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A comparative study on the eye movement patterns in Malay-English bilingual readers

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Abstract

During the process of reading, the eyes do not move continuously but jump from one word to another, and they also stop at particular points. In eye-tracking studies, these processes are called ‘saccade’ and ‘fixation’. This paper presents an analysis of the reading patterns of readers reading Malay and English sentences and questions using the eye tracker. Malay-English bilingual readers read a set of statements in Malay and English and their reading comprehension was tested using questions with different levels of difficulty. Their correct responses and reactions to the comprehension questions are also presented and discussed in this paper.

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Keywords: eye movement; bilingual readers; saccade; fixation; eye tracker

1. Main text

Reading is the process of obtaining information. However, we rarely think about how the eyes move when we read. Human beings are unaware that during the process of reading, the eyes do not move continuously in an orderly manner; they pause, they move backward, and jump from one point to another.

The eyes make (1) “a series of very rapid ballistic movements (called *saccades*); (2) brief intervals (called *fixations*), and (3) movements to earlier parts of text (called *regressions*) when reading (Reichle & Laurent, 2006, p. 390). However, despite being a complex behavior, it is considered systematic (Reichle & Laurent, 2006). Studies indicated that high frequency words and words that are highly predictable from the preceding context are more likely to be skipped (Rayner, 1998); Starr & Rayner, 2011). In addition, numerous studies have shown that

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when information in the parafovea (2 to 5 of vision adjacent to the fovea) is available during reading, readers decrease their subsequent fixation time spent on the target word (e.g., Ashby, Treiman, Kessler & Rayner, 2006; Rayner, 1989).

Reading has been known to be language- and culture-specific, and because of this, reading patterns across languages are expected to be dissimilar. Other than word frequency, word familiarity and word morphological structure are some of the factors that have been identified to play a role in the process of reading (e.g., Rayner, 1978, 1998). Cross-cultural studies have been conducted to understand reading processes in reading texts in different languages. These studies included those on the English language (e.g. Williams & Morris, 2004), Hebrew (e.g., Deutsch, Frost, Pollatsek & Rayner, 2005), Chinese (e.g., Perfetti, C. A., & Cao, F. 2001) and Thai (e.g., Winskel et al., 2009). Up to this date, no studies on reading Malay texts have been conducted in order to look at the eye movement behavior in the process of reading. Studying the eye movement behavior when reading Malay, a morphologically rich language is interesting as it offers an interesting opportunity to investigate early morphological processing.

Most of the reading research conducted so far investigated the reading processes involved when reading texts. However, few studies have been conducted to investigate the extent the readers actually comprehend the questions (e.g., Gibson & Pearlmutter, 1998; Eason et al. 2012; Collins & Levy, 2008; and Inhoff & Weger, 2005). According to Gibson & Pearlmutter (1998), sentence comprehension involves “understanding the meaning of each word that exists in the sentence”, with the assumption that “the representations constructed during sentence comprehension are projected from representations for individual words... and that the individual word representations are then combined to form phrases” (p. 262).

Collins & Levy (2008) add that faster and more accurate decoding does not automatically lead to better comprehension. Reading comprehension depends greatly on text types and question types, which may also include readers’ word recognition and background knowledge. Study conducted by Eason et al. (2012), who conducted on reading processes by children, indicated that there was a main effects of texts and question types. Children’s comprehension is not identical across all text types and question types – indicating higher order cognitive skills contribute to comprehension of more complex text and question types. Although their studies found that literal questions are easier to answer in comparison to inferential questions, they found that children refer back to texts when answering literal questions.

William Scott Gray (1960) found that confusion in reading tends to take place when the following take place: Substitution, Addition, Omission, the use of unfamiliar words and Repetition.

One study on reading sentences for comprehension was also conducted by Inhoff and Weger (2005). In their study, they found that “eye movements during the classification task were generally directed toward the right, irrespective of the location of the relevant target in the previously read sentence (p. 447).

This paper presents results of an experiment conducted to investigate the reading patterns in Malay and English comparative sentences in different word-relation/sense-relation contexts among eight Malay & English bilingual readers. They were undergraduate students of Universiti Kebangsaan Malaysia and their age ranges between 19 and 21 The focus was on sense-relation conditions because children and students in general tend to have problems in comprehending statements if they don’t read the questions carefully. The mistakes take place either because they don’t read the questions carefully, or that they don’t understand the questions.

2. Method

A reading experiment was conducted on achieve the overall aim mentioned above. Specific objectives of the experiment were as follows:

1. To investigate the eye movement behavior among Malay-English bilingual readers in reading Malay texts

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