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A Comparison of Two Computer Fonts: Serif versus Ornate Sans Serif

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Fonts are described in terms of their face, style, size and color. There are two main types, namely, serif and sans serif. Serif fonts have small appendages at the top and bottom of the letter. Serif fonts are the preferred fonts for large blocks of text, since the serifs are thought to help to distinguish each letter and thus, make it easier to read strings of characters. Sans serif fonts consist of only primary line strokes and are therefore simpler in shape, e.g. Arial and Futura. In standard typography these fonts are used primarily for short phrases, e.g. headings. This study compares reading performance between an ornate sans serif font (Gigi) and Times New Roman. The traditional measures of reading speed, comprehensibility, and subjective preference were employed.

A number of studies have considered font styles. For example, Tullis, Boynton and Hersch (1995) examined differences in reading rates for different font styles and sizes in a proof reading task carried out in a Microsoft Windows environment. Participants used Arial, MS sans serif, and MS serif at 6, 7, 8, 9 and 10-pt font sizes. Tullis et al. found no difference in reading speed between the serif and sans serif fonts; however, they found that the larger 9 and 10 point fonts elicited faster reading times. The study also found that the participants had a greater preference for the sans serif font compared to the serif font.

A study by Boyarski, Neuwirth, Forlizzi and Regli (1998) evaluated the reading speed of participants using the serif Georgia, Times New Roman, and the sans serif Verdana fonts. The fonts were all set at 10-point and the experiment involved participants completing a comprehension test (i.e. the Tinker Reading Speed test). No significant differences in reading speed were found between the fonts. However, it should be noted that the Georgia and Verdana fonts were specifically designed for on-screen reading so this may have influenced the results.

Bernard, Mills, Peterson and Storrer (2001) tested a range of fonts for effective reading speed, i.e. reading speed in conjunction with accuracy, and participants' perception of font legibility. Twelve fonts representing sans serif, serif, and ornate styles were studied. Differences were found for reading time with Tahoma (sans serif font) being read significantly faster than Corsiva (ornate font). Perceived font legibility also showed significant differences across the 12 fonts with sans serif fonts being more legible than the ornate fonts.

A further experiment by Bernard and colleagues compared four sans serif fonts (Arial, Comic, Tahoma and Verdana), and four serif fonts (Courier New, Georgia, Century School Book and Times New Roman). They found no difference in effective reading speed between the two font types (Bernard, Lida, Riley, Hackler & Janzen, 2002). However, significant differences were found for reading times of the fonts with the serif fonts producing quicker reading times. The experimenters found that the participants perceived a difference in legibility between the fonts of which Times New Roman, Verdana and Georgia were most legible. This is interesting, as the participants did not distinguish between serif and sans serif in terms

of perceived legibility. Further, Bernard et al. found that the participants associated specific personalities to the different fonts. The results showed that the ornate sans serif fonts, Bradley and Corsiva, were perceived as having a great deal of personality and being elegant, whereas Times New Roman was perceived as being "business-like." In terms of overall preference, Bernard et al. found that participants chose the sans serif fonts Arial, Verdana and Comic.

The prediction for the current study based on the evidence provided from previous research was that the serif font would be faster to read, easier to comprehend and preferred to the ornate sans serif font. It was also predicted that the sans serif font would be preferred in terms of attractiveness and overall characteristics.

METHOD

Participants

Twenty-five participants (13 males and 12 females) volunteered for this study. The mean age of the participants was 27.9 years with an age range from 19.7 to 63.7 years. All participants were familiar with reading from a computer screen, and had normal or corrected to normal vision.

Task Design

Font conditions were compared by having participants read through four paragraphs of 140 words presented in the two different fonts. The paragraphs were matched for level and topic of reading as both were taken from an introductory psychology textbook. Presentation conditions were counterbalanced across participants. Passages were presented on a Winbox XLI Pentium 2 laptop computer, with a thin film transistor 13.3" screen and a resolution setting of 1024 x 768 pixels.

There were 10 substitution words used in each paragraph for testing the readability of the different fonts. The substitution words were inappropriate to the context of the passage and varied grammatically from the original words in the paragraph, e.g. the word "male" was substituted with the word "dale." The dependent variables were the time taken in seconds to read through the paragraphs and the percentage of substituted words correctly identified.

Procedure

Text was displayed in the center of the screen: the size of both the Times New Roman and the Gigi font was 12-point. Both fonts were black presented on a white background. A stopwatch was used to record the time participants took to read the paragraphs and the experimenter also noted the number of correctly identified substitution words.

Participants were given a few minutes to read through the instructions and then were given the opportunity to ask questions. The participants were seated at a fixed position from the computer screen at a distance of approximately 60 centimeters away. They were presented with the first paragraph on the screen and were asked to read through it silently and as quickly and accurately as possible. Participants indicated they had finished reading the paragraph by saying "stop" and the time elapsed was recorded. After a break of one minute, the second paragraph appeared on the screen. Again, participants had to read through the paragraph as before. However, if they came across words, which appeared inappropriate in the context of the paragraph, they were asked to read these words aloud and provide the correctly identified substitution words. These were recorded by the experimenter.

