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Sylexiad: a typeface for the adult dyslexic reader

Estimates of the number of art and design students with dyslexia are as much as 11% higher than the national average of 4%; a further 6% have mild dyslexic characteristics¹. Robert Hillier questioned his own reading difficulties, and was diagnosed as dyslexic. It was to be the catalyst for a project that is still ongoing.

When I started my research project at Norwich School of Art and Design in January 2001, the limited typographic recommendations by the dyslexia organisations tended to be for sans-serif fonts. Arial, a Microsoft version of Helvetica, was recommended by The British Dyslexia Association, whilst Dyslexic.com recommended Sassoon Primary, a children's text font. Only the International Dyslexia Centre favoured a serif font, Times New Roman. It is worth emphasising that these typefaces were created by non-dyslexic designers for a non-dyslexic audience.

parob

parob

parob

pArOb

As part of the formative stage of developmental typeface testing, fonts set as individual words were compared for legibility and readability. The non-word 'parob', which contains two similar character sets, p/b and a/o, were set in, (from top to bottom), lower case Arial, Sassoon Primary, Times New Roman and Dine 2.

Although a number of dyslexic fonts have emerged since my research, widespread interest in dyslexia and typography can only be viewed as a relatively recent phenomenon. As such, I would argue that typographic rules and principles have consequently been framed from a literate, non-dyslexic viewpoint.

A key typographic principle, for example, concerns word shape. The psychologist James Cattell first proposed the word shape model in 1886.² It states that lower case letters are more legible than upper case forms because ascenders and descenders provide greater word shape for the reader. It is the earliest recognition model in psychological literature. It has, however, been rejected by cognitive science in favour of the parallel letter recognition model which

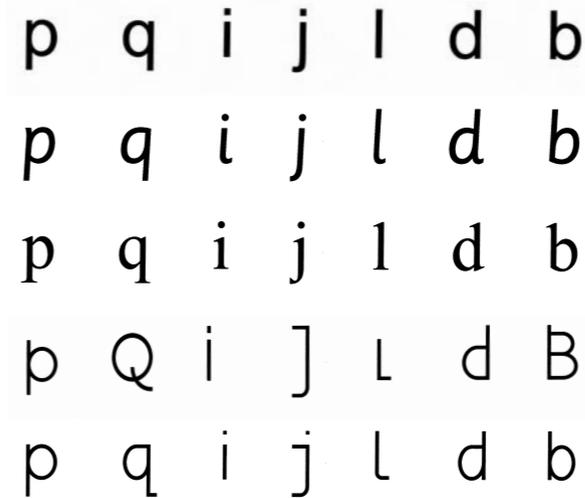
states that the letters within a word are recognised simultaneously and the letter information is then used to recognise the word.³

I began to question the typographic recommendations of the dyslexia organisations and the established rules of typographic legibility, in particular the notion of word shape. The aim of my research was therefore to test the dyslexia typeface recommendations against my own typeface designs in order to establish the typographic characteristics dyslexic readers actually preferred and why.

The design process used throughout my investigation was grounded within the cognitive aspects of dyslexia, and in particular, the visual aspects of the condition. It was also initially based on word shape. The unique testing model I have devised and employed throughout the research is called developmental typeface testing. It is important to note that psychologists rather than typographic designers have conducted all previous studies, which has had an impact on ideas concerning typographic legibility. As a result, all of their tests have been retrospective in that they always occur after the design process, never before or during. What makes developmental typeface testing unique is that rather than being an exclusively retrospective process, it has both formative and summative elements. This allows typefaces to be designed in tandem with the testing process.

The formative stage of the process comprised a series

1. Figures from the Surrey Institute of Art and Design, 'Staff Development on Dyslexia Awareness', Epsom, 1999, and Ian Smyth, 'What is dyslexia?' World Dyslexia Foundation Website. web.ukonline.co.uk/wdnf/what.html 1999, p.1.
2. See Kevin Larson. 'The Science of Word Recognition', *Eye* 52. 2004, pp. 74-7.
3. *ibid.*
4. See Linda Silverman, 'Visual Spatial Learners: The Power of Images'. Conference paper, London, The London Institute, 2000.



