This is a repository copy of *The effect of text layout on performance: a comparison between types of questions that require different reading processes*.

White Rose Research Online URL for this paper:
http://eprints.whiterose.ac.uk/87545/

Version: Accepted Version

Article:

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk/

2014

**The effect of text layout on performance: a comparison
between types of question that require different reading processes**

Dr Maria dos Santos Lonsdale, Ph.D

Specifications

Abstract

Previous research has assessed whether the typographic layout of reading examinations affects performance. To complement this under-researched aspect of assessment, an experimental study sought to find out whether such an effect is limited to types of question that require more location than comprehension processes; or whether it is also found with types of question that require comprehension processes to a greater extent. The results showed that participants read a text and answered questions on it faster with a text layout conforming to legibility guidelines. This is true for both types of question, regardless of the reading processes required.

Contents

1 | Introduction

There has been some recognition that examinations can defeat their own good intentions as educational tools (Hughes 1989; Jacobs and Chase 1992: 13). In the opening chapter of his book *Testing for language teachers* (1989: 1), Hughes tries to establish why examinations are so mistrusted. He starts by saying that "Too often language tests... fail to measure accurately whatever it is they are intended to measure." As a result, the scores students obtain do not always mirror their real skills. Some authors such as Hughes (1989), Zimmerman et al. (1990), Weir (1993), and Davis (1993) address the importance of well laid out and perfectly legible examination materials.

Previous studies have specifically investigated the influence that the typographic layout of reading examination materials has on performance, and how that compromises the validity and reliability of the examination (Lonsdale et al. 2006; Lonsdale 2007). The outcomes of these studies were clear in showing that the typographic layout of examination materials affects the speed and accuracy of reading a text and answering questions based on it. Specifically, efficient search reading and answering of questions can be supported if using text layouts and question and answer sheet layouts conforming to legibility guidelines, but impeded if legibility guidelines are disregarded. In these studies, participants also reported that the layouts conforming to legibility guidelines made it easier to locate the information and answer the questions.

However, despite the importance of typographic layouts for the construct validity of examinations, this issue still remains under-researched. Lonsdale et al. (2006) and Lonsdale (2007) are the only existing studies on this matter. Although Lonsdale et al. (2006) and Lonsdale's (2007) research provides solid evidence on the effect of typographic layout on performance in an examination-type situation,

there is an important aspect of reading examinations that is yet to be addressed: the types of question/reading tasks tested. In their studies, Lonsdale et al. (2006) and Lonsdale (2007) included only one of the two types of question tested in English language reading examinations, which differ in reading process requirements. That is, some questions require more location process (e.g. locate and match specific information) and other more comprehension process (e.g. understanding of main ideas).

Therefore, the present paper proposes to fill this gap in the research by ascertaining whether text layout has an effect on performance when answering both types of question, or whether it is limited to a type of question that requires more location than comprehension processes.

In order to understand the aim of the proposed study, this paper starts by reviewing literature to provide background information on the relevant aspects inherent to the construction of English language reading examinations.

2 Construction of reading examinations

2.1 General principles

In the book *Understanding and developing language tests*, Weir (1993: 19-22) gives an explicit description of the general principles that should underlie all good examination design. Hughes (1989: 6-8 and 22-47) also analyses these general principles, or 'qualities of tests', as he defines them (1989: ix). Both authors agree that examinations should be valid, reliable, and practical.

An examination is said to have construct validity if it measures just the skill it is supposed to measure (e.g., Hughes 1989: 7 and 26; Weir 1993: 19-20 and 72-3; Douglas 2010: 10-1). In other words, if the aim of the examination is to assess the candidates's proficiency in reading, "then we must address the problems in testing this and try to avoid other constructs… interfering with its measurement." (Weir 1993: 72).

As shown by the Lonsdale et al. (2006) and Lonsdale (2007) studies, legible examination layouts decreased candidates's speed of reading and accuracy of answering questions. This means that, in those cases where the typographic layout affects performance, the construct validity of the examination will be compromised since legibility is confounded with candidates's reading skills.

Hughes (1989: 7), Weir (1993: 20-1), and Douglas (2010: 10) further emphasize that reliability is an essential ingredient in the construction of an examination. According to them, an examination is reliable if it measures consistently from occasion to occasion and, therefore, we can depend on the results it produces. For example, if a candidate is given two equivalent examinations on different occasions, the two examinations should give a similar picture of the candidate's ability, provided they are carried out under the same circumstances.

Relevant circumstances might be the time of day or the legibility of the typographic layout. As Hughes (1989) claims:

> Too often, institutional tests are badly typed (or handwritten), have too much text in too small a space, and are poorly reproduced. As a result, students are faced with additional tasks which are not the ones meant to measure their language ability. Their variable performance on the unwanted tasks will lower the reliability of a test (Hughes, 1989: 39).

Practical matters such as cost effectiveness and the resources available are also significant considerations when constructing an examination. However, practicality should not put at risk the validity of the examination (Weir, 1993: 21-2). For instance, examinations should not be short just because they have to be economical in terms of time and money.

Typographic layout is, therefore, one aspect of the assessment which determines the validity and reliability of a reading examination. If legibility is confounded with candidates's reading skills, then validity is compromised because the examination does not measure accurately the skill it is intended to measure, i.e., reading. If the examination does not measure performance consistently, i.e., if different scores may be obtained with different layouts, then reliability is also compromised.

2.2 Typographic layout

Zimmerman et al. (1990: 5) and Davis (1993: 249) emphasize the importance of an examination's presentation and the need to make sure that the arrangement or typography of the materials contributes to maximum legibility. They suggest, for example, the use of margins and interlinear space to make the examination easy to read and score. They also refer to the importance of the layout of the question and answer sheet by recommending that similar types of question should be grouped together. Moreover, it should be kept in mind that the amount of space left for short-answer questions often signifies to the students the length of the answer expected from them.

Lonsdale et al. (2006), and Lonsdale (2007 and 2014) go further and provide an overview of the legibility guidelines developed from research and practice that should be taken into account when designing reading examinations. These guidelines are summarized in Table 1 and relate to the typographic features that define the layout of text as well as

of the question and answer sheets. It is clear from the literature that the typographic features of text can be manipulated to help, or at least not impair, the speed and accuracy of reading and answering in examinations. But, it is important to emphasize that for good legibility the various typographic features should be selected and combined in relation to each other. (For a more comprehensive literature review, see Lonsdale 2014).

Table 1. Summary of the findings and opinions on the typographic features of text and question and answer sheets.

