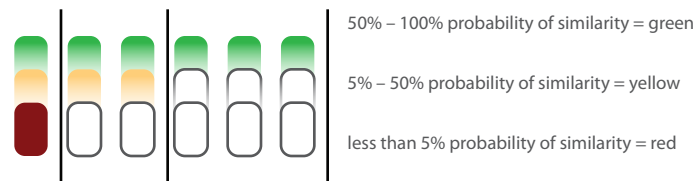


visualization logic



six boxes filled in proportion to show inter-hospital similarities
 six boxes need to show probability over/under 50%
 six boxes can be rapidly enumerated (in about 1 second)

A Statistical Approach for Visualizing the Quality of Multi-Hospital Data

Connolly et. al.

Visible Language

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education theory

the journal of visual communication research

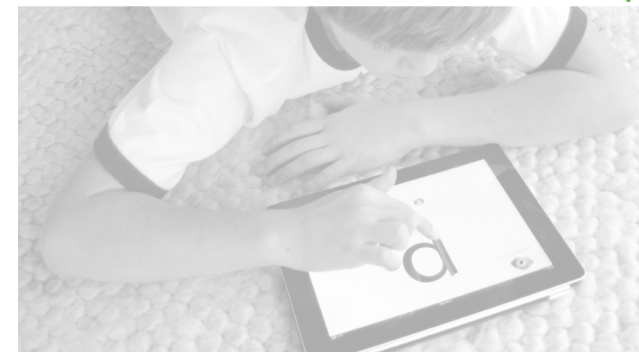
design principle



interaction
usability

drill
listen to sound
tactile

responsive



universality
visibility

memorability

mnemonics

first-sound



drag&drop

Linking Design Principles with Educational Research Theories to Teach Sound to Symbol Reading Correspondence with Multisensory Typea

Seward et. al.

individualized
evaluation



narrative

Visible Language

the journal of visual communication research

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NNOOOOOOOOO PPPPP
PPPPQQQQQQRRRRRRRR

improvisation



"Linear" by derek bealieu

improvisation

readings

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Visible Language

48.3

Visual Improvisation: Cognition, Materiality, and Postlinguistic Visual Poetry



Mike Borkent

University of British Columbia

ABSTRACT

In this article, I present a framework for the analysis of postlinguistic visual poetry through a discussion of several works by Canadian poets derek beaulieu and Donato Mancini. This poetry eschews words to manipulate parts or hints of letters, exploring the minutiae of typewritten form for meaning construction. Drawing on recent work in cognitive science, I show how visual poems disrupt common understandings of language through its materiality, how the creators engage in improvisations around these understandings to develop the unexpected, and how the poetic artifacts prompt dynamic inferences and improvised understandings in readers. Meaningful understandings of the poems emerge especially from the development of relational understandings between fragments of letters through the perception of fictive motion and fictive change. I show how cognitive improvisation facilitates these perceptions and meaning construction in the contrastive styles of beaulieu's and Mancini's poems. I argue that improvisational cognitive processes on the part of both the writers and readers play a crucial role in how postlinguistic forms come to be meaningful within the context of bibliographic and material expectations.

KEYWORDS

cognitive poetics, visual poetry, improvisation, materiality, fictivity, asemantic, postlinguistic

POSTLINGUISTIC VISUAL POETRY

Visual poetry, such as the following untitled poem by derek beaulieu (Figure 1; 2008, 48), foregrounds the materiality of written language through its forms and spaces of presentation, emphasizing contributions from both visual and verbal modes. As such, it engages with facets of bibliographic, pictorial, typographic, and inferred phonetic forms and conventions as elements of expression. While aspects of visual meaning generally contribute to formal choices in contemporary poetry, such as through line and stanza breaks, visual poetry utilizes the potential of these components extensively, making them essential to analysis rather than optional. It pushes beyond language’s references or representations to draw on the materiality of writing itself, including its medially and technologically derived qualities. Visual poems must be seen to be understood.



FIGURE 1
untitled poem by derek
beaulieu. Used with
permission.

In this poem, for example, beaulieu manipulates the similar shapes of the letters ‘a’ and ‘g’ to develop a form like a looped or knotted rope. Overlaying and connecting the similar letters constructs an extended, visual rendition of the word ‘gag.’ The poem’s cyclicity and inverted mirroring—a visual style commonly seen within beaulieu’s book—

seems to stop compositional expressivity by creating a Mobius strip out of language, effectively gagging written language through its own forms. The poem also makes a mockery of approaches to language that overlook the letters for the words, thereby also punning on the alternate meaning of ‘gag’ as a farcical joke. The otherwise blank page further emphasizes the singular word and its insular form, adding to the sense of binding and isolation. Here, the letters and their context enact the verbal content, while also poking at critical approaches that ignore their creative, material potential. This poem exemplifies the semantic and visual synergy employed in visual poetry to construct multiple levels of understanding.

Visual poetry’s ancient history, which likely began with writing itself (Balan, 1999, 7), primarily involves the mimetic, imagistic orientations of words seen in shaped, pattern poems (see Higgins, 1987). The recent influence of the theory and practice of the European avant garde, in particular the visual and non-linear textual productions of Mallarmé’s and Apollinaire’s Imagism as well as Futurism, Dada-Surrealism, and Vorticism, widened the creative possibilities for visual-verbal expression (see Bohn, 1986; Drucker, 1996). This typographic and bibliographic expansion prompted and informed the “classical period” of visual poetry between 1955–1970, known as the International Concrete Poetry Movement, which continued to broaden the possibilities for relating and integrating form and meaning (Perloff, 1991, Scobie, 1984, 30-32; see Solt, 1969). Especially since the 1960s, visual poetry has had a strong presence in Canada (see Balan, 1999). Throughout this recent history, Johanna Drucker notes an ongoing trend, in

While beaulieu (2006a) describes poems like the ones discussed in this article as “non-semantic,” this elides the meaningful qualities of the poems prompted by but not denoted by the letters. Similarly, these poems seem to qualify as “asemic writing” to some extent, but their employment of the Roman alphabet constrains them beyond the more pluralistic and gestural qualities typically ascribed to asemantic writings. To some degree we could call them *asemic typings* instead, but the term *postlinguistic* is purposeful. This term seeks to foreground the lettristic, typographical heritage that these visual poems both build upon and thwart. Without this sense of print literacy, such poems lose their potency.

both Canada and abroad, towards “an intensification of hybrid syntheses of visual and verbal means” (1996, 57). This trend is particularly noticeable in the growing production of what I call postlinguistic visual poetry (e.g. see Hill & Vassilakis, 2012), which eschews words to manipulate parts or hints of letters, exploring the minutiae of written form.¹

bpNichol, drawing on Michael Weaver, popularized the distinction between clean and dirty visual poetry (Emerson, 2011; Scobie, 1984, 35, 139). Clean poems visually mimic or enact the verbal content, such as in the case of shaped poems and many classical visual poems (see Higgins, 1987; Solt, 1969). Dirty poems, on the other hand, are “more interesting, and more supportive of contemplation, re-reading, or criticism” because they are “determined by structural principles, often abstract or arbitrary, which emerge from the visual or aural *material* of the words rather than from their expressive content” (Scobie, 1984, 35; see also Gross 1997). For example, beaulieu’s “gag” poem might be considered an elegant clean poem, since it mimics or enacts the meaning of the word, placing the visual in service to the verbal. However, the lettristic connections between the letters, which visually support the synthesis of the two meanings of the word while elaborating its form, add dirty features as well. Furthermore, this is the only poem in beaulieu’s book-length project that uses any recognizable words at all, with the remaining poems being non-semantic in focus. Perhaps we could infer that this is a poem that has stumbled across its linguistic element through structural affinities between the letters. This perceptible oscillation between clean and dirty designations in beaulieu’s poem affirms Scobie’s assertion that while useful for “describing tendencies ... it is unlikely that any given piece will fall *wholly* within one category” (43). Nonetheless, postlinguistic visual poems, such as the following poem by derek beaulieu (Figure 2: 2008, 85), and others by beaulieu and Donato Mancini discussed in this paper, represent the focused, materialist expressions of dirty visual poetry through their “anti-representationality and embrace of illegibility” (Emerson, 2011, 122). One might even consider postlinguistic poems—which I call poems that require the recognition of typographical linguistic features for interpretations while simultaneously refusing to use words—as embracing the dirtiest edge of the dichotomy, such that one might call them filthy, organic, sensuous. This filthy type of visual poetry disregards linguistic meaning while fostering alternative understandings of language, poetry, and print.

The postlinguistic poem by derek beaulieu in Figure 2, for example, seems to represent letters moving actively around the page—interacting, reconfiguring, and translating each other through their alternative forms, orientations, and possible sound(ing) lines. It might be argued that the poem represents the origin of language through an analogy to the ‘big bang,’ or perhaps a transformational, pre-linguistic confusion of sounds, or a playful rupturing of bibliographic expectations to construct depth out of linearity (and so on). Such poems offer challenges to how

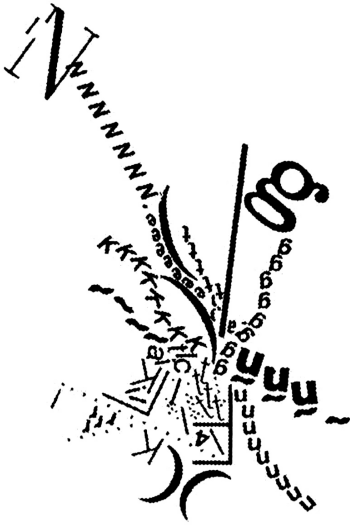


FIGURE 2

untitled poem by derek beaulieu. Used with permission.

critics describe and interpret them. Visual poetry, especially more recently, foregrounds crucial questions surrounding the interwoven notions of perception, representation, and meaning, and encourages readers “to develop a more flexible and creative attitude toward communication and a dynamic sensibility regarding perceptual experience” (Swiss, 1976, 46). Visual poetry manipulates and appropriates, as well as erodes and undermines, many assumptions about language to promote a process of *thinking through* the materiality of written language itself in both its visual and verbal modes of signification. As Sabine Gross (1997) shows, such doubling of sign functions significantly increases the cognitive work (and pleasure) of readers as they attempt to interpret the poems. For instance, as we saw with the gag poem, the form does not simply mimic the verbal cue but construes and expands its meanings as well. In these works “metaphor has become a tool of both form and content” (Beiman, 1974, 200) through which “‘meaning’ ... is multiplied” (221). derek beaulieu takes this idea further to suggest that with

postlinguistic visual poetry “the best we can strive for are momentary eruptions of non-meaning which are then co-opted back into representation by the very act of identification, pointing & naming” (2006, 84). Considering such poems, a series of questions emerge: How does poetic metaphoricity emerge out of perceptual phenomena? How does contemplation lead to multiplication? What do postlinguistic poems identify, point to, and name? How do readers enfold ruptures back into coherent meanings? How do readers, even of a seemingly straightforward poem like beaulieu’s elegant “gag” above, make dynamic inferences that multiply understandings from static, lettristic rubble?

To elaborate on how visual poetry prompts this range of different thought processes, I draw on recent research into image and text comprehension in cognitive science to suggest cognitive processes at work in reader-viewers as they interact with the poems. This research reveals, (1) how visual poetry disrupts a common understanding of language, (2) how beaulieu and Mancini engage with these assumptions through a process of textual improvisation in order to construct the unexpected, and (3) how their improvisational artifacts composed of static representations prompt dynamic inferences and propositional understandings in readers in a type of improvisation as well.

