutations

We live in a society deeply intertwined with data, where companies have integrated data extraction as the central axis of their business models (Peña 2023). This "extreme datafication" of human experience has deep implications, affecting areas such as politics, culture, and even our perception of reality (post-truth). But this scenario also offers opportunities to reinterpret data through aesthetic strategies, enabling individuals to appropriate it in a personal and reflective way.

The project, set to be exhibited between June and July 2025, explores these dynamics through an experimental approach that merges biology and aesthetics, computing and textiles, sound and images. Based on the analysis of genetic data from the artists involved, the project is a reflection on the codification of bodies and subjectivities, in a complex socio-technical system where each interconnected element impacts the others (Pinch et al. 1987).

The process begins with the artists' DNA test data, which is creatively reinterpreted through technological tools and aesthetic decisions, exploiting its symbolic features (Manovich 1999). From this data, three experimental works per artist are generated (image, audio, object), which are then remixed and emitted as radiofrequency signals, symbolically returning the data to the environment.

2.1. Goals

The primary objective of the project is to examine the implications of the current data culture, creating pieces that represent data and signals from the artists' subjectivities. Among its specific objectives, the relevant goals include:

- Developing three communication pieces in each domain (image, sound, object) for each artist, based on their DNA data, using both analog and digital tools.

- Creating a final digital-analog piece that merges the works of both artists, with the parts containing signals later broadcast via radio frequency.

- Generating printed documentation that captures the project's process, along with samples of previous works and reflections from invited writers.

- Presenting this experience through a series of activities, including exhibitions, talks, and workshops.

2.2. Description of the Components

The project uses the artists' DNA data, represented by nucleobase sequences (A, C, T, G), as the foundation for the creation of the works. The number four is used as a pattern, with elements such as colors, and base tones, among other parameters. The works will be developed in three domains: sound, image, and object, and will eventually be transformed into signals emitted via radio frequency.

Fig. 1. DNA Test: Kit to conduct the test. After being processed, the company sends back the data results in raw format.

- DNA Tests: The artists' DNA data (processed through commercial services) will serve as the basis for the project. This data is transcoded into other domains, such as Morse code, numeric, sound, visual, etc, and by doing so explores different ways to be represented. (fig. 1)

- Sound Representations: Each artist will develop sound works exploring the temporal dimension. María José will link the data with structures from traditional weaving and the printing of information onto textiles, while Ricardo will focus on the intersection of biological and economic data (such as the variation of the dollar, for example).

- Visual Representations: Each artist will create visual works that explore the data in two dimensions. María José will use four-color weaving patterns, while Ricardo will investigate images from Chilean and universal paintings, among other possibilities.

- Physical Representations: Both artists will explore data physicalization by using objects or interfaces, such as weaving systems, or installations with old electronic devices, among other possible explorations.

- Radiofrequency Emission: A special construction will be made to facilitate the emission of radiofrequency signals containing the remixed data, creating a symbolic connection with the surrounding environment. (Fig. 2)

Data   Visualization   Sonorization   Physicalization   Radiofrecuency Emision
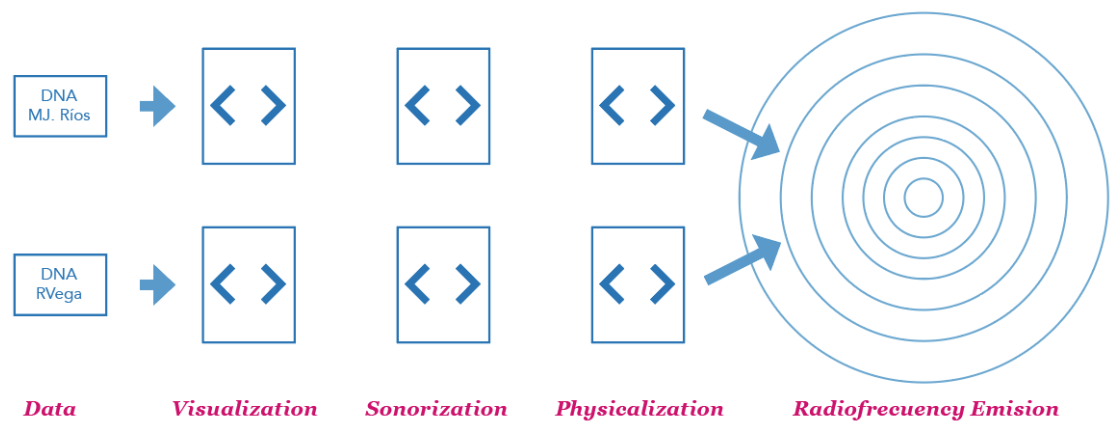
Fig. 2. General Process: Based on biological tests, one for each artist, visualization, sonification, and physical representations of DNA sequences are developed. Finally, the DNA sequence from both artists will be emitted as radiofrequency signals to be defined.