TEXT	QUESTION AND ANSWER SHEET
Type	**Type**
• Serif should be used for the body of the text and sans serif can be used for headings, captions, and marginalia. [McLean, 1980; Simmonds and Reynolds, 1994; Schriver, 1997]	• To make the hierarchical structure clear and emphasize important information, the following features can be used: – Different weights of the same type family (e.g. contrast larger and bolder with smaller and lighter type variants). [Gray, 1975; Waller, 1984]
• A typeface should be avoided if it: – Loses its identity when printed or copied. – Has unusual features. – Calls attention to itself rather than to the text. – Has not been tested objectively. [Simon, 1945; Hartley, 1994 and 2004; Black, 1990; Luna, 1992]	– A variation of type (capitals, lowercase, and italics), and size. Two different type families of the same kind should never be combined. [Gray, 1975; Waller, 1984] – Color for the type or background. [Gray, 1975, Waller, 1984]
• When printing text on a black or colored background, bold should be used to thicken the lines of the characters. [Bringhurst, 1992]	**Systematic manipulation of space**
Type size, line length, interlinear space	• Space should be used between items to show their connectedness: – To signal the end of each section, space can be changed slightly between sections but kept consistent between questions. – If plenty of space is used between paragraphs (nearly a line space) the text is seen as a number of separate, yet related, blocks. [Waller, 1984; Cutts and Maher, 1981; Lonsdale, 2007]
• The optimum arrangement for prose text should have: – A 10- and 11- point size type. – A line length of 60 to 70 characters per line. – An additional interlinear space of one to four points. Arrangements with relatively long or short lines, smaller type sizes and tight interlinear space slow reading. [Tschichold, 1967; Hartley and Burnhill, 1977; Spencer, 1969; Black, 1990; Bringhurst, 1992; Schriver, 1997; Winjholds. 1997; Lonsdale, 2006]	• Similar types of question should be grouped together and arranged inside one another graphically. [Waller, 1984; Zimmerman et al., 1990; Davis, 1993]
Paragraphs	• The more space there is around an item of information, the more it should stand out from the surrounding text. [Simmonds and Reynolds, 1994]
• Paragraphs should be denoted using one line space (with or without an indent), or simply using a new line with a moderate indentation of one to three ems. [Hartley et al., 1978; Schriver, 1997; Hartley and Burnhill, 1977; Rehe, 1979; Bringhurst, 1992; Carter et al., 1993; Hartley, 1994]	• Margins and interlinear space make the examination easy to read and to score. [Zimmerman et al., 1990; Davis, 1993; Lonsdale, 2007]
• The first paragraph should have no indent. [Simon, 1945; Tschichold, 1967; Carter et al., 1993]	

Table 1. Continued

TEXT	QUESTION AND ANSWER SHEET
Columns	**Instructions and questions**
• A single column layout with wide margins or a double column layout with a medium line length should be used. [Rehe, 1979; Simmonds and Reynolds, 1994]	• Lengthy instructions should be avoided, specially if they are printed in small type. [Hartley, 1994]
• If the text requires headings or other non-textual elements that could occupy two columns, then a single column layout should be used. [Hartley and Burnhill, 1977; Southall, 1984]	• Numbers should be set close to the corresponding question for quick identification. [Lonsdale, 2007]
• If the column measure increases, the interlinear space should also increase. [Carter et al., 1993]	**Answer spaces**
Text alignment and margins	• Answer spaces should: – Be big enough to fit all the necessary information. [Wright and Barnard, 1975; Hartley, 1994]
• Justified text with rivers and excessive hyphenation should be avoided. [Carter et al., 1993; Schriver, 1997]	– Have the same length to avoid giving clues about the length of the answer. [Davis, 1993; Jacobs and Chase, 1992]
• Margins are relaxing and very functional. They allow to: – Hold the book without covering the printed text or image; – Punch or clip copies for filing without damaging the text; – Make notes. [Simon, 1945; Spencer, 1969; Tschichold, 1967; McLean, 1980; Bringhurst, 1992; Carter et al., 1993; Hartley, 2004]	– Be located in a suitable place so that it is clear where the answers are supposed to be written (for example, alongside the respective questions). [Wright, 1981; Wright and Barnard, 1975; Hartley, 1994; Lonsdale, 2007]
	– Be arranged in vertical columns wherever possible, for convenient scoring. [Hawkes et al., 1936]
Headings	– Be placed to the left of the question, particularly when just a number or letter are required as the answer. [Hawkes et al., 1936; Jacobs and Chase, 1992]
• For text set in serif type the heading should be set in semi-bold or bold, sans serif, or in a suitable contrast type. For text set in sans serif type, only sans serif type should be used for headings, either in the same weight or bolder. [Tschichold, 1967; Simmonds and Reynolds, 1994; Schriver, 1997]	**Rules and boxes**
• Headings should be aligned left with no word breaks. [Tschichold, 1967, Simmonds and Reynolds, 1994]	• Rules should be used to divide, enclose or link different components, and boxes should be used to isolate each component in space. [Waller, 1984]

2.3   Academic reading activities tested

As mentioned above, Weir (1993) argues that the reading activities which students are involved in during their academic life should be replicated in reading examinations. Scanning, skimming, and careful reading are highlighted by Hughes (1989), Weir (1993), and Enright et al. (2000) as being the three main reading activities in an academic context.

Moore et al.'s (2012) study comparing reading requirements in IELTS (International English Language System) test items and in university

study, showed that a sizeable proportion of tasks in the academic corpus require mainly a basic comprehension of relatively small textual units (sentences, inter-sentences, paragraphs). Therefore, only careful reading for basic comprehension should be assessed and not careful reading to learn.

Enright et al. (2000: 4) defend the use of the activities of scanning and skimming in English language reading examinations because a high percentage of the reading practiced in academic life also involves these activities.

According to Urquhart and Weir (1998: 103-4 and 107), scanning involves selective reading. That is, the readers deliberately omit, avoid or pay very little attention to some sections of the text. This is the process used to achieve very specific reading goals rather than reading for the gist. For example, reading selectively to find the answer to a specific question; to find words, phrases, figures, percentages, names, dates of particular events in a text; or to find specific items in an index. Moreover, little or no syntactic processing needs to be involved.

Skimming, on the other hand, is defined by Urqhuart and Weir (1998: 102-3, 105, and 107) as reading for the gist and, like scanning the reading is selective and has a clearly defined goal. Readers skip some text sections in an attempt to comprehend the main ideas just on the basis of a few details from the text. Therefore, the amount of text processed is more substantial than when scanning, since readers may process entire sentences and sections of text, and not just words. Urqhuart and Weir (1998: 107) also suggest that, as with scanning, readers confirm whether the text surveyed is relevant or not before moving on.

Enright et al.'s (2000: 4) argument to use scanning and skimming in English language reading examinations because they are used in academic life, is supported by Weir et al.'s (2012b) survey. The survey was conducted for a study on the relationship between the academic reading tasks tested in IELTS and the reading experiences of students in their first year of study at a British university. The data suggested that, for university students, expeditious skills and strategies like scanning and skimming are just as critical for academic study as careful reading.

Jakeman and McDowell have described scanning and skimming as 'enabling skills' because they can help to deal more effectively with most questions in the reading examination. This is supported by Bax's (2013) findings, which showed that the most successful candidates were those who made use of expeditious reading strategies to locate in

the text the possible site of the correct answer as speedily as possible. Successful candidates also showed better abilities at matching words in the question and the text, and in doing the same with synonyms.

2.4 Types of question

Several authors describe and discuss a number of short-answer tasks such as: multiple-choice, matching, and completion tasks (e.g., McKeachie 1986: 91; Hughes 1989: 59-124; Jacobs and Chase 1992: 95-100; Davis 1993: 243; Weir 1993: 14-90; Urquhart and Weir 1998: 158-163; Svinicki and McKeachie 2013: 86).

Multiple-choice, matching, and completion tasks were analyzed for the purpose of this study in terms of their limitations and advantages. In summary, there does not seem to be a definitive conclusion on which task is better for measuring reading skills. However, multiple-choice tasks, in general, are regarded as having more limitations and being 'unreal' reading tasks. People are rarely (or never) presented with a list of options from which to choose in order to show their understanding of a text (e.g., Weir 1993: 14; Urquhart and Weir 1998: 159). In contrast, there are several situations where matching and completion tasks can be extremely useful and reliable. Contrary to multiple-choice, matching and completion tasks have been strongly recommended as either an alternative or complement to other tasks (Jacobs and Chase 1992: 101; Weir 1993: 95).

