# EYE MOVEMENTS DURING THE READING OF LITERARY TEXT

Hana Vančová

Department of English Language and Literature, Faculty of Education, Trnava University in Trnava,

Priemyselná 4, 918 43 Trnava, Slovakia

**Abstract**
*The submitted paper communicates findings of an experimental reading research using the eye-tracking method. The aim of the research was to follow the eye movements (saccades and regressions) of readers during the reading of different types of literary texts (prose, poetry, drama). This paper outlines the phases of reading and identifies the most important parts of different types of texts that help the readers understand literary text. The relation between psychology and reading of literary text is implied the end of the paper.*

**Key words:** *reading comprehension, eye-tracking, experiment, literary text, saccades, regressions, eye movements*

## 1. INTRODUCTION

Among the most important issues of contemporary psycholinguistics are the questions concerning comprehension of the text and understanding of this complex process. Reading is a complex communicative skill and without comprehension is not effective. Comprehension of the text in the real life situations could be also called functional literacy, which Scribner and Cole (1981, p. 236) claim to be: "not simply learning to read and write a particular script but applying this knowledge for specific purposes in contexts of use". The complexity of this issue requires use of different research tools.

The key factors influencing successful reading are eye movements during the reading and reading styles. Eye movements have been analysed since the 19th century and modern technologies allow the psycholinguists to record and look at the authentic eye movement while performing various reading tasks. Eye movements during the reading are mostly subconscious, therefore authentic. Recorded data help answer many questions raised by the researchers. Research method based on recording and analysis of eye movement is called eye-tracking and this method is used in several of fields of study, not only in psycholinguistics.

One of the key findings of eye movement recording is that the while reading the eyes do not smoothly glide from letter to letter, but make jumping movements of various length front and back (Hyona and Niemi, 1990; Kuperman, 2010). The movements forwards are so called saccades, used when the reader understands the text and can continue the reading in order to get new information. When misunderstanding occurs, the reader makes so called regressions, which are glances backwards to those parts of the text that require second reading in order to comprehend or verify the information acquired from the text (Inhoff and Wager, 2005; Schnitzler and Kowler, 2006). Some fixations are language specific; some fixations are universal across text written in all languages.

The length of saccades and their position depends on various aspects of the text and reader´s experience (Mistrík, 1996). The symbols that attract reader´s eyes across texts in all languages are primarily those that are unique for that particular type of text, in literary text those symbols may be numbers, capital letters, unusual symbols, letters printed in bold or cursive. If the text lacks these visual symbols, the size of saccade depends on the reader´s visual recognition and familiarity with the word.

For the purpose of this study, specifics of Slovak language must therefore be taken into consideration (Mistrík, 1980, Mistrík 1996). Slovak is a synthetic type of language; the grammatical information appears within the structure of the word – in its morphemes. In order to recognize the lexical meaning

of the word, the readers of Slovak text make different saccades and regressions as, for example, the reader of an English text.

For example, in the word "prie-my-sel-ný" (industrial), the order of read syllables is 1-3-2 which means that the readers fixate their eyes on the first morpheme, then make saccade to the last morpheme to get the grammatical information (word class, gender, number, case) and then they make regression to the central two morphemes for the lexical word recognition.

With the growing complexity of words in the text the number of fixations in eyes decreases. The grammatical and one syllable words are usually omitted when making fixations. In Slovak, there are about 2000 monosyllabic words. Their recognition of the word is also based on the predictability of the word within the given (con)text.

Regarding reading literary texts, Kulka (2008) and Mistrík (1980) point out basic differences in reading different genres of literary texts.

Reading of poetry is specific with strong feel of rhythmicity, melody and verse organization. Poetic texts play with words in creating tension, opposite relations, using specific vocabulary (diminutive, poetic, obsolete or rarely used words:

Reading of prose is the closest to the reading of non-literary continuous texts. All the rules regarding reading of non-literary texts can be applied to this style (Kulka, 2008). This type of the text contains descriptions, narrator´s point of view and dialogues. Within prosaic text, reader can occasionally encounter another types of text, such as letter, newspapers excerpts etc. The readers make concentrate primarily on full lexical words, proper names, unusual words and only then on other type of words.