The theoretical approach this paper outlines locates visible language and print culture as part of a cognitive and

intersubjective network of mind, body, and environment, and as such it stays close to the cognitive literature. Methodologically, it both describes the poetic artifacts and their production (much like an art or new historical approach), while also paying particular attention to how meaning is produced through responses to the materiality of language, in a way analogous to a materialist and poststructurally-inflected reader-response theory. In this way, I blend the classic tension between art historical descriptions of materials to more nuanced engagements with the phenomenological processes of seeing, seeing-in, and seeing-as (see Newall 2011); and in literary terms, between reference and free play. By locating key features of the poetic texts and their correlated cognitive responses, I show how knowledge of cognition helps direct analyses of these difficult postlinguistic texts.

RUPTURED METAPHORS

The early cognitive linguist Michael Reddy (1979) identifies the most common folk theory of language as the *conduit metaphor*. In this view—which Barbara Dancygier calls the “conduit fallacy” (2012, 203-04)—language users conceive of words as objects or containers (the form) into which communicators place meanings (the content) and move it seamlessly to a recipient for unpacking. This metaphor informs phrases like “do you get what I’m saying?”—which queries the transference and unpacking process—as well as phrases like “building on what you said”—which views words as objects that support further conceptual development. Most scholars would likely find this rigid model of language troubling for a number of good reasons, especially, as Reddy observes, for its decontextualization of language use and its assumed or purported clarity of reference. However, we remain influenced and at times hampered by this folk ideology which privileges abstract linguistic meaning over the means of its relation and other non-linguistic cues that accompany it. For instance, the paucity of attention to visual form in literary studies affirms writing as solely verbal rather than as a hybrid of visual and verbal modes.² Visual poetry, as the examples above show, actively plays with and disrupts this metaphorical belief by engaging with the materiality of visible language, foregrounding its surfaces, qualities, and configurations to prompt emergent, synthetic understandings. With visual poems, one cannot ignore the container for its contents, as each play a role in poetic meaning.

As I have discussed elsewhere regarding Canadian poet bpNichol (Borkent 2010), clean(er) visual poetry can use sparse verbal and visual cues to construct complex meanings, presenting only “illusions of simplicity” (to recycle the title of that paper again). That analysis attests to the cross-modal construction of understanding prompted by texts that make distinct verbal and visual contributions. derek beaulieu’s “gag” poem works similarly in this vein. These poems illustrate the productivity

2
The preference for verbal over visual modes reflects a number of fallacies surrounding modalities, especially the fear of visual hegemony, that support a monomodal rather than “hybrid” perspective (see Mitchell (2002), especially 174-76). This paper offers one such hybrid approach.

of creative, manipulative engagements with the materiality of letters and words by reorienting and drawing attention to the metaphorical container and by foregrounding synergies between visual and verbal representations and conceptualizations. Nevertheless, postlinguistic visual poems, such as in Figure 2, refuse to use words yet continue to explore expressivity and poeticity. These poems destroy the metaphorical container in order to reconfigure how we conceive of it and its production. But how do such meaningful reconfigurations come about?

COGNITION AND IMPROVISATION

3

By recent research, I refer to “2nd generation” cognitive science. 1st generation cognitive science, informed in language studies by such figures as Chomsky and Pinker, espouses an amodal, disembodied, symbolic, modular, and computational view of mind. In contrast, 2nd generation research describes the embodied, multimodal, networked, and grounded views of mind used in this paper (Barsalou 1999). See Gibbs (2006) for a thorough synthesis of the diverse research areas that affirm this position.

Recent research in the cognitive sciences³ shows a strong grounding of conceptualization in perceptual experiences across and between the senses through the *dynamical systems* of multimodal cognition (see Barsalou, 1999; Gibbs, 2006). This approach affirms a perspective of perception and cognition that emphasizes its embodiment, through which bodily interactions with specific environments (sensorimotor experiences) inform conceptualization in ways that blur the boundaries between subject and object (Hutchins 2010). A growing body of analysis on the use and comprehension of language, images, and other communicative modes has established this as a central feature of cognition and meaning (see Gibbs, 2006; Hutchins, 2010; Johnson, 2007). This research identifies a web of connections between concrete, sensorimotor experiences, developed out of organism-environment interactions and self-reflection, and their various abstract and creative extensions (and back again). This involves repurposing perceptual mechanisms for conceptual understanding and creativity, in particular interweaving perceptual phenomena such as gestalt understandings of disparate objects, force dynamics, and the affordances—the “possibilities for interaction”—with things (Johnson, 2007, 46). These imaginative processes within perception illustrate how meaning arises as an interaction between perception and abstract cognition rather than a simple effect of “pure” reception. Construing meaning in this way unravels the containment model of the conduit metaphor and places an emphasis on dynamic interactions between people, things, and environments, with and through different communicative modes. Thus, print technologies become a part of this perceptual-conceptual dynamic as an environment for creative interaction with things (in a sense, the page becomes a stage). These medial interactions can be purposeful or improvisational, with postlinguistic poems placing an emphasis on the latter.

I use *improvisation* in a different sense than the more commonly jazz-focused usage, in a way that correlates to the avant garde textual history of visual and conceptual poetry, particularly seen in many Dadaist methods as well as more recently in the work of creators like Brion Gysin and John Cage and many other experimentalists. I consider

improvisation to be a particular creative practice or artistic stance towards a medium and its conventions. This stance centers on eschewing or disarming overt authorial intentionality in order to respond in the moment to the materials of the artistic environment. Like John Cage, I “[embrace] one rarely achieved and often illusive etymological meaning of improvisation: to do something unforeseeable” (Feisst, 2009, 49). It is a “search for the encounter of an unexpected experience or revelation” (49).

In his discussion of improvisation, cognitive psychologist Raymond Gibbs suggests that

skilled performance is not generated from a prior mental decision to act in a particular way that is independent of . . . behavior. Instead, skilled human action may arise from how the individual's frame of mind automatically selects a subset of behaviors . . . from the unlimited alternatives within the self-organized constraint space that is defined by person-environment interactions. (2006, 77)

The improvisational stance centres on this confluence of skilled yet “automatic” (i.e. unconscious) and dynamic responsive behaviour that can apply to any medium and its modes of representation. This stance prompts a creative process that constructs an improvisational product of sorts—the trace of an anti-authorial, materialistic engagement—for instance, the jazz performance or the textual artifact. Thus, the postlinguistic visual poem reflects a cumulative letteristic trace of the real time, improvisational interaction of the writer with the materials of textual existence including the letters, the paper (both its size and weight), bindings (or lack thereof), and the various technologies of print production (pens, stamps, typewriters, photocopiers, computers, etc.). Unlike musical improvisation, which is responded to in the instance of performance through various instruments, textual improvisation leaves a specter of itself for interpretation, one that reflects its means of production. For visual poetry, the print medium limits the materials of improvisation through variously related print technologies, while providing the means to showcase them. Likewise, cultural expectations, linguistic and artistic scripts, and so forth, influence conventions and readerly expectations, which the poet engages as part of the literary environment. Of course, as artifacts rather than performances, poems can be returned to again and again for further scrutiny without re-mediation, which sustains Scobie's notion of dirty visual poetry prompting contemplation and criticism.

IMPROVISATIONAL CREATION

derek beaulieu's and Donato Mancini's compositional methods differ in dramatic ways, but they both engage with and reconceptualise typographical forms by improvising responses to the forms' affordances—their possibilities for interaction beyond their conventional uses. The consistent style of the

book-length projects of both authors focused on in this paper creatively extrapolates beyond the traditional uses, roles, or values of letters by interacting with them as objects or things on the page. Engaging the affordances of things involves disintegrating previous understandings of the thing in order to select, alter, and reintegrate its elements for different purposes. An example of affordances in action would be the use of a large book as a doorstop, re-conceptualizing and valuing it for its weight and shape rather than its contents. As Figure 2 illustrates, postlinguistic visual poems engage with letters to share a similar, affordance-based, improvisational logic, using type while reconfiguring or ignoring most of its conventions. This creative approach suggests to viewers alternative relations with letters beyond their uses as the building blocks of words, acronyms, and other symbols within specific typographic and bibliographic environments. beaulieu's and Mancini's improvisation through the materiality of specific letters foregrounds and develops the expressive quality of letters that un-forms and informs both the letters themselves and readerly expectations of them, in particular deconstructing and re-construing the conduit metaphor. Through this creative process, the poets begin to map out new, meaningful perceptions of language against a complex bibliographic, pictographic, and typographic history.

In his book *chains* (2008), as well as in other projects, derek beaulieu uses sets of typefaces on Letraset dry-transfer sheets—a lettering technology once used by drafts-people and designers to avoid the idiosyncrasies and errors of hand-drawn letters⁴—to create typographic consistency between individual letters and within poems. As seen above in his “gag” poem, this consistency allows letters to slide into each other, to overlap, and to, in a sense, respond to each other since they replicate each other's forms either completely or by “mimicking” aspects, such as shared, font-specific features like serif shapes (terminals), loops, and angles of axes. beaulieu observes that in composing his postlinguistic poems he generally attempts to respond to a sense of non-linguistic connections or responsiveness between letters, playing letterforms off of and through each other (beaulieu, 2009).⁵ beaulieu plays with orientations and relations of letters to decompose and recompose bibliographic assumptions surrounding type and visible language. This free-flowing compositional method removes most notions of authorial intentionality since beaulieu is not attempting to convey anything specific, but fosters, as a creative organism in a textual environment, a sensuous response to letters as meaningful, constructive forms unto themselves.

Unlike beaulieu's archaic lettering technology, Donato Mancini, in his book *Æthel*⁶ (2007), engages with digital fonts by “butchering them with the virtual razorblade” of image manipulation software and “Frankensteining them back together until the shapes on [his] screen looking back at [him are] unrecognisable as products of [his] own imagination” (2009, 26). Unlike beaulieu's typeface constraints (ones available on archaic Letraset sheets), Mancini engages with a wide variety

4 While creating consistency here, elsewhere beaulieu experiments with incomplete or manipulated transfers (e.g. see *Fractal Economies* (2006b)), along with other textual materialities tied to production technologies. A more detailed discussion of this range of approaches, as well as his other writings, exceeds the limits of this paper.

5 Similarly, Judith Copithorne, another important Canadian visual poet who creates postlinguistic visual poems, notes that for her composition method she is “working in a more physical manner with the actual visual reactions to the various physical attributes of the piece” (Barwin and Copithorne, 2013, n.p.).

6 As with beaulieu, Mancini's diverse creative output exceeds the limits and focus of this paper; therefore, I have limited myself to selections from one book of similarly styled visual poems.

of written language forms, including from Black letter (Gothic) to contemporary fonts as well as alphabets ranging from ASL hand signs to a range of other, non-Western scripts. (To ease comparisons between beaulieu's and Mancini's poems, I focus on poems that appear to be constructed out of the Roman alphabet.) Similar to beaulieu, Mancini asserts that a process of open, responsive, lettristic engagement produces poetry in which "there's little invention; there's inventive recombination. The only constraint was that [he] wasn't allowed to draw new lines. All of the lines come from lines already present in the letterforms." As such "Intentionality ... was severely frustrated" (26). This lack of conscious intention again contributes to an improvisational creative process, constrained by the affordances of lettristic forms but also developing and reconstructing through and beyond these understood limitations. While beaulieu plays with the affordances of whole letters in relation to bibliographic norms, Mancini decomposes the letters themselves, recomposing or reconstituting typography at a different level.