To further understand the types of question used to test reading skills in English Language Examinations several IELTS books of practice tests were also analyzed. The source materials were: Jakeman and McDowell (1996); UCLES (2000); Jakeman and McDowell (2001); Wilson and Terry (2005); Cambridge IELTS 8 (2011); the Specimen Material booklet provided by UCLES (2001) and the Official IELTS Practice Materials 1 (2009) and 2 (2010). Information regarding the nature of the matching and completion tasks, and corresponding types of question, was gathered.

In order to test scanning, skimming, and careful reading for basic comprehension in English language examinations, two different types of question, which fall under the umbrella of short-answer questions, are used. One type of question is weighted more towards location than comprehension processes. The second type of question is weighted more towards comprehension than location processes. (Enright et al. 2000: 5 and 31). The use of the term 'weighted more towards' reflects

the fact that comprehension and location processes are never tested in complete isolation. This is due to the fact that the task and level of difficulty would simply be inappropriate for the test purpose (Enright et al. 2000: 31; Weir et al. 2012a). Furthermore, many test questions, even questions designed to target particular cognitive processes, might in practice be answered using a range of cognitive reading processes operating together (Bax 2013: 460).

Of the types of question used in English Language Examinations (e.g., IELTS) those such as matching names with opinions seem to require location processes to a greater extent, while selecting a heading for each paragraph seems to require more comprehension processes.

3 | Purpose of the study

As introduced above, the findings that emerged from Lonsdale et al. (2006) and Lonsdale's (2007) experimental work showed that the typographic layout of examination materials affects the speed and accuracy of reading a text and answering questions based on it. However, only one type of question was used; a type of question weighted more towards location than comprehension processes.

Therefore, the question remains as to whether these significant results found by Lonsdale et al. (2006) and Lonsdale (2007) are limited to one of the two types of question tested in English reading language examinations.

With this in mind, it was decided to focus on the possible interaction between text layout and type of question. As a result, an experimental comparison was conducted to test whether the effects of text layout on performance would be found in relation to the two types of question described above.

Based on the findings of previous experiments (Lonsdale et al. 2006; Lonsdale 2007), it was expected that with the type of question weighted more towards location processes, the text layout conforming to legibility guidelines would once again result in better performance. As suggested by Lonsdale et al. (2006) and Lonsdale (2007), two levels can be distinguished in the process of reading in examination-type situations: perceptual and conceptual processing of text. (This suggestion is in line with Masson's, 1982 and 1985 characterization of cognitive processes of skimming stories, in which he identifies the interplay of the perceptual and conceptual aspects of skimming.)

At the perceptual level of reading, candidates skim for gist, scan, and search for key words, go back and forwards between a question and a

specific section of the text. At the conceptual level of reading, candidates seek to understand the instructions and questions, choose key words, and read the text around the key word more carefully in order to confirm whether the section contains the right answer. As concluded by Lonsdale et al. (2006) and Lonsdale (2007), it seems that the typographic layout of text has an effect on performance at the perceptual level of reading. Therefore, assuming that questions weighted more towards location processes require perceptual processing to a greater extent in order to locate the relevant information, then an effect might be found for this particular type of question.

Questions weighted more towards comprehension processes, on the other hand, require conceptual processing to a greater extent. However, as explained by Enright et al. (2000: 31), both types of question, whether involving more location or comprehension processes, require the candidates to locate information in the text by matching information from the question (e.g., key words noted in the question) to identical or closely paraphrased corresponding information in the text. Weir et al.'s (2012a) study on reading tasks used by students in the IELTS Academic Reading Test reinforces Enright's (2000) suggestion. The results showed that the most popular strategy in the study (which involved the various questions tested in IELTS) was to quickly match words that appeared in the question with similar or related words in the text. This was the strategy selected by participants in ten of the fifteen sections tested, with 83% of the participants reporting that they used it at least once.

Perhaps, then, an effect of typographic layout on performance can be expected for the two different types of question, since both seem to require perceptual processing of text (even if to a different extent) in order to locate the relevant information.

4 | Selection of experimental material

An experiment was designed to include the variables of text layout and type of question. The same text layouts as the ones tested in Lonsdale et al. (2006) and Lonsdale (2007) were compared. These two layouts reflect the variability in legibility found across forty-two IELTS text layouts surveyed in Lonsdale et al.'s (2006) study:

- Typographic layout T1, intended to be 'most legible'. Layout T1 conformed to legibility guidelines: serif type for the text, sans serif type for the headings, type size of 10.5 points, an additional interlinear space of 3.5 points, line length of 70 characters, text left aligned, paragraphs distinguished by one line space with no indent, and single column with wide margins (see Table 2 for specific details).
- Typographic layout T2, the typical typographic layout of IELTS (i.e., the layout found in the surveys to be the most commonly used in IELTS), intended to be of 'medium legibility'. Layout T2 followed some legibility guidelines: serif type for the text and heading, a type size of 10.5 points, and paragraphs distinguished by a new line with a moderate indentation of slightly over one em. The other typographic features fell outside the legibility guidelines: an additional interlinear space of only 0.5 points, a two-columns layout with a short line length of 42 characters, and text fully justified with rivers (see Table 2 for specific details).

The selection of two text layouts was followed by the selection of two types of question. This choice was informed by Jakeman and McDowell's (2001) descriptions, and the following questions were selected for experimental comparison:

- The 'opinion-name' question--according to Jakeman and McDowell (2001) this question tests how well candidates can locate and

Table 2. Typographic features of text layouts T1 and T2

	LAYOUT T1	LAYOUT T2
Typeface	• Text: Times New Roman • Title: DIN bold • Subtitle: DIN regular	• Text: Times New Roman • Title: Times New Roman • Subtitle: Times New Roman
Type size	• Text: 10.5 pt (1.8mm x-height) • Title: 28 pt (5mm x-height) • Subtitle: 18 pt (3.2mm x-height)	• Text: 10.5 pt (1.8mm x-height) • Title: 22 pt (4mm x-height) • Subtitle: 22 pt (4mm x-height)
Line length	• 70 characters	• 42 characters
Interlinear space	• Text: 14 pt • Title and subtitle: 27pt	• Text: 11 pt • Title and subtitle: same line
Margins	• Inside: 30mm (passage 56mm) • Top: 30mm • Outside: 44mm • Bottom: 20mm (on the 2nd page the margin is defined according to the number of words in the passage)	• Inside: 35mm • Top: 60mm • Outside: 35mm • Bottom: 50mm (on the 2nd page the margin is defined according to the number of words in the passage)
Alignment	Text aligned to the left	Text fully justified
Columns	Single	Double
Paragraphs	Line space	An indent of 35mm

match specific information (see appendix 1). Therefore, this type of question is weighted more towards location than comprehension processes.

- The 'paragraph-heading' question--according to Jakeman and McDowell (2001) this question tests the candidates's understanding of main ideas by matching headings to paragraphs in a text (see appendix 2). Therefore, this type of question is weighted more towards comprehension than location processes.

This choice was also influenced by the fact that these two questions have a very similar structure. Both types of question have a list of alternative answers given to match with each numbered question. As the variable of interest in the present experiment was the text layout, the differences between the typographic structure of the two types of question were kept to a minimum. Testing two questions that are different in terms of process requirements, but similar in terms of typographic structure, is extremely important for the present experiment. The greater the typographic differences between the questions, the more variability would be introduced into the data according to the different type of question. Consequently, the effects of text layout on performance may be obscured. Thus, so as to avoid confounding the results, it seemed logical to use the question and answer sheet layout that in the previous

experiments was found to support (or at least not impede) efficient answering i.e., the question and answer sheet layout conforming to legibility guidelines.

