

The Effect of Font Size on Reading Comprehension Skills: Scanning for Key Words and Reading for General Idea

Elahe Tavakoli

Sobh-e- Sadegh Institute of Higher Education, Isfahan, Iran
Email: tavakoli.elahe@yahoo.com

Shiela Kheirzadeh

Sobh-e- Sadegh Institute of Higher Education, Isfahan, Iran
Email: sh_kheirzadeh_2006@yahoo.com

Abstract—The present study tries to investigate the effect of font size on recognition of the key textual words, to determine if the students can find the answers to some multiple choice and true/false questions easier in a text typed with a larger or smaller font size. Forty male and female students were selected through the placement test in an institute. Their reading comprehension ability with the focus on scanning for the key words and understanding general idea was measured using two reading texts with different font sizes (fonts 10 and 16) but the same level of difficulty estimated by Fog index of readability. To minimize the ordering effect, counter balanced test design was applied during the test administration. Pearson Product Correlation did not show a significant relationship between the scores of the two font sizes.

Index Terms—font size, key textual word, scanning, readability

I. INTRODUCTION

All over the world reading materials and textbooks are among the most common, reliable and authentic sources of input in EFL classes. Reading is critical to full participation in modern society. It presents a major challenge for daily living. Reading requires processing of both the visual information from the page and the linguistic information that resides in the mind of readers. Consequently the way the information in the text is presented to the vision of the students, including font size and type, might have an effect on their scanning in general and on their speed in particular.

There are many studies on the effect of reading font size, font type and line width on reading speed and accuracy in readers with some kind of impairment (e.g. Gibson & Levin, 1975, Legge et al, 1985a, 1985b, 1997, 2001, Atkinson, 1993, Cornelissen et al, 1997, Demb, 1998, Eden, 2008, Everatt, 2008, Geiger et al, 1988, 1994); The print size and font type; however, is less documented in the case of normal readers (e.g. Akutsu, et al, 1991, Bernard, Chaparro, Mills & Halcomb, 2002, Bernard, Chaparro, Mills & Halcomb, 2003). These latter studies, however, have investigated the effect of font size when presented through the screen of a computer or mobile rather than printed reading text. The next section will elaborate the aforementioned studies in detail.

There are many researches on Accuracy of L1 Reading Comprehension and Reading Speed in the case of L1 readers especially those with a visual impairment or dyslexia. What is an issue of agreement in most of these studies (e.g. Gibson & Levin, 1975, Legge et al, 1989) is that comprehension breaks down at low reading rates often less than 100 words per minute and it is fostered if the reading speed increases, of course to a critical point.

In people with central vision, i.e. when the visual field is normal, reading speed increases with print size up to a critical print size beyond which reading speed remains at a plateau level, termed the maximum reading speed (Legge *et al*, 1985a, 1985b, Chung, 1991, Mansfield et al, 1994, 1996). For extremely large print, reading speed declines. However, reading is slower in people with peripheral visual field i.e. people with a disorder in the macular region of retina. (Tielsch *et al*, 1995). By print size the above researchers refer to the angular substance of the print on the retina not the physical print size on the page which is the focus in the present study. On the contrary, there are other researches in which font size has been defined on the basis of the actual font size and type on the screens or papers but not in normal readers (e.g. Gary et al, 2009, O'Brien et al, 2005).

Gary et al (2009) studying patients with sight problems tried to evaluate the effects of print size, font type and line width on reading speed to help provide recommendations to designers for creating more accessible print materials. 43 patients with acuity 6/30 or better (median age = 72) read texts presented randomly in four sizes (10, 12, 14 and 16 points), for each of four fonts (Times New Roman, Helvetica, Tiresias PC font and Foundry Form Sans) at a standard line width (70 characters). A subset of fonts was tested at additional line widths (35 and 90). Significant main effects were found for print size. None was found for line width and font type. Larger print sizes were read faster than smaller

print sizes. The results in this study suggested that font type has little effect on reading speed, once the size of the print is taken into account. What they concluded was that specialized fonts, designed according to preferences of readers with sight problems, did not necessarily lead to enhanced reading performance.