After the participants had completed the computer-based experiment, they completed a questionnaire to assess which font they would prefer in terms of personal use, web use, attractiveness and overall preference.

RESULTS

The reading time for the serif font Times New Roman was faster ($M = 22.06$ seconds, $SD = 5.69$) than for the ornate sans serif font Gigi ($M = 26.99$ seconds, $SD = 6.64$). This difference was found to be significant, $t = -7.41$, $df = 24$, $p < 0.01$. It is noted that the fast reading times were due to the relatively short lengths of the passages, and the fact that the readers were mainly university students

and therefore used to reading text quickly.

Comprehensibility was also better for the serif font Times New Roman (M = 8.80, SD = 1.19) than the ornate sans serif font Gigi (M = 6.68, SD = 2.02). This difference was also found to be significant, t = 5.58, df = 24, p < 0.01.

Results from the questionnaire showed a preference of 100% for Times New Roman for personal use and a preference of 68% for Times New Roman for web use. The ornate sans serif font Gigi was rated as being more attractive by 80% of the participants. Overall preference for Times New Roman was also greater with a mean likeability score of 3, compared to Gigi with a score of 2.6 on the same 4-point Likert scale (See Figure 1).

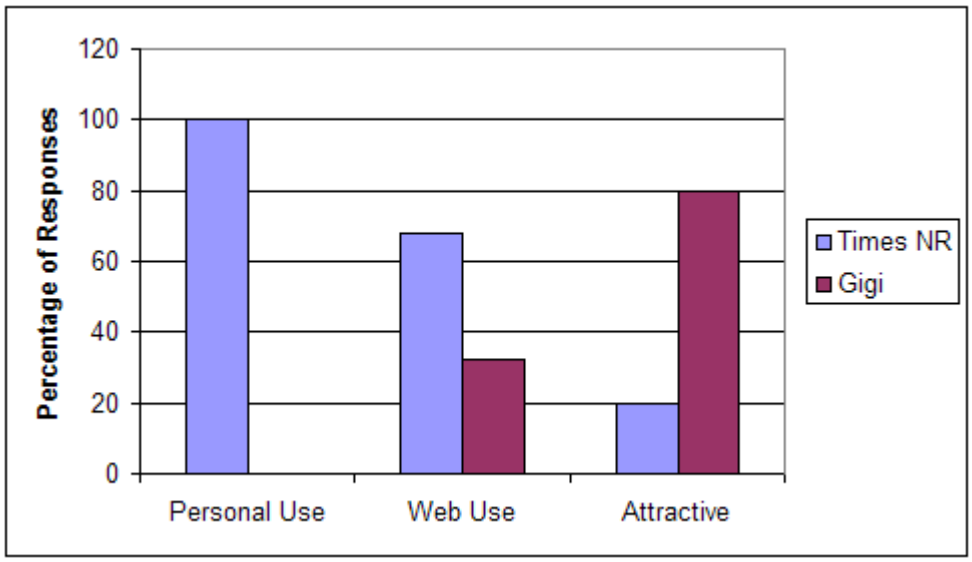

Figure 1. Preference for Times New Roman and Gigi fonts for personal use, web use, and attractiveness.

DISCUSSION

The findings from this study support the findings of Bernard et al. (2001) that serif fonts can be read faster than ornate sans serif fonts. However, the faster reading times for serif fonts do not support the findings of Boyarski et al. (1998) that reading times do not vary between serif and sans serif fonts. However, Boyarski et al. did not use an ornate sans serif font in their study.

With reference to comprehension, one previous experiment found that serif fonts did promote greater reading comprehension than sans serif fonts. This study provides support for this finding to be extended to include the ornate sans serif fonts as well. The results from this experiment also provide contradictory evidence to Bernard et al. that sans serif fonts such as Arial are preferred to Times New Roman and other serif fonts. This experiment found that the serif font Times New Roman was preferred overall and in terms of personal usability and web usability to the ornate sans serif font.

Tullis et al. (1995) found from their experiments that there were distinct differences in the speed and accuracy with which users could read the various fonts; however, they found even stronger differences in people's subjective preferences for a particular type of font. This was also replicated in this experiment as all the participants favored the use of the serif font for their personal use and the majority would also prefer to see the serif font used on a web site. However, the majority of the participants also strongly felt that the sans serif font Gigi was the more attractive of the two fonts. This is an important factor to consider when selecting fonts for on-screen text or for a web page as people may rate attractiveness over likeability and this may affect the extent to which a web site is used or favored over others.

As a final comment, the usability of online fonts for reading text includes factors other than font style. Factors which could affect the readability of on-screen text include the spacing between the words, the

line length on the screen, the amount of white space, the use of italics, underlining and boldness. The actual characteristics of the user of the computer must also be taken into consideration: for example, the age, sex, computer experience, background and personal preferences. Hence, font selection should not be considered in isolation. A further factor concerns the origins of font styles. Most fonts being read on computer monitors today were designed to be read from paper (Boyarski et al., 1998). Perhaps further development of fonts created specifically for on-screen reading is necessary in order to find out what would be the optimum online font.

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