2.3. Technical Aspects and Process Availability

The project will use Python (for data capture, processing, sound, and image creation), Processing (for image and sound creation), and Pure Data and Chuck (for sound creation). Different hardware will be used for physical pieces, such as an old TV. The project also considers a support team to help in the development process. The material (code, images, etc.) will be made publicly available on the internet, allowing others to use the code and develop new versions. The documentation will be made available on a website and GitHub Repository (https://github.com/ricardovv/proyecto_transmutaciones) for open access.

3. Rethinking Identity at the Intersection of the Biological and the Technological

While we are born with a specific set of DNA that specifies our fundamental biological characteristics, this does not dictate an unchangeable fate. DNA provides a genetic foundation influencing our physical and physiological predispositions, but its expression is shaped by external factors. Epigenetics plays a key role here, as Jirtle and Skinner (2007) point out, studying how elements like diet, stress, or social interactions can activate or silence genes without altering the genetic sequence. This shows that while DNA is fixed, its expression is dynamic and can change over a lifetime, influenced by experience and environment.

Donna Haraway, in her essay "A Cyborg Manifesto" (1991), argues that identity cannot be separated from the technologies around us. According to Haraway, there is no clear line between the biological and the technological, as the machines and devices we use are extensions of ourselves. These technologies not only enhance our physical capabilities but also affect our subjectivity, shaping how we understand ourselves and the world around us.

Thus, human identity emerges from the interaction of three forces: biological (our DNA), epigenetic (environmental modifications), and technological (the tools we use). This hybrid view highlights that while we are born with a genetic configuration, our identity is not fully determined by it. Instead, it is shaped by dynamic interactions between genes, environment, and technology. This relationship between biology and the environment, mediated by technology, invites us to rethink identity not as fixed, but as a construct in constant evolution. The innate and the acquired continuously engage in a dialogue, revealing a process where human beings are both products and agents of change in a deeply interconnected world.

4. The Decontextualization of Biological Data

The decontextualization of biological data in the biomedical industry and on commercial platforms presents a significant issue: reducing complex genetic signals to simple units of information. This process disregards the cultural, social, and historical contexts that give biological data meaning, limiting the understanding of identity to utilitarian and commercial views. On these platforms, genetic sequences are simplified into ancestry profiles, presented as abstract percentages that strip away the cultural and historical significance of biological identities. By leaving the interpretation of data to corporations, structural inequalities are perpetuated, excluding communities from constructing and claiming their genetic narratives.

As for María José's textile object, it is inspired by simple, enveloping designs, drawing on both traditional and contemporary sources. The essence of this design lies in the concept of creating a wearable work of art that fuses DNA sequences with textile art. The piece features a woven waistband crafted using Andean-Mapuche techniques, a tribute to the region's deep cultural heritage. The design is influenced by the enveloping and structural style of Issey Miyake, known for his innovative approach to fashion that combines simplicity and functionality. Miyake's work often focuses on creating visually versatile garments using pleats and flexible fabrics that facilitate movement. This influence is reflected in the textile piece, which is not only a visual representation of genetic data but also a functional work that adapts to the shape of the body.

When we consider the artistic use of genetic data, we see that it differs perceptually and conceptually from the use of arbitrary data sources like white noise. Genetic data carries a weight of personal, familial, and cultural history that shapes the audience's experience. These data are not only biologically significant but also imbued with
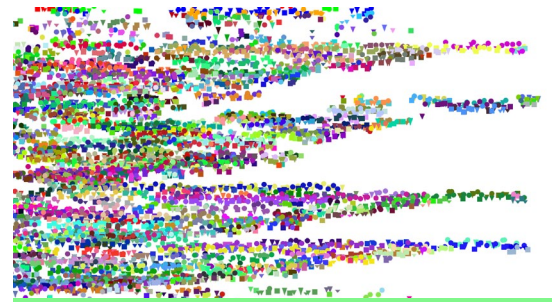

