The Datatext at the Knowledge Exhibition

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Abstract

Public understanding of many aspects of modern life is routinely, and sometimes wildly out of step with reality. Given the increasingly visual nature of modern life, the question arises whether visual communication may address this problem. There are historical precedents in this field from which to learn – such as Isotype. This theoretical study sets out the groundwork for an alternative approach to Isotype. The datatext (after W. J. T. Mitchell) is a multilevel discourse comprising visual arguments mutually reinforced by combinations of words, numbers, and images. This concept draws upon John Dewey's philosophy of education (and localism); Martha Nussbaum's ideas about capability; Iris Murdoch's metaphysics; representational and embodied metaphor; and good practice in infographic design. The author provides recommendations for an experiment to test the effective visual display of key civic facts to improve a local public's civic awareness.

Keywords: data visualization, civic information, visual communication

Introduction

Since 2012, U.K. market research company Ipsos Mori has run an annual Perils of Perception survey that seeks to make sense of the relationship between public perceptions and reality. Over 200,000 interviews have been conducted in an international undertaking across over 40 countries (Ipsos Mori, 2022). The survey has cast light on significant disparities between public understanding of civic facts and the reality "out there". A significant proportion of countries' citizenry surveyed routinely:

- Misjudge issues such as the proportion of Muslims in society
- Assume the wider public is less happy than is the case
- Assume the public is less tolerant of homosexuality, abortion, and pre-marital sex than is the case, and
- Assume that wealth is distributed more equitably than it is (Ipsos Mori, 2016).

These findings seem to speak to a problem in many guises today. Disinformation, misinformation, "fake news," and other related concepts seem to be a growing concern. In the U.K., up to 10% of survey respondents were found, during the COVID-19 pandemic, to be consistently receptive to conspiratorial claims about vaccines (Freeman et al., 2021). In another study, such people were found to be less likely to comply with official guidance and vaccination programs (Roozenbeck et al., 2021). The issue is taken seriously at the highest level. For example, in 2019, online disinformation was the subject of a parliamentary inquiry in the U.K. (DCMSC, 2019), while more recently, in July 2021, UK Minister for Digital Culture, Caroline Dinenage, launched a new initiative involving teachers, library workers, youth workers, and carers, to improve British citizen's media literacy, following a spate of surveys that indicate high rates of information illiteracy amongst the public (DCMSC, 2021).

How serious, then, is this problem? Some suggest that because "fake news" comprises so small a component of the average adult's media diet, that it represents less of a genuine threat to democracy, than it does a modern day "moral panic" (Jungherr & Schroeder, 2021). On the other hand, if "fake news" is defined in too restrictive a way (by for example, associating it only with a small number of disreputable websites) the true breadth and depth of the problem may be missed. Certain groups in society may be more vulnerable to "fake news" than others (Tandoc Jr., 2019). Indeed, the role played by disinformation in politically significant events, such as the 2021 U.S. Capitol riot, suggests the risks of "fake news" are significant, even if they only reach or influence a small number of individuals (Jeppesen et al., 2022). Little wonder then, that some suggest "fake news" should be addressed as a top scientific priority (Bergstrom & West, 2021). In seeking a way past this seeming impasse, it would be sensible to improve the effectiveness

of reliable sources of information while acknowledging the asymmetrical nature of potential harms misinformation may cause in public life.

We live in a world mediated by screens – in this sense, an increasingly visual world, and information and data are presented to us using visual methods. In news and current affairs, data journalists hold increasingly influential roles in the networked newsroom, helping to decide what news coverage we receive (Dick, 2014). Over the past decade, infographics have increasingly been used in politics to reach and engage voters (Amit-Danhi & Shifman, 2018; Towner, 2017). In healthcare, highly embellished infographics are an effective way to communicate, whether concerning antimicrobial resistance (Walker, 2019) or health policy goals and initiatives more broadly (Reynolds et al., 2008), particularly concerning low-numerate social groups (Nelson et al., 2008). Can infographics play some part in addressing the broader malaise of a (partly) misinformed citizenry and the concomitant problems arising from this? That is the question this paper seeks to address.

Fortunately, there are historical precedents to learn from in information design. Almost a century ago, Otto Neurath and an interdisciplinary team of experts, set about creating Isotype, a visual method for communicating statistics. Used at first to inform the Viennese public about the city's governance and its demographic composition, these pictographic forms were displayed in interactive museum exhibitions. Figure 1 shows a typical Isotype pictogram, concerned with car manufacture. This paper outlines the philosophical context that coincided with the rise of Isotype to explore the 'cross-connections' between thought and practice at its origins (Burke in Burke et al., 2013b, p. 89). The author presents an alternative philosophical perspective for conveying civic information in a form called the datatext, before setting out a hypothetical methodology to explore some of the key ideas in this alternative approach.

