## Towards evidence-based typography: First results

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At the previous TEX Users Group meeting we described a program to revisit the long-standing dicta of typography from the point of view of experimental science [9]. Indeed, any practitioner of the art "knows" that serif fonts are better for continuous body copy, while sans serif fonts are better for the texts intended to be read in chunks, like advertisements, that optimal line sizes are based on the physiology of eye movement, etc. However, many traditional views about human organisms are not confirmed by rigorous experiment: after all, a couple hundred years ago people also "knew" that profuse blood letting helps to cure a number of diseases including bubonic plague and the common cold [5]. Thus we started a long term program to study whether the traditional ideas of typography are confirmed by experiment.

Recently Legge and Bigelow studied readability and legibility of text with different font sizes [7] which led them to the so-called *ecological hypothesis*: the print sizes actually used over the centuries in book making are in the "comfort zone" for a normal vision reader, and variations in the size are of low importance. A natural generalization of this hypothesis is that other typographic devices like serifs or their absence do not matter much if they have been used in typography for a long time. We decided to test this generalized hypothesis.

In our experiments we asked the subject to read texts typeset differently and answer multiple choice questions about them. TEX allowed us to easily obtain high quality texts with controlled typographic features.

In the first series of tests we studied the influence of serifs on reading and comprehension. The experiments with serif and sans serif fonts described in the literature [2–4, 8] give controversial results: some studies show the advantage of serifs, while some indicate sans serif fonts are more legible. One should note that in these experiments (with the notable exception of [8]) the texts were typeset in different "superfamilies" (mostly Times and Helvetica), which may be a confounding factor: there are many differences between Times and Helvetica besides one being a serif font and another being a sans serif one. Therefore we chose for our experiments a pair of fonts from the same "superfamily": PT Serif and PT Sans by Paratype [6] (see Figure 1; note the difference in the alphabet width of the fonts due to the serifs). Their shapes are very close, and thus we can assume that the presence or absence of serifs is the main difference between the fonts. The experiments with Cyrillic readers ($n = 238$) showed (see Figures 2 and 3) that there was no statistically significant difference between serif and sans serif fonts — neither in the speed of reading nor in the number of correct answers about the text [1].[1] These results corroborate the generalized ecological hypothesis.

The quick brown fox jumps over the lazy dog.
01234567890 fi æ œ

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01234567890 fi æ œ

**Figure 1**: PT Serif and PT Sans fonts

Currently we are studying the influence of the line length (is it really necessary to do two-column typesetting in landscape orientation) and justification on reading speed and comprehension. Our preliminary results indicate that these factors also do not significantly influence the outcome.

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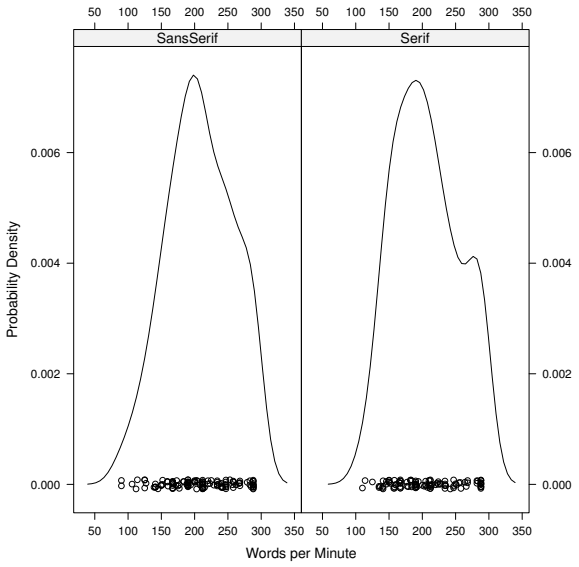


**Figure 2**: Reading speed for sans serif and serif fonts

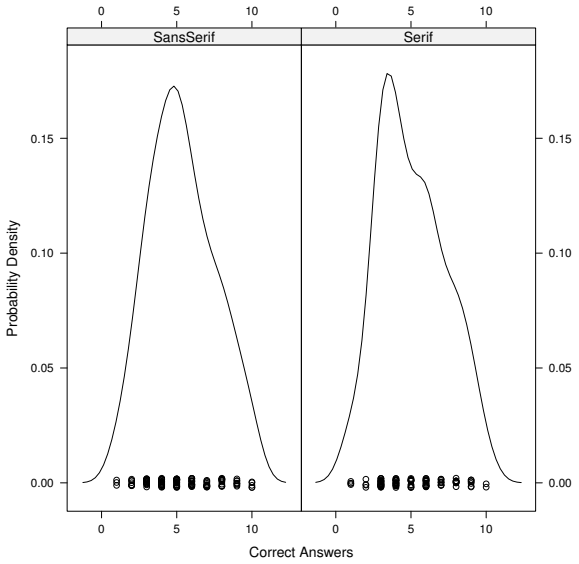


**Figure 3**: Reading comprehension for sans serif and serif fonts

*himself, in Fifty-eight Years Practice: Or, an Account of the several Diseases incident to Mankind, Described in so plain a Manner, That any Person may know the Nature of his own Disease, Together with several Remedies for each Distemper, faithfully let down, Designed for the Use of all Private Families*. Henry Kent, London, 1742.

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