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Speed reading applications such as Spritz isolate individual words from bodies of text and display them sequentially, often with the middle letter highlighted. Known as Rapid Serial Visual Presentation (RSVP), its proponents suggest it can accelerate reading speed from the average of 100-200 words per minute, to over 1000. This is principally achieved by the visual system reducing the number of saccades involved in 'normal' reading. When reading a word among many other words, for example a line of text, you are reading both backwards and forwards, scanning ahead for words within your parafoveal vision, and back again. The speed reading app Spritz declares on its website that: "You'll find that you will be able to inhale content when you regain the efficiencies associated with not moving your eyes to read. And you will no longer move your eyes in unnatural ways." (Spritz)

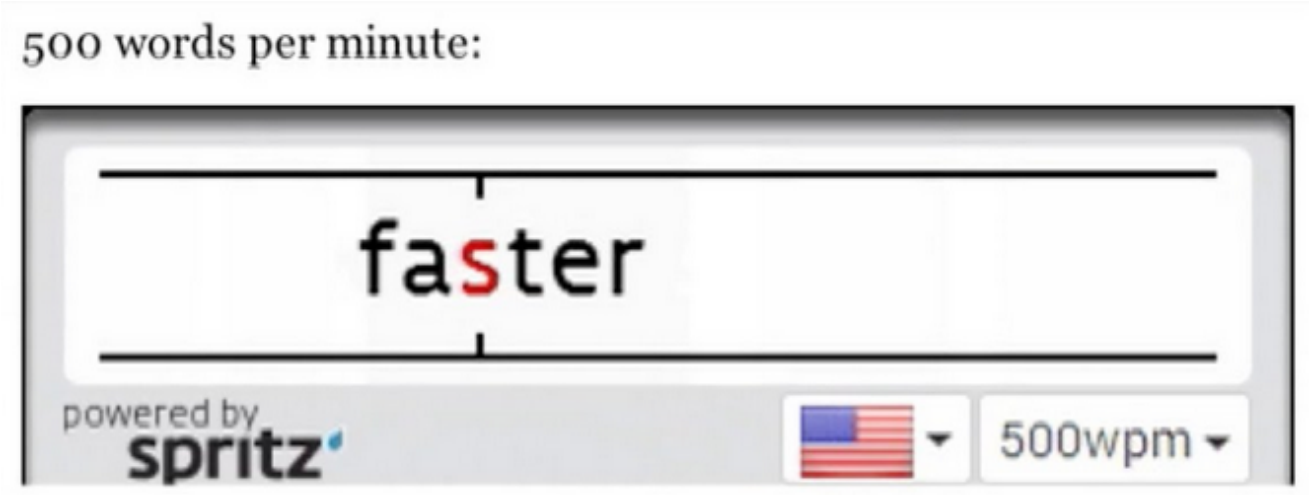


Figure 1: Screenshot from Spritz.

This is a new natural then, where we inhale content, and exhale who knows what. Not so much vapourware, as vaping words. But this invocation of old 'unnatural ways' and new physical and neuronal processes is both the most radical conceptual side effect of this esoteric technology, and the rhetoric that surrounds it. Furthermore, it is important to note that increased speed of reading is only one of the possibilities afforded by the processes of RSVP, and the degree to which comprehension 'keeps up' is questionable, as will be discussed later. In fact, speed reading as a term, application and a commercial enterprise, in the case of Spritz and others like it, has essentially appropriated and redirected the science of RSVP toward their own commercial, and one could say accelerationist ends.[1] That such an apparatus is framed in terms of increasing speed and the productivity of the reader, is perhaps unsurprising – in an age where speed and efficiency appear to be synonymous with technological development. There has of course been an increasing interest in speed with social sciences and the humanities in recent years. From the work of Paul Virilio, in particular Speed and Politics and The Great Accelerator, through to more recent work such as Hartmut Rosa and William E. Scheuerman's book High Speed Society. As they observe in their introduction:

> What was experienced as being extraordinarily speedy just yesterday… now seems extraordinarily slow. The shot lengths in movies, advertisements, and even documentaries have increased by a factor of at least fifty, and the speed with which speeches are delivered in parliament has risen by 50 percent since 1945… Speed dating and drive-through funerals remind us that even basic life activities appear to be speeding up: fast food, fast learning, fast love. (2)

Rosa and Scheuerman also consider the relations between speed and concentration, one which the aggressively temporal and linear form of the speed reader would seem to actively turn against (or even act as a therapy for):

> the time we're allowed to concentrate exclusively on one thing is progressively diminishing: we are constantly interrupted by a stream of incoming messages, phone calls, television and radio announcements, or merely by sudden breaks in our flow of consciousness that disrupt whatever activity we happen to be pursuing. (2)

Rather than turning away from speed readers because of their surface involvement in the equation 'fastness = progress', we examine how this new, temporal form of text might inaugurate a return to the technical and material fundamentals of reading – and what alternative ways of thinking through our relation to new textualities this might offer. This allows us to pose (although not always resolve) questions about technicities and materialities that converge upon the act of reading, but are not reducible to it. The claims made for speed reading applications by commercial companies such as Spritz and Spreader are weighed against clinical research and set within emerging theoretical frameworks, setting the stage for a critical design and creative practice using and abusing speed reader-type technology. We begin by introducing our initial research to date with this new machinic form of reading, and go on to explore what alternate conceptual and practical applications, beyond simply speeding up for the sake of productivity, it may afford, particularly within poetic, performative, and typographic realms. It should be noted that the text is speculative in character, seeking to articulate and provoke questions, rather than provide answers, which our research has engendered thus far, we hope this approach is fertile for readers.