The removal of forethought, of intended directionality and focus other than responding to the affordances of material forms themselves, reveals the improvisational nature of beaulieu's and Mancini's compositional processes. This characteristic resounds from their poetry: one reviewer even draws analogies between beaulieu's style and Miles Davis' ability to "[tap] the vein of jazz" (qtd. in the author note of beaulieu (2008). See also Mancini (2009, 25)). Figure 2 reflects this understanding through its explosion of letters and their inferred sounds. For postlinguistic poetry, typographic and bibliographic conventions, as well as expectations regarding specific, material engagements with letters and page space, contribute crucially to their composition and reception. Letters, or aspects thereof, in conjunction with the dearth of words, straight lines, spacing, "proper" orientations, and margins, all contribute to the readerly experience of rupture and play. Poetic alternativity makes the lettristic lettristic improvisations salient and novel. Through this improvisational engagement, beaulieu and Mancini produce poetry that points "to and away from multiple shifting clouds of meanings and constructions" (beaulieu, 2006a, 82). These poems "[challenge] the status quo of poetry and of the politics of language" (90) by denouncing expectations prescribed by the conduit metaphor and bibliographic history, by delighting in the viscosity of written language, and by exploring meanings beyond the purported containment of the word.

COGNITION, FICTIVITY, AND IMPROVISATIONAL READING

Through their abstract representation of multiplicity and indeterminacy, and largely the lack of linguistic specificity (Mancini does add titles, which I address later), the visual poems of beaulieu and Mancini invite a creative reading process that navigates through this apparently nonsensical openness

and rupture. Since postlinguistic visual poems offer no words, they seem restricted by their own materiality and visibility, divorced from conceptual or propositional meaning. While we can articulate how they break from typographic conventions, as well as draw on the avant garde tradition of typographical innovation and disruption, to articulate how the forms prompt new understandings remains difficult. To come to beaulieu's impressionistic sense of "shifting clouds of meaning" from letters fixed to the page, readers develop a dynamic understanding of the text out of its static forms.

To move from stasis to dynamism, from abstract form to meaning again, readers likely improvise beyond purely linguistic or symbolic understandings by engaging with the very affordances that the poets initially responded to to construct the poems. By reanimating senses of the compositional manipulations and disruptions of various forms, readers infer action from static things and construct interpretations from these dynamic elements. In short, this poetry impels a materially contiguous and contingent, rather than symbolically and abstractly, derived understanding that requires a multimodal approach to unpack.

The same embodied cognitive abilities that foster textual improvisation in the making of postlinguistic poetry also support the dynamic, interpretive processes of viewers of these poems. The pervasive harnessing of embodied, sensuous, and emotional experiences to develop elaborate, novel, fictive, alternative, and abstract constructions relies on the ability to mentally distance or attenuate our cognitive processes and then reanimate bodily knowledge through a process called *mental simulation* (Langacker, 2008, 524-537; Bergen, 2012; Gibbs, 2006; Matlock, 2004). This process of reanimation facilitates novel and/or fictive connections and inferences about experiences and things, from basic understandings of perception to elaborate metaphorical abstractions in language and other modes of expression. The attenuation of mental processes from physical ones allows for discrepancies between experiential knowledge and mental interpretations or connections. Leonard Talmy (1996), in his influential discussion of fictivity and our "cognitive bias towards dynamism" (213), focuses particularly on "nonveridical phenomena" such as "linguistic instances that depict motion...[and] visual instances in which one perceives motion *with no physical occurrence*" (211, emphasis mine); such an instance occurs when describing or perceiving a fence as running across a field. Mental simulation interprets these phenomena through inferential processes regarding objects, agents, perspectives, and means of perception and interaction (see Gibbs and Matlock 2008), with fictive constructions fostering more dramatic interpretations than non-fictive constructions (Matlock 2004). A closer look at two broad types of fictivity adds to the discussion of visual poetry by showing the significance of these processes to emergent, dynamic understandings of static representations, such as the cyclical and explosive inferences ascribed to the previous poems.

One notable embodied experience of fictivity

discussed by Ronald Langacker (2008), *fictive change*, denotes the subjective construal of something in terms of an alternate state of being. For instance, conceptualizing a “broken line” involves an archetypal line which breaks in the process of being represented on the page as a series of dashes (see Langacker, 2008, 530); by simulating the breaking of a whole line to interpret the dashes, readers conceive of a state prior to representation. In Figure 2 (the “big bang” poem), the top left N is likely simulated as having broken or become altered in the processes of representation, as shown in Figure 3, rather than simply being interpreted as its own unique form. Other

change-of-state expressions involve similar conceptual processes such that the negated state always informs conceptualizations, infusing the static representation with a dynamic, transformational shadow. For instance, beaulieu’s “gag” poem maintains the sense of the regular spelling of the term; therefore, the extended body of the poem prompts a sense of fictive change

representation

simulation



FIGURE 3

Example of fictive change simulation for top-most letter in Figure 2.

that extends the word in order to bind it. This inferred change-of-state construes the extensive looping of the word as a propositional understanding, critically mocking notions of linguistic determinacy through lettristic elaborations or transformations of the constraints.

A related dynamic inference from static representations is *fictive motion* (see Langacker, 2008; Talmy, 1996). Derived from embodied perceptual cues of scanning an object or sequence, fictive motion occurs when readers or viewers conceptualize static objects as mobile, such as in understanding that a line of static dots *runs* across a page. This conceptualization involves inferences about trajectories and relations between static elements.⁸ In terms of visual poetry, a repeated form, such as the various sequences of letters in Figure 2, can be construed as a single form glimpsed moving repeatedly through time and space, thereby prompting a sense of fictive motion paths across the page, such as indicated by the arrows in Figure 4. (Thus fictive motion motivated the readings of letters *exploding out* or of letters *moving through* the confusing mass at the centre.) Similarly, a homogenous, circular form, such as the first “gag” poem, might be construed as actively and interminably redirecting readers as we scan it, making it veridically static while feeling fictively dynamic. Fictive motion reveals the locus of that infinite looping that gags language and constructs understanding through perception. Articulating this dynamicity constructed through the scanning and reanimation of static representations—which derives from an embodied engagement with textual and imagistic space, objects, and actions—clarifies inferences made of visual poems that extend well beyond their forms.

8 Talmy (1996) describes multiple types of fictive motion paths. Here I only focus on the basic principle, which sufficiently covers my aims. Elsewhere (Borkent 2010), I have shown how two specific types of fictive motion path reveal poetic transformation in semantically-informed visual poems by bpNichol.

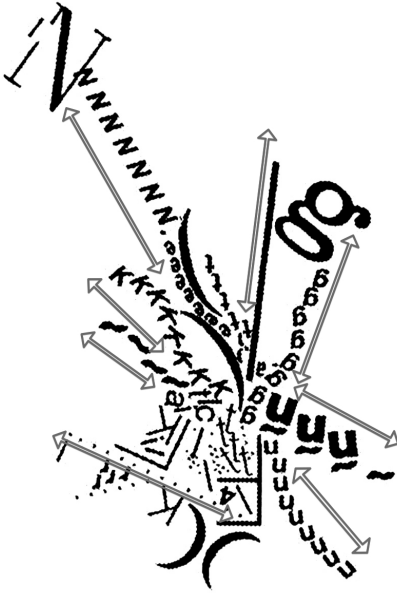


FIGURE 4

Possible fictive motion paths (arrows), correlating to groups of letters and punctuation, superimposed on Figure 2. Poem altered with permission.

BEAULIEU'S MACHINIC DISRUPTIONS

A glance at the earlier visual poems in derek beaulieu's book, *chains* (2008), reveals clear typographic control through limits on the size and number of letters used, large empty margins, and an overall repetitious or reflective pattern that seems to dictate their form (the "gag" poem, Figure 1, comes from this section). Rather than a negative criticism of these poems or an indictment of improvisation, this control reveals a creative engagement with the affordances of typography within some bibliographic constraints that sustain the perceptual and conceptual complexity within these poems. Poems, like the explosion of Figure 2, come and seem to break these limits later in the book, transforming the entire page into an active space of dynamic interaction. Such poems in particular, including the following one (Figure 5: beaulieu, 2008, 84), prompt improvisational engagements that move from dynamic creation to static artifact and on to dynamic understandings and interpretations.

The dynamic inferences of this untitled poem exhibit both fictive change and fictive motion. At first glance, the poem appears as a near-vertical line of "l"s and a perpendicular mass of letters on either side of it. The poem transforms into a scene of dynamic interaction through the mental reanimation of the letterforms and their relational qualities. The repetition of the "l"s vertically creates a slightly fragmented visual barrier that replicates the example of fictive change—the broken line—mentioned above, and which bifurcates the page into two distinct spaces.

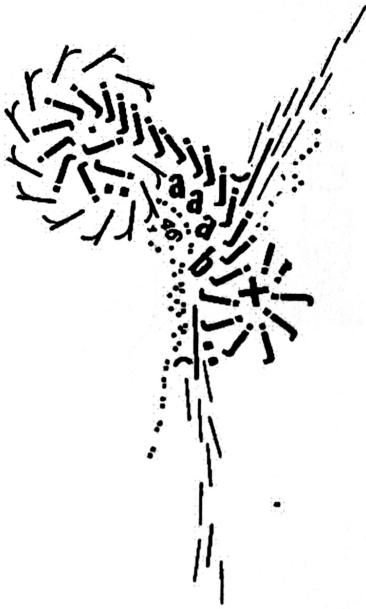


FIGURE 5

untitled poem by derek beaulieu. Used with permission.

9

Other interpretations of this poem surely exist, such as of the form bursting forth like a fungus rupturing the bark of a tree or like a plant growing out of an embankment, drawing largely on the same fictive changes and motions discussed above but adding another layer of inference based on these forms. My reading lays the groundwork for these others.

through inversion the “r”s. Perhaps this indicates a transformation, a fictive change, of the “j”s in moving across the barrier, rather than simply the presence of a different letter on that side. The dots represent the part of the “j” that keeps it from inverting into an “r,” and their removal supports the lettristic mimicry and sense of transformation.

The poem, as I have described it, focuses on the breaking of a barrier and the transformation of the “j”s into “r”s. In light of this, we might conceive of the liminal symbols caught in the breach—the few “a”s, a “b,” and the number “46”—as the broken and bent bodies of “j”s sacrificed in the rupturing of the barrier, or as other letters that tried to cross and failed. One can speculate further here, but any “reading” ought to examine the affordances and fictive simulations that connect these forms and which motivate interpretations.⁹ However, a second facet of embodied experience, of the readerly organism’s environment, supports the leap from form (which I have already shown to be dynamic and meaningful) to more elaborate, poetic understandings.

Letters, not just abstract forms, make up these poems, which places these works into a typographic, bibliographic, literary, and visual history, including the pervasive conduit metaphor. Since cultural and social conventions and expressions inform embodied, felt experiences, they affect interpretative processes prompted by these works. Thus, formal

A series of dots that run down the right side transfer to the left at the point when a series of “j”s breaches the divide; this prompts an instance of fictive motion, with the dots construed as one or just a few dots moving down the page over time. Because the line of “l”s buckles in the middle, the poem also prompts the inference of force dynamics, with the “j”s, through fictive motion, pushing upwards and through the line, pushing or drawing the dots through in the direction of force. This point of rupture couples the cases of fictive motion and fictive change, constructing an interactive scene on the page-stage through embodied simulation.