Figure 1
"Automobiles produced in 1929," Isotype illustration (Neurath, 1936, p. 93)
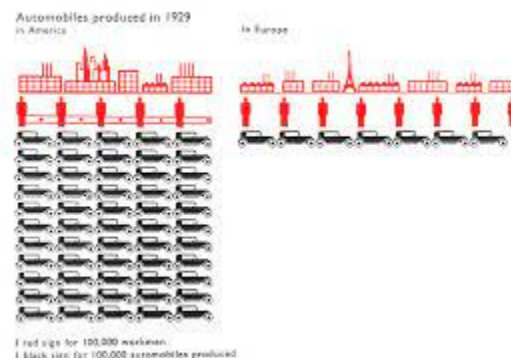
Otto Neurath's Epistemology and Educational Philosophy

Language, for Otto Neurath, was the medium of all knowledge. But in its spoken form he believed, it can mislead, due to internal inconsistencies. Ever the empiricist, Neurath thought of vision as a more reliable mode of connection between words and reality (Burke in Burke et al., 2013b, p. 88). Neurath sought a unified theory of empirical knowledge, expressed in predicate logic, based on an encyclopaedic rather than a systemic model; an approach to knowledge that was heterarchical in nature, rather than hierarchical (Cat, 2019).

Neurath's formative years were spent in Vienna, the capital of a constitutionally stable economic superpower, comprising peoples who spoke many languages across a wide geographical expanse (Janik & Toulmin, 1996[1973], p. 16). Fin de siècle Vienna was a fertile environment for new visual modes of communication, which may be found for example, in a series of popular almanacs published by J. Steinbrener (Dalbello & Spoerri, 2006). Figure 2 shows an embellished pictogram typical of those published in the Steinbrener almanacs.

The infographics in these books were embellished with realist depictions; countries were represented by national dress, professions by identifiable uniforms, and so on – they embraced the idea that statistical thinking could be both embodied and contextual (Dalbello, 2011, p. 167). Neurath was familiar enough with such illustrations (Burke in Burke et al., 2013a, p. 12); and indeed, both Isotype and these almanac designs seem to continue a long-established discursive tradition established by the Tables of Nations (Dalbello, 2011, p. 172). However, where the almanacs' infographics embody reasoning in detailed symbols of the particular, Isotype embodied reasoning in simplified, abstract forms. The rejection of ornamentation and the embrace of utility were organizing principles in Isotype, just as they were in many other intellectual fields in Neurath's Vienna, including architecture (e.g., Adolf Loos) and language (e.g., Karl Krause) (Janik & Toulmin, 1996[1973], pp. 93-97).

Figure 2
"What Different Nations Eat and Drink," pictographic illustration (*Šareni svjetski koledar: za godinu*, published by J. Steinbrener, 1900–1908).

Neuraths' approach to knowledge followed the Epicurean tradition of satisfying a means to an end in the present moment. This tradition represents a philosophy of "good living," involving the pursuit of a simple life of tranquillity and contentment, free from pain and fear. Neurath's emphasis on the collaborative process, rather than a hierarchical "program," speaks to the perceived importance of democratic cooperation in science and internationalization, a common theme among the Logical Positivists leading lights (Cat, 2019; Edmonds, 2020, p. 6). For Neurath, as for all Logical Positivists, an optimistic belief in the potential of human rationality was also important. By simply giving people the correct information, they would more likely than not make the right choices (Edmonds, 2020, p. 60). But Neurath was no naïve empiricist – for him, decision-making was informed by what he called "auxiliary motives" (not reasons), whether in the form of tradition, instinct, superstition, authority, or populism. Indeed, Neurath dismissed the idea of pure, unaided rationality as "pseudorationalism" (Howard, 2019, p. 53). His approach to science, therefore, did not necessitate the exclusive use of value-free methods (Cat, 2019). Neither did his approach to education,

which was distinctly pragmatic, drawing as it did upon the two dominant educational philosophies in Vienna -- popular (bourgeois) education and socialist education (Groß, 2019, p. 181). Education, for Neurath, required argumentation that might allow one to separate essentials from incidentals in each subject matter, which in turn meant that it was unavoidably (and unapologetically) ideological (Cat, 2019).