Torque: Twisting Mind, Language, and Technology

Our experimental publishing project Torque [2] has to date performed several applications of speed readers as an art medium. Our first book, Mind Language Technology was exhibited at the Typemotion exhibition at FACT, Liverpool (Nov 2014 – Feb 2015) in three formats – print, ebook and speed reader – utilising bespoke manufacturing processes, from coding and bookbinding, to artisan woodwork and print-on-demand cushions, inviting the reader to discursively explore the texts, their mediums of transmission, and different modes of reading.

Figures 2 and 3: Installation view FACT, Liverpool, and artist Erica Scourti reading alongside speed reader, at The Opticon, Tate Liverpool.

We also used speed readers to display a series of questions relating to issues of privacy and security to gallery visitors during a residency at Tate Liverpool. Set at 1000 words per minute the machinic pace and aesthetic of the speed readers were suggestive of processes of text analytics employed by government surveillance systems that rapaciously 'read' and sift online activity. Artist Erica Scourti and media theorist Christian Fuchs presented work alongside the speed readers and we produced a newspaper entitled The Opticon comprising over 15,000 words of gallery visitors' responses.

Our second book The Act of Reading, comprising essays and artworks from authors, including Katherine Hayles and Tim Etchells, was produced as a speed-reader video installation and exhibited at Furtherfield, London, in 2015, for the exhibition being being read being reading being read and reading beings. We also presented a 'slow reader' where visitors were recorded reading aloud poems appearing on screen one morpheme at a time, later broadcast across Finsbury Park, where the gallery is situated.

We are currently working with researcher Tom Schofield (who we commissioned to produce an open source speed reading application)[3] at Newcastle University's CultureLab, building on conversations with neuroscientist Alex Leff. The aim is to develop a range of new trajectories for rapid (and slow) serial visual presentation methods which 'weird' this technology, and problematise the progression of reading mediums in general as being solely used and thought about in terms of increased reading speed and efficiency. Exploring instead how they might serve processes of re-learning to read across multiple formats, in multiple modes, digital and print, fast and slow, attentive and discursive, approaching a kind of hyper-reading (Hayles, "How We Read"). As a collaborative project, we are particularly interested in three distinct areas of research that speed readers intersect: visualisation, vocalisation and typography. Below we introduce aspects of this research, and close with some questions about the contexts and implications for this specific area of machine research.

Textual Landscapes

Rather than shuffling our eye along the map of information on a page, with speed readers we enter the landscape of information itself. Dropping down the mine shaft of the text, we reach terminal velocity as the foundational materialities of reading vanish from under us.

Speed reading software applications are a recent instance within a long lineage of evolutions of how the written word is consumed and distributed. Mainstream publishing traditions, from parchment to broadsheet to ebook, have primarily placed words into bodies of text in two-dimensional relation on a surface, awaiting scanning by a moving eye. Beyond the confines of the mass media, the serial presentation of words has been experimented with and challenged through a variety of artistic practices, principally, concrete poetry, film titles, and text-based art across print, digital and filmic forms (Scheffer et al.). Digital media in particular, affords new forms of interaction and display, as Katherine Hayles writes, with "the advent of digital technology, writers have more flexibility in how they can employ the temporal dimension as resources in their writing practices… as a machine to organize time." (Hayles, "Digital Poetry" 181). Operating in a hinterland between printed page and digital platforms, new 'virtual reality' texts such as Mez Breeze and Andy Cambell's Prisom, float on virtual pages, on virtual planes, within recognisably figurative landscapes.

However much screens, and the software and hardware behind them, may have ruptured the fundamental economies of books, reading 'pages of text' still persists in the form of ebooks, PDFs, web-pages, etc. Perhaps now though, the term 'page' refers more to the screen than printed leaves, becoming a more amorphous and reconfigurable form, but still fundamentally a surface on which information can be recorded – across, not into, which the gaze moves. Furthermore, the paper page persists as skeuomorphism, as drop shadow hovering at the edges of most onscreen documents, reminders of the ability to print, icons of post-digital textuality, its residual form refusing to be scraped away from our collective palimpsest. The persistence of this skeuomorphism is echoed in speculative and artistic reading apparatuses, designs for which are often dedicated to the task of handling the book-codex, particularly turning pages. As Alessandro Ludovico's work on post-digital print has explored and articulated so well, print remains a highly effective interface, and the relationship between print and digital is far from being a one-way street.