Fig. 3. First visual test of data representation for textile printing, created using Python Colab and Processing (2024).
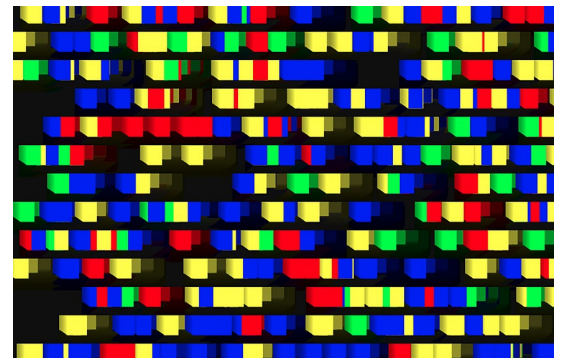

Fig. 4. Second Visual Test of Data for Textile Printing: Based on biological data (2 DNA tests), Visualization of the data based on DNA sequences, created using Python Colab and Processing (2024).

emotional, symbolic, and even political meaning, which is often tied to issues of identity, heritage, and human connection. This gives genetic data a symbolic weight that arbitrary, synthetic data cannot replicate. These perspectives and cultural aspects take the form of metaphors such as the "book of life" (Kay 1999), deeply embedded in cultural imaginaries related to DNA.

The challenge for artists is to transform biological data into aesthetic experiences without reducing it to mere abstraction or commodified categories. In this sense, while commercial platforms reduce DNA to simplified charts for consumer satisfaction, artistic practices must avoid the same pitfall. Without clear answers or theoretical frameworks, attempts to "aestheticize" biological data risk reproducing the very reductionism they aim to critique.

5. Cultural Reinscription and Political Dimensions of Data

The Transmutaciones project proposes an alternative vision for biological data, moving away from technocratic reductionism. The Transmutaciones project challenges this approach by advocating for a cultural and aesthetic recontextualization of genetic data, recognizing it as a dynamic and interpretable subject. At the core of this rethinking is the understanding that data, especially genetic data, are not immutable truths that exist in isolation, but are shaped by the contexts from which they emerge. The project invites us to view biological data as situated constructs, deeply embedded in histories, cultures, and social experiences.

Using different subjective decisions in the process of mapping from data to representation, Transmutaciones highlights how genetic data, far from being neutral or purely scientific, are inextricably linked to political and social processes.

In a broader context, this cultural re-inscription of data brings to the forefront questions about ownership, representation, and the ethics of genetic information. Who owns the data generated by genetic tests, and how can that data be used without erasing the rich histories and metaphors it carries? The project points to the need for a more equitable and transparent approach to the collection, interpretation, and use of biological data in particular, but to any data source in general, inviting to explore different ways to explore representation as a way to re-appropriate data from subjectivity and imagination (Vander Moere 2008).

6. Data as a Critical Tool

From a critical perspective, data are not passive or neutral reflections of the world but actively shape the realities they claim to represent. They are socially constructed artifacts, embedded with the ideologies, exclusions, and priorities of the systems that produce them. As D'Ignazio and Klein assert in Data Feminism, "Data are not objective; they are the product of unequal social relations, and this means that they are saturated with bias, injustice, and structural oppression" (D'Ignazio and Klein 2020, 7). This understanding reframes data not as inert facts, but as discursive instruments capable of legitimizing authority or, conversely, unsettling dominant structures of knowledge.

Viewed this way, data become potent critical tools, exposing structural inequalities, serving as raw material for collective political action. When activated through sound, image, movement, or touch, they can transcend their abstract form and catalyze situated responses. Rather than being fixed or final, data becomes open to re-interpretation and embodied encounters. This transforms data from static repositories into relational and affective experiences, becoming triggers for sensing, feeling, and acting.

The translation of data into multisensory experiences, through sound art, installation, or textile interaction, alters how they are received and understood. This multisensory re-articulation democratizes access, breaking away from technocratic codes and inviting diverse audiences into dialogue with the data's meaning. Donna Haraway anticipates this in her notion of situated knowledge: "All knowledge is embodied, situated, and tied to specific contexts of power and experience" (Haraway 1988, 581). Ultimately, the critical and artistic use of data must resist the logic of disembodiment. It must insist that data are never 'from nowhere'; they are always from someone, about someone, and used by someone.