Due to the individual nature of the tasks, these two types of question require reading different amounts of text, and one has two more items to match than the other. However, it was not the aim of this study to compare whether one type of question is easier to answer than the other, but whether the layout facilitates or impedes answering one question compared to the other. Furthermore, each text layout was combined with each type of question, and each participant used each combination, so that the influence that different layouts can have on the same person was ascertained.

5 | Experimental comparison

The experimental comparison investigated the effects of text layout on performance when reading a text and answering two different types of question on it, under time pressure.

5.1 Method

Participants

Thirty-two people volunteered to participate in the experiment. Some participants were students (undergraduate and postgraduate students), and some were not students but had either a first degree or a higher degree. Their average age was 30.9 years. There were seventeen female and fifteen male participants.

As in Lonsdale et al. (2006) and Lonsdale (2007), this study aimed to extend the findings to examinations in general, as well as to other similar academic materials. For that reason it was decided to include non-native English speakers (nineteen) as well as native English speakers (thirteen) to maximize the relevance of the results.

Materials

In this experiment four conditions were prepared, which combined two text layouts with two types of question. The text layouts were T1, intended to be more legible, and T2, intended to be of medium legibility. The types of question were Tq1, 'opinion name', weighted more towards location than comprehension processes, and Tq2, 'paragraph heading', weighted more towards comprehension than location processes.

The four conditions are illustrated in Figures 1, 2, 3, and 4. It should be remembered that typically in the 'paragraph heading' type of question

xxxxxxx xxxxxx

*Xxx xxxxxx xxxxxxx **Xxxxxxxx X-X**, xxxxx xxx xxxxx xx xxx xxxxxxx xxxxxxxx xxxxx, xx xxxxxx xxx xxxxxxxxxx xx xxxxxx.*

Xxxxxxxxxxx
Xxxxxxxx xxx xxx xxx

    Xxxxxxxxx xx xxx xxx xxx xxxxx xx xxxxxx xxxxxxx xxx xxxxxx. X xxxxxx xxxxxx xxx xxxxxx xxx xxxxxxxxxx xxxxxxxxxx xx xx xxx x xxx xx xxx xxxx xxx xxxxxxxx xx xx xxxxxx xxx xxxx. Xxx xxxxxxxx xx xxxxxx xxxxxxx, xxxxxxx, xx xxxx xxxxxxxx.

Xxx xx xx xx xxxxxxxxx xxxx xxxxx xx xxx xx xxx xx xxxx xx x xxxxxx xxxx. Xxxxx xx x xxxxx xx xx xxxxx xxxx xxxxxxxx x xxxxxxx xxxxxxx. Xxx xx xxxxx xx xxx xx xxx xxxxxx xxxxxx xx xxxxx xxxxxxx xxx xx xxxxx xxxx x xx xxxxx xxx xxxxxxxx xxxxx xx xx xxxx xxx xxxx xxxxxx.

Xxxxx xx xxxx xxxxx, xxxx xxx xxxxxx xxxxxx xxxxxx, xxxxxx xxxxx x xxxxxx xxxx xx xxxxx xxxxxx xx xxxx xx xxxx xxxxxxx xxx xxxxxx xxxx xx xxx, xxxx xxx xxxxxx xxxxxxxx xxxx xxx xxxx, xxxxx xx xxxxxxx xxxxxx. Xxxxxxxxx xxxxxx xxx xxxxxx xxxx x xxx xx xxxxx xx xxx xxxxxxx xxx xx xxxxx xx xxxx xxxxxxxx xx xxxxx xx xx xxxx xx xxxx x xxx xxx xxxxxx. Xxxx xxx xxx xxxxxxxx xxxx xxxxxx x xxxx xxx xx xxxx xxx xxxxx.

Xx xx xxxxx xxxxxxx xxxxxxx xxxxx xxxx xxxxxx xxxxx xx xxxxxxx xxxxx xx xxxxxxxxxxx. X xxx xxxx xx xxxxxxxx xxxxxx xx xxxxx xxxx xxxxxx xxxxx xx xxx xxx. X xxx xxxxx xxxxxx xx xxx xxxxxx xxx xxxxxxxx xxxxxxxx xxx xxx xxxxx xx xxxxxxxx.

Xx xxx xxxx xxxx xxxxxx xxxxxx xxxx xxx xxxxxxxx xxxx xxxxxx xx xx xxxxxxxx xxxxx. Xxx xxx xxxxx xxxxxxxxx xx xx xxxx xx xx xxx xxxxxxx xx xxxxx, xxxxxxx xxxxx, xxxx xxx xxxx xxxx xxxxxxx xx xxxxxx xxxxx. Xxxx xxxx xxxxx xx xxxxxxxx xxxxxxxx xxxx xxxx xxxxxx xxxx xxxx xxxxxx xxxxxx xxx xx xxxx xx xxxx xx.

Xxxxx xxxxxx, xxxxxx xxxxxx (xxxxx xxxxx xx xx xxxxxxxx) xxx xxx xxx xxxx xxx xx xxxx xxxx xxxxx xx xxxx xxxxxxx xx xx xxxx xxxxxxx xxx xxxxxxxx xx xx xxxxxxxx xx xxxxxxxx xx xxx xxx xxxx xxxx xxxxxx. Xxxxx xxxxxxx xxxxxxx xx xxx xxxxx xxx xxx

---

Xxxxxxxxx X-X

Xxx xxxxxx xxxxxxxx xxxxxxxx x xxxxxx xx xxxxxx xxx xxxxx xxxxxx. Xxxxx xxxx xxxxxx (X-X), xxxx xxx/xxx xxxxxx (X-X).

*Xxxxxx xxx xxxxxxxx xxxxx **(X-X)** xx xxxxx X-X xxxxxx.*

XX *Xxxxx xxx xxxxx xxxxxxx xxxx xxxxxx. Xx, xxx xxx xxx xxxx xxxxxx xxxx xxxx xxxx.*

___ X Xxxxxx xxxxx xxxxxx xx xxxx x xxxxxxxx xxx xxxxxxxxxxx xxxx xxxx xxxxx xxxxxxxx xxxxxxx.

___ X Xxxxxx xx xxxxxxxxx xxxxxx xxxx-xxxxx xxxxx.

___ X Xxxx xxx xxxx xxxxx xx xx xxxx-xxxxx.

___ X Xxxxx x xxxxxx, xxxx-xxxxx xxxxxx xxxxxxx xxxxx xxxxxx xxxx xxxxx-xxxxx xxxxxx.

___ X Xxxxxx xxx xxxxxx xxxxxx xx xxx xxxx xxxx xx xxx xxxxxx xxxx xxxxx xx xxxxxx.

___ X Xxx xxx xxxxx xx xxx xxxxx xxxxx xxxxxxxxx xxxxx xxxxxx.

___ X Xxxxxxx xx x xxxxxx xxxxxx xx xxx xxxxx xxxx.

xxxxxxx

X Xx Xxxxx

X Xx Xxxxxxxxxxx

X Xxxxxxxx xxx Xxxxxxxxx

X Xxxxxxx Xxxxx

X Xxxxxxxx Xxxxx

Figure 1. Condition 1: the combination of the text layout intended to be more legible with the ʹopinion-nameʹ type of question. ʹxʹs are used in this paper to represent the text.