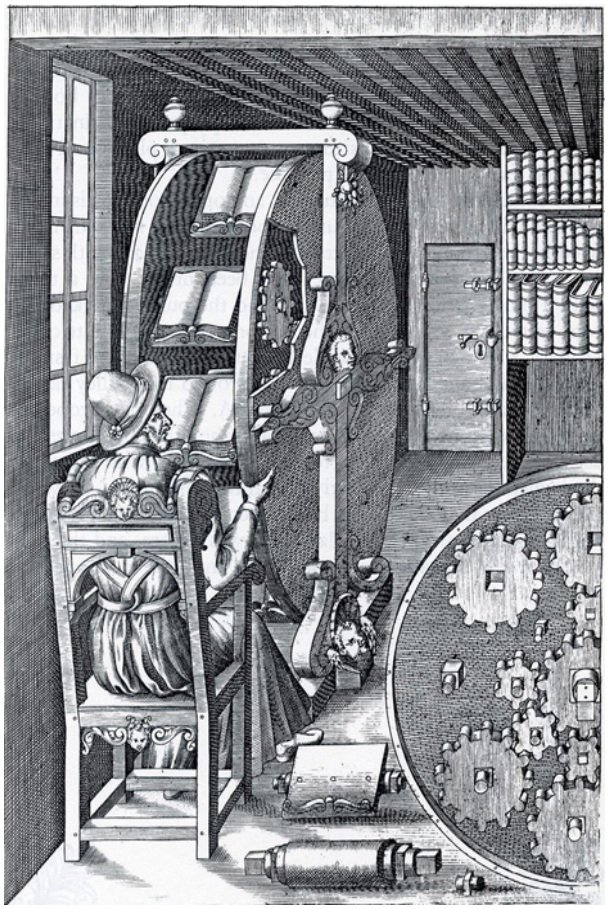


Figure 4: Agostino Ramelli's Bookwheel, engraving from Le diverse et artifiose machine, 1588. Reproduced in A. G. Keller, A Theatre of Machines (London: Chapman and Hall, 1964).

Figure 5: Rodney Graham, Reading Machine for Lenz, 1993.

Speed readers, by eschewing this figurative link with the page as a text map, draw on more primal facilities of the visual system, in particular how it facilitates orientation through landscapes and the ability to recognise objects within; processes that our reading and visual systems recycle for reading, being a much more recent invention (Dehaene). To understand the potency and relevance of speed

reading in relation to such contexts and processes, we need to look more closely at the nature of our visual and reading systems.

Speed readers achieve their acceleration of text processing primarily by suppressing the need for eye saccades: the optical twitches back and forth across a text that our eyes perform when reading lines of text. This process appears to be an evolutionary vestige of the way in which we build high definition images of our surroundings. Around 33% of our entire visual system – from retina to the visual cortex in the brain – is concentrated on producing high definition in only 0.1% of the visual field, right at its centre: "When you hold your arm fully extended and look at your thumbnail, that's about the extent of central vision" (Leff 178). Nevertheless, we feel as though we have a high resolution image of the entire field because the visual system casts around, 'sampling' and registering positions, and reconstructs the whole from these remembered hi-definition fragments (Leff 178-180).

Likewise, in page reading, the intensity of visual equipment is not only guided along horizontally; it also desirously, distractedly, produces minute precognitions of the visual field composed by the page, flashing its optimal visual spot-light not only from the word we are reading to the next word along the line, but also to a spread of locations down the page, before returning. Reading in this way builds up a picture or model of a language world, from many smaller encounters with many individual words, each registered in relation to others on the page. Furthermore, in order for page reading not to blur the text, the brain switches the visual cortex 'off' during an eye movement and on again when the eye settles. Which is to say that reading, and in fact landscape viewing, are themselves rapid and serial in their presentation.

Alex Leff's research at UCL's Aphasia lab has observed that it is these eye movements and on-off actions, or rather the struggle to make them and build up a coherent picture from them in relation to a flat plane of text, which can be a substantial cause of reading disorders such as alexia and aphasia. These ostensibly cognitive disorders are more accurately located in an instability between the interface of muscular and nervous systems. The Aphasia Lab use RSVP to simulate eye movements and retrain the visual system, and have developed web-based therapies, including Read-Right, which can help to improve reading speeds in patients with Hemianopic Alexia.[4]