6.1. Co-Production of Meanings

Within this critical and performative framework, data are not passively received or interpreted; instead, they become catalysts for the co-production of meaning. Audiences are not treated as mere observers, but as agents who, through their affective, cognitive, and sensory engagement, contribute to the ongoing interpretation of data. This interaction blurs the boundary between subject and object, positioning meaning as relational and emergent rather than fixed or given.

In collective and participatory contexts, data activate their cultural and political dimensions, no longer functioning solely as information-
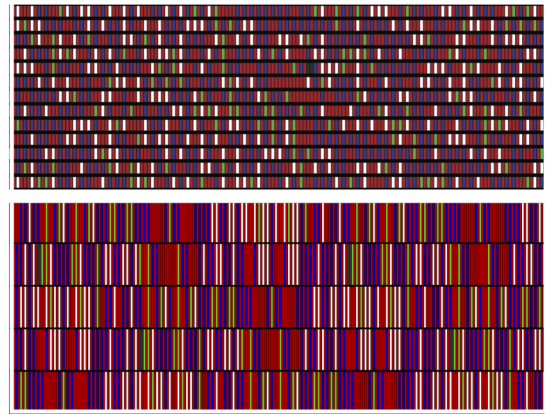
Fig. 5. Visual test of data with audiovisual projection, made using Processing (2024).
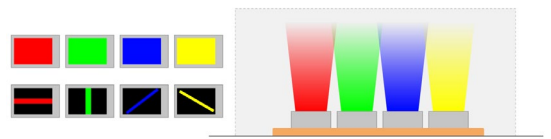
Fig. 6. Exhibition layout using 4 old tube televisions that will interact with light pulse triggers from DNA data.

al units but as provocations for dialogue and memory. As Karen Barad notes in Meeting the Universe Halfway, "Agency is not restricted to humans; data, like other non-human elements, can reconfigure relationships and meanings" (Barad 2007, 178).

From this perspective, data, like objects, technologies, and materials, possess intra-active agency: their meaning does not preexist the encounter but emerges through entangled relations with human and non-human actors. In artistic, scientific, or hybrid projects, data thus function not as mirrors of reality, but as co-constructors of new imaginaries. They guide decisions, shape interactions, and open up unexpected possibilities for interpretation and transformation.

This entangled model challenges individualistic and anthropocentric notions of meaning-making, proposing instead that subjectivity is always collective, situated, and contingent. Through these processes, data become sites where multiple narratives, knowledge, and agencies intersect. In doing so, they open new epistemological grounds for thinking and feeling the world differently.

6.2. Data as Situated Practice and New Narratives

To reclaim data as critical and transformative tools, it is essential to understand them not as neutral abstractions but as situated practices. Data are generated, interpreted, and mobilized within specific historical, political, and material conditions, and therefore carry the marks of the systems that produce them. Recognizing their situatedness allows us to move beyond the illusion of universality or objectivity, making space for multiple truths, plural epistemologies, and embodied interpretations. When data are abstracted into charts or percentages without context, their power to challenge dominant narratives is neutralized.

Artistic practices, particularly those that engage with visual, sonic, or performative translations of data, offer a powerful means to recontextualize data and generate alternative narratives. This transformation of data into sensory and participatory forms through sound, image, or gesture does more than communicate information differently: it activates new ways of knowing and imagining collectively. As Evelyn Ruppert (2017) points out, data, when critically reconfigured, open up new possibilities for the collective imagination; that is, it is emphasized that data are not endpoints, but starting points for storytelling, and the reimagining of the social fabric.

In this sense, Transmutaciones exemplifies a broader epistemological shift: one that sees data not as static objects to be decoded, but

as living materials, capable of generating new subjectivities. Through the integration of situated knowledge, artistic practice, and multi-sensory engagement, data become sites of co-creation and political agency, rather than tools of abstraction and control.

7. Transmutaciones (Transmutations) Project as a Hybrid Space

The Transmutaciones project unfolds within a hybrid space where art, technology, and activism intersect, aiming to transform not just data but also to challenge its role in shaping identity and knowledge. As Bishop (2012) suggests, data-driven art does more than just repre-sent reality; it has the potential to reshape it, challenging the way we understand our lives and relationships. Data-based art should not be confined to illustrating information, but can serve as a critical tool to intervene in the social and cultural structures that produce that data. In her work. She emphasizes how artistic practices can generate new forms of knowledge and sensitivity by inviting the audience to engage actively, not merely as recipients, but as co-producers of meaning. This perspective positions art as a symbolic battleground where dominant ways of seeing, feeling, and understanding the world can be unsettled.