The circular form of the “j”s on the right has an “x” in the middle that suggests a hub around which they spin. The “j”s, whose dots point into the center of the wheel, fictively spin and fling through the barrier, inverting their orientations as they enter the new space. Then they rotate in the other direction, dots out, without a notable axis, and with a growing number of new forms of “r”s burgeoning out around them. Dots also fall below. Notably, the forms of the “j”s mimic

inferences will vary between readers, based on differences in experiences and background knowledge, including language type (Bergen 2012). Through this situating of embodied cognition, the previous spatial reading now extends into a poetic reading of the grapheme, of the “inarticulate mark” (quoted in beaulieu, 2006a, 80), and the specific visible language that informs it. By elaborating on readerly expectations of common typographic forms, a possible interpretation of the poem could be that the wheel of machinic language breaks through a perceptual barrier to birth new forms that are free from mechanization (in a way making a mockery of moveable type through its very movability). Alternatively, machinic language breaks down in engaging a new experiential space that refuses it as it is and re-animates it in new forms. In either sense, the deconstructed containment of language gives rise to creativity by trespassing into new arenas and responding to them, de-mechanizing or refusing expected linguistic representation. Combining fictive dynamics of forms with experience invokes an understanding of the poem as a diagram of a theory of language, in which users break beyond the confines of the conduit metaphor to revel in embodied forces and experiences at work within representative modes and the medium.

Furthermore, through its reliance upon letters, beaulieu’s poem draws on the domain of literary history, in terms of both production and reception. The repetition of letters creates a visual sense of rhyme and rhythm and, yet, refuses symbolic communication, forcing a poetic sensibility onto the raw materials of written language without determining what that sensibility might say. Nonetheless, the materials of the poem suggest a dramatic interaction between the machinic qualities of letterforms as they move through different spaces. From the perspective of an embodied reading, it focuses this energy on the reanimation and alteration of letters, thereby revitalizing the poetic eye and its graphemic extensions prior to articulation, injecting the dynamicity of the body into typographic space, opening up new perceptions of writing. The poem gestures through postlinguistic language toward a poetic, altered future, offering, in a sense, a poetic manifesto to transform type. By reconstructing typographic codes while keeping recognizable, unaltered letters, beaulieu’s poem prompts an improvisational reading, fostering a sense of creative, future expansions extending from the present.

MANCINI’S SCULPTED LETTERS

Donato Mancini’s poems in his book, *Æthel* (2007), also elicit improvisational readings but through striking stylistic differences. In contrast to beaulieu’s hard, machinic Lettraset poems which compose new forms out of old, overlooked ones, Mancini’s poems, such as “The Jazzercise Dance of Hope” (Figure 6: n.p.), decompose and recompose the letters themselves through digital manipulation, leaving glimpses of their former selves. Nonetheless,

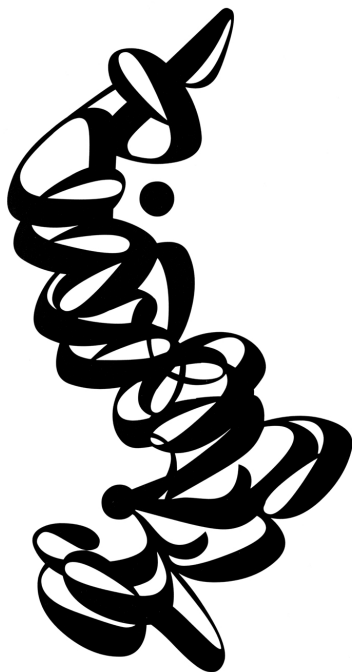


FIGURE 6

"The Jazzercise Dance of Hope" by Donato Mancini. Used with permission.

Mancini notes, his titles exploit experiential links and categories which "[open] a set of associative paths that determine multiple potential readings. 'Free,' maybe, but finite" (2009, 29). A title does not delimit a specific reading, but rather introduces a complicating, constructional variable that lends directionality to improvisational interpretative processes.

This titular directionality prompts at least two possible routes for mental reanimation that derive from inferences about different perspectives on the poem and their types of associated fictivity. The first option sees this representation as a lone (I think feminine) figure moving up-right through space as a (perhaps Flamenco) dancer, her arm outstretched above the dot of her head, her hips jutting to the right, and her dress swirling at the bottom. From this perspective, the Frankensteined letters become the energetic dance of the woman moving across the page-stage. The letter-figure fosters the reconceptualization of language into a linguistically nonsensical yet quasi-representational, imagistic form that reflects the health and creativity of "jazzercise." Through the openness and playfulness of an *almost* signifying act, it reveals the hopefulness behind expressivity as well. The fictive motion attributed to the form, motivated from experiential, embodied knowledge of dance coupled to the scanning of the undulating shapes, prompts this sense of health, creativity, and hope, promoting a view of the nonsensical as a beneficial and dynamic state for language.

Mancini's works also elicit fictive motion and fictive change. While we cannot trace exact letters in space, the interconnected, recognizable aspects of decomposed letters (such as calligraphic stems, loops, and dots) and the overall twisted form lend it an organicism in two ways. First, the reader infers, through simulation, the authorial hand that carves up letters (rather than places them, like beaulieu) to construct the poem, exemplifying fictive change (as was shown in Figure 3). The reader also reanimates the represented forms by scanning them, interpreting them as fictive change or motion. Furthermore, this poem, located on the right-hand page, faces its title from across the spine of the book, prompting a perceptual shift across the fold to focus on it. This break between title and figure adds to inferences about its fictive activeness: in a sense, the poem becomes dislocated, quite literally, from its title and is dancing across and off the page.

The title's location and content also adds to the poem's interpretation by directing inferences about the poem towards the specific movements and roles of dance. As

However, while maintaining the perceptual and conceptual parameters of the dance, we might also construe the poem as a diagram of the foot patterns of an actual dance, as one might find in a dance handbook, viewing the page-stage from above. In this case, the shifting forms direct the future actions of dancers as they swirl across the dance-floor. The poem, from this aerial perspective, prompts a sense of fictive motion, since we can conceive of it as a sequential enactment by a single figure over time. At the same time, it also prompts fictive change, as the letterforms posit a fictive state of (altered) being. This still carries the hallmarks of the previous reading—health, creativity, hope—but revokes its fictive performativity through its futurity (perhaps the very definition of hope for a future performance). In this reading, the poem becomes a manifesto for a free typography, in a sense calling for an revolutionary, lettristic dance rather than allowing it on the page, diagramming a hoped for future state for type through a static present.

In both of these readings, the readerly activation of the forms as a dynamic performance or diagram becomes particularly meaningful through the directions of the title. While the form certainly suggests dance-like and energetic qualities, the title specifies ways of conceptualizing it and, to a degree, its affective calibre. At the same time, the title can hardly be taken at face value—just like the poem—in particular regarding jazzercise, a hybrid exercise-dance regime often characterized as kitschy and lacking the gracefulness of dance. The simultaneous juxtaposition and redundancy of combining “jazzercise” with “dance” prompts an ironic or facetious tone, which undermines any sense of blithe hopefulness. The dynamic mental performance of the representation enacts a sense of hopeful health on the page as we read, but the title both affirms and denies it. This duplicity, conferred as well through the conflicting and irreconcilable perspectives upon the poem itself (present/future, horizontal/aerial)—reminiscent of the classic examples of perceptual illusion like the duck-rabbit, first employed for psychological studies by Joseph Jastrow (Figure 7: 1899, 312)—adds a self-reflexive and self-effacing quality, emphasizing the representational fluidity within modalities. While the poem might seem to envision a typographic revolution through the butchered, dancing letters, expressing vitality outside of the constraints of the conduit metaphor, its conflicting compositional qualities, especially prompted by the directive framing of the title, also suggest a naïveté to the hope of typographic rebirth.

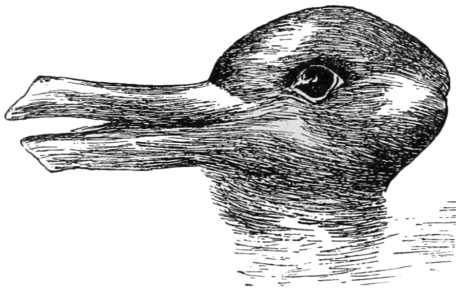


FIGURE 7

Joseph Jastrow's original duck-rabbit illusion illustration (1899, 312). Public domain.

Another poem by Donato Mancini, “Literature Prefers Metaphor” (Figure 8: 2007, n.p.), also combines conflicting lettristic qualities and layers to prompt conceptual depth. Two formal features suggest metaphoricity, even without the title—making the title less directive and more ekphrastic than the previous example. At first glance, the mutilated, black letterforms prompt similar inferences of fictive change as in his previous poem, through which lettristic forbearers haunt the poem. However, within this mixed form, new letter-like elements, especially tails and serifs, glint out of the internal white space as well. The co-presence of black and white letterforms constructs a bistable, metaphor-like relationship between two incompatible elements. The fictive motion prompted by scanning, reminiscent of derek beaulieu’s cyclical “gag” poem, suggests a second metaphoric quality. Here, the looping qualities of the form mean that we likely cycle around the bends, folds, and junctures of the poem, scanning for a beginning or an end and for a point of recognition to offer coherence or intelligibility to these haunted forms. Instead, we remain caught in a perceptual tension between recognition and bafflement. Metaphorically speaking, this poem holds us in a state of excitation between a tradition of expressivity and its manipulative deconstruction.

In the reading of the opening poem by derek beaulieu, the formal cyclicity prompted the gagging of language itself, in essence stopping up the conduit metaphor. Coming almost full circle, this poem actively and interminably cycles and transforms perceptions of language. While beaulieu’s poem worked paradoxically through imagistic and verbal elements to become perceptually mobile while stifling linguistic activity, this poem’s cyclical energy becomes the locus of literary and figurative productivity. As the poem’s title (somewhat facetiously) suggests, the preference for metaphor—for interpretive layers, difficulties, and transformations—drives literary creativity. The poem enacts this understanding through the lack of words and the perception of fictive motion and fictive change; through improvisational engagements with recomposed typographic forms, it offers an interpretive structure that moves from linguistic bafflement to a sense of creative energy that affirms its ekphrastic title. Here, the conduit is multiplied rather than stopped.

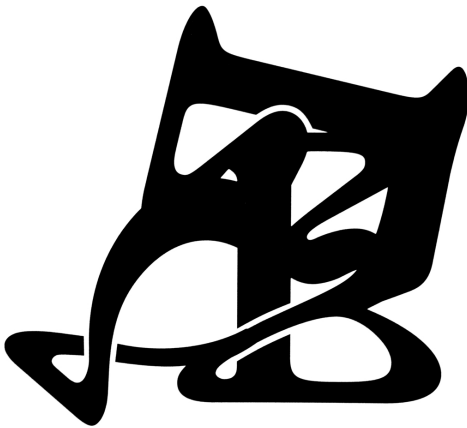


FIGURE 8

“Literature Prefers Metaphor”
by Donato Mancini. Used
with permission..

POSTLINGUISTIC VISUAL POETRY
AND IMPROVISATION

Postlinguistic visual poems, such as those by the Canadian visual poets derek beaulieu and Donato Mancini discussed here, present a decisive challenge to critical models that begin with linguistic and propositional views of meaning. A dynamic, embodied approach to meaning facilitates articulations of how forms and their connections to bibliographic elements remain meaningful by prompting poetic complexity and depth from apparent nonsense. Furthermore, focusing on improvisation illustrates the many modes of creativity that cycle around such works in both creators and viewers as they play with type.