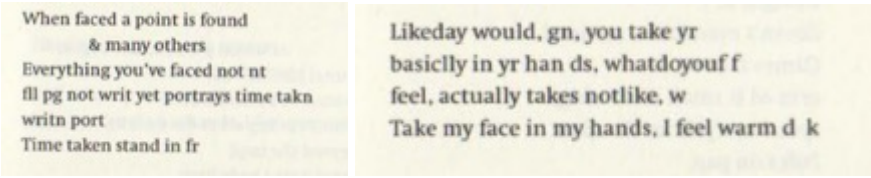
Using the figure of the landscape itself as rapidly and serially presented, we can perhaps better understand this therapeutic quality, and also the feeling of falling through a text we get when we encounter speed readers. Rather than simulating the distracted twitching of page reading, the speed reader produces an always-relevant visual stimulus akin to a landscape rushing by, perhaps a forest of letterforms. Each glimpse of the text in RSVP is a high definition fragment in which an animal or fruit might be seen. This provokes the question, if speed reader technology and associated innovations can help people with noticeable reading disability as in the work of Alex Leff and others, is there a gradient of ability that 'normal' readers can ascend further up? Although the modern page-reading mental apparatus has been trained into a concentration of singular focus, do the eyes themselves lag behind in an integral

archaic distraction?

Subvocalisation

Commercial apps like Spritz, redirect the science of RSVP and Optimal Viewing Position toward what they claim is a more fluent, focused experience, that smoothes over disorders by requiring less physical engagement of visual or subvocal systems. The tagline on Spritz's website reads: "Reading Reimagined. Improve focus, completion, and fluency. Enjoy a pleasurable, effortless reading experience." Writer Colin Schultz in something of a puff piece on the technology wrote that the: "the process feels less like reading and more like absorbing the text". To which we might add: or is it the text absorbing us? And furthermore, is speed reading just a spectacle of reading, that enables the eye to better register and perhaps to 'complete' more texts, but at the expense of comprehension and the textual sensorium?

The saccadic twitching of the eye is accompanied and echoed by the subvocal twitching of the throat, called subvocalisation – also subdued in the speed reading experience, where increased speed results in a decrease of the 'inner voice' we hear when reading. Literary scholar Steven Connor observes "what readers may feel as a sounding in the mind may be due at least in part to the effect of very small impulses sent by the brain to the larynx and the tongue" (Connor 106) – and presumably also these impulses bouncing-back to the brain. This subvocal physical encounter with texts is a point of material empathy with the author, whose writing process was accompanied by the impulses in the larynx approximating the words they write. Poet Caroline Bergvall's text About Face refolds the pain of a "sutured jaw" that she suffers while performing, back into a poetic text. The poem that results is a kind of pseudo-transcription of the disfluencies, aposiopesis, and gasps of speaking with a faulty jaw, made-textual by disordering and removing letters, and adding gaps into the middle of words.


When faced a point is found
& many others
Everything you've faced not nt
fll pg not writ yet portrays time takn
writn port
Time taken stand in fr

Likeday would, gn, you take yr
basiclly in yr han ds, whatdoyouf f
feel, actually takes notlike, w
Take my face in my hands, I feel warm d k

Figure 6: Extracts from Caroline Bergvall's About Face (31-45).

About Face emphasises the bio-technical, subvocal – and perhaps saccadic – apparatus of reading as a kind of empathic struggle that echoes Bergvall's own pain and struggle with enunciation. The poem's meditation on faces, by its emphasis on the mediation of Bergvall's own face, lend it an intimate quality.

We might observe then that subvocalisation, repressed in speed reading, is a vital part of the sensuous quality of a poetics. But perhaps, like a child moving her lips as she reads, the subvocal is something we have outgrown. Connor muses "that our difficulty in describing [the internal voice's] qualities is due to the fact that we are hearing its last dim spasms and whispers. Perhaps, following the stilling of our

external lips, we are undergoing a slow quelling of the internal voice" (106). The speed reader then may not be a premature technical closure of our sensual embodiment of language. Rather, a symptom of reading itself shedding these unnecessary evolutionary vestiges, a sublimation no less.

In this sense, speed reading pushes against our physical and cognitive capabilities, amplifying or awakening certain physical responses, such as blink reflexes and iris contraction, just as it subdues subvocalisation and eye-saccades. Are some of these responses more useful for a future reading? If this is so, we might ask: what will the formal qualities of our future literature be, at the level of assonance and consonance, for example? How does rhythm enter into the semiotic regime now that a text engulfs us, rather than an ocular drift, back and forth across a body of text? Furthermore, with speed readers, do we enter the text, in a mode approaching a trance state? Is this a realm in which the distractions of self-reflection and self-awareness are occluded, or appear only as spectral undefined borders? Could this bodiless, and selfless reader be the foundations for a new literary subject?

Text Comprehension and the Materiality of Type

A recent review paper on speed reading applications suggests that users are unable to increase the speed of reading whilst still maintaining proportionate levels of comprehension (Rayner et al.). At best, studies have shown that readers may still be able to comprehend individual sentences at increased speed, but at worst they can render reading slower than standard rates: "Successful reading thus requires more than recognizing a sequence of individual words. It also requires understanding the relationships among them and making inferences about unstated entities that might be involved in the scenario being described." (Rayner et al. 5). Furthermore, the assertion by makers of apps such as Spreader and Spritz that eye movements and saccades are wasted time does not stack up, because cognitive processing continues during saccades, and "devices that present words faster than readers' natural pace may run the risk of presenting a word before the brain is prepared to process and understand it" (Rayner et al. 8-10). Additionally, reducing the inner sounding of words, or subvocalisation, as suggested by proponents of speed reading, who deem it linguistic loitering or neuronal negligence, has an adverse effect upon reading because "translating visual information into phonological form, a basic form of language, helps readers to understand it" (Rayner et al. 16). Finally, the onward recursive march of speed reading apps do not allow readers to easily go back or reread certain parts of texts and accordingly makes misinterpretation more likely (Rayner et al. 17).