Words Divide, Pictures Unite
Neurath conceived of Isotype as a method for explaining the connections between social and economic realities, for an audience that was often poorly educated. Clear and easy-to-follow rules were needed to communicate clearly with this audience. These rules (called the Vienna method before 1934 and International Picture Language after 1935), concern the repeated use of identical figures to represent increasing scale in the numbers displayed, as opposed to the use of re-scaled figures commonly found in other pictographic styles (Neurath, & Cohen, 2012 [1973], p. 215). Neurath believed that increased suffrage required the efficient diffusion of knowledge through education (Vossoughian, 2011, p. 58). A universal language he hoped may help achieve this goal (Cat, 2019), an idea long-established in utopian socialist thought, owing debts to Descartes, Comenius, Leibniz and others (Lins, 2016, p. 238). Neurath described Isotype variously as a 'helping language' (Hartmann 2008, pp. 279-282), a 'universal slang,' a 'universal jargon' (Burke in Burke et al., 2013b, p. 90), and a 'language-like technique' (Burke, 2011, p. 37). Such a means of communication would empower the modern citizenry, forging 'a new world outlook' spreading just as the old authorities of state and church were declining (Neurath & Cohen, 2012 [1973], p. 252). Statistics were, for Neurath, an organizational precondition for modern governmental planning (Hartmann, 2008, p. 280). In visual form, they were a resource, he hoped, that may be used to foment political change amongst the Viennese public (Vossoughian, 2011, p. 58). And yet, the process of transmission in Isotype was intended to reflect the nature of scientific knowledge as neutral and lacking in association (Groß, 2019, p. 184), and so Isotype symbols were intended to be value-neutral (Cat, 2019).

The *Gesellschafts- und Wirtschaftsmuseum* in central Vienna, run by Neurath from 1925 until 1934 (Edmonds, 2020, pp. 132-133), housed Isotype displays that provided an alternative way of thinking about social issues to conventional museums (Nemeth, 2019, p. 126). The displays included multimedia learning materials intended to spur group discussion, including "lantern slides, charts, photographs, and models" (Vossoughian, 2011, p. 52). The interior of the building (designed by co-founder of the Vienna School of Architecture, Josef Frank) was, in terms of its lighting, fixtures, and even frames, intended to focus attention on the visual arguments on display (Neurath & Cohen, 2012 [1973], p. 215). Neurath recognized the importance of screens and modern media in modern life and accommodated what he saw as the conditioning effects of cinema and illustration within Isotype displays (Cat, 2019). Visual learning served both as a direct means of conveying introductory subject matter and as a way of optimizing engagement in learning (Neurath & Cohen, 2012 [1973], p. 236).   Neurath thought that Isotype leaned towards internationalization in a way that word-based education could not (Neurath & Cohen, 2012 [1973], p. 247).

Neurath's displays concern his philosophical belief in reasoning about truths that could only be elicited through logic and scientific language. This reasoning required basic building blocks, or observational techniques, corresponding to medium-sized physical objects in the real world. Isotype was therefore used to express relationships between real things in the world as opposed to abstractions, such as money, value, or interest (Leonard, 1999, pp. 468-9). This approach had a practical advantage; it provided a means to focus discussion on public objects that could be objectively assessed, rather than on subjective, private opinions, thoughts, and feelings (Howard, 2019, p. 58).

Metaphysics and the Rise of Nationalism
Neurath had embraced Marxism by the close of World War I while fighting, and 'Red Vienna' provided a fertile environment for the spread of his ideas, on his return to the city after the war (Edmonds, 2020, p. 59). However, the Wall Street Crash of 1929 had a catastrophic effect on the Austrian economy, creating large-scale unemployment that led to a polarization between a largely progressive Vienna and the country's conservative provinces (Edmonds, 2020, p. 127). The Austro-fascists that would sweep away Neurath's social museum in 1934 were steeped in the metaphysics of Völkisch ideology, romanticism, and the veneration of tradition (Edmonds, 2020, 2020, p. 142). The rise of this movement coincided with rising anti-Semitism, which directly affected many Jewish members of the Vienna Circle, including Neurath (Edmonds, 2020, p. 127).