The Transmutaciones project emerges as a project that moves be-yond the capitalist and technocratic logic that instrumentalizes data for economic or political gain. Instead of viewing biological data as passive inputs for scientific or commercial analysis, the project re-interprets them as active agents capable of generating new relation-ships and meanings. By transforming genetic patterns into sensory experiences, whether through visualizations, sounds, or movements, these data are re-signified, shifting from abstract numbers to situat-ed, contextualized, and living narratives.

As French theorist Nicolas Bourriaud (1998) suggests, contemporary art can redefine social relationships and create spheres of intersub-jectivity that challenge dominant power structures. His concept of relational aesthetics emphasizes that art is not only about producing objects but also about generating encounters and interactions that resist isolation and control.

8. Conclusion

The Transmutaciones project explores the role of data in contem-porary culture, transforming it from numbers into vehicles for re-flection and tools for transformation. This project proposes a re-configuration in which genetic data become elements of dialogue, questioning, and aesthetic exploration. As direct participants, we

rethink our relationships with identity and technology, actively engaging in creative processes that re-signify data within a broader and more situated context.

By integrating the aesthetic and cultural dimensions of data, Transmutaciones not only challenges the usual means of representation but also opens possibilities for artistic exploration. Data is presented not as inert statistics but as agents capable of generating changes in our conceptions of knowledge and subjectivity, highlighting the importance of considering the different factors involved in data production.

Furthermore, the project shows that art can go beyond its representational function to act as a critical medium that helps to rethink our relationship with data, now part of our culture as technology is. By exploring data representation and mapping strategies guided by subjectivity, Transmutaciones invites reflection on what it means to be human in the digital era, exploring new ways of constructing and sharing knowledge.

References

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Duke University Press.

Bishop, Claire. 2012. *Artificial Hells: Participatory Art and the Politics of Spectatorship*. Verso.

Bourriaud, Nicolas. 1998. *Relational Aesthetics*. Les Presses du Réel.

D'Ignazio, Catherine and Klein, Lauren F. 2020. *Data Feminism*. The MIT Press.

Haraway, Donna. 1985. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century". *The Socialist Review*, no. 80: 65–108.

Haraway, Donna. 1988. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective". *Feminist Studies* 14(3): 575–599. https://doi.org/10.2307/3178066.

Haraway, Donna. 1991. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century" In *Simians, Cyborgs, and Women: The Reinvention of Nature*. Routledge. 149–181.

Jirtle, Randy L. and Michael K. Skinner. 2007. "Environmental Epigenomics and Disease Susceptibility". *Nature Reviews Genetics* 8(4): 253–262. https://doi.org/10.1038/nrg2045.

Kay, Lily. 1999. "In the Beginning Was the Word?: The Genetic Code and the Book of Life". In Mario Biagioli (editor) *The Science Studies Reader*. Routledge. 281–293.

Manovich, Lev. 1999. "Database as Symbolic Form". *Convergence: The International Journal of Research into New Media Technologies* 5(2): 80–99. https://doi.org/10.1177/135485659900500206.

Manovich, Lev. 2002. "Data Visualization as New Abstraction and Anti-Sublime". http://manovich.net/index.php/projects/data-visualisation-as-new-abstraction-and-anti-sublime.

Peña, Paz. 2023. *Tecnologías para un Planeta en llamas*. Paidós.

Pinch, Trevor and Wiebe Bijker. 1987. "The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other". *Social Studies of Science* 14(3): 399–441.

Rancière, Jacques. 2009. *El reparto de lo sensible*. Barcelona: Editorial Salamandra.

Ruppert, Evelyn. 2017. "Sociology and the Future of Data: A Manifesto." *Sociology* 51 (5): 981–995. https://doi.org/10.1177/0038038517706704.

Vander Moere, A. 2008. "Beyond the Tyranny of the Pixel: Exploring the Physicality of Information Visualization". In *Proceedings of the 12th International Conference on Information Visualisation*. 469–474.