Print size is believed to play a crucial role in reading speed for dyslexic readers (O'Brien et al, 2005). They predicted that dyslexic readers require larger critical print size to attain their maximum reading speeds. He measured reading speed across 12 print sizes for a group of dyslexic readers in grade 2 to 4 (aged 7 to 10 years) and compared the reading rates as a function of print size for groups of children with and without dyslexia. Their finding is also confirmed by other researchers (e.g Solomon & Pelli, 1994, Legge, Ahn, Klitz & Luebker, 1997, Legge, Mansfield & Chung, 2001). Solomon and Pelli (1994, p. 396) assert: "It is possible that larger print size facilitates dyslexic reading by increasing the visibility of spatial frequencies critical for letter recognition.

There are other researches in the literature which have issued font size and its effect on reading text when presented on screens (e.g. Bernard et al, 2001, 2002 & 2003). Most these studies ended up with a range of sizes as favorable ones not the best font size, following the similar performance of all groups on some font sizes and explaining the neutral effect of reading font size on speed and accuracy. Contrary to such researches, there are others stating the font size influences on on-screen reading. Dyson (2004, p. 381), for instance, reported "fonts at the 10 point size were read significantly more slowly than font at the 12 point size, but there was a speed- accuracy trade-off removing differences between sizes. Fonts that were read faster were generally read less accurately".

The findings in the literature on print/ font size and the effect on reading posed the following challenging questions, which struck the researchers' mind to plan the present study:

1. Many researches have confirmed the positive effect of font size and its effect on reading speed, in other words the smaller the font size, the faster the reader, though there are some contrary findings. The question raised in the researchers' mind is if reading comprehension as getting a general understanding from the text is influenced by reading speed.

2. Having reviewed the questions, many readers are used to scan the text in order to find a related key textual word similar to what they have already seen in the questions. The question here is if font size can help students with finding or recognizing of the related key word in the reading text in order to read more carefully and answer the question with a focus on details. In other words, font size might help the reader to locate the answer in the text more easily.

The first question deals with the effect of print size on reading comprehension defined as getting the main idea or a general understanding of the text. The second question, however, specifically deals with identifying the detailed information in the text. Following the above questions the researchers conducted a study with a focus on font size defined as the physical font size on the printed paper and reading comprehension as the ability of the readers to generally and specifically understand the text and answer a set of multiple choice and true/false questions. The purpose of this study, therefore, was to answer the following questions:

Is there any relationship between font size and EFL learners' ability to perform a reading comprehension test?

Based on the above questions the following hypothesis emerged:

Hypothesis: There is no significant relationship between the performance of EFL learners' on reading comprehension questions (detailed questions and understanding the general idea) over two font sizes.

II. METHOD

A. Subjects

An oral and a written placement test was administered to all the applicants registering in Nasl-e Farda Private language Institute, based on the content of the four volume New Interchanges Third Edition (instructed in 12 terms, 12 levels). 40 male and female applicants, aged 17-28, who were assigned to the second volume of New Interchange, level 4, were selected for the present study.

B. Instruments

Two reading texts, printed with font 10 and font 16, were selected from New Interchange 1, second edition, and analyzed based on fog index of readability, length of the text characters, and mean characters in each line. A sample text had also been selected out of the Interchange 1, third edition and analyzed with a fog index of 12.71. This had been done to make the researchers certain about the equal level of difficulty of the two reading texts with the difficulty level of reading texts in the participants' course book. In other words, the researchers were assured that the two main reading texts employed in this study were appropriate representative of the reading texts the participants encounter in their term.

The sample text, titled as "Cell phone Etiquette" was randomly selected from among the 16 reading texts in New Interchange 1. The text with the font 16 (titled as Joan Chen), was selected with a length, including spaces, of 1383 characters (mean = 59.8 in each line) and totally 262 words (mean 11.6 word in each line). The second text with the font 10 (titled as John Travolta), was selected with a length, including spaces, of 1487 characters (mean = 63.83 characters in each line) and 267 words (mean 12.83 word in each line). The font 16 text had a fog index of 12.68 and the other text, font 10, a fog index of 12.96.