Proponents of speed reading decrying regressive eye movements, the sounding of words, alongside a championing of speed readers' ability to make quick and correct inferences at all times, is suspiciously ideological, and runs the risks of enacting an almost vitalist or techno-positivist critique of bodies, both human and textual. But if we put aside increased speed as a focus of their use, the space of increased legibility and readability offered by the technics of speed reading might enable the catalysing and disruption of other areas of the reading experience. Beyond simply increasing speed, new possibilities

emerge regarding content, typography, and the physical space we occupy, and that text occupies in us, when reading.

Experiments with typography and speed reading offer certain affordances to explore both the fundamentals of reading and to push it into more divergent or liminal territory: investigating where the limits of legibility may lie, what machinic systems of computation and display may enable or replace, and how in turn this might affect our mediation of and with the world. Recent work by theoretical neurobiologist Mark Changizi observes that human visual signs possess a similar signature in their configuration distribution, suggesting that there are underlying principles governing their shapes. He provides an ecological hypothesis that visual signs have been culturally selected to match the kinds of conglomeration of contours found in natural scenes because that is what we have evolved to be good at visually processing (Changizi et al.). This body of research suggests that the words you are reading now look this way because they resemble the contours found in natural scenes, thereby tapping into our already-existing object recognition mechanisms.

