Legibility Investigation: Towards controlling typeface variables

Abstract

One frequent problem in legibility investigations is that the tested typefaces vary on too many variables. In an investigation which compares typefaces that – at the same time – vary on letter width, weight, contrast and skeleton, it will be difficult to determine precisely why the findings come out as they do, and the external validity suffers. By applying a method of integrating design practice with academic research, I have designed a new typeface family that addresses this problem of multiple typographical variables. At its current stage, the typeface family Neutral Test has seven members. One is the master typeface; three of the remaining typefaces have one stylistic feature that differs from the master (skeleton, weight, and width); and three have two stylistic features that differ from the master (weight/skeleton, weight/contrast and weight/width). In an experimental investigation where the test material is based on the different members of Neutral Test, the researcher will thus be able to identify the specific stylistic feature that causes a given difference in performance.

Author Keywords

Type design; fonts; legibility; reading; perception

Research Imperatives

Many studies into typeface legibility are carried out by researchers from a non-design oriented academic background. These researchers – naturally – do not have a professional understanding of typography, which tends to reduce the suitability of their test material. For example, basing the test material on the typefaces Times Roman and Courier will cause problems in the analyses of the outcome, since the typefaces differ on a number of stylistic features including stroke contrast, weight, height-width proportions, letter skeleton and the shape and style of the serifs (fig. 1). It will consequently be difficult to draw any conclusion about why the results came out as they did. Such comparisons will only inform us about the difference between the two typefaces in question, without providing any new knowledge to inform our understanding of typeface characteristics in general. This comparative method of testing typeface legibility has – until recently – been the main approach for legibility testing (for a review see: Lund 1999). In some cases, this is likely because the researchers’ key area of interest lies elsewhere. In other cases, researchers have struggled with the technological limitations before the era of digital type design. This latter problem no longer exists, and a number of recent studies have implemented test typefaces that are controlled for unwanted variables (Bessemans 2012; Chahine, 2012; Dyson 2011; Beier & Larson 2010; Morris et al. 2002). The test typefaces in these studies are developed specifically for the investigation in question. Because the variables are controlled, it is easier here to determine why the results come out as they do, and the produced findings consequently support a broader understanding of how typefaces influences the way we read. The downside of this approach, however, is the time-consuming task of developing test typefaces.
from scratch for each new project. As a typeface family that, on the one hand, is subtle in expression and, on the other hand, is designed for the control of variables, the typeface family Neutral Test offers a useful test material across a wide range of legibility investigations.

**Research Process**

The intention behind the design of the master style was to create a typeface that is as neutral as possible. This follows the idea put forward by the renowned type designer Adrian Frutiger (1998; 2008), in that all characters are modelled on a basic letter skeleton, which emerges as a dark area when the most popular typefaces are superimposed on each other in light shadings. The theory is that this skeleton constitutes a neutral letter shape, since its features are identical to the shared area of the eight popular typefaces. The master typeface is derived from this basic skeleton (fig. 2). The remaining members of the family all derive from the master style.

In the work of isolating typographical variables, a number of dilemmas arose. Some of these relate to the bold weights of the family. The intention with Neutral Test Bold is to vary from the master solely on the added weight. To maintain the same level of stroke contrast as found in the master, the stroke should have the same weight added in all parts of the letters. However, when weight is added in this way, letters such as ‘e’ and ‘a’ will close up in the inner space (top row, fig. 3). Consequently, the added weight could not be the same in all bold-style letters. A second dilemma pertains to our perceptual understanding. It is a well-documented phenomenon that we do not perceive all shapes and forms in their mathematically correct dimensions. For vertical and horizontal strokes to appear equal in weight, horizontal strokes should be lighter in weight than vertical strokes. The issue is well known among type designers (Gates 1969), and it is something that all professionally developed typefaces take into account. Obviously, this method of adding different weight does not constitute a scientific approach, where all letters and letter parts would have to change at the same mathematical formula. However, to create functional typefaces, it is necessary to make perceptual adjustments, and so these adjustments were made in the bold weights of Neutral Test.

Typographical variables tend to have a strong influence on each other (Beier 2012). This too resulted in a number of dilemmas. One of these relate to the perceived difference in weight between styles of different stroke contrast. The high stroke contrast typeface Neutral Test Contrast has the same letter width and the same
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Figure 3. ‘Neutral Test Bold’ (bottom) is adjusted in stroke weight to avoid the counters closing up as it happens in the top row where the stroke weight is the same in horizontal and vertical strokes in all the letters. The middle example shows the two versions superimposed.

weight in the vertical strokes as Neutral Test Bold. The two differ solely on contrast. However, due to the light hairline strokes of the Contrast style, this may result in the style being perceived as lighter in weight than the corresponding Bold style. The same dilemma is found in the relationship between the styles of regular width and the styles of extended width. Due to the extra white space inside the letters of the extended width styles, these may appear lighter in weight than the corresponding regular width styles, even though the stroke weights are identical for the Regular and Expanded styles and for the Bold and BoldExpanded styles. This dilemma is difficult to solve; if the styles were adjusted for apparent equal weight, the real boldness of the styles would not be identical, and thus it could be categorized as an extra stylistic feature. On the other hand, if the styles appear to have different weights, that too constitutes an unwanted difference.

Research Outcomes

The range of dilemmas related to how the different styles are perceived by the viewer demonstrates that the task of isolating typographical variables has its difficulties. However, when held up against the method of comparing completely different typefaces such as Time Roman and Courier, it still offers a considerable improvement.

In addition to the master style, the six current members of the typeface family can be divided into two groups (fig. 4). Group 1 holds the typefaces that all differ from the master on one stylistic feature, and the group 2 holds the typefaces that all differ from the master on two stylistic features. In a comparison between the master and a typeface from the first group, a difference in performance can be located to the added stylistic feature. In a following comparison between the master and a typeface from the second group, a further difference in performance can be attributed to the additional stylistic feature.

As a test material, members of the Neutral Test typeface family can inform us on a number of legibility-related matters. One relevant question is whether high stroke contrast reduces distance legibility. A distance comparison of the Bold style and the Contrast style would shed light on this particular issue. Another question is whether an extremely expanded style or an italic style would hamper continuous reading, or whether the reader adjusts to the typeface without complications.
The typeface family Neutral Test can be applied as test material within a wide range of experimental legibility investigations. Whenever a new research question comes up, additional test styles can be created, without requiring the design of a new typeface family from scratch every time. One such question that might facilitate the development of additional styles would be to identify the optimal letter weight for a given reading situation. For this investigation, a range of interpolations between the regular weights and the bold weights would be appropriate. Another interesting question is the role serifs play in different reading situations. For such investigations, new typefaces can be created with added serifs functioning as an extra stylistic feature; these new styles can take the outset in any of the existing typefaces of the family.

In that way, the typeface family Neutral Test, is not to be viewed as a finished product; it is a tool that will continue to develop to meet the needs of new legibility investigations.

References