

The Influence of Font Type on Information Recall

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Previous research on reading has primarily focused on the cognitive and neurological aspects of learning to read and reading disabilities. In this study, the physical characteristics of the text itself were examined in an applied setting. Specifically, the influence of two common characteristics of font types (serif or sans serif markings and proportional or monospacing) on recall of information was investigated. The participants were college students ($N = 149$). Each participant received a one page discussion of Tuberculosis, in the form of an office memorandum distributed in a health care facility, and was then tested on recall of the important points discussed in the memorandum. Serif fonts significantly improved recall of the information.

Do the physical characteristics of the font used in a passage of text influence the recall of what is read? Although research on reading has a long history in psychology, the majority of this research has been on reading disabilities and learning to read (Aaron, Joshi, & Williams, 1999; Chiappe, Hasher, & Siegel, 2000; Guthrie, Shafer, Von Sekler, & Alban, 2000; Smith, 1998). These studies have primarily focused on the neurological and cognitive aspects of reading. This study was conducted to find an answer to an applied question. As part of a consulting project with a local organization, we were asked if the font used in an inter-office memo had any influence on how well the information in the memo would be remembered. The purpose of this study is to answer that question by examining the influence of two common characteristics of font types - the presence of serif or sans serif markings and proportional or monospacing - on recall of information presented in an office memorandum.

Prior research has focused on how the passage length of text may influence comprehension of the material. Surber (1992) found that when participants were given either a long or short textbook passage to study, those who read the shorter passages spent substantially more time per word studying than did those who were given the long passage. This

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occurred, Surber speculated, because readers given the short passages were engaging in greater depth of processing of the material (Surber, 1992). This finding and Surber's explanation coincides with the attentional resources theory provided by Kanfer and Ackerman (1989). In this model, Kanfer and Ackerman suggest that humans have limited attentional resources that they can devote to a task. If less attention is given to the process of reading the text, then more attention can be given to attending to the message in the text.

Prior research has also examined how distractions in texts may influence readability and comprehension. Connelly, Hasher, & Zacks (1991) showed that older adults are less able to ignore irrelevant stimuli (such as distracting text in italics interspersed amid target text), and as a result read more slowly and show poorer comprehension than younger adults. This effect of distraction continued even when the distracting text contained content that was related to the target text. Carlson, Hasher, Connelly, and Zacks (1995) also found that when distractions (e.g., a phrase in a different font than the target text) were randomly placed within the text, a marked disruptive effect on reading occurred. This effect was particularly severe in older adults.

Further research that focused specifically on the characteristics of the font indicates that the legibility of the font type is another important factor to consider in readability and reading comprehension. Tinker (1963) examined the effects of font size and font legibility on reading speed and comprehension. He organized two sets of conditions to give to participants: (a) material set in 10-point Roman lower-case type on eggshell paper stock which was deemed very legible (b) material set in 8-point italic type on eggshell paper stock which was deemed to be poorly legible. Participants were timed while they read and then were asked general questions about the material they had seen. The 8-point italic print slowed reading speed by 10.4% and also participants had less memory of what was read (Tinker, 1963).

Older and younger adult reading speeds and error rates for different font types (which varied in legibility) were examined by Smither and Braun (1994). Specifically, the effects of weight (Regular, Bold), font size, and font type on readability of medication labels were examined. It was found that Century Schoolbook 12-point bold print is the most appropriate choice for older readers of prescription bottle labels.

The above studies all indicate that when the process of reading requires more attentional resources due to the nature of the text, then readability and comprehension are reduced. The present study examined the effects of different font styles on recall of information presented in text. Specifically, the font types were varied so that the influence of proportional vs. mono-spaced fonts and serif vs. sans serif fonts on recall

for information presented in text was examined. In proportional fonts, the amount of space used for each letter is proportional to the size of the letter. For example, an "l" takes up less space than an "m." In mono-spaced fonts, each letter uses exactly the same amount of space. Serif fonts have small markings at the bottom of many of the letters that suggest they are resting on a straight line. San Serif fonts do not have these additional markings.