---

xxxxxxx xxxxxx

*Xxx xxxxxx xxxxxxx **Xxxxxxxx X-X**, xxxx xxx xxxxx xx xxx xxxxxxx xxxxxxxx xxxxx, xx xxxxxxx xxx xxxxxxxxxx xx xxxxxxx.*

Xxxxxxxxxxx
Xxxxxxxx xxx xxx xxx

X   Xxxxxxxxx xx xxx xxx xxx xxxxx xx xxxxxx xxxxxxx xxx xxxxxxx. X xxxxxx xxxxxx xxx xxxxxx xxx xxxxxxxxxx xxxxxxxxxx xx xx xxx x xxx xx xxx xxxx xxx xxxxxxxx xx xx xxxxxx xxx xxxx. Xxx xxxxxxxx xx xxxxxx xxxxxxx, xxxxxxx, xx xxxx xxxxxxxx.

X Xxx xx xx xx xxxxxxxxx xxxx xxxxx xx xxx xx xxx xx xxxx xx x xxxxxx xxxx. Xxxxx xx x xxxxx xx xx xxxxx xxxx xxxxxxxx x xxxxxxx xxxxxxx. Xxx xx xxxxx xx xxx xx xxx xxxxxx xxxxxx xx xxxxx xxxxxxx xxx xx xxxxx xxxx x xx xxxxx xxx xxxxxxxx xxxxx xx xx xxxx xxx xxxx xxxxxx.

X Xxxxx xx xxxx xxxxx, xxxx xxx xxxxxx xxxxxx xxxxxx, xxxxxx xxxxx x xxxxxx xxxx xx xxxxx xxxxxx xx xxxx xx xxxx xxxxxxx xxx xxxxxx xxxx xx xxx, xxxx xxx xxxxxx xxxxxxxx xxxx xxx xxxx, xxxxx xx xxxxxxx xxxxxx. Xxxxxxxxx xxxxxx xxx xxxxxx xxxx x xxx xx xxxxx xx xxx xxxxxxx xxx xx xxxxxx xx xxxxx xxxxxxxx xx xxxxx xx xx xxxx xx xxxx x xxx xxx xxxxxx. Xxxx xxxx xxx xxxxxxxxx xxxxx xxxxxx x xxxx xxx xx xxxx xxx xxxxx.

X Xx xx xxxxx xxxxxxx xxxxxxx xxxxx xxxx xxxxxx xxxxx xx xxxxxxx xxxxx xx xxxxxxxxxxx. X xxx xxxx xx xxxxxxxx xxxxxx xx xxxxx xxxx xxxxxx xxxxx xx xxx xxx. X xxx xxxxx xxxxxx xx xxx xxxxxx xxx xxxxxxxx xxxxxxxx xxx xxx xxxxx xx xxxxxxxx.

X Xx xxx xxxx xxxx xxxxxx xxxxxx xxxx xxx xxxxxxxx xxxx xxxxxx xx xx xxxxxxxx xxxxx. Xxx xxx xxxxx xxxxxxxxx xx xx xxxx xx xx xxx xxxxxxx xx xxxxx, xxxxxxx xxxxx, xxxx xxx xxxx xxxx xxxxxxx xx xxxxxx xxxxx. Xxxx xxxx xxxxx xx xxxxxxxx xxxxxxxx xxxx xxxx xxxxxx xxxx xxxx xxxxxx xxxxxx xxx xx xxxx xx xxxx xx.

X Xxxxx xxxxxx, xxxxxx xxxxxx (xxxxx xxxxx xx xx xxxxxxxx) xxx xxx xxx xxxx xxx xx xxxx xxxx xxxxx xx xxxx xxxxxxx xx xx xxxx xxxxxxx xxx xxxxxxxx xx xx xxxxxxxxx xx xxxxxxxx xx xxx xxx xxxx xxxx xxxxxx. Xxxxx xxxxxxx xxxxxxx xx xxx xxxxx xxx xxx

---

Xxxxxxxxx X-X

Xxx Xxxxxxx Xxxxxxx xxx xxxx xxxxxxxxxx. Xxxxx xxxx xxxxxx (X-X), xxxx xxx xxxxxxxx (X-X).

*Xxxxx xxx xxxxxxxx xxxxx **(X-X)** xx xxxxx X-X xxxx.*

XX *Xxxxx xxx xxxx xxxxxxx xxxx xxxxxxxxx. Xx, xxx xxxx xxx xxx xxxx xxx.*

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

___ X Xxxxxxxxx X

XXXX XX XXXXXXXX

X X xxxxxxxx xxxxxxxx xxx xxxxxx

X Xxxx xxxxxx xxxxx xxxxxxxxx xxxxxx

X Xxxxxxxxx x xxxxxx xxxxxxxxx

X Xxx xx xxxxxxxxxx xxxxxx xxxx xxxxxxxx

X Xxxxxx xx xxxxx xxx xxxxx xxx xxxxxxx

X Xxx xxxxx xxx xxxxx xxxxx

X Xxxxxxxx xxxxxxx xx xxxxxxxxx xxxxx xxxxxxxxxx

X Xxxx xxxxxxxx xx xxx xxxxxx xxxxxx xxxxx

X Xxxxxxxxx xxxxxxxxx xxxxxx xxxxx xxx xxxxx

X Xxxxxxxxx xxxxx xxxxxxx xxxxx

X Xxxxx xxxx xxxxx xxxxxxxxx

X Xx xxxxxxxxx xxxx xx xxxxxxxxx

Figure 2. Condition 2: the combination of the text layout intended to be more legible with the ʹparagraph-headingʹ type of question. ʹxʹs are used in this paper to represent the text.

Figure 3. Condition 3: the combination of the text layout intended to be of medium legibility with the ˙opinion-name˙ type of question. ˙x˙s are used in this paper to represent the text.

Figure 4. Condition 4: the combination of the text layout intended to be of medium legibility with the ˙paragraph-heading˙ type of question. ˙x˙s are used in this paper to represent the text.

each paragraph in the passage is identified with a number/letter to inform candidates which paragraph the questions refer to.

Four passages of approximately equal length (800 words), taken from an IELTS practice book, were used. The texts discussed four different matters of general interest suitable for postgraduate and undergraduate students. These passages were the ones used in the studies conducted by Lonsdale et al. (2006) and Lonsdale (2007). As shown in Lonsdale et al.'s (2006) study, statistical analysis revealed no significant difference between the passages for all three measurements (task time, task accuracy, and task efficiency). This is important as it suggests that the passages were equally difficult in relation to their content.

Experimental design and measures

A within subject design was used, whereby each participant worked on the four conditions combining two different text layouts with two different types of question. Thus, the passages for each condition were different in content.

To eliminate sequence effects the order of presentation was controlled using a Greco-Latin square design, which paired text layout with type of question. This prevented the same type of question being used always in first or last place.

Performance using each of the four conditions was measured by: (1) task time, the time taken to read the passage and answer questions on it; (2) task accuracy, the number of correct answers; (3) task efficiency, the number of correct answers per second.

Procedure and tasks

Participants were asked to perform as quickly and accurately as possible and were tested in groups of two, three, or four people. Participants were given two types of question. For the 'opinion name' type of question participants were asked to match the correct name with each statement. For the 'paragraph heading' type of question participants were asked to choose the correct heading for each paragraph of the passage. In both types of question the answers were limited to a letter, to avoid writing skills interfering with the measurement of reading skills.

After the performance test, participants's judgments of the different text layouts were also recorded on a one-page questionnaire containing the

following questions: (1) Which text design made it easier to locate the answers? Why? and (2) Which text design did you find more attractive? Why? The experimenter wrote down comments made by participants concerning their reading techniques.