In their respective books, beaulieu and Mancini engage with typographic forms in two distinct ways. beaulieu composes, with recognizable letters, poems that riff off typographic and bibliographic affordances to reconstruct perceptions of language, ranging from cyclic confines to transformative ruptures. beaulieu's poems prompt reorientations and reconceptualizations of extant linguistic artifacts, injecting novelty and fictivity into the typographies of daily life. On the other hand, Mancini actively decomposes and reconstructs letters themselves, dissecting their affordances to compose alternative ones while maintaining vestiges of their former selves. His poems prompt a strong sense of fictive motion as we scan for points of recognition, with the fictive change glimmering out only once we notice the facets of butchered letters within. Mancini's titles also add another variable to interpretative processes, as they present the only point of authorial assertion in response to the unexpected artifact. His titles act as an expression of his own readerly improvisation in response to the poem, which then guides subsequent viewers interactions. The titles present surprising congruencies with the postlinguistic poems, confirming the meaningfulness of the oft-ignored lettristic forms that his poetry makes salient through their annihilation. These poems act as speculative fictions for language; they revel in undercutting any sense of stability that written language affords by showcasing novel interactions with type that contrast the static containers of the conduit metaphor with the dynamicity of improvisational, embodied creativity.

Both authors engage in improvisational methods informed by the affordances of writing, either at the level of the letter or its composite parts, and within the confines of the page. Readers respond through mental simulation, improvising through postlinguistic nonsense and bibliographic backgrounds back to meaning. The material creativity on both sides shifts understandings of meaning away from linguistic determinacy towards sensations, patterns, and fictive projections grounded in organismic experiences. The multimodal, embodied approach presented here interweaves perception and conception to introduce a methodology

that helps to unpack the material and conceptual affordances and proliferations these poems and their poets revel in. This approach addresses how the static forms of visual poems prompt contemplation, critical depth, and multiplications of meaning through improvisational cognitive processes. It links this to the transgressive and transformative poetic understandings of language they prompt in the reader. The inculcation of the reader's creative responses to poems that reconfigure and transfigure language also makes them into what Martin Puchner (2006) calls "art manifestoes," which actively engage with performativity and representation. In postlinguistic visual poems, vestiges of the conduit remain, but with kinks, holes, and eddies disrupting and energizing expressivity through a tactile engagement with, and reanimation of, the materials and modes of communication. The poetic and dynamic richness of these poems would remain largely untapped without this embodied perspective on visual and linguistic creativity and meaning, helping us feel our way out of the postlinguistic, lettristic dark.

ACKNOWLEDGEMENTS

My gratitude to derek beaulieu and Donato Mancini for their kind permission to reprint their poems. My thanks to Barbara Dancygier, Eve Sweetser, Kevin McNeilly, and Sherrill Grace, as well as participants at several conferences and the generous reviewers of this article, for their insightful comments on parts of this paper at various points in its development. All errors and omissions are my own. This work was supported by a doctoral scholarship from the Social Science and Humanities Research Council of Canada.

Most importantly, the love, patience, and support of Brianna, Madeleine, and Zoë, made it all possible.

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ABOUT THE AUTHOR

Mike Borkent is a doctoral candidate at the University of British Columbia, Vancouver. He studies cognitive approaches to visual literatures and poetry, focusing on North American comics, graphic novels, and visual poetry. He recently co-edited a volume on *Language and the Creative Mind* (CSLI 2013) with Barbara Dancygier and Jennifer Hinnell, and has authored another paper on visual poetry, "Illusions of Simplicity" (2010), which was reprinted in 2012. He was also the head developer and co-author of *CanLit Guides* (www.canlitguides.ca) for the journal *Canadian Literature* (2011-14).

Book Review:

Design for information, an introduction to the histories, theories, and best practices behind effective information visualizations.

by

Isabel Meirelles

Beverly, MA: Rockport Publishers, 2013.

Jorge Frascara

Design for information is a thorough representation of both the field of information visualization and the research interests of the author, whose focus is on “the theoretical and experimental examination of the fundamentals underlying how information is structured, represented and communicated in different media.”

Beginning with the “big picture,” the book includes an amazing collection of examples, the most thorough I have seen to date in a volume. The author organizes the content according to several categories represented by the titles of the chapters: 1. Hierarchical structures: trees; 2. Relational structures: networks; 3. Temporal structures: timelines and flows; 4. Spatial structures: maps; 5. Spatio-temporal structures; and 6) Textual structures. An appendix, notes, a bibliography, a contributors list, and an index complete the content of the book.

Design for information is an extensive taxonomy of data visualization types and is “a must” for anybody interested in the work done in the area. Each one of the hundreds of examples is explained and discussed, forming a kind of encyclopedia on the subject. It seems that nothing escaped the exemplary collection that Meirelles assembled. The discussions and explanations normally focus on what information is represented and how it is represented.

It is interesting to see, as well, how many different professional fields today use diagrams to organize and represent information: basic science, applied science, education, engineering, medicine, and technologies, etc. The value of the book is centered on the inclusion of examples of how many different problems are now being addressed through data visualizations, how many historical efforts preceded whatsoever is

done today, and how the advent of the computers have allowed the field to explode by handling large data sets as well as dynamic representations.

At the end of the examination of the 224-page volume I became curious as to how these diagrams might have performed with the users they were intended for in terms of ease of comprehension; what conclusions I could arrive at from an evaluation of the examples from a perceptual and cognitive human factors perspective; or how a complementary book could contribute to the development of best practices. I would not expect that one volume could be so extensive as this one and also cover the field critically. However, I have to wonder how the super-complex visualizations permitted by computer programs today would perform regarding comprehension, memorization, and use of the information presented. The discussion on perception and cognition is very brief, and it might leave some readers wondering about the assertions made: they are proposed as principles without them being discussed. This topic, as well as Gestalt theory, are not considered during the description of examples. The size of some reproductions is too small to assess their quality as data visualizations. They appear as examples of problems addressed but not as information in themselves. To compensate for this, the book includes valuable URLs for people interested in seeing in better detail many of the diagrams shown.

While the above issues could be perceived as weaknesses, the strength of the book is its truly amazing array of examples and the rare historical diagrams it offers. It also displays an uncommon erudition and includes an extensive and useful bibliography. I do not know how long Meirelles took to complete the manuscript, but it feels like a lifetime project. These assets, coupled by excellent production, make this an indispensable publication for anyone interested in information visualization.

Book Review:

Isotype: Design and contexts 1925–1971

by

Burke, Christoher; Kindel, Eric; Walker, Sue (Eds.)

Hyphen Press, London, 2013

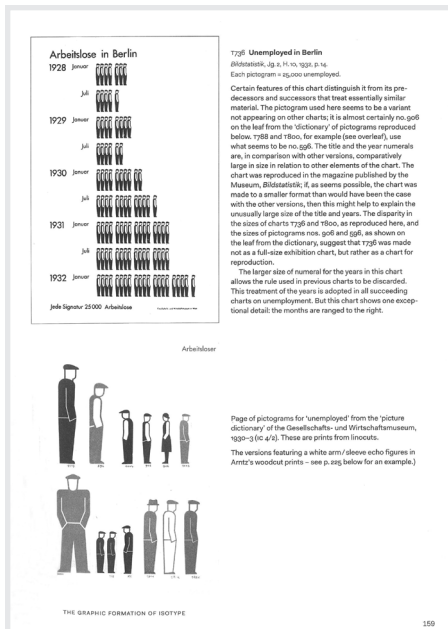
Per Molleup

Isotype, why not?

The term Isotype, an acronym for International System Of Typographic Picture Education, is a technique of data visualization introduced by sociologist, economist, and philosopher Otto Neurath. Originally called “The Vienna

School of Pictorial Statistics” and developed and practiced at the Gesellschafts- und Wirtschafts-museum in Wien (Social and Economic Museum of Vienna), 1925–34, Isotype’s purpose was to communicate societal information to visitors. In 1935, Neurath’s technique was renamed, and Isotype began its own life and was used for other purposes in other places.

Isotype builds on the idea expressed in Neurath’s often-repeated adage, “To remember simplified pictures is better than to forget accurate numbers” (p. 85). Therefore, Isotype is best known for Picture tables—graphic displays with rows of repeated pictograms each standing for a number of real world units. The picture tables embody the proposition that it is easier to compare quantities by comparing numbers of well-presented symbols, than to compare symbols of different size. Pictograms in the Isotype picture tables are scaled: in a display showing unemployment, each pictogram would stand for 1,000; 100,000; or 1 million – or another round number of unemployed persons. In picture tables, the reader must count the pictograms in different groups and multiply with the scaling factor to get the total amounts. The number of the repeated pictograms in a picture table is most often rounded off. Some Isotype picture tables feature half, quarter, or smaller fractions of pictograms. Even then, Isotype displays are typically not as precise as the numbers they represent.



Page 158

Males with flat cap and hands in pocket stereotype unemployed persons. Striking workers have crossed arms.

Isotype: Design and contexts 1925-1971 describes Isotype in a period delimited by 1925 when the Gesellschafts-und Wirtschaftsmuseum in Wien was founded and 1971 when the Isotype Institute in London closed. The book comprises 12 chapters dealing with the genesis and further development and design of Isotype. The book includes two kinds of information; it describes Isotype design principles, and it describes the process by which Isotype was developed and disseminated. To this reviewer the former part is the most interesting, while the latter part serves as a useful historical backdrop.

TEACHING MUSEUM

In the first of two central chapters, Christopher Burke covers the ten-year lifetime of The Gesellschafts-und Wirtschaftsmuseum in Wien including the formative years of Isotype. The idea behind Isotype predated the museum. Otto Neurath, sociologist, economist, and philosopher, had already applied charts with pictorial descriptions of quantities for the Museum für Siedlung und Städtebau, Museum for Settlement and Town Planning. Eager to educate by means of these didactic tools, Otto Neurath suggested a new museum to expand the ordinary population's understanding of national and world relations. The social democrat regime in Vienna understood the importance of education and provided the necessary financial support.

Otto Neurath invented Isotype, but more than that, he promoted it. Philosophically and organisationally trained in addition to being well connected academically and politically he spread the word and established the connections that were vital to the incubation of a new idea like Isotype. Neurath partnered his strong interest in education of ordinary people with his equally strong social commitment resulting in his belief that progress depends on knowledge, and knowledge should be delivered in ways that are both attractive and memorable – essential qualities of Isotype.

The Gesellschafts und Wirtschaftsmuseum in Wien was not a museum in the traditional sense of that word; and therefore consistent with Neurath's view that "The modern museum should be a teaching museum, a means of education, a schoolbook on a grand scale..." (p. 30). The Gesellschafts und Wirtschaftsmuseum in Wien consisted primarily of graphic charts explaining societal matters, first and foremost quantities. The museum introduced a number of advanced ideas to meet its audience. To accommodate prospective visitors the museum was open evenings and Sunday mornings. Also, the museum branched out at several places where visitors would be. At a certain time, the museum would exhibit at several different locations in Vienna including the town hall. A central corner shop museum open in the lunch hours had as many as two thousand visitors a day. At the corner shop special interactive knowledge machines were placed where visitors could test their knowledge – anticipating a distant, digital future. Exhibition material was reused and exchanged between permanent

and time limited exhibitions in several places. Along with its own exhibitions, the museum took part in fairs and exhibitions in Austria and abroad.

The museum also published books, pamphlets, and journals to reach its audience in time and space. *Gesellschaft und Wirtschaft*, Society and Economy, was a collection of 100 Isotype charts. *Fernunterricht*, distant teaching/learning, later renamed *Bildstatistik*, Pictorial Statistics, prefigured modern distance learning.