Using font features such as serif and proportional spacing has often been suggested as a way to enhance the readability of text by printers and graphic designers (Craig & Bevington, 1999; Will-Harris, 1990). However, these claims are anecdotal, with no supporting empirical evidence. If a font is easier to read, then we predict that fewer attentional resources are spent attending to the process of reading and more attention can be given to the message (Kanfer & Ackerman, 1989). As more attentional resources are devoted to processing relevant information, we predict that greater depth of processing will occur and that we will find greater future recall of that information.

METHOD

Participants

There were 149 participants in this study (53 males and 96 females). Three of the participants were African-American. Two of the participants were Asian. One hundred and forty-four of the participants were Caucasian. The participants were undergraduate psychology majors at a mid-western public university with an enrollment of approximately 15,000. The participants participated in this project as part of an extra-credit assignment for their introductory psychology class. The average age of the participants was 18.98 years.

Materials

Each group of participants was given materials written in one of four fonts. These fonts differed in terms of mono or proportional spacing and serif or san serif markings. **Courier** was the serif, mono-spaced font, **Helvetica** was the san serif, proportional font, **Palatino** was the serif, proportional font, and **Monaco** was the san serif, mono-spaced font. These four fonts were chosen because they are common representatives of the conditions specified in the study and can be found on most word-processors. All materials used 12-point as the size for the font presented. Each participant was provided with a one page, single-spaced memorandum discussing the disease Tuberculosis. This memorandum was obtained from a local health care facility and was used as part of an education program on worker safety. Knowledge for Tuberculosis was measured with a six-question test that assessed key pieces of information

presented in the memorandum. A copy of the memorandum and the six knowledge questions are presented in the Appendix.

Procedure

Participants were tested in small groups of less than 12. Thirty-eight participants were included in the cell for Courier. Thirty-seven participants were in the cell for Helvetica. Thirty-six participants were in the cell for Palatino. Thirty-eight participants were in the cell for Monaco. Each participant was initially given the one page memorandum on Tuberculosis and asked to carefully read the information. Participants were told that they would be asked questions about the information presented in the memorandum, though they were not told the nature of the questions to be asked. Participants were not timed on this task; however, most participants finished reading the memorandum within 8 minutes. After reading the discussion on Tuberculosis, the memorandum was collected and each participant was given a questionnaire that contained five attitude questions. These questions were used as a distractor task. Responses to these questions were not analyzed as part of this study. After completing the attitude questions, the questionnaire was collected and each participant was given a six-question test that assessed recall for important points in the paper using open-ended questions. After completion of the open-ended questions, this test was collected and participants were debriefed. The tests were scored by giving one point for each correct answer.

RESULTS

The design of this study was a 2 x 2 independent-groups ANOVA, which examined the influence of each independent variable (serif or san serif fonts and proportional or mono-spaced fonts) and their interaction. The presence of serif or san serif fonts was found to be significant, $F(1, 145) = 4.08, p = .05$. The mean for the serif fonts was 4.55 ($SD = 1.15$) and the mean for the san serif fonts was 4.15 ($SD = 1.31$). This suggests that approximately a 9% improvement in recall for important points from the printed material used in this study resulted by using a serif font. The spacing of the font was shown to be non-significant, $F(1, 145) = .95, p = .33$. The mean for the mono-spaced fonts was 4.44 ($SD = 1.17$) and the mean for the proportional fonts was 4.24 ($SD = 1.32$). The interaction between the independent variables was also non-significant, $F(1, 145) = .52, p = .47$. The mean for Courier (serif/mono) was 4.58 ($SD = 1.0$), the mean for Palatino (serif/proportional) was 4.53 ($SD = 1.3$), the mean for Monaco (san serif/mono) was 4.32 ($SD = 1.32$), and the mean for Helvetica (san serif/proportional) was 3.97 ($SD = 1.3$).

