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ScienceDirect
Computers in Human Behavior 24 (2008) 888–902
Computers in Human Behavior
www.elsevier.com/locate/comphumbeh

The segmented presentation of visually structured texts: Effects on text comprehension

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Available online 18 April 2007

Abstract

The effects of a segmented presentation applied to a visually structured text were examined in the context of the explosion of small-screen devices. Empirical research investigating the influence of text signaling on text processing suggests that the text visual structure may influence comprehension by facilitating the construction of a coherent text representation. Undergraduate students were asked to read a text under different segmented conditions varying on the type of information provided about the text visual structure and on the segmentation unit. When the segmented presentation did not supply any information or when it only offered local information about the text visual structure, text comprehension depended on the segmentation unit. When the segmentation unit did not fit the text visual structure, an erroneous text representation was constructed, whereas the compatible segmentation unit led to a correct text comprehension. When the segmented presentation rendered the global text visual structure, the segmentation unit had no effect on comprehension and more readers constructed a correct and close text representation. Thus, the text visual structure seems to play a role in text comprehension and this role has to be taken into account for text segmented presentation.
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Keywords: Small-screen devices; Segmented presentation; Text visual structure; Text comprehension

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doi:10.1016/j.chb.2007.02.016

1. Introduction

What are the effects of a segmented presentation on text comprehension when the text is highly visually structured? For several years, there has been a dramatic explosion of handheld devices like personal digital assistants (PDA), mobile phones, or pagers using small-screen interfaces (e.g. Bernard, Chaparro, & Russell, 2001; Jones, Marsden, Mohd-Nasir, & Boone, 1999). The small size of their screen is a key characteristic for the usefulness of these devices (Kamba, Elson, Harpold, Stamper, & Sukaviriya, 1996). Yet, this small size highly constrains the dimension of the displayed information. As a consequence, research has been conducted on the following question: how to represent information (text, data,...) on a small screen, so that human cognitive systems are able to process it? Among several approaches, one is to design and to evaluate new ways of presenting information like the Rapid Serial Visual Presentation (RSVP). The RSVP is a segmented presentation of a text on a computer screen. Generally, the text is presented one or more words at a time at a fixed location and at a computer-controlled pace on the screen. The RSVP raised many empirical evaluations (e.g. Castelhano & Muter, 2001; Forster, 1970). Some of them showed that the RSVP is as efficient as a normal page-format reading (e.g. Juola, Ward, & McNamara, 1982), other demonstrated a disadvantage of the RSVP (e.g. Masson, 1983). The advantages of the RSVP are practical and theoretical: The RSVP is a relevant presentation mode in situations involving small screens, research tasks, visually impaired users or some dyslexics (Muter, 1996; Muter, Kruk, Buttigieg, & Kang, 1988). Another advantage of the RSVP would be to remove the cognitive processes devoted to the need to make eye movements since the gaze is directed at a fixed location (Juola et al., 1982). Therefore, the reader could engage higher levels of processing (Castelhano & Muter, 2001; Sinclair, Healy, & Bourne, 1989). It is also a methodological tool to study the cognitive processes involved during reading (Forster, 1970; Juola et al., 1982). It is usual to differentiate RSVP from other ways of presenting texts like moving-window presentation (Just, Carpenter, & Woolley, 1982), Times Square format or sentence-by-sentence presentation. In sentence-by-sentence presentation, the text is divided into individually displayed sentences. This last way of presenting text is very close to the RSVP mode since the display unit in the RSVP may be extended to the sentence (Kang & Muter, 1989; Moore & Zabrucky, 1995).

Several parameters may vary in the RSVP. The unit presentation duration can be either reader- or computer-controlled. As a computer-controlled presentation duration does not allow taking into account segment's and reader's properties (Just et al., 1982), several researchers adjust the presentation duration to the reader's reading rate (Rahman & Muter, 1999) or let the possibility to the reader to control it (e.g. Buttigieg & Muter, 1987). In this last case, it seems that the RSVP entails similar performances to normal reading conditions (Muter et al., 1988). The size of the presentation unit may also vary and these variations have consequences on eye movements; the optimal size seems to be 12 letters or two or three words (Cocklin, Ward, Chen, & Juola, 1984; Muter, 1996). Aaronson and Scarborough (1977) showed that when the segmentation matches significant units, text comprehension is improved. This effect could be due to the elimination of processes devoted to divide information into significant units. Another RSVP parameter is the possibility given to the reader to regress back in the text and the regression size (Baccino, 2004). In their second experiment, Muter et al. (1988) obtained that the larger

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