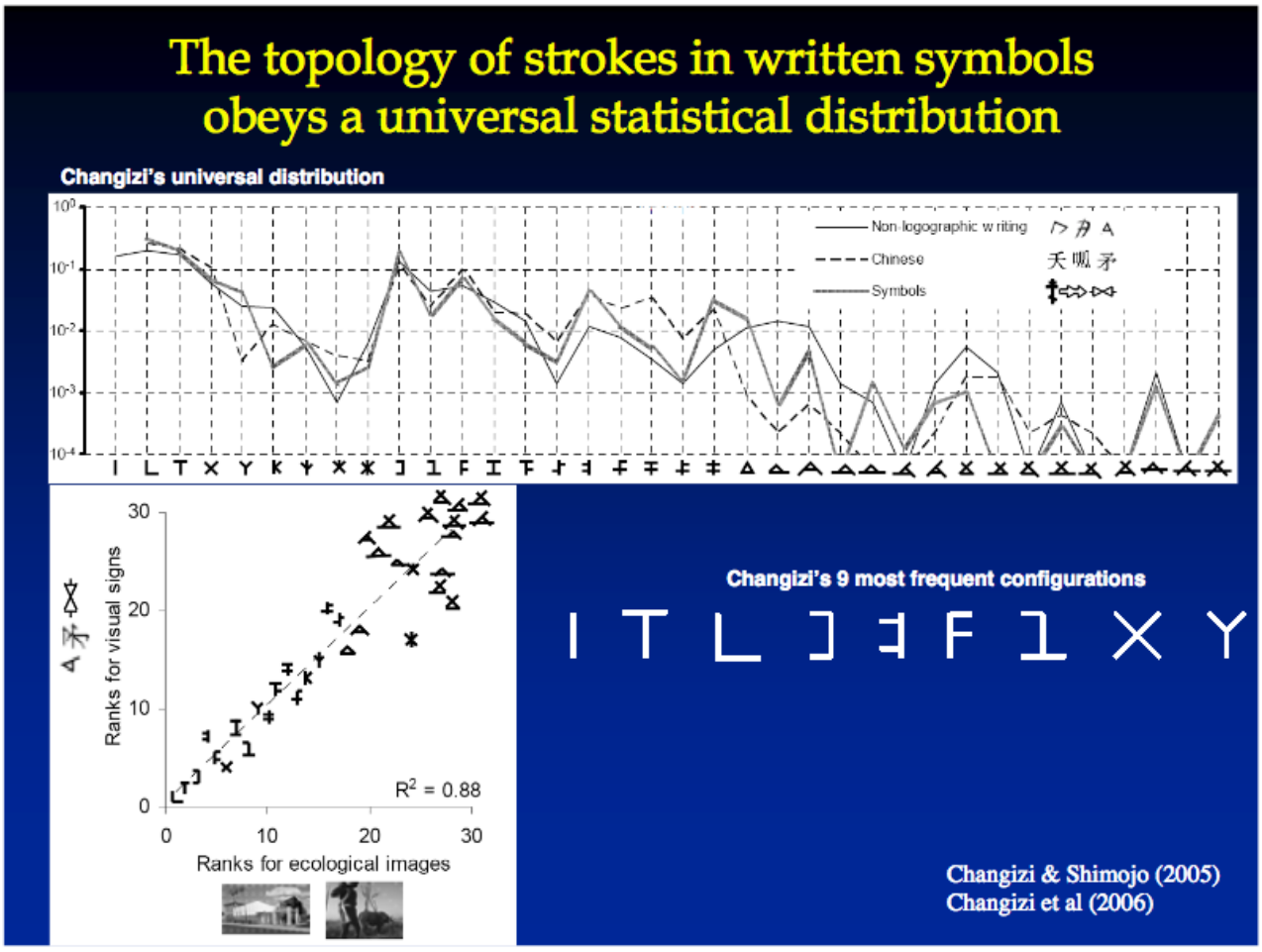
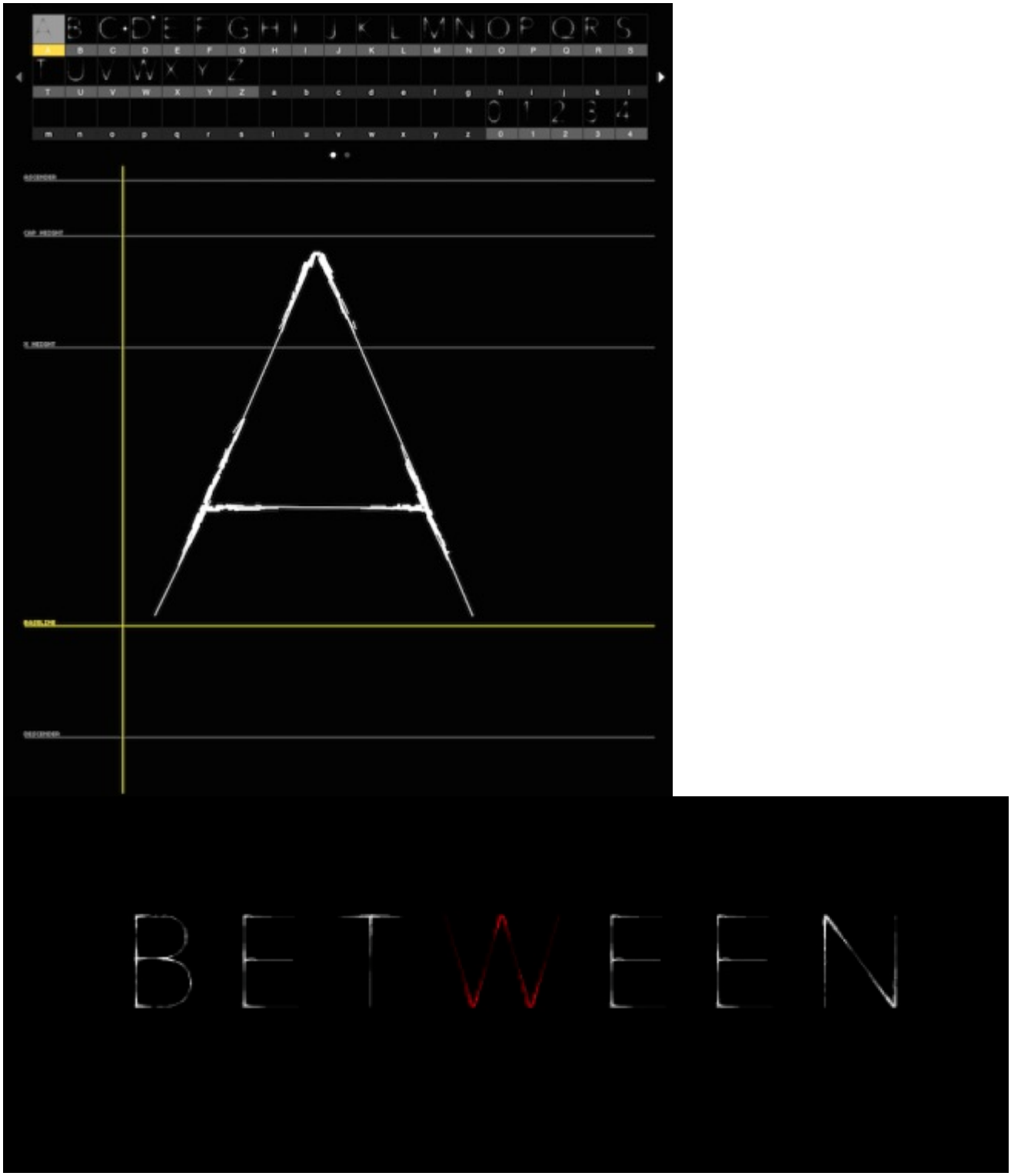


Figure 7: Slide reproduced courtesy of Stanislas Deheane.