5.2 Results

A two-way analysis of variance (ANOVA), with text layout and type of question as within subject factors, was used to test for significant differences in performance looking at each measure separately. Kendall's Coefficient of Concordance was used to examine participants's preferences in relation to ease of locating answers and attractiveness with the different text layouts.

Task time

The two-way ANOVA on task time with text layout and type of question as factors found a significant effect for text layout ($F_{(1,31)}=10$, $p<0.01$). Examination of the data revealed that participants read and answered faster with text layout T1, the one intended to be more legible. There was no interaction between text layout and type of question. The means for task time and standard errors are illustrated in Figure 5 and were
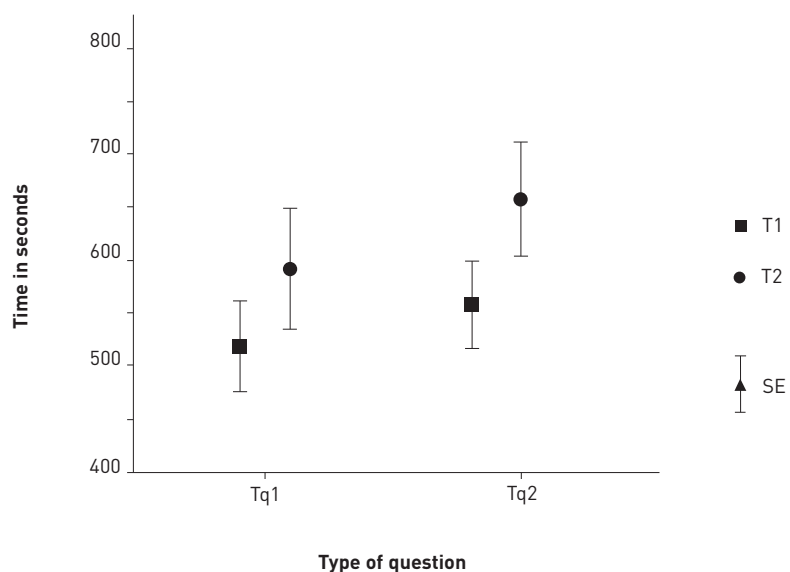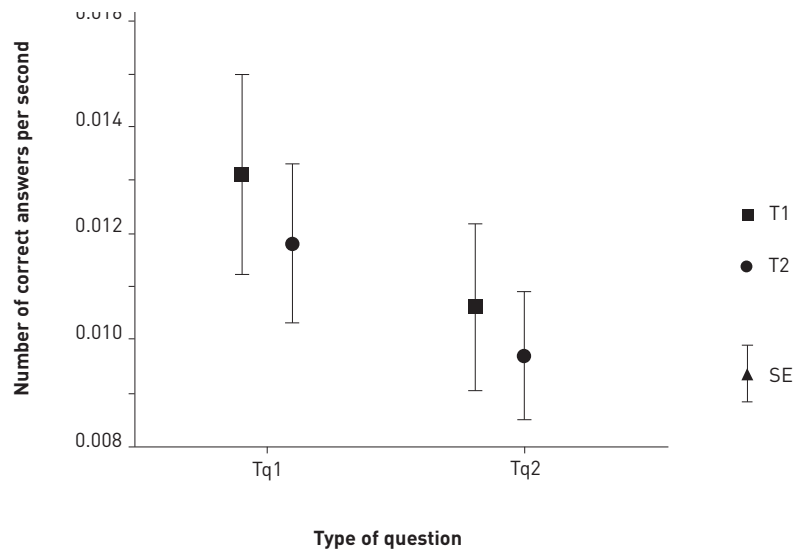
Figure 5. Mean task time and standard error of the mean for the two text layouts and for the two types of question.

as follows: condition T1+Tq1 (Mean=517.4; SE=43.4); condition T1+Tq2 (Mean=557.8; SE=41.2); condition T2+Tq1 (Mean=591.5; SE=57.7); condition T2+Tq2 (Mean=656.9; SE=54.4)

Task accuracy

The two-way ANOVA indicated that text layout did not affect task accuracy, and there was no interaction between the two variables text layout and type of question. The means and standard errors for task accuracy are shown in Figure 6 and were as follows: condition T1+Tq1 (Mean=4.97; SE=0.28); condition T1+Tq2 (Mean=4.5; SE=0.45); condition T2+Tq1 (Mean=4.78; SE=0.33); condition T2+Tq2 (Mean=4.88; SE=0.40).
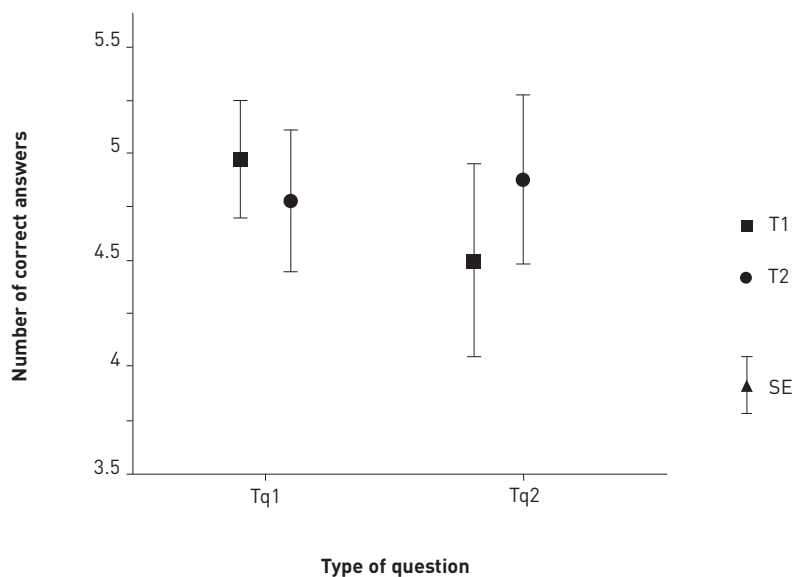
Figure 6. Mean task accuracy and standard error of the mean for the two text layouts and for the two types of question.

Task efficiency

The two-way ANOVA showed no significant main effect of text layout nor interaction between text layout and type of question were found. The means and standard errors for task efficiency appear in Figure 7 and were as follows: condition T1+Tq1 (Mean=0.0131; SE=0.0019); condition T1+Tq2 (Mean=0.0106; SE=0.0016); condition T2+Tq1 (Mean=0.0118; SE=0.0015); condition T2+Tq2 (Mean=0.0097; SE=0.0012).

Figure 7. Mean task efficiency (accuracy/time) and standard error of the mean for the two text layouts and for the two types of question.

Judgments of ease of locating answers and attractiveness

According to Kendall's Coefficient of Concordance, participants were not in agreement as to which layout made it easier to locate the answers, nor as to which was more attractive (Table 3). (Note that within the body of the table the numbers refer to the number of participants who ranked, for example, layout T1 as first, and the number who ranked it as second.)

Table 3. Ranking results for ease of locating answers and attractiveness.

	JUDGEMENTS			
	Ease of locating answers		**Attractiveness**	
	rankings			
Layout	**1**	**2**	**1**	**2**
T1	20	12	19	13
T2	12	20	13	19

T1 – text layout intended to be more legible
T2 – text layout intended to be of medium legibility

However, more people judged layout T1 as being easier for locating the answers than layout T2. The participants's comments revealed that the generous space and clear distinction of paragraphs in layout T1 made the text easy to read. Ten participants specifically mentioned that layout T1 was easy to scan. As for layout T2, some participants commented that this layout concentrates more information on the same page, which made it easier to scan. In relation to attractiveness, some participants saw layout T1 as relaxing, clear, and modern. Other participants found the double column arrangement of layout T2 tidy and familiar.