Reading dramatic text is also specific because this type of text is "amputated", the narrator´s speech is missing and the text is divided into reading the left side and right side. The hot spot analysis proved that the readers cannot omit reading the left part, as it is crucial to understanding of the text, to the relation of utterances. Although literary theorists argue that reading dramatic text is not related to real life reading situations, as dramatic texts are designed to be performed on stage, and not read; the visual concept of dramatic text is often found in modern ways of communication, such as chat conversations or comics.

Having all these specific features of different types of literary text in mind, Mistrík (1980, 1996) lists basic types of reading behaviour in different reading situations for all types of texts in general:

- Informative – initial familiarization with the text and its structure, structure of the book, formulation of expectations about the text. This type of reading does not follow the structure of the text.
- Cursory – reading at high pace/speed, reading of the text itself, and successive reading. It is only saccadic reading, from upper left corner to lower right corner. Deviations from this direction of eye movements appear when important information appears out of this general direction. Concentration on lexical words.
- Selective reading – discrimination of information based on their importance. The eye movements follow blocks of text on both horizontal and vertical axis.
- Analytic reading – opposite of cursory reading, concentration on detail.
- Combined reading – acknowledges the fact that there is no "pure" style of reading, usually combination of above mentioned
- Recreational reading – typical for reading of literary texts, different purpose of reading (primarily for an experience, not information).

Dyson and Haselgrove (2000) also noticed difference in strategies in reading from paper and reading from screen. While reading from paper is analytical and preferred when studying; typical feature of reading from screen is the ability to assess the quality of the material and its relevance for reader for future use.

Another aspect of reader´s approach to text is knowledge of the genre of the text and the expectations that it raises about content of the text and influences the reading style and information they look for and acquire from the text (Sparks and Rapp, 2010).

Carrying out this type of study with literary text may clash with the literary theory, its principles and methodology. Literary theoreticians approach the literary text as a medium that can have either its true or several possible meanings, and the main purpose to read it is to discover it (Eco, 2005). The relation between psychology and reading literary text will be implied in the conclusions.

## 2. METHOD

### *2.1 Participants*

Ten participants (7 Czechs, 3 Slovaks; 7 men, 3 women) of average age 23,57 (men: 24,3; women 23,4; Czechs 24,28; Slovaks 22,3). All of the participants of the experiment were university students; eight of them had studied at the secondary grammar school before and two of them attended other type of school before university studies.

### *2.2 Material*

Four excerpts of literary works (one poem, one excerpt of prose and two excerpts of drama). In this reading experiment, non-continuous texts were omitted. The texts were presented to Czech and Slovak readers in their mother tongues. The text was laid out on white background and in Calibri font so it was as similar as possible to the reader to the reading from the paper.

### *2.3 Procedure*

Texts and tasks were presented on screen. The reading was self-paced. The text could be only moved forward – the readers could not return to the previous screen, once they had read it. The readers were never forewarned about the type of the text they were going to read.

### *2.4 Data*

To analyse data, video recordings were used. These recordings offered unique video sequences showing the directions of eye movements.

Another useful tool used in this study was so called “hot spot” analysis. This analysis is based on the static pictures coloured according to the time devoted to certain area in the text. The “hotter” the colour, the more time spent in that area of the text. The most read parts were red coloured; the least read parts of the text were green. For illustration, three hot spot analyses are presented in the next section of this contribution.

## 3. RESULTS - READING OF INDIVIDUALS ACROSS GENRES

While evaluating the data of this experiment, it must be taken into account that although the texts were chosen from literary ones, which are usually read for pleasure, in this case the readers were reading for purpose (the experiment). Also, results might have been influenced by the fact that readers were reading from the screen (Dyson and Haselgrove, 2000).

In general, it can be concluded that readers follow their individual reading style while reading all types of literary texts. This proves Linderholm´s et al. theory (2008) of maintaining the same reading strategy while reading different genres.