DISCUSSION

The results of this study show that for one important characteristic of font type, the presence of serif or san serif markings, a statistically significant effect was found for recall of important information. The improvement in recall was approximately 9%. This improvement clearly has practical value, especially when the information to be conveyed may be very important, such as information on worker health and safety. In addition, achieving this increase is not difficult or expensive to do. It merely requires the use of a font that has serif characteristics. Clearly, the results of this study have implications beyond writing office memoranda. In any field using textbooks, instruction guides, fact sheets or safety manuals that presents instructions or information in writing, using a font that promotes the recall of what is read is useful.

Why does the increase in recall occur when using serif fonts? Serif fonts have markings that make rows of text appear to set upon a line. Therefore, the rows of text may be more easily separated perceptually when presented on a page and may be easier to read (Craig & Bevington, 1999; Will-Harris, 1990). This same effect is often achieved when a reader uses a straightedge to underline the row of text being read to more clearly separate it from the surrounding rows. The work done by Kanfer and Ackerman (1989), and Suber (1992) suggests that more easily perceiving a row of text on a page makes the text easier to read and so less attentional resources are required for the process of reading. More attentional resources can then be devoted to attending to the message in the text, which results in deeper processing and an easier recall of the information presented.

One concern with the methodology used in this study was the reliance on a recall test, rather than a multiple-choice recognition test, to determine how much of the information in the memorandum participants remembered. There were two reasons we chose to use a recall test. First, the recall test, because it does not provide clues to the answer in the form of possible response choices, was less susceptible to a ceiling effect. This is especially important in our study, given that the test was administered so close in time to the participants finishing reading the memorandum. Second, the recall test represents the conditions more likely to be found on the job, where employees would obviously have to remember the information without the benefit of clues presented in the form of multiple choices. In effect, the recall test is harder than a recognition test and more accurately represents how employees would have to retrieve information while on the job.

Another concern with this study is the level of familiarity that participants may have with serif fonts. Serif fonts are often used in textbooks and other reading materials to which college students are

commonly exposed. Therefore, college students may have more experience reading materials in serif fonts. Instead of the physical characteristics of the font influencing the readability of the text, an alternative explanation is that the results may have occurred because people are more familiar with serif fonts. The increased familiarity may make the serif fonts easier to read and this allows for deeper processing of the message. Researchers could potentially examine this question by using fonts that are representative of serif and sans serif characteristics, but are in less common usage than those used in this study, and so, less familiar to participants.

There are a number of other issues that can be explored in future research. College students were used in this study and they may be more literate and have more experience reading than other populations. The influence of using a more readable font may actually be magnified in a population with lower levels of literacy and reading experience, because these populations have more difficulty perceptually separating lines and receive a greater benefit from the markings present in serif fonts. Children, adults learning English as a second language, and adults with lower educational levels are useful populations to examine.

Another variable to examine in future research is the length of the text. Would we find benefits for using serif fonts compared to sans serif fonts when examining short warning signs or messages? Often in a *workplace safety messages and other important information for workers* is displayed in the form of warning signs and safety checklists. The text in these signs is often too brief to present multiple lines that are perceptually difficult to separate. For short messages, there may be no difference in information recall between serif and sans serif fonts. It may also be possible that the serif font, with its additional markings, is distracting for very short messages that do not require great effort to separate lines of text.

In this study we examined the influence of font type on recall of the information presented. There are other interesting dependent variables that should be examined in future research. One indicator of the readability of the text is the average time required to read the material *presented in each font*. The average time to read a document also has practical implications, because in many professions there is a large amount of material that must be read. Finding a font that minimizes reading time, but does not reduce comprehension and recall would be very valuable.

Researchers may also wish to investigate the subjective reactions that people have to different fonts. In a work context, subjective reactions to the text of a memorandum may include perceptions about the professionalism of the person who sent the memorandum and the

relevance or importance of the message contained in the memorandum. Resumes are another common written document encountered in a work context. The font used when writing a resume may influence the employer's perceptions about the job candidate, recall of relevant details about the candidate's work history, and an employer's intention to hire. In an educational environment, font type may influence a teacher's perceptions regarding the quality of an essay and the grade that is ultimately given. Finally, knowledge of the perceptions of the esthetic qualities of various font types may be useful to graphic designers in the development of a wide range of written materials.