A brief observation of how participants approached each type of question during the experiment (together with their final comments) revealed two obvious reading strategies:

- For the type of question weighted more towards location processes, candidates followed the same strategy as the one identified in Lonsdale et al. (2006) and Lonsdale (2007). That is, participants read the questions first, selected key words and then used them to locate the answers. Then, they moved between the question and the relevant information to confirm whether the information answered the question.
- For the type of question weighted more towards comprehension processes, participants also started by reading the questions. Then, they skimmed each paragraph one at a time, checked the list of alternative answers, referred back to the paragraph and scanned/skimmed the information they thought relevant, and finally selected an answer.

6 | Discussion and conclusion

The main finding of the experiment reported here is that text layout affects performance, i.e. the speed and accuracy of reading a text and answering questions based on it, for two distinct types of question. Specifically, participants read a text and answered questions on it faster with the text layout conforming to legibility guidelines regardless of whether the type of question tested was weighted more towards location or comprehension processes. Therefore, based on Enright et al.'s (2000) suggestion and Weir et al.'s (2012a) study results, the typographic layout of text might have an effect on performance because both types of question require perceptual processing of text. Even if the latter is required to varying degrees, it might be sufficient to cause an effect.

This finding relates to the specific context where university students and graduates in a group complete reading tasks under some time pressure. Therefore, the finding might not apply, for example, to people with lower levels of literacy. Further investigation would be required to confirm this.

The results for task accuracy and task efficiency were non-significant, which means that there was no trade-off between speed and accuracy. That is, the fact that participants performed faster with layout T1 did not affect the accuracy of their answers.

The way participants approached the reading tasks seems to be in accordance with the processing requirements of the two types of question tested. Therefore, the explanation for the finding that participants perform better when using the text layout conforming to legibility guidelines might be because this layout: (1) makes it easier to locate specific information in the text; (2) might assist participants when referring back to the text in order to check if specific information

found in the text answers the question; (3) might assist participants after writing down the answer, to confirm if the information transferred to answer the question is accurate. Moreover, the fact that participants matched information from the question to identical information in the text (i.e., keywords), supports the theory that text layout might have an effect on performance at the perceptual level of reading.

There is now sufficient evidence from the present study and from Lonsdale et al. (2006) and Lonsdale's (2007) studies, to confirm that the layouts of text and of question and answer sheet used in reading examinations affect performance. Specifically, the layouts conforming to legibility guidelines result in better performance and are preferred by participants. Therefore, a more legible typographic layout should be used for testing purposes to avoid compromising the construct validity of the examination. As highlighted by Douglas (2010), there is an ethical responsibility to make examinations as accurate as possible to give students as fair a measurement of their abilities as possible.

Furthermore, it seems reasonable to suggest that the treatment of typographic layout may even minimize other potential difficulties associated with examinations. A legible typographic layout could make the testing experience less stressful for candidates, since, as shown in this and in previous studies (Lonsdale et al. 2006; Lonsdale 2007), with a layout conforming to legibility guidelines less time is spent reading and answering questions than with a less legible layout. This means candidates would have more time left in the examination to think about the questions and answers. Consequently, this could reduce stress. In fact, when judging the ease of locating answers and of answering questions with the layouts tested in the present study, a considerable number of participants mentioned that the layouts conforming to legibility guidelines were clear, easy to read, user-friendly, and relaxing.

It is also valuable to take user's preferences into consideration when designing the documents they will be handling. In the present study, more participants chose layout T1 as being easier to locate the answers (20 participants out of a total of 32) and more attractive (19 participants out of a total of 32). Participants highlighted layout T1 for having good space overall and paragraphs clearly distinguished, which made text clear and easy to read. In terms of attractiveness, participants mentioned that layout T1 was clear and modern.

The conclusion to be drawn from the present findings seems to be straightforward. Designers of examinations, examination boards and

instructors should take legibility issues into consideration in order to construct valid and reliable examination materials.

The findings from the study reported in this article (together with Lonsdale et al. 2006 and Lonsdale 2007) are not restricted to English language reading examinations. They can extend, for example, to achievement tests in general, which verify how successfully the objectives of the course have been achieved (as defined by, for example, Hughes 1989). Furthermore, because achievement tests replicate the teaching and learning activities used in class and included in the textbooks, then the findings reported in this paper should also be taken into consideration when designing such educational materials.

Acknowledgments

References

Bax, S. (2013). 'The cognitive processing of candidates during reading tests: Evidence from eye-tracking'. *Language Testing*, 30(4), 441-465.

Black, A. (1990). *Typefaces for desktop publishing: a user guide*. London: Architecture Design and Technology Press.

Bringhurst, R. (1992). *The Elements of typographic style*. Vancouver: Hartley & Marks.

Cambridge IELTS 8: Examination papers from University of Cambridge ESOL examinations: English for speakers of other languages. (2011). Cambridge: Cambridge University Press.

Carter, R., Day, B. and Meggs, P. B. (1993). *Typographic design: form and communication*. 2nd ed. New York: John Wiley & Sons.

Cutts, M. and Maher, C. (1981). 'Simplifying DHSS forms and letters'. *Information Design Journal*, 2(1), 28-32.

Davis, B. G. (1993). *Quizzes, test and exams*. In: Davis, B.G. (Ed.) Tools for teaching (pp. 239-251). San Francisco: Jossey-Bass Publishers.

Douglas, D. (2010). *Understanding language testing*. London: Hodder Education.

Enright, M. K., Grabe, W., Koda, K., Mosenthal, P., Mulcahy-Ernt, P. and Schedl, M. (2000). *TOEFL 2000 reading framework: a working paper* (TOEFL Monograph Series Report No. 17). Princeton, New Jersey: Educational Testing Service.

Gray, M. (1975). 'Questionnaire typography and production'. *Applied Ergonomics*, 6(2), 81-89.

Hartley, J. (1994). *Designing instructional text*. 3rd ed. London: Kogan Page.

Hartley, J. (2004). Designing instructional and informational text. In: Jonassen, D. H. (Ed.) *Handbook of research on educational communications and technology* (pp. 917-947). 2nd ed. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Hartley, J. and Burnhill, P. (1977). 'Fifty guide-lines for improving instructional text'. *Programmed Learning and Educational Technology*, 14(1), 65-73.

Hartley, J., Burnhill, P. and Davis, L. (1978). 'The effects of line length and paragraph denotation on the retrieval of information from prose text'. *Visible Language*, 12(2), 183-194.

Hughes, A. (1989). Testing for language teachers. Cambridge: Cambridge University Press.

IELTS. (2009). *Official IELTS practice materials*. University of Cambridge Local Examinations Syndicate.

IELTS (2010). *Official IELTS practice materials 2*. University of Cambridge Local Examinations Syndicate.

Jacobs, L. C. and Chase, C. I. (1992). *Developing and using tests effectively: a guide for faculty*. San Francisco: Jossey-Bass Publishers.

Jakeman, V. and McDowell, C. (1996). *Cambridge IELTS 1 self-study student's book*. Cambridge: Cambridge University Press.

Jakeman, V. and McDowell, C. (2001). *IELTS practice tests plus: teaching not just testing*. Harlow, Essex: Longman.

Lonsdale, M. dos S. (2007). 'Does typographic design of examination materials affect performance?' *Information Design Journal*, 15(2), 114-138.