### *3.1 Reading poetry*

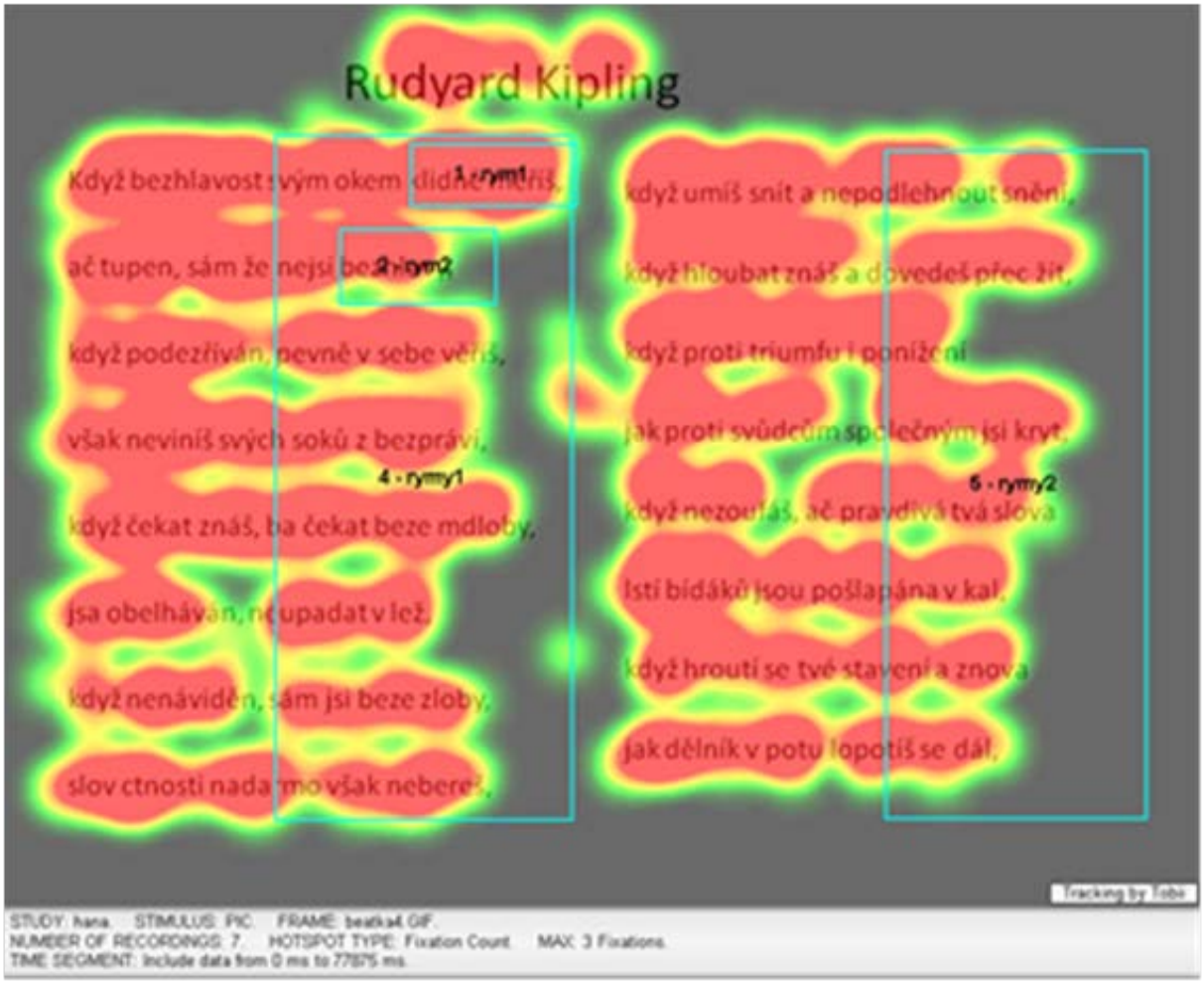



*Figure 1 Reading poetry - hot spot analysis*

The poem, *If* by Rudyard Kipling, was presented on screen in two columns. Areas of interest were identified in the place of rhymes – at the end of lines. The layout and pattern of the poem was successfully recognized by eight participants but two participants did not read the poem in column but in full lines, skipping from one column to another. This finding proves that the eye tracking research method helps to reveal unexpected reading patterns and behaviour and also points at the importance of informative reading. This finding may lead to conclusion that even the adult readers might not have been familiar with frequently used layout of poetic text, further more they were not able to formulate the main idea of the text.