Just as reason was revered amongst the Logical Positivists, so to was metaphysics repudiated as being essentially meaningless to them. In his 1931 essay *The Elimination of Metaphysics through Logical Analysis of Language*, Neurath's friend Rudolph Carnap explored how regressive political organizations had invoked metaphysical abstractions (e.g., the National Socialist use of 'Das Volk'). (Howard, 2019, pp. 54-55). Neurath stood out within the Circle as being particularly vehement in his antipathy towards metaphysics, even arguing for the use of an *Index Verborum Prohibitorum*, a list of banned metaphysical words and phrases, to be used in discussions (Howard, 2019, p. 55). For Neurath, as for all Logical Positivists schooled in the Austro-Marxist tradition, opposition to metaphysics was no mere philosophical talking point; it was a foundational political commitment (Howard, 2019, p. 57). In Neurath's view, the religious zealot and the nationalist were united in their exceptionalist beliefs, against which the Marxist viewed all human life across the same 'earthly plane' (Neurath & Cohen, 2012 [1973], p. 295). For Neurath, "The community of the state is nothing but a kind of large association, whose statutes do not possess special holiness" (Neurath & Cohen, 2012 [1973], p. 295). Logical empiricism, continuing the tradition of Anglo-utilitarian empiricism skepticism, therefore represented the antithesis of authoritarianism, and hence of fascism (Edmonds, 2020, p. 4).

Pictures Unite, Pictures Divide
Isotype has been subjected to much criticism over the years because of its perceived reductionism at the expense of accuracy (Burke in Burke et al., 2013c, p. 197) and because of its essentialism (Hartmann, 2006). Indeed, the 'signs for the five groups of men' (1936) have been discredited by recent discoveries in the field of genetics after The Human Genome Project, which shows that there is more genetic variation within some traditional racial typologies than there is between them (Rutherford, 2020). Others have criticized Isotype because of Neurath's work with the Izostat Institute in Soviet Russia, which was later concerned with publicizing Stalin's *five-year plan*. In turn, Isotype was described by a contemporaneous scholar of data design as having "the drive of vigorous propaganda behind it" (Funkhouser, 1937, p. 350). These criticisms clearly present a challenge to Isotype's legacy.

Some other problems with Isotype seem rather less ideologically fraught, however. For example, though Isotype was designed according to a physicalist philosophy, this need did not preclude the design of embellished visual data concerning abstract ideas like money or interest rates. Neurath's antipathy to metaphysics and expressions of national identity need not preclude embodied realities from being presented in such displays. Political theorists have noted the centrality of feeling to public notions of nationalism (Smith, 2003), and indeed, not all notions of national (or local) attachment are necessarily authoritarian. The rise of civic nationalism challenges the idea that national identities are mere 'imagined communities', as does the concept of 'ecstatic nationalism', concerning embodied and materialized identities (Skey, 2006).

A central problem seems to be that Isotype was designed to convey social relations abstracted from the lived environment in which they took place. This was seen as essential to its design. According to Neurath, verbal languages bind speakers to their immediate community, whereas the "language of vision" allows for the shedding of national traits and hence for a widening of, indeed for the globalization of an imagined audience (Hartmann, 2008, p. 283). But in shedding these associations, the bond between people and the lived environment is broken too. Neurath thought that the representative iconology of Isotype's symbolism was superior to abstract lines and curves, not only because they may semantically anchor meanings within representations but also because they incorporate affect due to their "friendliness" (Jansen, 1996, p. 152). But what if this friendliness inspires an emotion more like polite curiosity, rather than an authentic, affective attachment to, or sympathy with the graphical characters displayed? Indeed, Isotypes' human figures may be interpreted as being mere representations of Adolphe Quetelet's "l'homme moyen"; a statistical concept of the average man, that played a significant role in the emergence of eugenics (Grue, 2006). Devoid of personality and authenticity, these figures are, it may be argued, as abstract as lines, bars, or circles. Such figures may offer distraction, but are they capable of providing audiences with a meaningful sense of emotional connection and attachment? The author will now address this question with recourse to alternative ways of thinking about representation, cosmopolitanism, and metaphysics, to those espoused by Neurath.

John Dewey's Localism and Governance

In *The Public and its Problems* (1927), John Dewey sought to establish a clear link between democracy in governmental systems, in terms of accountability, and democracy as a way of life for a nation's citizens. Dewey believed that a democracy must play a significant role in educating its citizens, as well as involving them in its processes (Dewey, 1927). Local associative behavior must be constituted as communities of action, sharing common interests, concerns, and symbols (Dewey, 1927). This ideal, according to Dewey, has three essential requirements; universal education in how civic society works; transparency in the circulation of facts and statistics about the functioning of the state, and localism (Dewey, 1927). Foregrounding the local as a critical influence on how larger scale political organizations should be run, Dewey considered that any attempt to develop the capacities and capabilities of the public must therefore begin at the local level, which he believed, could lead Americans from being an atomized "Great Society" to a connected "Great Community" (Dewey, 1927).