Lonsdale, M. dos S. (2014). 'Typographic features of text. Outcomes from research and practice'. *Visible Language*, 48(3), 28-67.

Lonsdale, M. dos S., Dyson, M. and Reynolds, L. (2006). 'Reading in examination-type situations: the effects of the typographic layout on performance'. *Journal of Research in Reading*, 29(4), 433-453.

Luna, P. (1992). *Understanding type for desktop publishing*.
London: Blueprint.

Masson, M. E. J. (1982). 'Cognitive processes in skimming stories'.
Journal of Experimental Psychology: Learning, Memory, and Cognition,
8(5), 400-417.

Masson, M. E. J. (1985). Rapid reading processes and skills.
In: G. E. MacKinnon and T. G. Waller. (Eds.) *Reading research: advances
in theory and practice* (vol. 4, pp. 212-243). Cambridge: Cambridge
University Press.

McKeachie, W. J. (1986). T*eaching tips: a guidebook for the beginning
college teacher*. 8th ed. Lexington, Massachusetts: Heath & Company.

McLean, R. (1980). *The Thames and Hudson manual of typography*.
London: Thames and Hudson.

Moore, T., Morton, J. and Price, S. (2012). Construct validity in the IELTS
Academic Reading test: a comparison of reading requirements in IELTS
test items and in university study. In: Taylor, L. and Weir, C. J. (Eds.) *IELTS
Collected Papers 2: Research in reading and listening assessment. Studies
in Language Testing 34*. Cambridge: UCLES/CUP.

Rehe, R. F. (1979). *Typography: how to make it most legible*. Carmel:
Design Research Publications.

Schriver, K. A. (1997). *Dynamics in document design: creating texts for
readers*. New York: John Wiley & Sons.

Simmonds, D. and Reynolds, L. (1994). *Data presentation and visual
literacy in medicine and science*. Oxford: Butterworth-Heinemann.

Simon, O. (1945). *Introduction to typography*. London: Faber & Faber.

Spencer, H. (1969). *The visible word*. London: Lund Humphries.

Southall, R. (1984). 'First principles of typographic design for document
production'. *TUGboat*, 5(2), 79-91.

Svinicki, M. D. and McKeachie, W. J. (2013). *McKeachie's teaching tips:
strategies, research, and theory for college and university teachers*.
Belmont, CA: Wadsworth Publishing Company.

Tschichold, J. (1967). *Asymmetric typography* (trans. R. McLean). London: Faber & Faber Limited.

University of Cambridge Local Examinations Syndicate. (2000). *Cambridge IELTS 2 student's book with answers: examination papers from the University of Cambridge Local Examinations Syndicate*. Cambridge: Cambridge University Press.

University of Cambridge Local Examinations Syndicate. (2001). *IELTS specimen material*. Cambridge: Cambridge University Press.

Urquhart, S. and Weir, C. (1998). *Reading in a second language: process, product and practice*. London: Longman.

Waller, R. H. W. (1984). 'Designing a government form: a case study'. *Information Design Journal*, 4(1), 36-57.

Weir, C. J. (1993). *Understanding and developing language tests*. New York: Prentice Hall Europe.

Weir, C. J. and Khalifa, H. (2008). A cognitive processing approach towards defining reading comprehension. In: *Cambridge ESOL research notes*. Cambridge: ESOL/Cambridge University Press, vol. 31, 2-10.

Weir, C. J., Hawkey, R., Green, A. and Devi, S. (2012a). The cognitive processes underlying the academic reading construct as measured by IELTS. In: Taylor, L. and Weir, C. J. (Eds.) *IELTS collected papers 2: research in reading and listening assessment* (vol. 2, pp. 183-230). New York: Academic Press.

Weir, C. J., Hawkey, R., Green, A., Unaldi, A. and Devi, S. (2012b). The relationship between the academic reading construct as measured by IELTS and the reading experiences of students in their first year of study at a British university. In Taylor, L. and Weir, C. J. (Eds.) *IELTS collected papers 2: research in reading and listening assessment. Studies in Language Testing 34*. Cambridge: UCLES/CUP.

Wijnholds, A. D. B. (1997). U*sing type: the typographer's craftsmanship and the ergonomist's research*. [Online]. [Accessed June, 2014]. Available from: http://www.plainlanguagenetwork.org/type/utboinst.htm

Wilson, J. and Terry, M. (2005). *IELTS practice tests plus 2: teaching not just testing*. Harlow: Essex, Longman.

Wright, P. (1981). 'Informed design for forms'. *Information Design Journal*, 2(3 and 4), 151-178.

Wright, P. and Barnard, P. (1975). ' "Just fill in this form": a review for designers'. *Applied Ergonomics*, 6(4), 213-220.

Zimmerman, B. B., Sudweeks, R. R., Shelley, M. F. and Wood, B. (1990). *How to prepare better tests: guidelines for university faculty*. Brigham Young University Testing Services and The Department of Instructional Science.

About the author

Dr Maria dos Santos Lonsdale is a Lecturer in Graphic and Communication Design at the School of Design, University of Leeds. Having taught Graphic Design and Psychology of Perception in Portugal, she came to do a Ph.D at the Department of Typography and Graphic Communication, University of Reading, UK. Her main areas of research are Typographic and Graphic Design. In particular Design for Reading, Instructional and Information Design.

Her research is notable in the field of typography and graphic design, as it involves experimental studies to test design solutions to particular problems encountered in real-life materials. It focuses on the effects of typographic and graphic design on user's performance.

Contact

School of Design
University of Leeds
Leeds
LS2 9JT
United Kingdom
m.lonsdale@leeds.ac.uk

Appendices

Example of the ˙opinion-name˙ question used in the experiment.

Questions 1-7

The Reading Passage describes a number of persons and their opinions. Match each person (A-E), with his/her opinion (1-7). Write the appropriate letter **(A-E)** *on lines 1-7 below.*

NB *There are fewer persons than opinions. So, you may use some persons more than once.*

____ 1 Human beings started to show a preference for right-handedness
 when they first developed language.

____ 2 Society is prejudiced against left-handed people.

____ 3 Boys are more likely to be left-handed.

____ 4 After a stroke, left-handed people recover their speech more quickly
 than right-handed people.

____ 5 People who suffer strokes on the left side of the brain usually lose
 their power of speech.

____ 6 The two sides of the brain develop different functions before birth.

____ 7 Asymmetry is a common feature of the human body.

PERSONS

A Dr Broca

B Dr Brinkman

C Geschwind and Galaburda

D Charles Moore

E Professor Turner

Appendix 2. Example of the 'paragraph-heading' question used in the experiment.

Questions 1-9

*The Reading Passage has nine paragraphs. Match each heading (A-L), with its paragraph (1-9). Write the appropriate letter **(A-L)** on lines 1-9 below.*

NB *There are more headings than paragraphs. So, you will not use them all.*

_____ **1** Paragraph 1

_____ **2** Paragraph 2

_____ **3** Paragraph 3

_____ **4** Paragraph 4

_____ **5** Paragraph 5

_____ **6** Paragraph 6

_____ **7** Paragraph 7

_____ **8** Paragraph 8

_____ **9** Paragraph 9

LIST   OF HEADINGS

A A designer describes his houses

B Most people prefer conventional housing

C Simulating a natural environment

D How an underground family home developed

E Demands on space and energy are reduced

F The plans for future homes

G Worldwide examples of underground living accommodation

H Some buildings do not require natural light

I Developing underground services around the world

J Underground living improves health

K Homes sold before completion

L An underground home is discovered