Readers were reading all words in the poem; making fixation at the first and last words of each column, proving Kuperman´s rhythmical theory (2010). Rhyme was not proven to be key stylistic figure of the poem; frequently reread were stylistic figures, such as inversions (e. g. *house of yours will be burned*), enumerations (e. g. *muscles, nerves, bones*), formally interchangeable but in the context unexpected words (e. g. *sprostý* (stupid) – *prostý* (plain)), obsolete and rarely used words. Readers who recognized the genre of the text were able to process the form of figurative language and were able to formulate the main idea of the text.

*3.2 Reading prose*

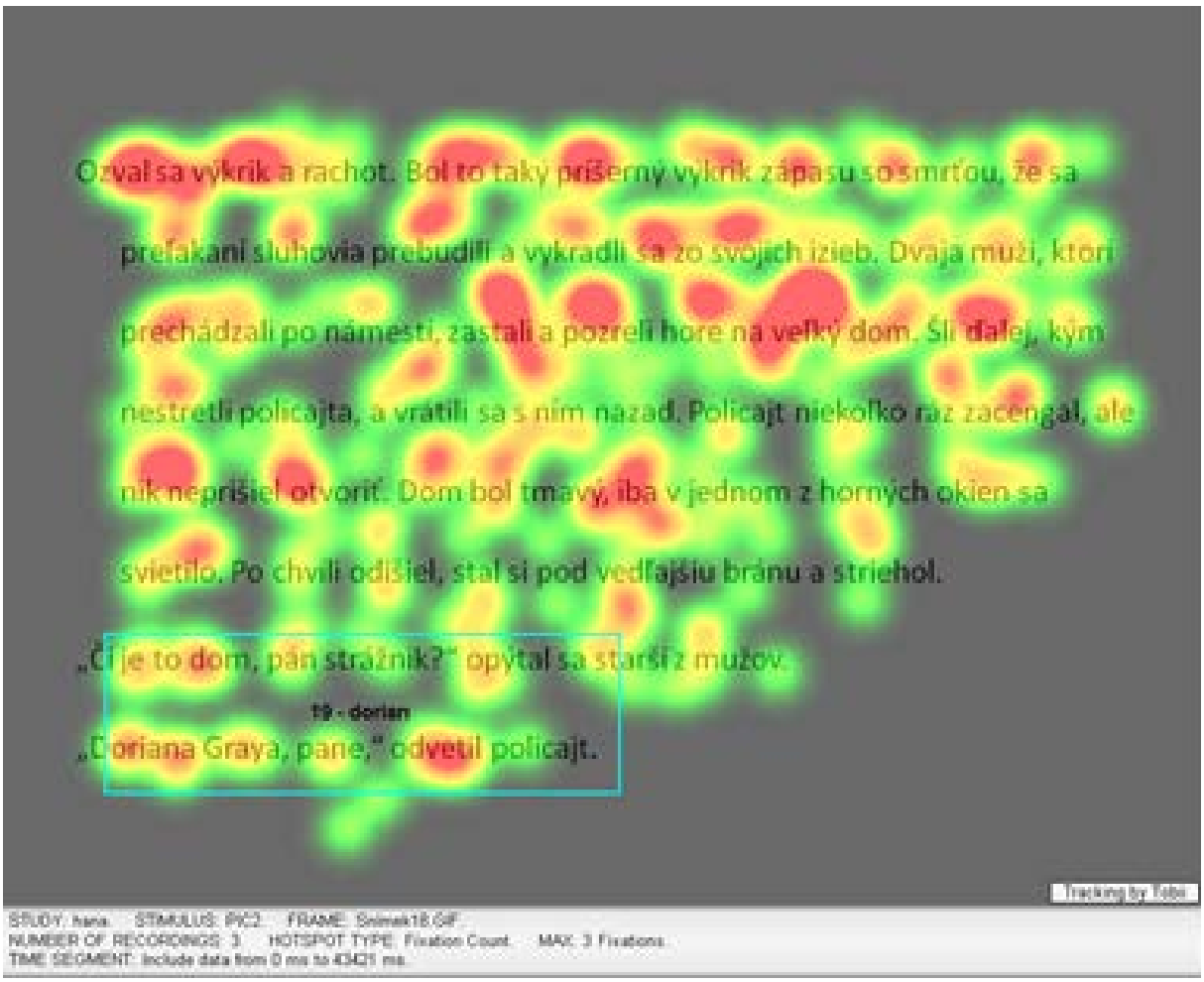



*Figure 1 Reading prose - hot spot analysis*

Reading prosaic text, an excerpt of *The Picture of Dorian Gray* by Oscar Wilde, also seemed to follow their own individual reading styles. The dominant style of reading was linear cursory style (fixation on the first word in the upper left corner and lower right corner). In prosaic text, readers easily identified the genre and read it carefully. The way they read prose was consistent with the reading style of other types of texts. The text was relatively rich in obsolete lexical items (e. g. *kočiš a lokaji* – coachman and footmen) that were reread and paid more attention than the contemporary word stock. Other words that attracted readers´ attention were enumerative nominal constructions (e. g. *zvädnutú, zvráskavená, odpudzujúcu tvár* – withered, wrinkled, and loathsome of visage); constructions containing capital letters and family relations (e. g. *strýko sira Henryho Ashtona* – Sir Henry Ashton's uncle); and also combinations of full lexical words (e. g. *veľký dom* – the great house).

Dialogues in quotation marks were proven to be less important to make eye fixations for the readers.