To make sure that the topic of the two main texts doesn't make any differences on the performance of the participants, both were selected with the genre of biography of famous movie stars in America.

A short definition was provided for the new unknown words to participants, given in front of the text lines. The reason for controlling this variable was to be ascertained that students' unfamiliarity with a specific word did not influence their performance on reading comprehension questions. The above information is briefly summarized in the following table:

TABLE 1:
TEXT FEATURES

	Title	Mean characters in each line	Length of the text characters	Fog index of readability
Sample text	Cell phone Etiquette			12.71
Text with font 10	Joan Chen	63.83	1487	12.96
Text with font 16	John Travolta	59.8	1383	12.68

C. Procedure

After the selection of two reading texts, questions were devised in two types: true/ false questions (10 items for each text) and multiple choice questions (5 items for each text). The questions were not presented in sequence and the order of their answers' appearance in the text. The reason was to see if font size determined students' capability of identifying the location of specific information and consequently finding the answer to the detailed questions. Texts were rendered in Times-Roman font, a proportionally spaced font, on A4 papers.

Questions were made by the researchers and checked by two of the colleagues with at least 5 years experience of teaching reading comprehension courses at the university to EFL learners. The consensus was obtained that around 25% of the questions in each text measured general idea of the paragraphs and the rest of the questions, about 10 items in each text, measured the participants' ability to locate key words, detailed information in the text.

The participants' reading comprehension ability, specifically their recognition of the answers in the text and understanding the general idea, was measured by administering both reading texts, with different font sizes but the same level of difficulty, on all the participants. The timing on each test was equally controlled and 10 minutes.

To minimize the ordering effect, counter balanced test design was applied during the test administration.

III. DATA ANALYSIS

Descriptive data analysis including mean and standard deviation was estimated on the scored gained through the administration of both reading texts with font 10 and 16. As Table 2 shows, there was not a significant difference among the performance of the participants on the two texts with different font sizes.

TABLE 2:
DESCRIPTIVE STATISTICS

	Mean	Std. Deviation	N
font 10	8.1667	1.91741	40
font 16	8.6111	2.06195	40

Pearson Correlation was also estimated between two sets of scores on the scores of the two text sizes which showed .64. The following Table shows the result:

TABLE 3:
PEARSON CORRELATION

		font 10	font 16
font 10	Pearson Correlation	1	.642
	Sig. (2-tailed)		.004
	N	40	40
font 16	Pearson Correlation	.642	1
	Sig. (2-tailed)	.004	
	N	40	40

IV. DISCUSSION

Pearson Product correlation ($r=0.64$) shows that the two sets of scores are positively correlated meaning that when an individual scores high on a reading test with a font size 10, her score on the other reading test with font size 16 is high too. This means that the hypothesis in this study is rejected and font size makes no difference on students' performance of reading comprehension tests.

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Elahe Tavakoli was born in Isfahan, Iran in 1981. She received her M.A degree in TEFL from University of Isfahan in 2007.

She has published an article in JLTR in 2011 with the title "Investigating the Construct Validity of the FCE Reading Paper in Iranian EFL Context". Her research interest includes reading skills and strategies, and testing. She has participated in conferences including Tehran University conference and the university of Isfahan research week periodical.

She is currently a lecturer in the higher education Institute of Sobh-e- Sadegh, Isfahan. She is the permanent academic member and has held this position since 2008.

Shiela Kheirzadeh was born in Khoozestan, Iran. She received her BA degree in Teaching English as a Foreign Language (TEFL) from Islamic Azad University of Najafabad, Isfahan, Iran in 2002 (as the top student) and her MA in TEFL from the University of Isfahan.

She is currently the lecturer in the English department at Sobh-e-Sadegh Institute of Higher Education. She is the permanent academic member and has held this position since 2007. She has participated in a conference in Tehran University and has published and presented an article in the university of Isfahan research week periodical. She has also published an article in JLTR in 2011 with the title ""Field dependence/ independence as a factor affecting performance on listening comprehension sub skills: the case of Iranian EFL learners"

Her subjects of interest are psycholinguistics, sociolinguistics and issues in applied linguistics.