Three persons led the development of Isotype: Otto Neurath, a sociologist, economist, and philosopher; Marie Reidemeister, a German academic; Georg Arntz, a German graphic designer.

Austrian Otto Neurath's past career included his initiative to, and directorship of, the German museum of war economy in Leipzig during WWI. After the war, his presidency of the Central Office of Economics, in the Bavarian Soviet Republic, was followed by a conviction of assisting high treason and an eighteen-month, later suspended, prison sentence. In 1920, Neurath was back in Vienna to become the director of the Forschungsinstitut für Gemeindewirtschaft, Research Institute for Co-operative Economy. In this capacity Neurath initiated a Museum for Settlement and Town Planning, which within a year – also on Neurath's initiative – was replaced by The Gesellschafts- und Wirtschaftsmuseum in Wien.

Marie Reidemeister (after 1940 Marie Neurath) met Otto Neurath before the start of the Gesellschafts- und Wirtschafts Museum in Wien, became his right hand, and continued working with Isotype after Otto Neurath's death in 1945. Most importantly, Marie Reidemeister played and developed the role of 'transformer'. Otto Neurath and Marie Reidemeister considered the 'transformation' of a message into a principle for a graphic chart the crucial part of the work with Isotype. Transformation was the link between science and graphic design. According to Marie Reidemeister: "We think out which is the point that has to be brought home, and then we try to do so in such a way that everybody will grasp it. We avoid distracting the attention from the more important issues." (p. 15). Also according to Marie Reidemeister, other designers impressed by Isotype would emulate the form but hardly master the transformation (p. 14). Today, the term 'transforming' is not used, but the substance is a natural part of the work of information designers engaged in data visualisation in news media and elsewhere.

Georg Arntz was a German artist working with woodcuts in precise graphic shapes, which caught the attention of Otto Neurath. Georg Arntz began working for the museum in 1928 and in 1929 moved to Vienna where he developed the schematic graphic form that became a signature quality of Isotype. In the process he also changed the technical production from paper cuts to printing from linocuts.

Three conditions for launching Isotype were present. First, a strong-minded initiator with a firm social and educational commitment who was well connected politically; second, highly qualified principal collaborators; and third, a friendly political market.

Partly inspired by the political winds and the following possible need for a foothold outside Austria, Otto Neurath established in 1932 the affiliate Mundaneum to take care of international relations. In 1932 and 1933, Mundaneum established branches in Amsterdam and London respectively. In 1934, the International Foundation for the Promotion of the Vienna Method of Visual Education was established in The Hague. Later in 1934, when the political situation in Austria and Vienna as envisioned by Neurath became dangerous, he, his wife Marie Reidemeister, Georg Arntz, and two other collaborators moved to the Netherlands. The Gesellschafts- und Wirtschaftsmuseum was closed. Part of its material was already transferred to Mundaneum. The rest was seized by the new regime, not the first time a design initiative has been subject to political change. In 1940 the Neuraths moved on to England.

THE NETHERLANDS

Two chapters of the book deal with the continuous work in the Netherlands and England. In Vienna, Isotype had been a means to inform the visitors of the Gesellschafts- und Wirtschaftsmuseum. In the Netherlands the Neurath team had to earn their way from projects. Otto Neurath wrote two books in Basic English: *International Picture Language* and *Basic by Isotype*. Other jobs included production of a children's theatre puppet show and an art exhibition, *Rondon Rembrandt*. Also, commissions resulted from Otto Neurath's frequent travels to the USA.

ENGLAND

When Germany occupied the Netherlands the Neuraths moved on to England, where Otto Neurath had been promised a teaching position at Oxford. The Isotype Institute was then established in 1942. The Isotype work in England followed two lines. The Neuraths wrote and designed a number of books for Adprint, a book packager who also published, and they worked on informative films together with British film producer John Rotha. The books dealt with the war effort and social policy. Apart from a couple of booklets this work included a three book series: *America and Britain*, *The Soviets and ourselves*, and *New Democracy*. Two chapters in *Isotype: Design and contexts 1925-1971* deal with film work and children's books respectively.

FILM

Documentary filmmaker John Rotha approached the Neuraths soon after their arrival in England to initiate a collaboration concerning films for the Ministry of Information. The first film, *A few ounces a day* about saving waste to be used in the war effort, was based exclusively on animated Isotype graphics. The Neuraths acted as de facto directors and Maria Neurath made a complete storyboard as well as the graphics to be animated. Later followed several films, where Isotype animations were combined with live action. A series of films that had significant results included, *Worker and*

warfront, which was shown for workers in factory canteens, *World of Plenty* and *Land of promise* which dealt with food and with planning respectively.

In 1945 Rotha established a special company, Unifilm, with himself and Otto Neurath as directors. After Otto Neurath's death Marie Neurath would continue the cooperation with John Rotha until 1948, when Unifilm closed down. In 1954 Marie Neurath contributed to a TV series, *The World is ours*, and in 1965 to a film *The physics and chemistry of water*.

The film work was not without problems. Some critics found that serious matters should not be treated through the genre of animation. The Neuraths complained when they did not have full control of the work, and Paul Rotha did not always find the necessary support for Isotype work from the Ministry. Professional designers recognise these kinds of problems. Otto Neurath also had some didactic reservations. Isotype on paper lets the viewer see and compare several displays concurrently in space, while film – working in time – doesn't provide that possibility. Also paper media, in contrast to film, gives viewers as much time as they want. Today video technology has solved this problem.

CHILDREN'S BOOKS

In her chapter about children's books Sue Walker rightly states that "The children's books produced by the Isotype Institute provide an excellent insight into Marie Neurath's work as a transformer and show that she had a particular skill in making charts and illustrations that were accessible to children of all ages." (p. 391). This chapter reaches beyond children's books: The account of Marie Neurath's approach is relevant to all designers concerned with data visualisation.

The children's book production took place from the 1940s into the 1970s. Otto Neurath took the initiative, but after his death Marie Neurath edited, wrote, and designed a large number of children's educational books, some of which were schoolbooks. Children's book series included *If you could see inside, I'll show you how it happens*, *Visual history of mankind*, *Visual science*, *Wonders of the Modern world*, and *Wonder world of nature*. The Isotype institute delivered both the text and design for these books. Illustrations would include pictograms and all kinds of explanatory drawings. In another series, *They lived like this*, the majority of the illustrations were drawings of contemporary artefacts. This series was co-written by external artists.

Marie Neurath's thoughts about the work with children's books are interesting to everyone working with data visualisation:

I had to ask myself: what are the essential things we want to show, how can we use comparison, direct the attention, through the arrangement and use of colour, to bring out the most important things at the first glance, and additional features on closer scrutiny. Details had to be meaningful, everything in the picture had to be useful for information. (p.395)

From a note addressed to the readers of the second book in the Visual history series:

Everything which would not help you understand the meaning, or which would confuse you, is left out. Colours are used only to help make the meaning clearer, never simply as decoration. This means that every line and every colour in these pictures has something to tell you. (p. 403)

U S A

Three factors obstructed Isotype's introduction into the USA. The timing was not good. It was the middle of the depression, there were several imitators (just competitors?) around, and there was Rudolf Modley, a former part-time employee in the administration of the Gesellschafts- und Wirtschaftsmuseum in Wien. Rudolf Modley would cooperate and compete with the Isotype team in Den Hague and Oxford, and challenge Otto Neurath's views.

A group of influential supporters worked together to get Otto Neurath and Isotype to the USA. When in 1930 there was an opportunity to use Isotype at the Museum of Science and Industry in Chicago, Otto Neurath recommended the employment of Rudolf Modley. Here and later Modley acted more independently than envisaged by Otto Neurath.

In 1934 the supporters founded the Organizing Committee for the Institute for Visual Education "to establish in the United States an organization which can develop and promote the graphic methods of presenting social and economic facts, which have been characterised by the Vienna Method as exemplified in the work of the Gesellschafts- und Wirtschaftsmuseum in Wien under the direction of Dr. Otto Neurath" (p. 307). When the organisation did not follow Modley's advice, he created his own company, Pictorial Statistics Inc. Otto Neurath and Rudolf Modley held differing views. Neurath wanted standardised pictograms designed centrally while Modley had a more relaxed view. Neurath explained:

That is to say, for our picture language one general list of a limited number of signs is needed for international use, and this has to be worked out by or under the control of one chief organization (This organization is now the ISOTYPE work-room at the Hague). (p. 332).

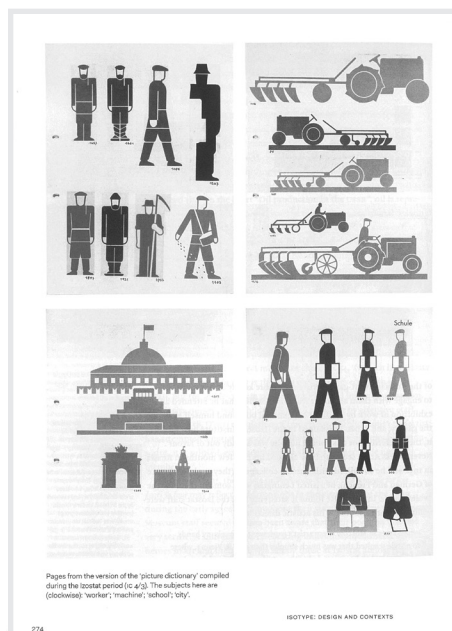
Also, Modley saw the pictograms as elements that could have their own life while Neurath saw pictograms as parts of visual arguments enabled by transformation. Modley was not interested in transformation. In line with this view he published symbols sheets with pictograms to be used by everyone and a book entitled, *1000 Pictorial Symbols* (1942).

Otto Neurath travelled to the USA several times and secured important commissions, primarily in the health sector. Isotype also delivered illustrations to *Compton's pictured encyclopedia* (1939) and Otto Neurath wrote *Modern man in the making* (1939) for Knopff publishers. After Neurath's death Marie Neurath wrote an essay on Isotype for Henry Dryfuss's *Symbol Source Book* (1972).

The Isotype team's efforts in Russia took place from 1931-1934. Russia did not want to commission Isotype work from Vienna. Instead, they wanted Isotype staff to help establish a Soviet institute. A special organisation named Izostat was established with Otto Neurath as one of two directors, and several Isotype staff would join them for shorter or longer periods. The total staff at times would be as high as 75. A number of problems hindered

cooperation. The work primarily dealt with visualising the established success of the first five-year plan 1928-1932 and the predicted success of second five-year plan 1933-1937. While The Vienna Method as practiced in Vienna was based on empirical facts, the Russians wanted forecasts to play an essential role. The estimates were often exaggerated. Another problem was that the Russians wanted naturalistic pictograms aligned with wanted Soviet realism. Also, the Russians wanted more, sometimes propagandistic, illustration. The cooperation resulted in some publications with more or less Viennese influence. Georg Arntz made a series of charts for *Izvestia*, charts for exhibitions, and a number of publications more or less influenced by the Isotype team. One Isotype idea was used with a new meaning. In the Vienna Method black was sometimes used to illustrate worse, while red would stand for better. In Russian charts red would stand for Russia while black would stand for other nations.

In 1934 the Russians wrote to Otto Neurath that the contract did not comply with Russian law and the amount due at the end of the contract would not be paid. The latter incident was a major blow to the Isotype organisation, which in Den Hague depended on paid work. Izostat continued without Isotype help until 1940.