REFERENCES

- Aaron, P. G., Joshi, M., & Williams, K. A. (1999). Not all reading disabilities are alike. *Journal of Learning Disabilities, 32*, 120-121.
- Chiappe, P., Hasher, L., & Siegel, L. S. (2000). Working memory, inhibitory control, and reading disability. *Memory and Cognition, 28*, 12-20.
- Carlson, M. C., Hasher, L., Connelly, S. L., & Zacks, R. T. (1995). Aging, distraction, and the benefits of predictable location. *Psychology and Aging, 10*, 427-436.
- Connelly, L., Hasher, L., & Zacks, R. (1991). Age and reading: The impact of distraction. *Psychology and Aging, 6*, 533 - 541.
- Craig, J., & Bevington, W. (1999). *Designing with type: A basic course in typography*. New York: Watson-Guptill Publications.
- Guthrie, J. T., Shafer, W. D., Von Sekler, C., & Alban, T. (2000). Contributions of instructional practices to reading achievement in a statewide improvement program. *The Journal of Educational Research, 93*, 211-218.
- Kanfer, R. & Ackerman, P., L. (1989). Motivation and cognitive abilities: An integrative/aptitude-treatment interaction approach to skill acquisition. *Journal of Applied Psychology, 74*, 657-690.
- Smith, A. (1998). Young children and reading; what does the research tell us? *Australian Journal of Early Childhood, 23*, 12-18.
- Smither, J. A. & Braun, C. C. (1994). Readability of prescription drug labels by older and younger adults. *Journal of Clinical Psychology in Medical Settings, 1*, 149-159.
- Surber, J. R. (1992). The effect of test expectation, subject matter and passage length on study tactics and retention. *Reading, Research, and Instruction, 31*, 32-40.
- Tinker, M. A. (1963). *Legibility of print*. Ames: Iowa State University Press.
- Will-Harris, D. (1990). *Type style: How to choose and use type on a personal computer*. California: Peachpit Press.

APPENDIX

Tuberculosis

Tuberculosis (TB) is a disease that is spread from person to person through the air. TB usually affects the lungs. These germs are put into the air when a person with TB of the lungs coughs, sneezes, laughs,

or sings. TB can also affect other parts of the body, such as the brain, the kidneys, or the spine.

General symptoms may include feeling weak or sick, weight loss, fever, and/or night sweats. Symptoms of TB of the lungs may include cough, chest pain, and/or coughing up blood. Other symptoms depend on the particular part of the body that is affected.

You can tell if you have TB by getting a TB skin test. If it is positive, you will probably be given other tests to see if you have TB infection or TB disease.

People with TB disease are sick from germs that are active in their body. They usually have one or more of the symptoms of TB. These people are often capable of giving the infection to others. Permanent body damage and death can result from this disease. Medicines that can cure TB are prescribed for these people.

People with TB infection (without disease) have the germ that causes TB in their body. They are not sick because the germ lies inactive in their body. They cannot spread the germ to others. However, these people may develop TB disease in the future, especially if they are in a high-risk group. Medicine is often prescribed for these people to prevent them from developing TB disease.

When a person takes a TB skin test, a negative reading usually means the person is not infected. However, the test may be falsely negative in a person who has been recently infected. It usually takes 2 to 10 weeks after exposure to a person with TB disease for the skin test to react positive. The test may also be falsely negative if the person's immune system is not working properly.

A positive reaction to the TB skin test usually means that the person has been infected with the TB germ. It does not necessarily mean that the person has TB disease. Other tests, such as an x-ray or sputum sample are needed to see if the person has TB disease.

1. Name three symptoms of TB?
2. What kind of test is commonly done to detect exposure to TB?
3. What area of the body is usually affected by TB?
4. It usually takes _____ to _____ weeks after exposure to TB for a test to react positive.
5. Can people with TB infection (without the disease) spread the germ to others?
6. Name three ways that TB germs are usually spread.

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