Furthermore, the reading system synthesizes not only external worlds but internal ones too, recycling both the natural landscape and our visual system to new ends. The neuronal recycling hypothesis implies that our brain architecture constrains the way we read, and has functioned as a massive selection process, where over time, writers and designers have developed increasingly efficient notations that fitted the organisation of our brains. Cognitive Psychologist Stanislas Dehaene argues our cortex did not specifically evolve for writing, rather, writing evolved to fit the cortex and to be easily learnable by the brain.

The typeface shown below is designed to be used with a speed reading application, and accentuates the areas of letters where contours intersect. As discussed above (and demonstrated in Figure 10 below), the visual system recognises objects through the configuration of their contours. Where these are accentuated or removed they become easier, or conversely more difficult, to recognise. This typeface combines this aspect of visual recognition with the increased legibility of type in RSVP, creating a textual encounter that is both more and less legible, experimenting with the possibility and affordances of a kind of liminal reading: a reading on the edge of different physical, typographic, and neuronal systems.



Figures 8 and 9: Images of Torquera typeface by Sam Skinner.

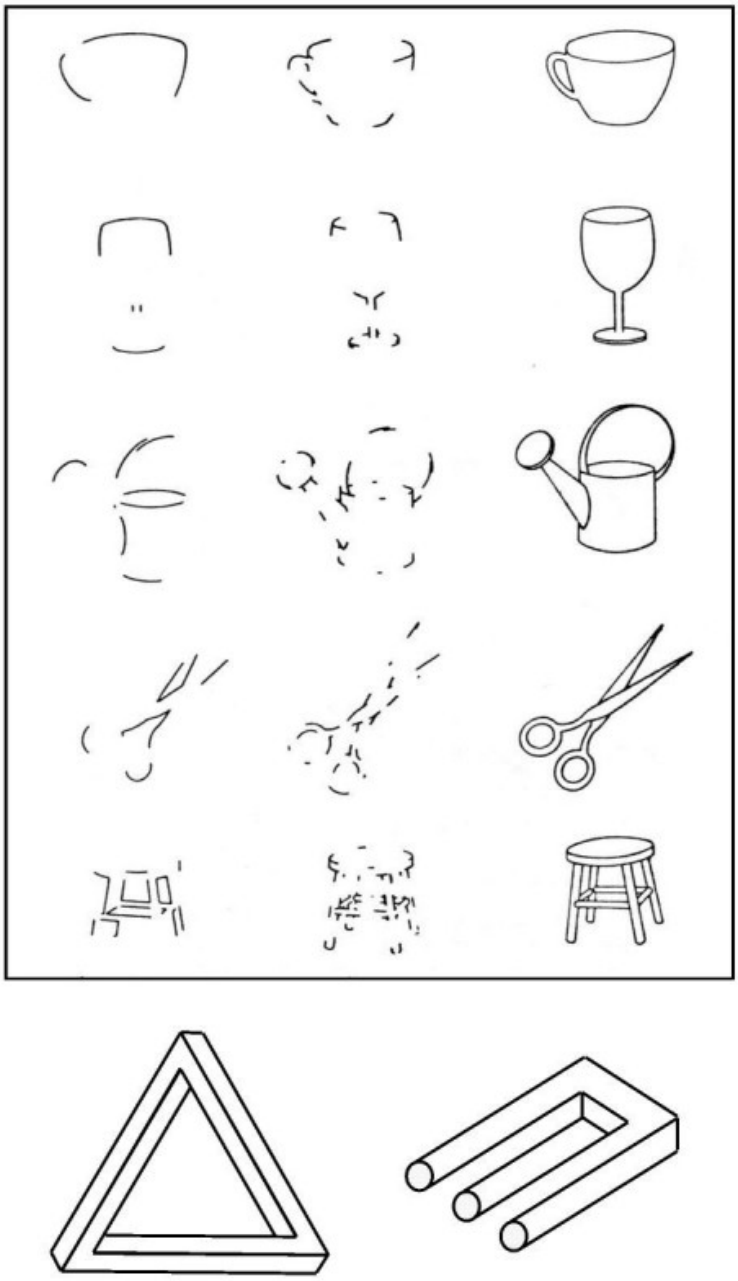


Figure 3.7. Complex objects are recognized through the configurations of their contours. At the places where they join, these contours form reproducible configurations shaped as T, L, Y, or F. If these junctions are erased, the images become much more difficult to recognize (left column), whereas deletion of an equivalent amount of contour that spares the junctions causes much less difficulty (middle column) (after Biederman, 1987). As soon as an organized set of contours is present in the image, even if it does not form a coherent whole, our visual system cannot help but perceive it as a three-dimensional object (bottom).

Figure 10: Courtesy of Stanislas Deheane, from Reading in the Brain.

Researching the phenomena of reading as a composite machinic system enables a kind of meta-reading of the world beyond words, where text becomes a microcosm and interstice of other systems, providing unique answers to the fundamental questions: why does text look the way it does? Why does writing consist of such a number of strokes, arranged in such a way? Where might the genesis of these fundamental qualities of textuality itself lie?

