The Study on Reading Characteristics of Mongolian College Students Based on Eye Movement

Mei-Li LIU¹,a,*，Guo-Qiang CHEN²,b，Gegentana²,c

¹Key Lab of China’s National Linguistic Information Technology, Northwest University for Nationalities, Lanzhou, Gansu, China
²Northwest University for Nationalities, Lanzhou, Gansu, China

a769779307@qq.com, b877867573@qq.com, cgegeentana@foxmail.com

*Corresponding author

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Abstract. Eye is the activity of the object. Gaze is an important indicator of information. This article takes the Mongolian college students as the subjects, Comparatively analyses to the characteristics of eye movement in reading the texts which different styles of Mongolian and Chinese, to extracts the fixation duration and fixation frequency that two important eye movement indexes, and studies on the cognitive processing characteristics and reading psychological characteristics of Mongolian college students in reading different literary styles. It is concluded that the different characters of the text will affect the fixation duration, and the familiarity will affect the fixation frequency.

Introduction

There have been 100 years of history to study the reading of eye movement in the west. From the end of nineteenth Century, the reading of eye movement was mainly studied for English mother tongue natives, to explore the rules eye movement in English reading. In China, Eye movement study was beginning in early1920s, The earliest study of Chinese eye movement was conducted by Shen Youqian in 1925 at Stanford University, It has been more than 80 years ago.[1]

With introducing some advanced technology and equipment, the domestic research of eye movement have been great breakthroughs both in quantity and quality. However, many Chinese researchers have made a comparative analysis of the eye movement in reading English and Chinese texts, the research which on the characteristics of eye movement of minority students in reading their native language and second language is less. In this paper, the Mongolian college students read the different text styles of Mongolian, eye tracker record two important indexes that fixation duration and fixation frequency, then comparatively research on Mongolian college students' reading comprehension level in different styles chapters of two languages and objectively evaluate their reading ability and level. This study is also better for the minority language teaching.

Research Methods

Experimental Instruments

The instrument used in this experiment is Hi-speed1250 eye tracking system (SMI, German), recording data are eye fixation position, fixation duration, fixation count, pupil size and the extraction of eye movement indexes. This experiment is controlled by a computer, the stimuli is presented in the center of color display. Screen resolution is 1024*768 pixel. A computer presents reading materials, the other computer records eye movement data.

The Participants

The subjects were ten native Mongolian college students who Northwest University for Nationalities, Their Chinese proficiency was passed mandarin level test of grade 2. Testee are 5
males and 5 females. They are naked eyes or corrected visual acuity reached 1.0 above, and no color blindness, no reading disorder.

**Experimental Materials**

The reading materials are four different styles articles in Mongolian and Chinese respectively, includes exposition, prose, narration and argumentation. Each article’ word 400 – 600, and two multiple-choice questions for each styles.

**Experimental Analysis Index**

This paper used the following two indexes to analyze the eye movement’s characteristic in different styles reading of Mongolian students.

- **Average fixation duration(s)**: it is the mean residence time of eyes’ each fixation point.
- **Fixation frequency (count/s)**: the number of viewpoints in the unit time (fixation frequency = fixation point / fixation time).

**Eye Movement Index Analysis**

**Fixation Duration**

It analyses the fixation duration in different styles of Mongolian and Chinese. From Figure 1, we can see the Mongolian students reading different style of Mongolian. In the prose, the duration is the longest, 0.342 s, then the exposition and argumentation 0.336s and 0.335s, the shortest is narration, .328 s. In different styles of Chinese, the exposition’s duration is the longest (0.332 s), the argumentation, 0.331s, and then the prose 0.329 s, the shortest in narration 0.323 s.

<table>
<thead>
<tr>
<th></th>
<th>Fixation Duration (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mongolian</td>
</tr>
<tr>
<td><strong>Exposition</strong></td>
<td>0.336</td>
</tr>
<tr>
<td><strong>Prose</strong></td>
<td>0.342</td>
</tr>
<tr>
<td><strong>Narration</strong></td>
<td>0.328</td>
</tr>
<tr>
<td><strong>Argumentation</strong></td>
<td>0.335</td>
</tr>
</tbody>
</table>

**Figure 1. The Fixation Duration of Different Styles in Mongolian and Chinese Contrast Diagram.**

It can be seen from Fig.1 that Mongolian college students read the duration ratio of the different styles of Mongolian and Chinese. The watching duration of Mongolian texts is longer than that of Chinese styles. The durations of the Mongolian and Chinese explanatory texts are little difference. Because Mongolian is the alphabetic writing, syllable as a unit, the Mongolian word to write out is a rectangular, so the attention duration is longer. While Chinese is the ideographic text, a Chinese
character represents a syllable, write out is the box-shaped, so the attention duration is relatively short. From which it can be concluded that the shape of the text will affect the length of the attention duration.

**Fixation Frequency**

In analyses to fixation frequency in different styles of Mongolian and Chinese. From Figure 2, we can see the Mongolian students reading different style of Mongolian. The narration is the highest, 3.077 count/s, then the argumentation and exposition 3.021c/s, 3.013count/s, the lowest is prose, 2.938 c/s. In different styles of Chinese, narration’s fixation frequency is the highest, 3.128 c/s, the prose is 3.062 c/s, then the exposition’s is 3.101 c/s, The lowest is argumentation, 3.060 c/s.

As can be seen from Fig. 2, Mongolian college students to read Mongolian and Chinese different styles of fixation frequency ratio. The watching frequency of different Mongolian texts is less than that of Chinese styles. The attention frequency in Mongolian narration is close to the Chinese’s. It indicates that Mongolian college students are familiarity with their native language. Chinese is the second language for the Mongolian college students, only in the Chinese reading in the high frequency, they can understanding the article accurately and access to the correct information. It can be concluded, the article and the text familiarity will affect the frequency attention more.

### Table 2. Reading Fixation Frequency in Different Styles of Mongolian and Chinese.

<table>
<thead>
<tr>
<th>Style</th>
<th>Mongolian</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposition</td>
<td>3.013</td>
<td>3.101</td>
</tr>
<tr>
<td>Prose</td>
<td>2.938</td>
<td>3.062</td>
</tr>
<tr>
<td>Narration</td>
<td>3.077</td>
<td>3.128</td>
</tr>
<tr>
<td>Argumentation</td>
<td>3.021</td>
<td>3.060</td>
</tr>
</tbody>
</table>

**Conclusion**

Reading is an important way for people to acquire knowledge and information. The research shows that a large amount of language input, especially the different styles’ reading in different languages, play a very important role in Mongolian college students' language acquisition and application ability. (1)In the experiment, fixation frequency of Mongolian college students are 3.128 c/s and 3.060 c/s respectively in Chinese narrative and explanatory texts reading. While Shen De-li’s " The research on the process of students’ Chinese reading based on eye movement "(2001), which is done by Chinese nationality college students, the reading frequency of narration and exposition notes of the Chinese college students were 2.250 c/s and 2.164 c/s respectively. It can be
seen that the frequency of Mongolian college students' gaze is much higher than Chinese students, and the gap is relatively large. Mongolian college students still have to improve Chinese reading. (2) Mongolian and Chinese are completely different languages. Chinese is ideogram and Mongolian is phonetic, they are not the same in writing and reading, resulting in attention duration of the difference. (3) Mongolian is the mother tongue for Mongolian college students, while Chinese is their second language. In contrast, Mongolian students have a higher familiarity with different Mongolian texts, and only a few words need to be spelled. Therefore, the watching frequency of different Mongolian styles is less than that of Chinese styles.

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References