In 1916, in *Democracy and Education*, Dewey devised an approach to pedagogy whereby learning is not conceived of as a simple mode of transmission from the teacher to the learner but is instead mediated according to the environment in which it takes place. Dewey defined environment in a broad sense, to include the space of learning, as well as the psychological disposition of the learner, which would include, as Jayanandhan puts it: "… the things that are noticeable to or important to a person" (2009, p. 106). For Dewey, the importance of affect in shaping the learning experience is profound; it is a "moving force" towards new ideas or, indeed, towards a sense of place (Jayanandhan, 2009, p. 107). In terms of how this approach may best be understood at the policy level, Dewey's wider philosophical legacy can be used to conceive of an exhibition of locally meaningful civic data as a form of pragmatic localism, a way of operationalizing local government policy while acknowledging the tensions that may arise as a consequence, in terms of central government (Coaffee & Headlam, 2008).

Martha Nussbaum's Cosmopolitanism and the Capability Approach

In its design, Isotype conveys a certain cosmopolitanism while eschewing the notion of local attachment. The question arises, might it be possible to unite the two? Here it is important to distinguish between different manifestations of cosmopolitanism. So, for example, the Kantian notion of the *Weltburger* (world citizen), and its association with the public use of reason, would seem to be compatible with any civic display of public information. But it is necessary to challenge an older conception of cosmopolitanism, one reaching back to the Stoics and their wish to center the cosmos in ancient thought as an alternative to the *polis (the city state structure of community commonly found in ancient Greece)*. This was an approach that sought allegiance with a higher moral order encompassing all of humanity, rather than an allegiance with the local (Held, 2005, pp. 10-11). Martha Nussbaum has critiqued the seemingly internal incoherence of this ancient philosophy in terms of the modern field of human development, observing that it seems to involve an uncoupling of the relationship between material wealth and human flourishing, a process that results in an ethical bifurcation, whereby "duties of material aid" are treated differently from "duties of justice" (Nussbaum, 2019, p. 7). A potential solution to this problem, Nussbaum suggests, may be found in the works of Cicero. To Cicero, the local comprises a "special salience" pertaining to the ethics of action and compassion that allows for the balancing of "… the near and the distant, pointing the way to a reasonable moral psychology for today's world" (Nussbaum, 2019, p. 10). Nussbaum provides a list of Central Human Capabilities, the fourth of which is concerned with 'Senses, Imagination, and Thought' that may contribute to a broader educational infrastructure, benefitting local publics and providing them with "… an adequate education, including but by no means limited to, literacy and basic mathematical and scientific training" (Nussbaum, 2011, pp. 33-4). In Nussbaum's approach, then, it may be possible to develop a universal "language-like" medium, using locally resonant imagery, towards more effective exhibitions that might improve people's understanding of their local environment.

Iris Murdoch's Unselfing and the Metaphysical Animal

Logical Positivism was the dominant force in British analytical philosophy from the 1930s (MacCumhaill & Wiseman, 2022). The leading thinker in this movement in the U.K., A.J. Ayer, espoused a radically anti-metaphysical approach, primarily influenced by his reading of key figures in the Vienna Circle (MacCumhaill & Wiseman, 2022, p. x). But not all British philosophers of the post-War period were quite as anti-metaphysical as Ayer and Neurath.

After World War II, as a post-graduate at Newnham College, Cambridge, Iris Murdoch, along with a small, close-knit group of peers, began to dissent from what, by then, were seen as increasingly old-fashioned ideas about the supposed tension between logic and metaphysics. Murdoch was inspired by idealistic ideas about morality and metaphysics, conceiving of people not as rational animals but instead as metaphysical animals, who create stories, art, music, and signs, to make sense of what is important, while just as importantly, pointing towards what might become important (MacCumhaill & Wiseman, 2022, pp. xiii-xiv). Murdoch developed a moral theory of 'unselfing,' rooted in the idea of an attentive gaze directed toward individual reality. In *Sovereignty of the Good* (1970 [2001]), she explained how the act of 'unselfing' can lift the individual out of their immediate (and often relatively narrow) cares and concerns, allowing them to see the wider good in the world. This process permits a certain softening of views based on established relationships and bonds (Driver, 2020, p. 169). 'Unselfing' is, in turn, contingent upon humility, attentiveness, and, crucially, upon a conception of love, not in terms of an individual's feelings but instead defined as a quality of trust and care that legitimizes and so maintains and repairs the authority required of any source of reliable, public information (Murdoch, 1969 [1997]). This disposition shifts the conception of education away from a mere accumulation of information and towards the relationships that make education possible toward a better understanding of others and an embrace of the idea of incomplete knowledge (MacCumhaill & Wiseman, 2020, p. 169). This approach is very different from Neurath's, which was concerned with establishing a universal theory of knowledge. Rather than driving out metaphysics, as Neurath sought to do in his philosophy, Murdoch instead intended to bring metaphysics and aesthetics into alignment in the context of art critique, a process that made unselfing possible, as she explains:

> A contemplative observation of contingent 'trivial' detail (insects, leaves, shapes of screwed-up paper, looks and shadows of anything, expressions of faces) is a prevalent and usually, at least in a minimal sense, 'unselfing' activity of consciousness. This might also be called an argument from perception. It 'proves', as against generalizing and reductionist philosophical or psychological theories, that individual consciousness or awareness can be spoken of in theoretical discussions of morality. It is where the moral and the aesthetic join. (Murdoch, 1994, p. 245)

As a Platonist, Murdoch's attitude to learning represented moral progress, allowing a de-emphasis on oneself, one's place in the broader world of knowledge, and what it is to be known (Murdoch, 1994, p. 179).

Combining Dewey's philosophy of education (in particular his emphasis on localism as key to bridging democratic systems and democracy as a way of life), Nussbaum's capability approach (with its recognition of the special importance of the local in the ethics of action), and Murdoch's ethical conception of 'unselfing,' (with its encouragement to turn away from the self, with a regard to those relationships and bonds that connect us to others), it is possible to conceive of an alternative to Isotype that may be an effective medium for communicating important civic information to a local public, in local exhibitions. The following section will set out some methodological bounds of such a hypothetical experiment.

Hypothetical Methodology

A dry-run experiment involving the material proposed would ideally be situated in an exhibition space. The author would commission various multimedia infographic designs comprising key demographic and social information about the local environment. The local district may define the locality. These designs should be datatexts. The datatext may be defined as:

> …a visual argument that takes the form of images and words, that combine to express numerical data with the aims of optimizing memorability, and affective connectivity, while at the same time adhering to standards of best practice in terms of accuracy… Datatext design considers the social identity and group dynamics within the publics they are designed for. The datatext should be clear and vivid and [should] contain reliable information, displayed accurately. (Dick, 2022, p. 140)

The datatexts produced may concern any of the following topics:

• Proportions of the local population by age, gender, race, disability, and religious affiliation
• Proportions of immigrants living locally (first and second generation)
• Proportions of unemployed, under-employed, retired people etc.

- Comparative rates for various types of crime
- Index of life expectancy (by electoral ward, for comparison)
- Proportion of the population who vote
- Index of local earnings, including mean, median, key outliers, and comparative data
- Details on local media consumption

The exhibition design should consider vital empirical findings from past studies of memorability in museums. These designs should adhere to established best practices in data visualization design in media and mass communications (Cairo, 2019), incorporating up-to-date empirical findings in optimal design (Vanderplas et al., 2020). Because some studies show tactile and kinaesthetic engagement can improve memorability (Sweetman et al., 2020), the authors may commission multisensory, interactive multimedia datatext objects. Similarly, since an increasing scale of materials in exhibitions has also been found to positively affect memorability (Sweetman et al., 2020), the authors may likewise commission large-scale wall chart datatexts.

Datatexts, like all forms of infographics, are essentially visual metaphors (Wainer, 2006, p. 30), so their design will involve thinking deeply about metaphors. A metaphor may be defined broadly, – as the application of figurative language in any form. Three basic assumptions about the nature of metaphors in datatexts may help in the design phase, namely:

- Some metaphors are abstract and implicit (for example, line graphs, where up is more and down is less, according to *cognitive metaphor theory*),
- Some metaphors are representational and explicit (for example, pictograms), and;
- Some visual displays of data contain both of these kinds of metaphor

Given the embodied nature of the first of these types of metaphor (Lakoff & Johnson, 1980), some gestalt-like image schemas based on Lakoff's *Spatialization of Form* hypothesis (Risch, 2008) may be incorporated into the design. Statistics concerned with the theme of fixedness (within space) may feature recognizable local icons and landmarks (such as statues, buildings, stadia, and natural landmarks) within their design, whether in color, greyscale, or outline. Figures 3, 4 and 5 incorporate key landmarks from, respectively, the Heaton, Byker and Jesmond areas of Newcastle, in their design. Alternatively, statistics concerned with movement may feature landmarks associated with the local transport network, bridges, roads, and other locally recognizable infrastructure. Some initial research will be required to identify those icons and landmarks with net positive associations amongst the local population.