*3. 3 Reading drama*

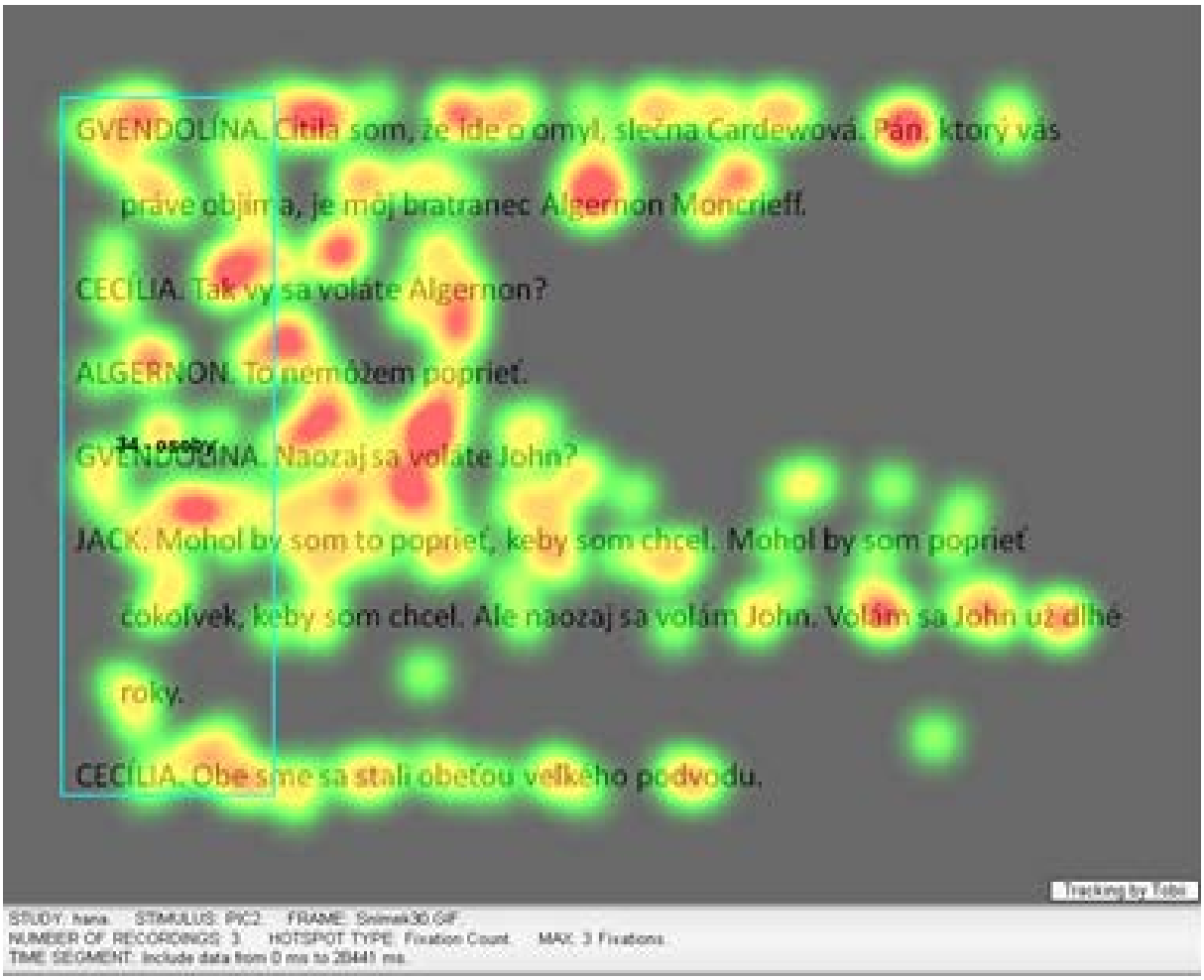



*Figure 2 Reading drama - Hot spot analysis*

Reading drama, two excerpts from the play *The Importance of Being Earnest* by Oscar Wilde, was a relatively unusual task for the readers.

The introductory parts of the utterances were written in capital letters, the utterances themselves were written with capital letters only at the beginning of sentences and proper names. Readers were not forewarned that they were going to read the drama, so they first had to recognize the genre. After this recognition, they read the text again, paying special attention to proper names in utterances, even names of cities (e. g. *Londýn* – London) or streets (e. g. *Albany Street)*. This can be explained as increased sensitivity to proper names caused by their high importance for the comprehension of the text. Dramatic text differs from the prosaic one by the way the characters are introduced – prose can make use of pronouns, nicknames, descriptions or other types of indirect references, whereas author of dramatic text must be consistent when giving names to characters on the left side of the text. So, if the name appears in the text, readers try to identify which character of the possible list of characters is referred to.

Two types of dramatic text were selected in order to learn how readers respond to structure of dramatic text. First excerpt was a dialogue of two characters, the second excerpt contained dialogue of four

characters. Presumption was that readers would omit introductory parts in the text in dialogue of two characters, because they soon recognized the pattern in which the characters change the utterances. The introductory part was more useful in the second type of dramatic text, because there was no pattern given and reader must always identify the speaker, which was proven in the reading experiment.

## 4. CONCLUSION

The aim of this experiment was to learn the reading behaviour of the Czech and Slovak readers, and reading patterns of different genres of literary text. The results of the experiment showed that reading behaviour of these participants is in accordance with reading behaviour of participants taking part in previous research. Most of the conclusions produced by previous research can also be applied to readers in different languages, irrespective of the structural arrangement of the text.