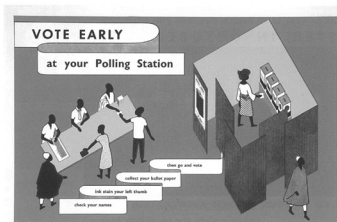


Page 174
Isotype work for Izostat in
Moscow characterised by
Russian realism.
(original in color)

AFRICA

Some Isotype work in Africa took place from 1952-1958. Otto Neurath reportedly said that Isotype was not for the Viennese, but for the Africans (p. 449). In 1943 he worked on a proposal for an exhibition for the British Colonial Office entitled, *Human life in Africa*. This project did not materialize.

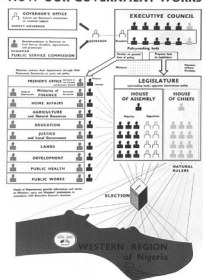
In 1953 a partnership between Buffalo Books, a subsidiary of Adprint, the Isotype Institute, and Purnell and Sons, a printing firm, planned and published the magazine *Forward* addressing the three British colonies Gold Coast (Ghana), Sierra Leone, and the Western Region of Nigeria soon to become independent. A trial issue and an issue number 1, dealing with culture, adventure, sports, and practical advice were published before the magazine was determined to be economically impossible in 1953.



"Vote early at your polling station", 1955-6, 300 x 250 mm.

"How our government works", 1955-7, 700 x 350 mm.

HOW OUR GOVERNMENT WORKS



ISOTYPE: DESIGN AND CONTEXTS

480

Page 480

Isotype work with limited abstraction for Western Region, Nigeria, promoted participation in an upcoming election. (original in color)

In 1954 Marie Neurath wrote a memorandum sketching what Isotype could do in the Western Region of Nigeria. It included a visual explanation of the aims of the government and the establishment of a local workshop for Isotype run by trained Nigerians. Marie Neurath visited Africa three times and a series of booklets and poster-leaflets were produced, while the workshop remained a plan.

For the Western Region a series of 16-page White Paper Booklets were published including *Education for all in the Western region*, *Better farming for better living in the Western Region*, *Health for all in the Western Region*, and *Paying for Progress in the Western Region*. Also a series of poster-leaflets dealing with health issues was produced. As indicated by the name, the poster-leaflets worked both as wall charts and as folded leaflets to take away. A following visit to the Western Region resulted in commissions for a new series of booklets.

Compared with the Western Region in Nigeria the Gold Coast and Sierra Leone had little work for Isotype. In 1956 Isotype made one leaflet for The Gold Coast, *The Volta River Project: what it means to you*, and in 1957 one for Sierra Leone *Voting, general election*.

In the late fifties the Isotype work in Africa came to an end. The chapter author, Eric Kindel, offers a number of probable explanations, one being the distance, another being the failure to establish a local workshop with trained local people. To the Isotype Institute the African experience meant realising the need for locally adapted symbols for man, woman, house, and more. The pictograms should 'speak'. In the same vein, charts were given familiar backgrounds. According to Marie Neurath: "[A]dherence to the method cannot go as far as imposing an alien background on those unable to share one's experience of it." (p. 495). This did not, according to Marie Neurath "imply that the system had to be radically changed" (p.495).

DESIGN

In the second central chapter of the book, Robin Kinross presents the design of Isotype. This chapter was originally a part of Kinross's MPhil thesis from 1979. (Robin Kinross is the owner of Hyphen Press, the publisher of this book as well as Otto Neurath's 'visual biography': *From hieroglyphics to Isotype* (2010) and a string of well presented books on typography.) The provenance of the chapter may explain the order in which it deals with the subject. The description begins with the formats of the wall charts, and moves through

colour, male and female, qualifying symbols, and guide pictures, down to pictograms and configuration. In the latter part Kinross codifies six types of displays dealt with by Isotype. This would have been a natural start of the chapter to be followed by pictograms. Apart from this peculiar arrangement the chapter gives a robust description of the elements used in Isotype. Kinross calls Isotype "a coherent approach to ordering material in graphic form" (p.107). It covers what we today call 'data visualisation'. In contrast to the remaining part of the book, Kinross offers a few critical remarks on Isotype.

Considering Neurath's interest in education it is remarkable that there exists no manual, no single, document explaining the Isotype design principles thoroughly. One reason could be that Isotype remained a work in progress. Another reason could be that Neurath did not want everyone to design visual displays, but rather to commission the displays from the initiators. So-called notes, single sheets each describing a design subject, were descriptive rather than prescriptive. They described current practice more than recommending what should be done. Also, Neurath's publication, *International Picture Language*, 1936, written in Basic English doesn't serve as a manual either.

Kinross's description of Isotype design gives a clear impression of Isotype being a work in progress. Pictograms, qualification, grouping of pictograms, use of colour, use of typography, and configuration would change considerably between 1925 and 1934, especially after Georg Arntz joined the team. However, this development did not always follow a straight line. Different principles were sometimes used concurrently; old design features were sometimes used after new design features were introduced. The development involved standardization, modularization, and simplification. Pictures would be reused and be combined; the use of colours would be restricted.

Kinross refers to the common misunderstanding that "quantified rows and columns" "might be typical of the work as a whole" (p. 142). Well, these picture tables and their pictograms are what most of us think about first when we think about Isotype. The picture tables and their pictograms are featured on the covers of publications and wherever Isotype is discussed. Kinross shows the width of Isotype by the following classification (p. 139).

Charts showing quantified material:

1. rows and columns [picture tables],
2. division of a whole (usually a checker-board),
3. geographically ordered pictograms and more diagrammatic charts,
4. quantities related to area (usually showing densities),
5. flows.

Charts showing non-quantified material:

Neurath broke down the picture table category into six sub-categories (p. 140):

- 1.1 comparison of total quantities,
- 1.2 where sizes of constituent parts are interesting, as well as total quantities,
- 1.3 where relative sizes of constituent parts are most important,
- 1.4 to make a shift particularly clear; alignment left and right to form an axis,
- 1.5 where the sizes of parts and of wholes are equally important; one compares both horizontally and vertically,
- 1.6 to allow comparison of parts and wholes, and to make a shift clear; especially important in showing changes over time.

A schematic drawing and an Isotype picture table illustrate each of these sub-categories.

While the fact that a large part of the text of this chapter is devoted to picture tables and pictograms may support the idea that Isotype first and foremost is picture tables, the book’s numerous illustrations establish some balance. Isotype is both picture tables and a general approach to data visualisation.

In a chapter about pictograms, Christopher Burke confirms that a direct line from the Isotype pictograms to the pictograms used in transport and communication today hardly exists. However, qualities such as standardization, modularity, and schematization are parts of the Isotype heritage. Isotype pictograms worked in lines in picture tables to compare something, while modern pictograms in transport and communication simply point to the existence or condition of something. Otto Neurath, however, suggested that the Isotype pictograms could possibly also be used for public information signs. This application was not realised.

WHY NOT?

Isotype: Design and contexts 1925–1971 is a comprehensive introduction to the Isotype idea. The book’s 12 chapters written by nine authors are well planned with a minimum of overlaps. While the main text goes into considerable historical detail, the illustrations present the elements and charts by which Isotype should be known and appreciated. The numerous illustrations – more than 400 – and their elaborate captions turn the book into a portable archive, which for everybody unable to access the Isotype collection at University of Reading will remain the most important Isotype resource.

Implicitly the book relays a well-known phenomenon: how a design idea born to solve one problem if successful becomes a

solution that looks for other problems. From informing the Viennese citizens the problem changed into finding potential outlets for the newfound method.

In the beginning of *Isotype: Design and contexts 1925–1971* Christopher Burke states, “The best way to bring these [the qualities of Isotype] to the fore is to examine it as a historical phenomenon in all the complexities of its contexts.” (p. 14). This is questionable. To compare is the basic function of Isotype. Isotype should itself be compared with competing data visualizing formats. How can we evaluate the virtues of airships without comparing airships with other airborne vessels?

We still need a balanced discussion of the qualities of Isotype. What exactly is the Isotype approach? How does it survive today? How does Isotype compare with the display formats that news media and others prefer today? What are the pros and the cons of Isotype compared with other more frequently used data visualising formats such as bar charts, bubble charts, and line charts? Understandability, accuracy, attraction, and memorability are factors that should be discussed. The discussion should also include the intended target groups of Isotype and the contemporary audiences of news media and professional literature. Is Isotype only for uneducated people?

One probable finding is that most contemporary audiences prefer exact information to the visual explanation offered by Isotype picture tables. Today bar charts, pie charts, and bubble charts, which in principle present *visual* messages, are as a rule supplied with exact figures. Such displays are hybrids. They are half visual display, half table. The visual part lets the reader get a fast idea, while the figures deliver accuracy. In a short period Isotype’s picture tables were also supplied with exact figures. In later displays the figures were abandoned. The big, undisputable advantage of isotype displays is that they are attention grabbing and attractive to look at. The visual attraction may be accompanied by good memorability.

.....
P S

Design and contexts 1925-1971 is well crafted with a pleasing design. However, there are two minor flaws. First, the key to source abbreviations is located on page 18, while readers expect to find it in the beginning of the book where it would be easy to retrieve for later reference. Second, tiny, alphanumeric caption designations of up to four characters are written with lowercase numerals (6 and 8 with ascenders and 3, 4, 5, 7, and 9 with descenders), which are difficult to read, especially when presented in the very small type used for marginalia.

Per Møllerup
14 August 2014

The Case for Mental Imagery

by
Stephen M. Kosslyn, William L. Thompson,
and Giorgio Ganis

Mike Zender

date: 2035 CE

location: a design office

The designer looked at the screen and watched the child's memory of being sick. "I'm sorry to ask you this, but think of diarrhea again please," she said. The toilet shimmered into view briefly followed by transparent wavy lines. The designer noted the lines, then replayed the other children's memory and noted that 67% of them included shimmering, wavy lines to represent smell. "Thank you, that's all I needed. You've really helped me design this icon," she said.

Paul Rand once said that communication design is about "saying the commonplace in an uncommonplace way." (Rand, 1970, p. 36) This suggests that effective communication is essentially enhancing the familiar. For visual communication design, this means creating unique images that will connect in predictable ways with the images people already hold in their minds. From this perspective, the whole user-centered design movement is a cultivation of means for designers knowing, not just assuming, the mental images people have. Stephen Kosslyn, William L. Thompson, and Giorgio Ganis' book *The Case for Mental Imagery* (Kosslyn, Thompson, & Ganis, 2006, p. 4) gives designers an accurate glimpse into how mental images work.

MENTAL IMAGES

The plausibility of the fictional design office above hinges on the answer to a debate that has raged for at least decades, perhaps centuries: do we see mental images or not? According to Kosslyn, Thompson, and Ganis, "A mental image occurs when a representation of the type created during the initial stages of perception is present but the stimulus is not actually being perceived." Mental imagery is seeing what is not there, not an illusion or a mirage, but seeing in our mind something familiar and then perhaps using that mental image to think with or solve a problem. We might experience this by answering this question: how many windows face the street in your house or apartment? Given this task most people gaze blankly for a second

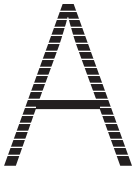
or two as they push into memory an image of their house and then briefly count the windows in the image. Kosslyn et. al. cite similar questions such as “Do you know which is darker green, a frozen pea or a pine tree? Or the hand in which the Statue of Liberty holds the torch” as examples where people use mental imagery.