Figure 3
A (draft) datatext depicting the population of Heaton (a district in Newcastle upon Tyne, England) by religion (drawing upon the Office for National Statistics' 2011 census). The (untitled) background image is of the W.D. & H.O. Wills Building, a listed Art Deco-style building in Heaton. CC License: Ken Brown / W.D. & H.O. Wills Building / CC BY-SA 2.0.
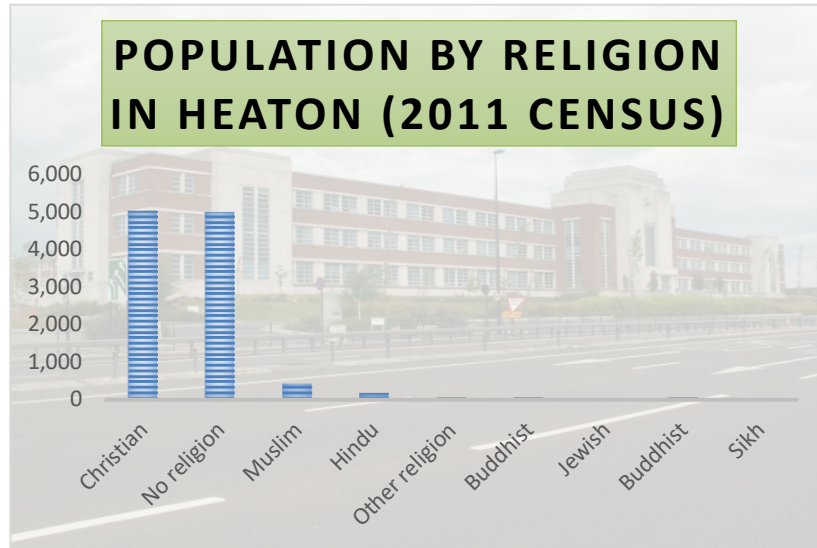

Figure 4
A (draft) datatext depicts Byker's population (a district ward in Newcastle upon Tyne, England) by religion (drawing upon the Office for National Statistics' 2011 census). The background image in this design is titled: "Tom Collins House, Byker, Newcastle upon Tyne - This building forms the western end of the Byker Wall." CC License: User:Lawsonrob
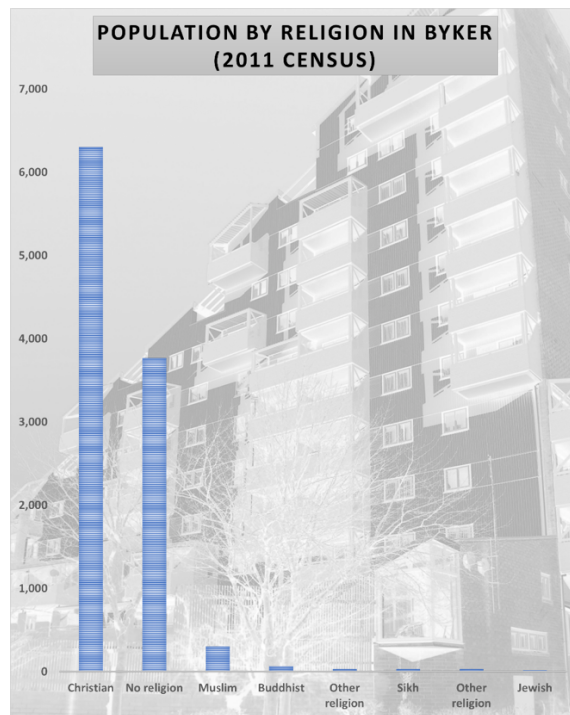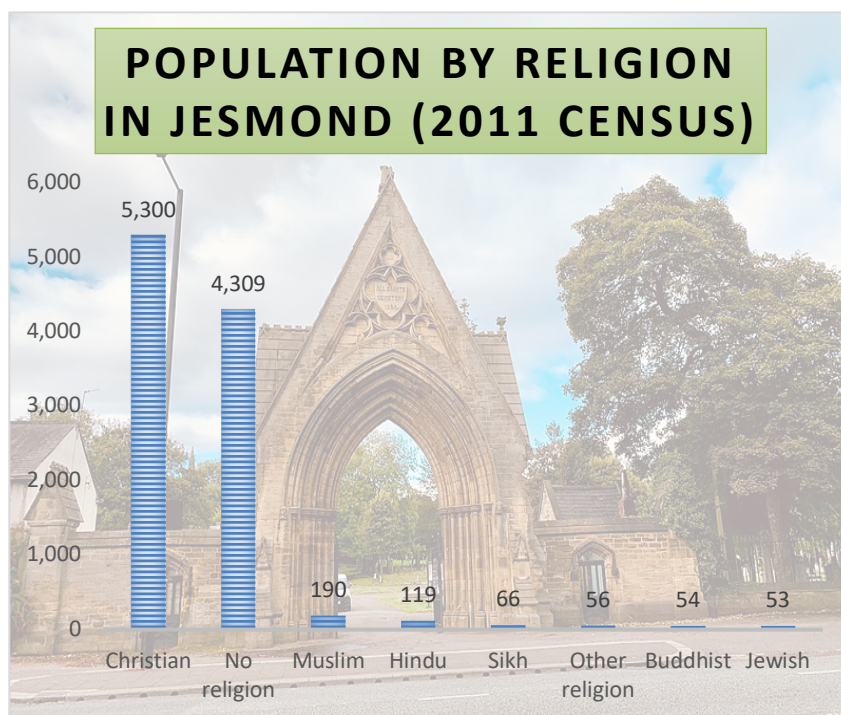
Figure 5