Within the context of Machine Research – which we understand as a field of enquiry that asks how both the human and nonhuman is put into a critical perspective by machine driven ecologies – how might text or the technics of reading be seen in machinic terms as an apparatus operating between worlds? And to take this one step further, how might the machinic be driven by more fundamental exigencies of matter – where matter precedes agency, both human and technical? Can these processes, these machinations, be seen in terms of an engine at the heart of life, fundamental to and transferring energy between systems? Iris van der Tuin and Aud Sissel Hoel describe in their diffractive reading of philosophers Ernst Cassirer and Gilbert Simondon, the “ontological force” of technological apparatuses. Writing that “what takes Cassirer’s and Simondon’s accounts beyond the terrain of relational and processual approaches, is their insistence on an irreducible third ingredient in the ontological entanglement: Technicity” (188), where “the human/nature mangle [is] essentially mediated by tools or technological objects” (190).

An instance of this entanglement as co-constitution is suggested when we look at the evolution of language, tools and cognition; where it matters less which came first as each co-constitutes and catalyses the other in a continual process of becoming (Gibson and Ingold), trading places, entangled, one in the other. As such, each can be perceived as being as alive as, and alive to, the other. Speed reading as we have framed it, can be studied as another fork in this process of differential re-becoming: a McLuhan-esque moment of ‘retribalization’ perhaps, where the speed reader returns the reading subject to an animalist state of orientating through a landscape and cognizing objects within.

Through the machinic processes used to both analyse and evolve our reading systems, old divisions between nature and culture fall away, becoming another iteration in a long line and tangled web of linguistic evolutions. Perhaps, we might rethink them and refer to speed reading machines instead as rereading machines, where their rapid recursions offer a more performative means or third space to mediate new textual landscapes, finding a home and use within the aesthetic domain, less accelerationist, more experimentalist. After all, machines have the advantage of not having to recycle old neuronal systems like humans do, and present new ways to read and write, forming ruptures in the possible we describe as new media. Perhaps speed reading machines serve as an interface, a kind of machinic empathy operating between web crawling bots and spiders rapaciously indexing the web, and our own skimming of inboxes or abstracts. Or is speed reading rather a symptom of trying to keep pace with machines? Whatever the answer, the limits of reading speed, and crucially also of comprehension

are important markers, delineating the difference between page turning and reading. Furthermore,

how we write into and for, new forms of reading, holds significant potential. Both reading and writing are mediated by machines, but as Sean Pryor and David Trotter remark, “the converse… is equally important: writing mediates technology.” (10). Accordingly, new literacies, new writing, and new forms of reading must in turn mediate machines and our agglomeration with them.

Conclusion

So where next? And what is the role of Torque, here operating as a public research project, and our role as people who are inherently skeptical of narratives portraying history as a succession of ever-faster ever-more-efficient technologies – and nevertheless awake to the therapeutic and speculative potential of reading machines? As ever, the answer is not to ignore this new technology, but to explore its embedded strangeness. We propose that speed reader technology might indeed play a part in navigating contemporaneous evolutions in computational culture and new modes of reading. After all, the speed reader itself is merely one example of a tendency for media to flow forward, often with little concern for the past. Twitter streams, 24 hour rolling news coverage, and the notion of the status update – a new self every time – are other associated phenomena of the contemporary reading subject.

We have observed our own tendency to become distracted while reading long form writing online, and this is a common complaint. In a study of hypertext in pedagogy, Gail A. Hinesley notes that researchers have found evidence of “cognitive overload” and “a haphazard, hypertext-structured thought process” resulting from this common form of online text (Hinesley). The potencies discussed in this paper, of the speed reader and of the body as revealed by speed readers, might help us to disentangle the relation between this distraction, the digital-age mind and reading itself. Plato famously decried writing for its potential ill effects on memory and verbal communication, but was there ever a time different to now, when technics arrived without deleterious, corrupting effects? By producing our own speculative technicity in collaboration with others, we seek an alternative platform by which reading itself can be reassessed as a component activity of contemporary thinking and being-with the world.

Notes

[1] Accelerationism is a term coined by Benjamin Noys, to refer to the political ideology of embracing Capitalism’s tendency towards destructive speed. In recent years, there has been a split between “left-accelerationist” theorists such as Alex Williams and Nick Srnicek (2013), and the “right-accelerationism” of Nick Land, who suggests that rather than using the collapse of capital to improve social conditions, we should embrace accelerated flows “precisely for its inhuman, violent, and destructive power” (Shaviro 2015). Both of these trajectories place an emphasis on the increased opportunities offered by technological innovation, to revolutionise social relations. By making the

equation of neoliberal-accelerationism here, we observe that the accelerationist ideology in technology-entrepreneurial culture has the tendency to value the financial benefits of an innovation over its particular usefulness or contribution to people's well-being.

[2] See project website here: http://www.torquetorque.net/

[3] Made using Processing and available here: https://github.com/tomschofield/speed_reader.

[4] For further details, see: http://www.ucl.ac.uk/aphasialab/alex/home.html.

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