Belief that this phenomena exists are not new. The authors briefly note that thinkers from the classic Greeks to Einstein claimed to use mental images “in memory, problem solving, creativity, emotion, and language comprehension.” However, introspective experiences are notoriously difficult to study, easy to refute, and thus ripe territory for endless debate. Kosslyn, Thompson, and Ganis use Chapters 2 and 3 to detail the debate, Chapter 4 to marshal empirical findings from a broad range of cognitive psychologists and neuroscientists in order to settle the debate, and Chapter 5 to articulate a well-founded theory of mental imagery.

The theory articulated in the book is based on the process of visual perception which it describes. The eye is just the start of a process that occupies much of the brain. In fact, approximately 50% of the cerebral cortex is devoted to visual processing. The brain is not like a general-purpose computer with generic processing capacity to which are downloaded different problems for analysis. Rather, the brain is like a special purpose device with different neurons in different regions hard-wired to accomplish specific tasks. Vision is one of the brain's largest tasks. In visual perception a huge volume of sensations are processed and reduced to simpler more organized forms. It's as if individual camera pixels are processed for simple features then structured into units that correspond to distinct objects and key properties that define and distinguish those objects from each other. Kosslyn and his colleagues propose that we can reverse this process and push the abstracted memory of a visual object backward onto the brain's early visual processing areas and there mentally re-construct a representation of something. Representation is a key idea here. The authors point out that stored depictive representations are not like photographic pictures. They are simplified forms that can be re-presented and then examined and to which detail can be added. It may help communication designers to think of these abstracted representations as “brain icons” because they, like drawn icons, are simplified and focus on key features of an object or idea rather than inessential details. We can use these mental images to reason about problems, like whether a jar could squeeze into a crowded pantry shelf, or to communicate with people by creating images that connect with their visual imagery. It is important to note that understood this way, there is a deep and complex relationship between seeing and thinking that deserves attention.

COMPETING THEORIES

Kosslyn et. al. identify the core of the debate as two competing conceptions of the format we use to store internal visual representations: depictive



Depictive format above

FIGURE 1

FIGURE 2

Propositional format below

**“two diagonal lines
that meet at the top,
joined halfway down
by a short horizontal
segment.”**

(Kosslyn et al., 2006, p. 12)

or propositional. The depictive approach suggests that our brain encodes images in a visual format using points, similar to the way a computer screen uses pixels. The blocks forming the triangle in Figure 1 illustrate a depictive format. The propositional approach suggests that we format images using abstract concepts like words in language or computer software. The words “two diagonal lines that meet at the top, joined halfway down by a short horizontal segment.” in Figure 2 illustrate a propositional format for the same image.

The format used may seem like an academic debate, but it matters because the format of representation makes possible, or at least preferences, different kinds of thinking and from this the creation of different knowledge.

To settle the debate the authors call upon findings that add significant detail to the outline of the perceptual process noted above. Very early in this process the image from our retina is topographically mapped point-for-point on our brain. Objects close to each other on our retina are also close to each other on the cortical area called V1. There are, in fact, several topographically organized layers in V1 with each layer providing different kinds of processing. Cutting down through layers are columns that distinguish different line orientation, curve, value, and hue. These topographic layers are part of what Kosslyn labels the “visual buffer.” The “visual buffer” then “reports” the results to other areas of the brain where patterns and shapes are assembled, where objects are formed and subsequently identified. Kosslyn asserts that through these successive stages a “population code” is assigned containing in abstracted form the key visual features that define an object. Kosslyn posits a “hybrid representation” that combines information for each point about its role in the depiction of the object, as well as additional abstracted information. “In spite of their coding nondepictive information, these hybrid representations cannot be reduced to propositional representations. Crucially, they use space (literally, on the cortex) to represent space in the world. The fact that each point codes additional information does not obviate its role in depicting the shape.”

The highlight of Kosslyn’s argument is that these encoded representations can be recalled and when they are, an image is reconstructed from memory using the same topographic neural space in the “visual buffer” that was used to “see” the initial image from the eye. In Kosslyn’s words, the “stored shape representation is primed so strongly that activation is propagated backwards, including a representation of a part or characteristic in the visual buffer (which corresponds to the depictive image itself).” Kosslyn theorizes that we literally re-construct the object from memory and create a representation of it. These are mental images.

VALIDATION

When Kosslyn and his colleagues wrote this book some years ago the viability of their theory was still open to debate. But much has happen since then to support its basic premises.

In 1988 Tootell et. al. provided a foundation for how we see when they showed a topographically represented visual image mapped on the surface of a primate brain. Over the years various scientists have developed techniques that enable them to dye a primate brain and see there on the cortex - in real time - the images from the eye. A 2012 NIH presentation by Dr. Eyal Seidemann is one example of video showing this. ("Decision Related Activity and Top-down Attentional Modulations in Primate V1" <http://videocast.nih.gov/summary.asp?Live=11769&bhcp=1>) More recently researchers used fMRI to produce an image of a person's recalled memory (mental image) of a simple object. In 2014 Dr's. Cowen, Chun and Kuhl presented findings that through observing brain activity they were able to reconstruct recognizable individual faces from people's mental images of faces they were seeing ("Neural portraits of perception: Reconstructing face images from evoked brain activity" in *Neuroimage*). The title of the March 28, 2014 Fox news article reporting this paper was "We know what you're thinking: Scientists find a way to read minds." by Maxim Lott. While the face reconstruction study may be as much about the inventiveness of the computer processes employed as it is about the biological ones, its findings dramatically support the foundation of Kosslyn's hypothesis: mental images are seen reconstructed in the visual buffer. These studies can "see" them.

SO WHAT?

The Case for Mental Imagery may sound interesting to some readers, but to others the question "So what?" may have been lingering for some time now.

So what? How is the information in this book relevant to the designer? One answer is "A theoretical foundation for communication design." Communication design has entertained competing theories to guide practice. Some, such as semiotics, are based in linguistics. Theories of visual perception such as the one articulated by Kosslyn, Thompson, and Ganis may help provide more appropriate visual ground for a theory of visual communication. Knowing how people process, store, and use images is at the heart of visual communication. It's true that communication designers create objects that use both textual and visual forms to communicate and much has been written recently about the role of designer as author and the need for more writing in design education. Without dismissing the positive role designers can play in crafting the written content of the communication they create (designer as author), or diminishing the role writing can play for organizing and expressing thought in design classes (writing in design education), Kosslyn's theory suggests that there is a good reason that college "communication" programs focus on writing while "visual communication" programs focus on image making. Visual images are the essence of visual communication. Communication designers employ forms of communication that largely bypass language. Kosslyn reminds us that people think with images. One benefit of

Kosslyn's theory as it applies to design is that it is founded on hard-wired neurobiological perceptual processes common to all people, suggesting that design principles founded on this approach may be universal, applying to people of every age, language, literacy level, and culture. With limited research resources to invest, design might do well to focus on universal visual processes that can apply to nearly everyone before building upon theories focused on individual differences.

In addition to providing a theoretical foundation for visual communication, "Visual thinking" is another defense of the book's relevance. Kosslyn's theory, based as it is on depictive representations, means that visual designers use a visual language that is inherently more flexible and less inhibited by arbitrary encoding structures than language. Depictive reasoning can be more ambiguous and less structured than propositional reasoning. Images are more direct, less categorical, less overtly defined, and thus better suited for creative thinking and problem solving than language-based propositional representations that seem plodding by comparison. "I see" is a common visual-based metaphor for sudden understanding and an apt metaphor for visually-empowered design thinking.

"User centered" is yet another response. Kosslyn's theory means that communication designers now and in the future can reliably identify the mental images that people have, thus gaining direct insight into how to communicate with them more accurately. Designers who know their subjects' mental images can more reliably produce images that evoke the correct meaning. Knowing people's mental images moves user-centeredness into the user's head, literally. The point of view for designers might be transformative.

"Evidence-based" is another reply. Kosslyn's theory doesn't just apply to the front end of design creation, but also to the back end of design evaluation. Using people's mental images to evaluate communication objects could give not only very accurate measurement of communication but insight to corrective action. A loop of creation and evaluation based on reliable measurement of mental image may provide communication design with some solid principles for practice.

Another Paul Rand quote suggests a final answer when he states, "...the designer must steer clear of visual clichés by some unexpected interpretation of the commonplace." "Innovation" is the final answer. Design has been said to be the process of converting existing states to preferred ones. Designers don't just create what already exists; they create something new. So how can knowing the images people already have in their heads help create something new? To a designer the question is the answer. Knowing what people think enables us to take liberties, to explore novel variations and "unexpected interpretations", to both connect and expand what is in people's minds. Apart from knowing the people's mental images designers innovate in the dark, ignorant of whether their novel approaches support or hinder communication.

Kosslyn, Thompson, and Ganis' theory means several things to communication design. It means that seeing and thinking are complementary, helping to explain the effectiveness of information visualization. It means that visual communication designers who create images are directly connecting to the one of the most significant means people have for processing information, for thinking. It means that emphasis on visual thinking is one key to why design is good at creative problem solving.

If design theories should be founded on research findings in visual perception and cognition, then they will in some measure be founded on work by Kosslyn and his colleagues. It's a book that most designers should read.

Cowen, Chun, & Kuhl. (2014). "Neural portraits of perception: Reconstructing face images from evoked brain activity." *Neuroimage*

Kosslyn, Stephen M., Thompson, William L., & Ganis, Giorgio. (2006). *The Case for Mental Imagery*. New York, NY: Oxford.

Rand, Paul. (1970). *Thoughts on Design* (Third ed.). New York: Wittenborn Schultz.

Advisory Board

W E L C O M E

Visible Language wishes to welcome new advisory Board member Keith Crutcher. Keith reflects our interest in connecting to disciplines whose research is well-advanced and whose knowledge is related to visual communication.

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K e i t h C r u t c h e r

Keith A. Crutcher, Ph.D., has over 30 years of experience in biomedical research and technology including prior tenured faculty appointments at the University of Utah (7 years) and the University of Cincinnati (22 years), a founding role in an early stage drug discovery company (ApoLogic, Inc.), and four years serving as a Scientific Review Officer at the Center for Scientific Review at the National Institutes for Health. In the latter role, he managed the peer review of hundreds of grant applications. His academic research program, funded by the NIH, NSF, and other agencies, included studies of brain injury and Alzheimer's disease resulting in over 100 peer-reviewed publications, two issued patents, and numerous presentations. He has also served as an ad hoc reviewer for several federal agencies and private foundations as well as serving on the editorial boards of several journals including *Experimental Neurology*, *Aging Cell*, and *Neurobiology of Aging*, where he participated in the peer review of numerous manuscript submissions. He currently does consulting work for applicants seeking research funding and provides assistance in preparing proposals and navigating the peer review system at various federal agencies.

JOURNAL INFORMATION

Visible Language is an academic journal focused on research in visual communication. We invite articles from all disciplines that concern visual communication and would be of interest to designers.

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Before there was reading there was seeing. *Visible Language* has been concerned with ideas that help define the unique role and properties of visual communication. A basic premise of the journal has been that created visual form is an autonomous system of expression that must be defined and explored on its own terms. Today more than ever people navigate the world and probe life's meaning through visual language. This journal is devoted to enhancing people's experience through the advancement of research and practice of visual communication.

If you are involved in creating or understanding visual communication in any field, we invite your participation in *Visible Language*. While our scope is broad, our disciplinary application is primarily design. Because sensory experience is foundational in design, research in design is often research in the experience of visual form: how it is made, why it is beautiful, how it functions to help people form meaning. Research from many disciplines sheds light on this experience: neuroscience, cognition, perception, psychology, education, communication, informatics, computer science, library science, linguistics. We welcome articles from these disciplines and more.

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