A (draft) datatext depicting the population of Jesmond (a district ward in Newcastle upon Tyne, England) by religion (drawing upon the Office for National Statistics' 2011 census). The (untitled) background image in this design is of an 1835, Greek-Revival-style arched entrance to Jesmond Old Cemetery Catacombs. CC License: AlixChaytor.

The author will recruit a diverse range of participants living locally in the exhibition space in advance. Informed consent will be required, and participants will complete a demographic declaration. A single study phase, asking participants to estimate the various metrics displayed in the exhibition, will be administered before participants are given access to the exhibition. Participants will then engage with the exhibition on their terms. Some graphics that do not adhere to datatext principles may also be included as a form of experimental control. Participants will be administered a short exit survey upon completing their exhibition visit. Participants would then be surveyed at subsequent intervals (one month, six months) to test their memory of the exhibition's contents over the longer term.

Conclusion

To conclude, it seems that there are some aspects of Isotype in its conception and design, from which we can learn to pursue an engaging and effective visual display method for data. Neurath's pragmatism, and his pursuit of democratic ends, are values in keeping with the improvement of public engagement in politics through processes of transparency. Designing educational materials around an audience's media habits, as Neurath did, is also a potentially useful approach.

Some of Neurath's ideas may be improved upon. For example, his conception of people as social (and rational) beings necessitated an analysis of the environment in which people learn. But Neurath defined the concept of environment very tightly – failing to consider the wider lived environment within which people receive, refine, and share knowledge of the world. We may agree with Neurath that certain visual symbols have a comprehensive (if not necessarily universal) appeal. Still, we should not ignore the fact that some symbols have important meanings, and associations at the local level, too. Indeed, we can see that the seeming paradox of a quasi-language or visual method for communicating statistical facts need not necessarily adhere to the scientific notion of neutrality. We can surely also agree that visual methods

should adhere to generally agreed standards of best practice in design (particularly those established in journalism, media, and communication –literature that centers the reader) without unduly fetishizing them.

But Neurath's thinking was unduly dogmatic on some critical matters, too. This is particularly true of his opposition to ornamentation, considering what we now know about the memorability of embellished visualizations (Borkin et al., 2013). His opposition to metaphysics, particularly those that connect people to places (which must be considered in the context of rising fascism in interwar Vienna) blinded him to the importance of the wider environment (on Dewey's terms), not least in terms of how ritual and habit inform the communication and circulation of new knowledge within communities. And whether "friendly" or not, Isotype figures lack authenticity; they are by degrees no more or less abstract than lines, circles, and bars. People may like them, but that does not mean they have an affective connection with them.

By accommodating elements of Neurath's philosophy of visualization and by adopting ideas from Dewey (on localism), Nussbaum (on capability), and Murdoch (on "unselfing"), it is possible to conceive of a theoretical alternative to Isotype that may prove to be an effective medium for communicating important civic information to local publics, in local exhibitions. This approach involves designing datatexts, visual arguments mutually reinforced by combinations of words, numbers, and images conceived of as comprising a multilevel discourse. These datatexts may be used to communicate key social indicators and facts, using locally resonant images and other metaphors while adhering to standards of best practice in the journalism and communications literature. The effectiveness of these displays for the productive communication of civic facts to the local public may then be tested experimentally.

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