Results of the experiment suggest that not only the reading behaviour and movement of the eyes are the crucial factor in text comprehension, as they appear to be universal across the languages, but also the personal reading patterns of each reader have to be taken into the consideration.

The classification of four types of readers by Hyona and Nurminen (2006) can be applied also to this experiment and its participants – readers who read linearly achieved better understanding of the structure and content of presented excerpts of literary text. Readers who followed other style of reading could not recognize the structure of poetic text. Another style of reading, cursory reading by Mistrík (1980), was frequently followed during this experiment – readers made most eye fixations in the direction from the upper left corner of the screen to the lower right corner of the screen.

As it has been already mentioned, the main purpose of reading literary text is an experience and emotional satisfaction of the reader, which is connected to their psyche and therefore is studied by psychology. The psychologists, such as Kulka (2008), see literary text as one of the many types of art and art as such satisfies needs of both, its producer and its recipient. That is why Kulka does not look at the text only as an object having its meaning that needs to be discovered, but as a stimulus for reader´s mind and their emotional world. The interplay between the text, reader and their experience and emotional world goes beyond the meaning of the text itself – the reader builds their mental world and updates it according to their degree of identification with the text, memories and experience it triggers and the purpose why the reader reaches for the particular literary text. The readers respond to literary text the way the author might not have had in mind and the psychological and emotional world of the reader plays more important role than expected by literary theorists.

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