As part of the formative stage of developmental typeface testing, fonts set as individual characters were compared for legibility. Here, seven letter strings containing two similar character sets (b/d/p/q and i/j/l) were set (from top to bottom) in lowercase Arial, Sassoon Primary, Times New Roman, Dine 1 and in Dine 3.

of comparative test studies, which resulted in the design, development, and testing of a number of radical and experimental fonts called Dine. Dine 1 was based on a diagnostic dyslexia handwriting checklist,⁴ which included unusual letter spacing, strange letter formations, a combination of upper and lower case letters and an overall lack of letter fluidity. The form of Dine 1 can be viewed as being illegible. It was, however, an appropriate starting point for the investigation as it facilitated subsequent font development into less radical and more legible forms. Dine 2 is a duocase font, evolving as a result of the testing of Dine 1, which in turn, led to the design of Dine 3.

During the formative stage, a succession of dyslexic reader groups was established at Norwich School of Art and Design. These groups provided both quantitative and qualitative data concerning a number of comparative tests involving specific text formations. The Dine fonts were

tested against lower case and upper case forms of Arial, Sassoon Primary and Times New Roman set as individual characters, words, sentences and paragraphs. During each study test comparisons were made concerning the design, readability and legibility of each font. The outcomes and reader responses to a series of questions, coupled with my own experiences as a dyslexic reader, helped to inform each subsequent design of the Dine fonts.

An analysis of the formative data attempted to high-

As part of the summative stage of developmental typeface testing, fonts set as individual sentences were compared for legibility and readability. In this example, lines from Night Mail by W.H. Auden were selected due to the strong rhythmic, rhyming and repetitive nature of the stanzas and set (from top to bottom) in lower case Arial, Sassoon Primary, Times New Roman, Dine 3, Serif Sylexiad and Sylexiad Sans.

And applications for situations, and timid lovers' declarations,

And applications for situations, and timid lovers' declarations,

And applications for situations, and timid lovers' declarations,

AND APPLICATIONS FOR SITUATIONS. AND TIMID LOVERS' DECLARATIONS.

And applications for situations, and timid lovers' declarations,

And applications for situations, and timid lovers' declarations,

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As part of the summative stage of developmental typeface testing, fonts set as individual paragraphs were compared for legibility and readability. In this example, texts from The Dorling Kindersley Children's Illustrated Encyclopaedia have been set in Serif Sylexiad (left) and Sylexiad Sans.

light the differences experienced by the readers when reading different typefaces. An attempt was also made to identify the significant factors required in order to develop a preferred typeface for the adult dyslexic reader. It is interesting to note that of all the typefaces tested during the formative stage, the readers found Dine 1 (the font with most shape) to be their least favoured font. Dine 3, however, (the font with the least lower case shape) was the readers' most favoured font. The analysis also informed the design of Sylexiad, the first variant of a typeface for the adult dyslexic reader. Sylexiad has two initial forms, a serif version called Serif Sylexiad and a sans serif called Sylexiad Sans.

The summative phase of developmental typeface testing involved the comparative testing of the Sylexiad fonts against the other test fonts of Arial, Sassoon Primary and Times New Roman. Internal trials resumed at Norwich School of Art and Design whilst external trials were conducted at the University of East Anglia. Both trials comprised of a dyslexic group and a control (non-dyslexic) group. The summative element involved study tests with upper and lower case texts set as individual characters, words, sentences, and paragraphs. Comparisons were made between the readability and legibility of each font.

Distinct typographic preferential differences between the two groups emerged. The majority of non-dyslexic readers preferred: serif style fonts, lower case forms, large

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x-heights, medium weights, variable strokes, normal inter-word spacing and familiarity of form. They also preferred Times New Roman as a family. The majority of dyslexic readers, however, preferred handwritten-style fonts, upper case (Sylexiad) forms rather than lower case forms, long ascenders and descenders, light weights, uniform strokes, perpendicular design, generous inter-word spacing and, as with the control, familiarity of form. Unlike the control they preferred Serif Sylexiad as a family.

My findings indicate that for the majority of dyslexic readers tested, the typographic characteristics of generous inter-word spacing allied to the light weight and slightly condensed form of the Sylexiad fonts were significant. The investigation also indicates that for subjects with reading difficulties such as dyslexia, it is the combination of spacing, weight and form that is often more important than individual letterform design. More controversially, my research questions the importance of word shape as a useful recognition model for dyslexic readers.

During the summative stage there was also a distinct preference by the dyslexic readers for those paragraph texts set in upper case rather than lower case forms. These findings, coupled by the fact that most reversal difficulties occur in lower case rather than upper case forms, would tend to support (at least for the majority of the dyslexic readers I have tested) the parallel recognition model favoured by cognitive psychologists.

Sylexiad is only the first version of a typeface for the adult dyslexic reader. Further research into word recognition and the testing of new versions of Sylexiad against new fonts and new dyslexia typeface recommendations will therefore continue.

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