

THE EFFECT OF FATIGUE ON EYE MOVEMENTS AND METAPHOR COMPREHENSION IN READING

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Introduction

Measuring eye movements when subjects read a text is one of the most precise methods for measuring moment-by-moment (online) processing demands during text comprehension. Cognitive processing (specifically, emphasis on metaphors in this study) demands are reflected by several aspects of eye movement behavior such as fixation duration (the average in reading is 225-250ms [1]), number of fixations and number of regressions (subject is returning to prior parts of a text) [2]. Metaphors are different than the literal language in that they critically involve previous experience, which enables to understand the metaphoric meaning. Previous experiments with eye movement recordings show that more familiar metaphors are read faster than less familiar metaphors [3].

The aim of the study is to examine characteristics of the eye movements (fixation duration, regression) and the effect of fatigue on metaphor comprehension when reading unfamiliar, familiar and text without metaphors.

Methods

- 14 (7 fatigued and 7 non-fatigued) students participated (2F/12M, mean age 21±0,4 years, normal vision)
- Statistical procedure: Mann-Whitney U test
- Monocular eye movements were recorded with an iView HiSpeed video-based eye tracker.
- Data analysis was performed with BeGaze and Microsoft Excel.

Stimulus and task

Three different texts containing unfamiliar, familiar and no metaphors were used. To analyze the comprehension and to motivate the participants, several questions about the context were asked after reading every text.

Pusdivpadsmitos Svētās Margaretas baznīcas zvānu skaņas samtaini ieslīd klusajos sirds nostūros. Tur norimst skaņas aplis pēc apla kā dzīva būtne, kas grib paslēpties, izkust, priekā nodrebēt, pazust mierā- kā Klarisa pati, nodomāja Pīters. Baznīcas zvaniem pagurstot, viņš nodomāja, ka viņa taču ilgi slimojusi, un skaņas izteica nogurumu un ciešanas.

Figure 1 Unfamiliar metaphor stimuli

Results

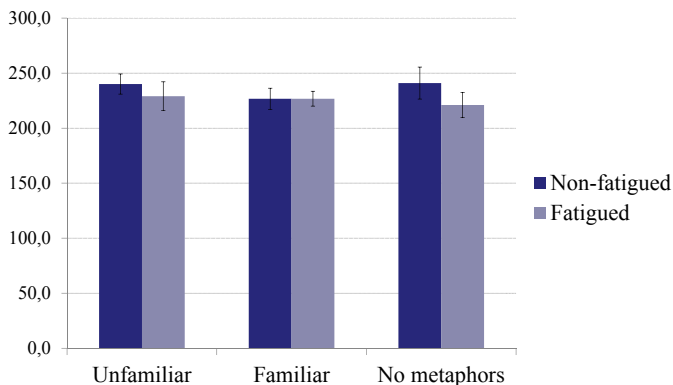


Figure 3 Average fixation duration

Kalniņas kundze ieslēdz kafijas automātu un uzmet ledainu skatu Jānim, kurš aprauti un steidzīgi nopurpina savu domu. Māris noslēpj ieskābu smīnu aiz avīzes, jo redz, ka viņa kaimiņš cenšas izvairīties no asumiem par katru cenu. Bet Kalniņa kundzes kafijas automāts ir atkal sācis streikot. Un tagad Jānis dabū izbaidīt savu sodu. Par to, ka viņš tikko centās vispār aizslīdēt garām rājieniem un atbildībai.

Figure 2 Familiar metaphor stimuli

Results

Preliminary results demonstrate that average fixation duration is not significantly different for fatigued and non-fatigued participants (Mann-Whitney U test > 0.05,) when reading texts with different complexity.

The comprehension was similar to both fatigued and non-fatigued readers (81% and 78% of answers were correct).

Discussion

Although eye movements in reading are highly individual and the differences in average fixation durations are not statistically significant, a tendency can be observed that, contrary to non-fatigued participants, fatigued participants have their shortest fixation times when reading text containing no metaphors.

Average fixation times robustly reflect processes of meaning assignment. Therefore, additional information concerning eye movements during metaphorical semantic processing can be explored if the content of metaphor is experimentally controlled and, in particular, if the semantic transfer between source and target domains is analyzed more in detail. This is elaborated in the upcoming studies.

References

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